

APPENDIX

PHIL MURPHY
GOVERNOR

SHEILA OLIVER
LT. GOVERNOR



State of New Jersey
BOARD OF PUBLIC UTILITIES
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Joseph L. Fiordaliso
President

Mary-Anna Holden
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Commissioner

Bob Gordon
Commissioner

October 18, 2018

ASSEMBLY ENVIRONMENT AND SOLID WASTE COMMITTEE

STATE HOUSE ANNEX

PO BOX 068

TRENTON, NJ 08625-0068

Chairwoman Pinkin, Vice Chair Lopez and honorable members of the Assembly Environment Committee, thank you for inviting me to join you today.

New Jersey faces unprecedented challenges in the coming years as we deal with climate change and its repercussions. Climate change is real and it is going to change our way of life in one way or another. We will either continue to operate business as usual until it is too late to save the planet or we will act now. Under Governor Murphy's leadership, New Jersey has chosen to act now. This is a time for bold action and under this Governor we are beginning a new chapter for offshore wind in New Jersey.

EO8, signed by the Governor just two weeks after taking office, designates the New Jersey Board of Public Utilities (NJBPUB) as the lead agency on offshore wind and to work with other state agencies to move New Jersey towards the Governor's goals of 1,100 megawatts of offshore wind energy capacity initially and 3,500 megawatts of capacity by 2030. The Governor's plans for offshore wind are the most ambitious in the nation.

New Jersey has the largest and most competitive offshore wind lease area in the U.S. One of the reasons for this is the early actions of this legislature in passing the Offshore Wind Development Act, also known as OWEDA. When passed in 2010, OWEDA's goal was to encourage offshore wind development in New Jersey. During the previous administration, New Jersey laid dormant

regarding offshore wind. Now, under this administration we have finally been able to move forward.

Less than one month after implementation of EO8, the NJBPU directed staff to begin taking a number of steps.

- 1) We are developing an Offshore Wind Strategic Plan, together with the Department of Environmental Protection, the Economic Development Authority, the Department of Labor and expert consultants;
- 2) We have initiated a rulemaking process to establish the Offshore Renewable Energy Credit (OREC) funding mechanism which was proposed in July.
- 3) This rule defines the process by which an offshore wind project receives funds and how those funds will flow between all of the parties including the ratepayer.
- 4) Last month we opened a solicitation for the generation of 1,100 megawatts of offshore wind capacity – the largest single solicitation of offshore wind in the country to date. The solicitation process closes in December and the Board will take action in May of next year;
- 5) The Governor, at the Global Climate Action Summit called on the BPU to evaluate two additional 1,200 megawatt solicitations of offshore wind capacity – one in 2020 and another in 2022;
- 6) We are having discussions with our sister states in the Northeast and Mid-Atlantic regions to explore the potential benefits of a regional collaboration on offshore wind and other opportunities to combat climate change.

I am happy to be here today before the Assembly Environment Committee and report that the Board is moving expeditiously yet prudently with these tasks.

The ultimate goal is to achieve the lowest cost for New Jersey ratepayers and the best value for New Jersey. As we have seen by recent example in other states, the price of offshore wind is more economical than originally anticipated. The prices have dropped from triple to double digits per megawatt hour. The strength of OWEDA provides New Jersey with the ability to procure offshore wind in a similar competitive environment, which ultimately benefits the ratepayer. Offshore wind will create new generating capacity and ultimately lower the cost of energy throughout the entire state.

This Administration's focus on offshore wind power is helping to lead the way in the fight against global climate change and in doing so, New Jersey will also become the leader in the emerging offshore wind economy. Offshore wind will create construction, operations, and

maintenance jobs which will trickle out and create thousands more jobs in New Jersey. Every dollar we invest in clean energy today will provide us with tremendous returns in new economic activity tomorrow.

If you take a step back and look at the total picture, the benefits offshore wind will provide to our society cannot be overstated. Not only will it help us fight climate change but it will also spark new innovation and new industries and the jobs that they bring. I am truly excited to see all of the great benefits offshore wind brings to our state.

As I have said many times before, the time to plan for a clean energy future is now. And with its economic and environmental benefits, offshore wind truly is a win-win for New Jersey and we are ready and willing to lead the nation in the clean energy movement.

Thank you.

Joseph L. Fiordaliso, President
Board of Public Utilities
44 South Clinton Avenue
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Offshore wind as a renewable energy resource¹

Statement prepared for the Assembly Environment and Solid Waste Committee as invited testimony concerning offshore wind as a renewable energy source and the economic and environmental benefits offshore wind can provide to the State.

I would like to thank the committee chairwoman and the committee members for the opportunity to provide this testimony. My name is Dr. Josh Kohut. I am an associate professor of oceanography at Rutgers, The State University of New Jersey. This afternoon I am providing comment given my expertise in atmospheric and ocean science. I am currently a faculty member of the Rutgers University Center for Ocean Observing Leadership (RUCOOL) within the Institute of Earth, Ocean, and Atmospheric Sciences (EOAS). RUCOOL is recognized as a world leader in ocean science, technology, and prediction. Our faculty, technical staff, and students work together through state, national and international partnerships to conduct ocean research and support applications, decision-making, and management of ocean resources.

Summary of the main points

- The ocean off the New Jersey coast considered for offshore wind development undergoes remarkable variability across time scales from days and weeks to seasons, years, and decades. This ocean variability directly impacts weather conditions across the state and offshore. For example, surface ocean temperatures influence localized summer afternoon sea breezes that could be a key mechanism for available wind resource to offshore wind facilities during coincident times of high electricity demand. Hurricanes and Nor'Easters remind us of the significance the ocean has on storm intensity. Public perception of the danger, the response of local communities and state agencies, and advice issued by federal forecasters all depend on reliable and accurate ocean and atmospheric observations and predictions.
- Our wind modeling work supported by the New Jersey Board of Public Utilities (NJBP) uniquely incorporates local ocean processes in daily offshore wind forecasts to more accurately assess the offshore wind resource. The modeled wind speed and estimated capacity factors across the areas designated for offshore wind are consistently favorable for wind development, with average winds throughout the area of approximately 20 mph. In particular, the wind resource offshore remains more consistent during the peak summer months, when winds over land are often considerably weaker.

¹ Prepared by *Rutgers University*: Josh Kohut, Joseph Brodie, Matt Campo, Travis Miles, Scott Glenn, Jeanne Herb and *Monmouth University*: Karl Vilacoba

can help to identify and mitigate conflicts between offshore wind and other ocean uses, such as:

- Maps showing areas with the highest vessel traffic concentrations (e.g. cargo, tug, passenger) and commercial fishing activity by year and month
 - Maps showing areas that present the highest risk for migratory bird strikes vs. turbines.
 - Maps illustrating areas with the highest concentrations of marine mammals that are sensitive to ocean noise, such as turbine construction.
- The OceansMap portal supported by the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS) allows users to access, visualize, and interpret a broad range of environmental data off the coast of New Jersey, including both real-time observations and forecasts. OceansMap web portals combine sophisticated data visualization and analysis tools with an intuitive, map-based interface designed to facilitate data exploration and discovery. From maritime planning to water quality monitoring to operational search-and-rescue, regardless of your application, OceansMap makes met-ocean data easy.
 - Finally, the preparation for and construction of offshore wind turbines provides a large number of offshore platforms which could be instrumented to collect oceanographic and coincident ecological measurements. These data would empower the research and management communities with a wealth of new information to understand and model the coupled marine ecosystems in an ocean undergoing climate scale changes. This would greatly benefit the scientific community, and ocean stakeholders in general.

I would like to thank the Chairwoman and the committee members for your time. Please continue to consider Rutgers as a resource in the future.

NEW JERSEY OFFSHORE WIND IS COMING HERE



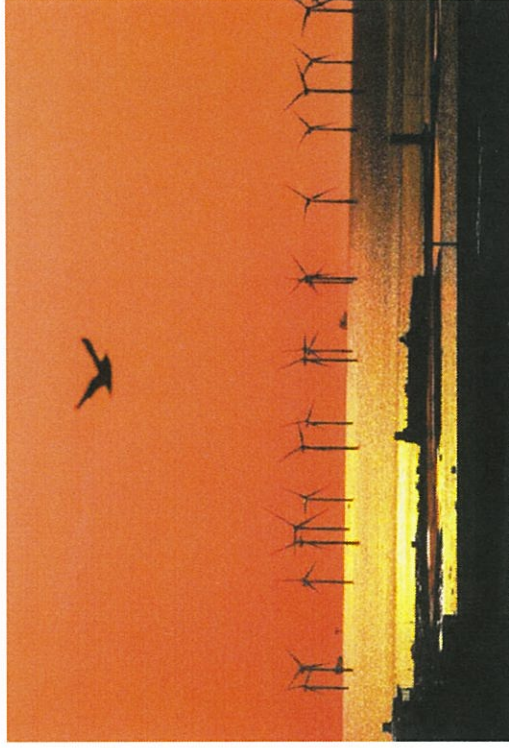
RAMBOLL

Forbes

2,254 views | Jul 20, 2018, 8:20 am

Offshore Wind Is Likely The Next Big U.S. Renewable Sector

Mergemarket Contributor

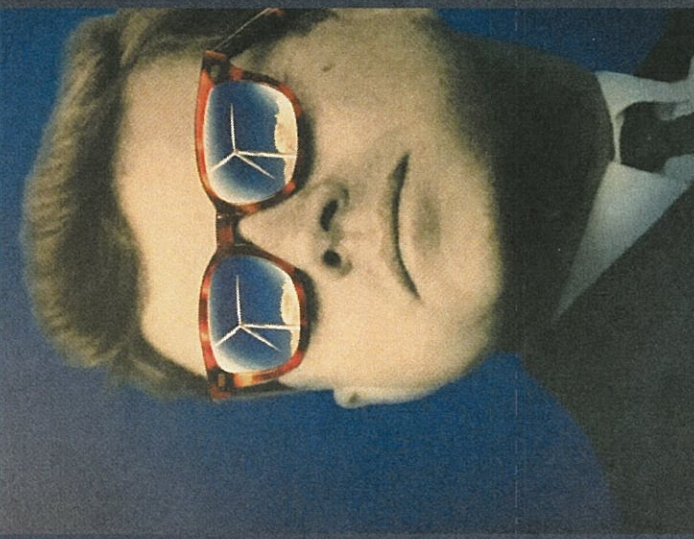


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INTRODUCTION

Your NJ BPU Team preparing Offshore Wind Strategic Plan

- Ramboll
- Stantec
- Rutgers Energy Institute Wind Group
- BVG Associates
- The Business Network for Offshore Wind
- InGroup
- Endeavor



'NJ's Future's So Bright....We Gotta Wear Shades.....'

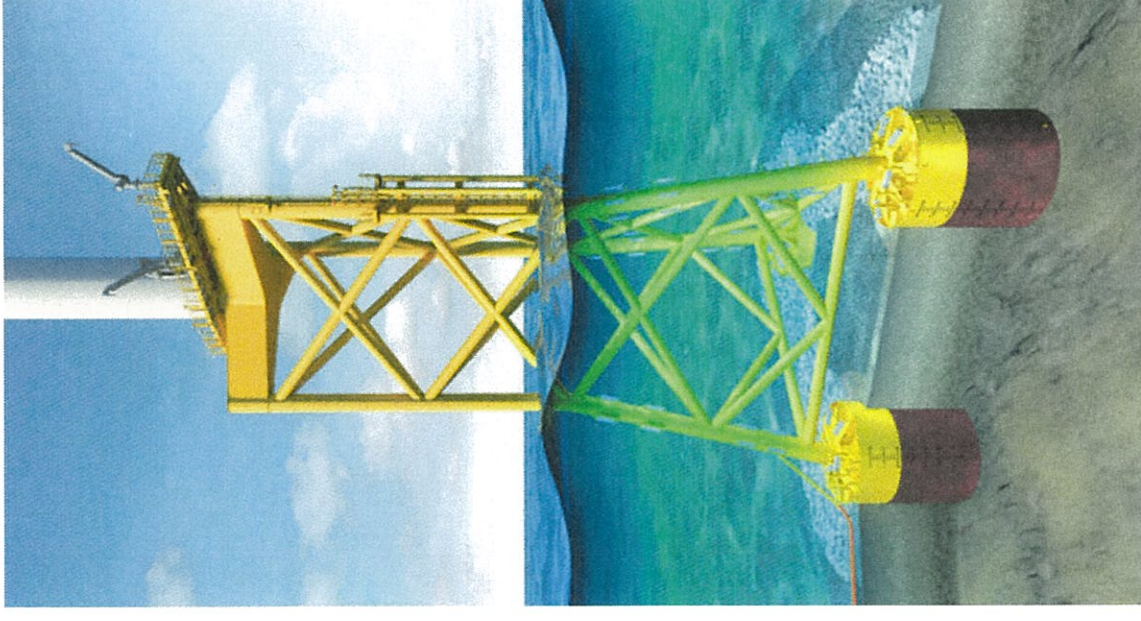


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UNDERSTANDING THE US MARKET

- A new industry is being born off the US East Coast.
- The US offshore wind market is expected to go from 30 MW in 2018 to more than 14 GW in the next ten years.
- The epicenter of the US offshore wind market will be the mid-Atlantic with 13 projects currently under development representing \$20 billion in capital investments.
- East Coast states see the enormous potential for low-carbon-emissions energy and will also include economic development that will revitalize underutilized ports and coastal infrastructure.
- New Jersey is committed to 3,500 MW of offshore wind and is positioned centrally along the East Coast, which makes it an attractive location for manufacturers and suppliers for the offshore wind industry to locate.

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UNDERSTANDING THE US MARKET

From BPU's Request for Quotation:

"...an aggressive offshore wind energy production goal will also result in various portions of the offshore wind development supply chain being located in New Jersey, including manufacturing, assembly and construction of the component parts of offshore wind turbines, which will contribute to a stronger New Jersey economy..."

10X

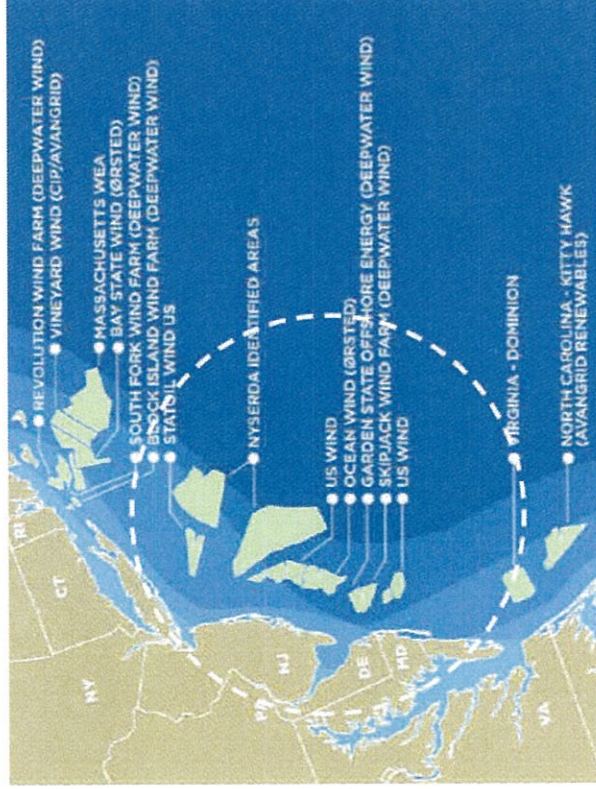
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OFFSHORE WIND IS COMING TO NEW JERSEY AND THE EAST COAST



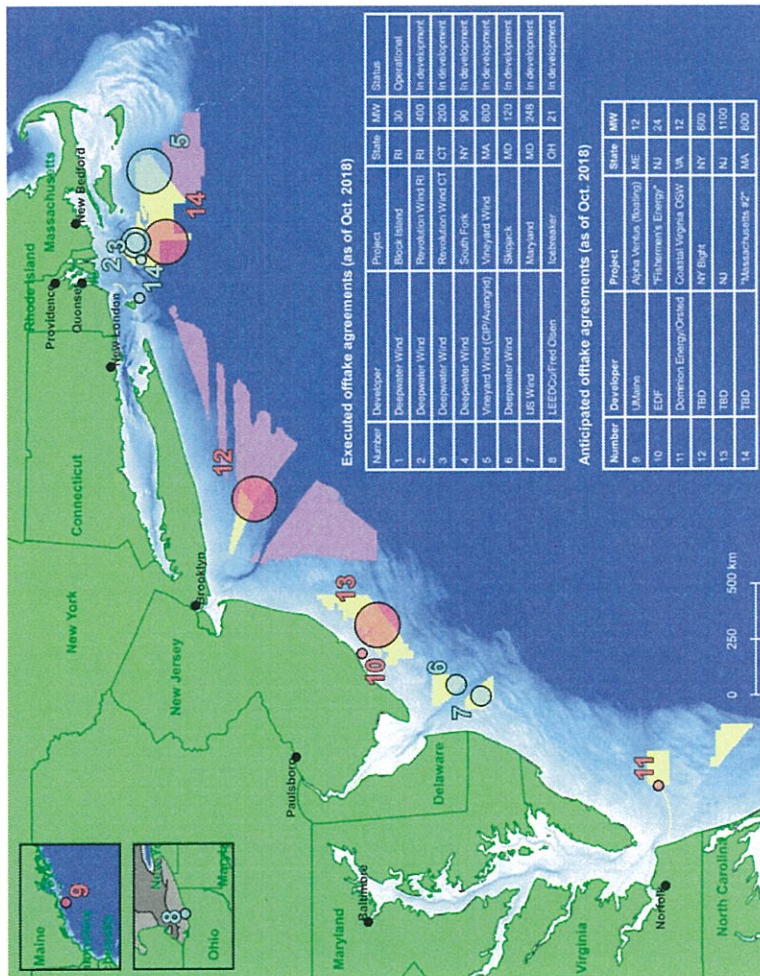
Existing lease areas



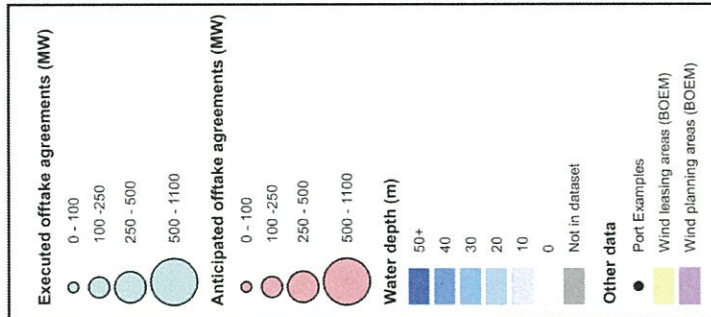
Existing and proposed lease areas



JERSEY STRONG



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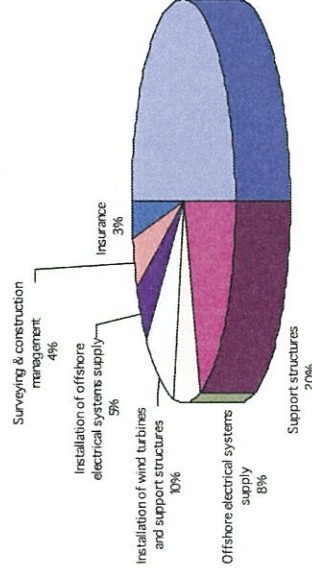
JERSEY STRONG

3,500 MW - Currently Largest Planned Wind Farms

- **Round 1:** 1,100 MWs Commercial Operation Date (COD) / Operational by 2024
- **Round 2:** 1,200 MWs COD / Operational by 2026
- **Round 3:** 1,200 MWs COD / Operational by 2028

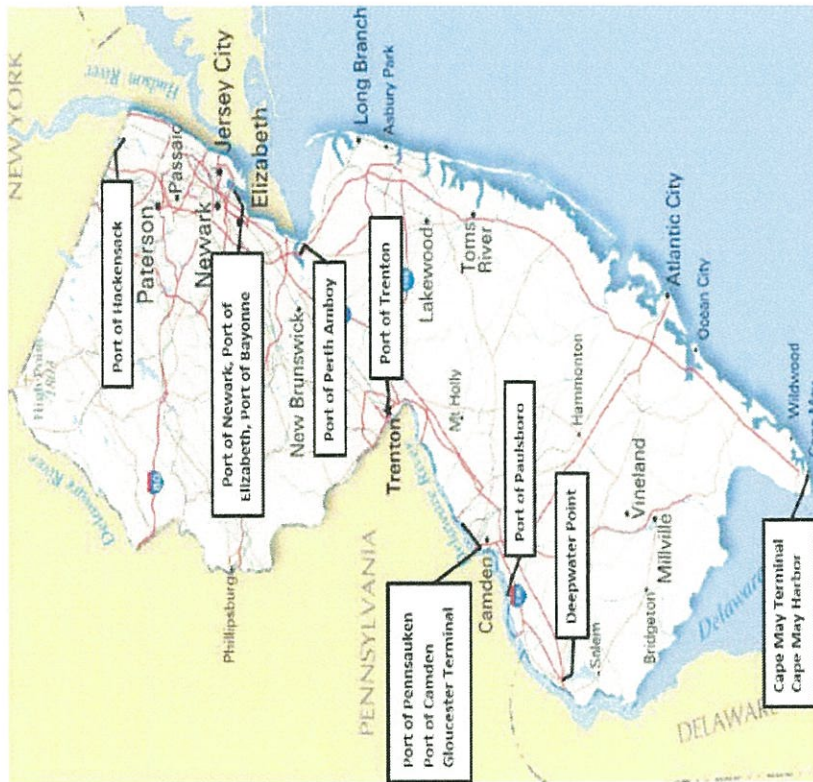
Currently Over 10,000 MWs Along the East Coast

- OSW Market is Being Established
- We are Leaders in the Market
- We are Centrally Located in the Market



14x

-



15x

JERSEY STRONG

- **Why Us?**
 - Largest and most advanced port on the US East Coast (Port of NJ / NY)
 - Easy access to New Jersey, New York and Mid Atlantic lease sites
 - Available Brownfields Sites
 - Commitment to invest in infrastructure to unlock the offshore wind economy
 - Extensive warehousing and logistics capabilities
 - Best prepared for smart and connected ports (No. 1 State in the US for fiber and broadband)



[HEADING]

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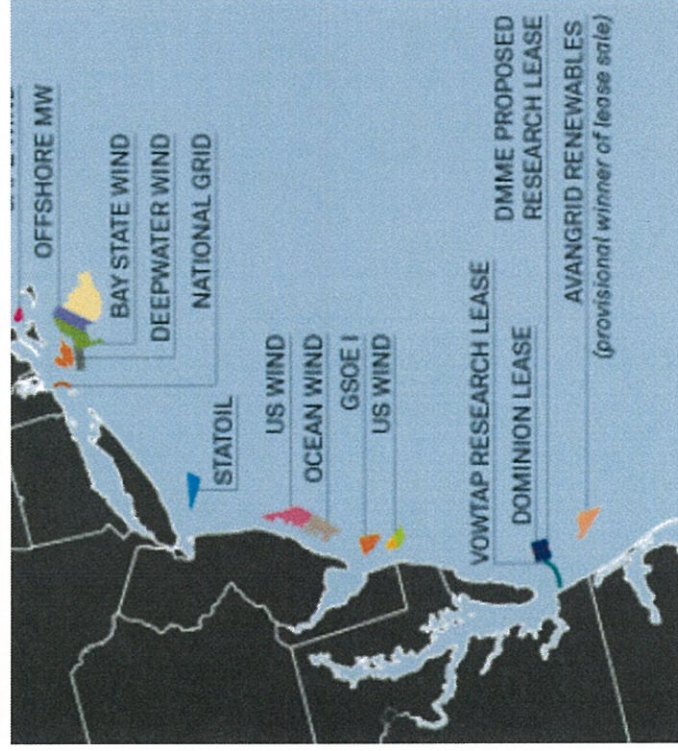
QUESTIONS?

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NEW JERSEY OFFSHORE WIND IS COMING



NEW JERSEY'S LEASE AREAS ARE IDEALLY SUITED TO OFFSHORE WIND DEVELOPMENT



- Utilize shallow continental shelf as a renewable energy source
- Relatively close to shore (10-21 nautical miles) and shallow water depths (under 30 m)
- Strong wind speeds (average annual wind speed of 8.5 m/s, significantly higher during peak)
- Designed for utility scale development (close to population centers)
- Orsted (Ocean Wind) and US Wind holding existing NJ leases
- Deepwater Wind (DE) and Equinor (NY) leases are also able to interconnect to New Jersey



ENVIRONMENTAL ASPECTS



RAMBOLL

- To ensure development of the valuable ocean resources in an economically and environmentally sound basis
- Many lessons have been learned from Europe that can be applied to the US market, but only with a strong understanding of local environment and energy generation / usage markets
- The US offshore wind market issues are complex, capital intensive projects that stretch from offshore waters to coastal ports to on-shore interconnect locations
- The goal of the environmental modeling analysis is to quantify and explore the opportunities and constraints, and the benefits and impacts associated with the development of 1,100 MWs of offshore wind capacity and 3,500 MWs by 2030



ENVIRONMENTAL ASPECTS

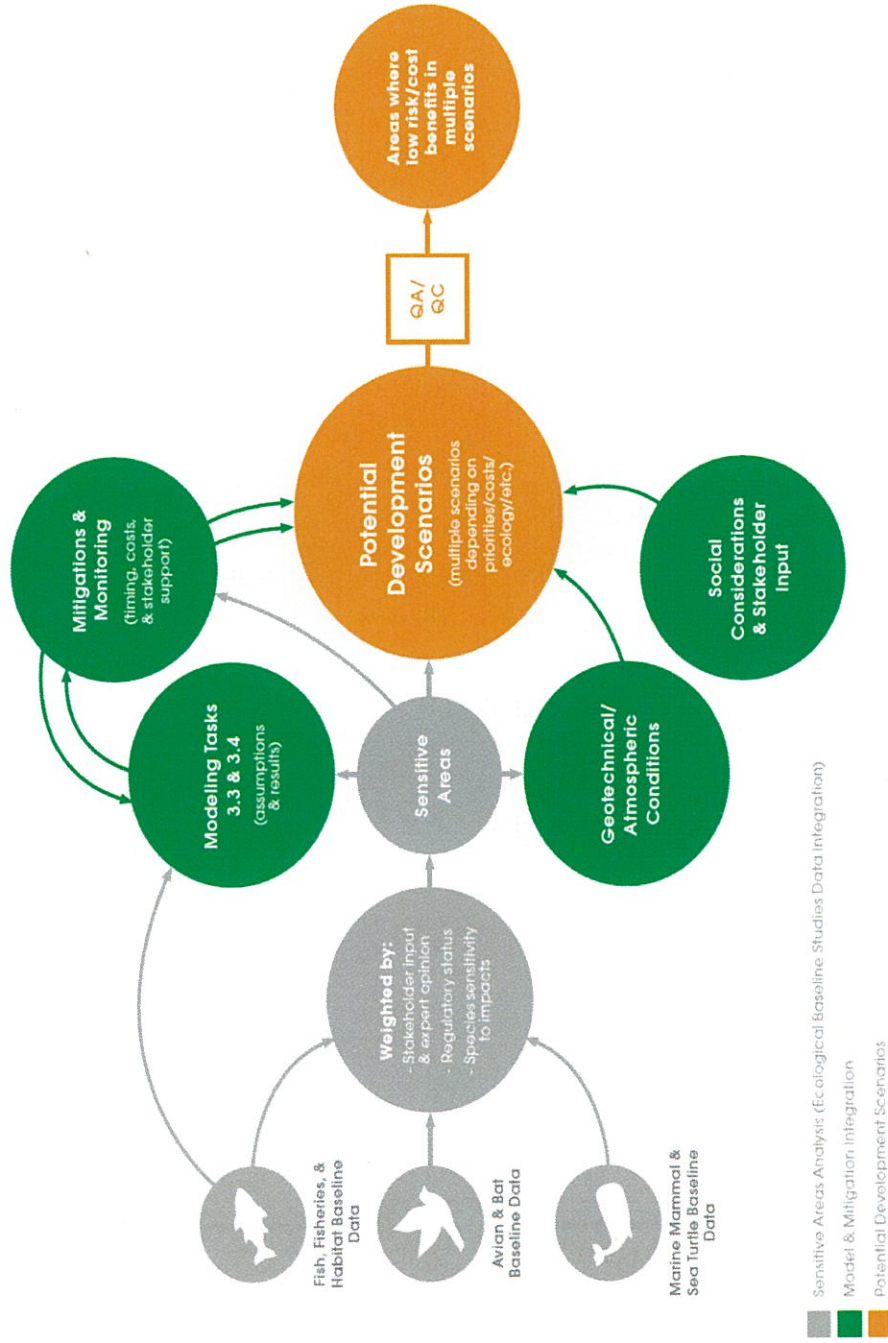
From EO8:

"...[the environmental modeling] shall ensure that natural resources are protected throughout the development and operational stages of offshore wind energy production..."

20X



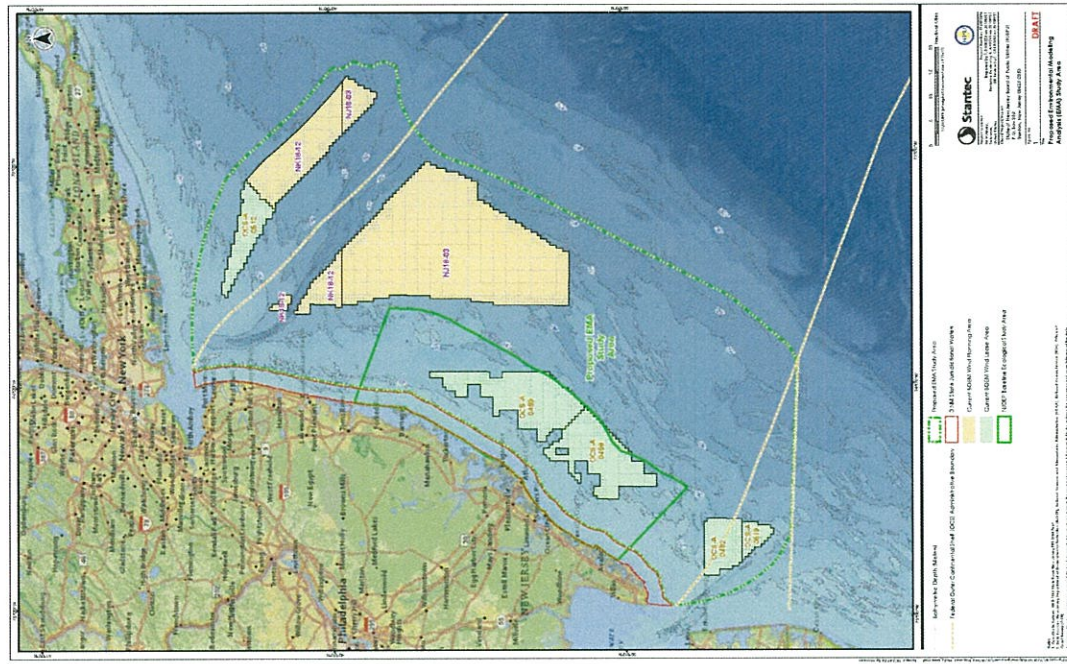
ENVIRONMENTAL MODELING



ENVIRONMENTAL PROTECTION & ADVANCED RESEARCH – PROPOSED ENVIRONMENTAL MODELING ANALYSIS (EMA)

- Proposed boundaries for EMA based on:
- **North and South:** BOEM OCS administrative boundaries plus extended buffer to encompass immediately adjacent BOEM wind lease and planning areas
- **West:** 3 nm state jurisdictional waters – unlikely to develop utility scale farms within these shallow waters; will be addressed in Strategic Plan but cable routing best served by a finer-scale project-specific sighting study
- **East:** approximates 60 m depth contour – near term limit for fixed structure wind farm technology

RAMBOLL



23X

PROPOSED LAYERS

- Have completed an extensive review of online data repositories and reports
- Spatial data files have been filtered for relevance and duplication (N = 84 layers)
- Currently grouping into categories, standardizing, and cutting to spatial boundaries
- An example of the six categories of data being integrated:

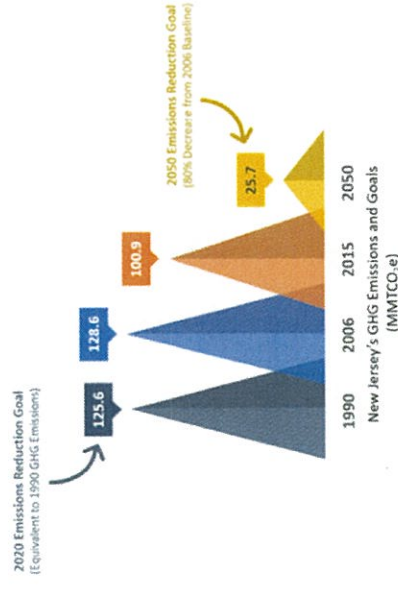
Group Name	Feature Type (example)
Biological	Essential Fish Habitat
Feature only	Jurisdictional boundaries
Geophysical	Bathymetry
Industry	Cable And Pipelines
Resource Use - Management	Sea Scallop Rotational Areas
Security	Danger Zones and Restricted Areas

REDUCING GREENHOUSE GAS EMISSIONS

- Reducing our use of fossil fuels also results in reduction of other pollutants that improves air quality and creates local health benefits
- Relying more on renewable resources will help New Jersey achieve it's target of 80% decrease over the 2006 baseline
 - Climate adaptation to address global sea level risk
 - Storm resiliency

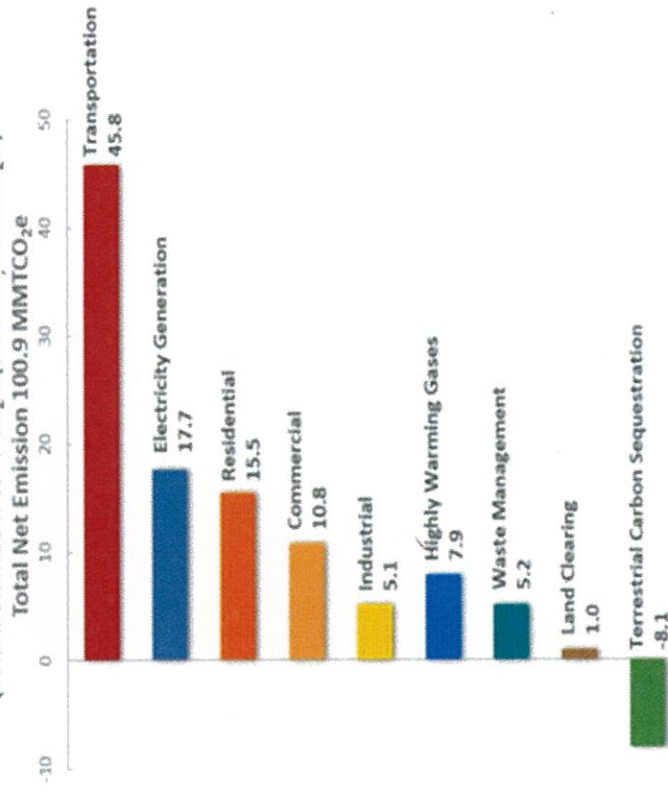
24X

How do we get there? What is the role of renewable energy?



New Jersey's Greenhouse-Gas Emissions

Estimated NJ Greenhouse Gas Emissions, 2015,
(in million metric tons CO₂ equivalent, MMTCO₂e)



26x

Offshore Wind and Greenhouse-Gas Reductions

OFFSHORE WIND CAPACITY (MW)	PROJECTED GENERATION* (MWh)	ESTIMATED ANNUAL EMISSIONS AVOIDED**			
		CO ₂	NO _x	SO ₂	
3,500	15,330,716	7,269,716	5,749	5,979	
		VOC	PM _{2.5}	PM ₁₀	
3,500	15,330,716	62	209	218	
		NH ₃	CO	Hg	
3,500	15,330,716	94	570	0.02	
*50% capacity factor; **CO₂, NO_x, and SO₂ values estimated based on PJM emission factors (PJM-EIS public report on System Mix for 2017 @ https://pjm.eis.com/GATS/Public-Reports/PJMSystemMix/Filter; other criteria pollutant values calculated based on USEPA Air Emissions Inventory @ https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data (2017) and generation data from USDOE Energy Information Administration @ https://www.eia.gov/electricity/data/browser/).					

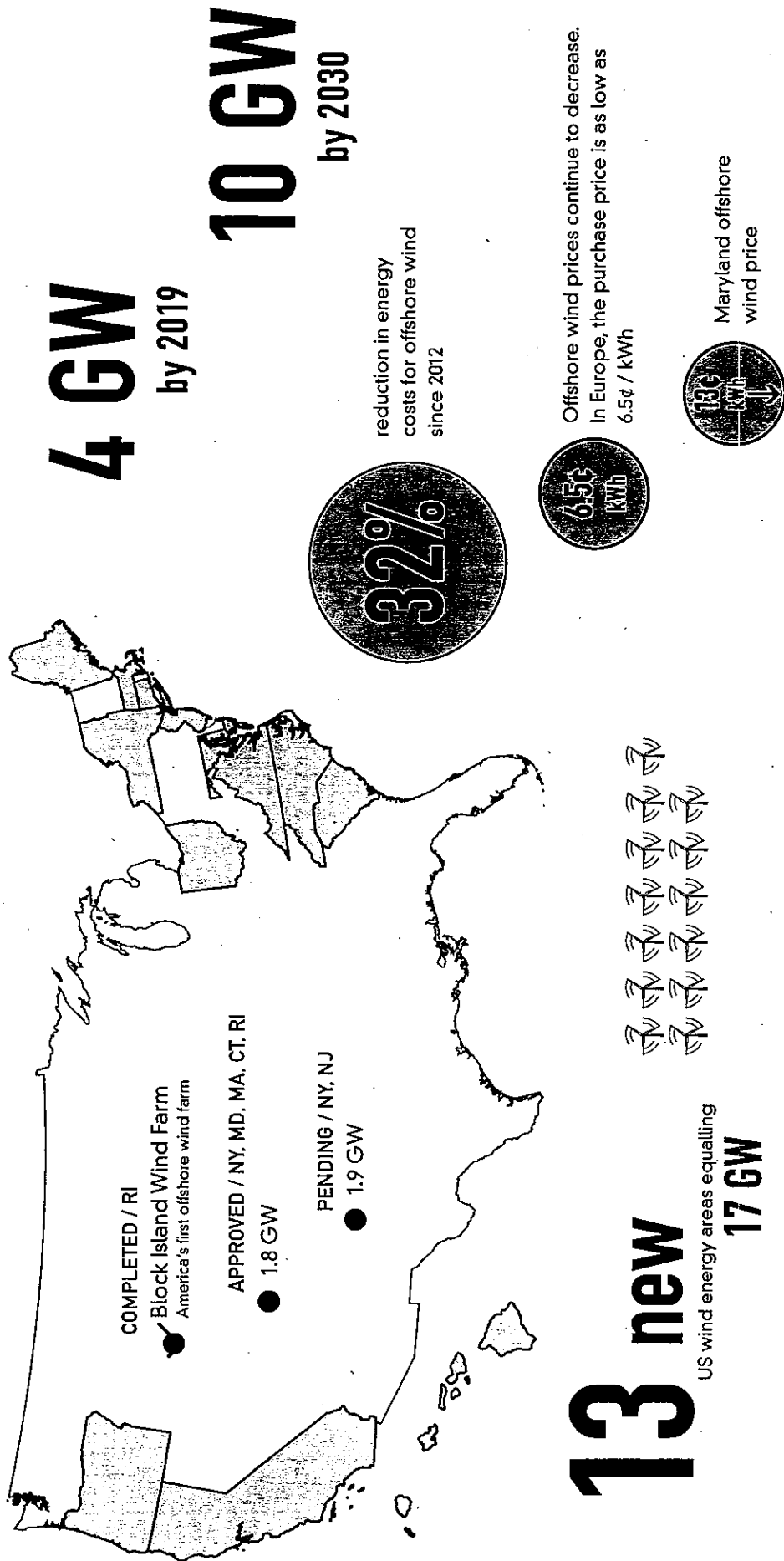
QUESTIONS?

US OFFSHORE WIND MARKET OVERVIEW

OCTOBER 2018 / OFFSHOREWINDUS.ORG / @OFFSHOREWINDUS/

BUSINESS NETWORK FOR OFFSHORE WIND

- 1 Not-for-Profit
- 2 Focus on supporting the US Offshore Wind supply chain
- 3 Provide:
 - information
 - education
 - introductions



THE IMPORTANCE OF STATE GOVERNMENT

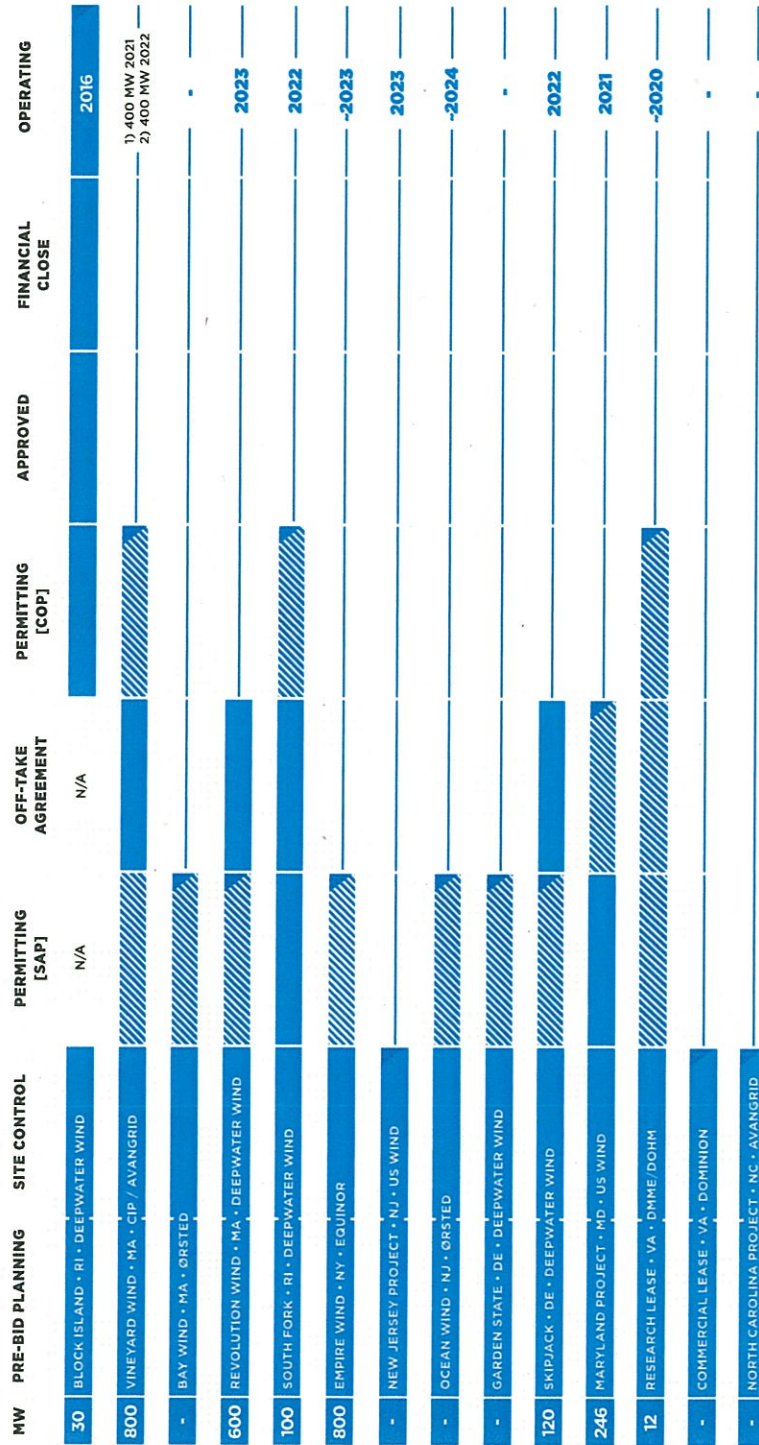
STATES' COASTAL WATERS UP TO 3 MILES FROM SHORE

State and federal government review: marine terminal to offshore wind farm area (Task Force meetings). States are responsible for power policies

Historically, legislation required to support offshore wind

Public Service Commissions responsible for administration and decisions about offtake agreements

PROJECT TIMELINE



US OFFSHORE WIND PROJECT TIMELINE BUSINESS NETWORK FOR OFFSHORE WIND

Data has been taken by U.S. BSWF and validated by the developer. It is based on the latest information available at the time of publication. However, it is subject to change. The purpose of this information is to provide insight into the timeline of the U.S. Offshore Wind industry and to 2020. Timeliness and definitions are provided with U.S. BSWF's 2021 Offshore Wind Technology Market Update.



MASSACHUSETTS

BUSINESS NETWORK
OFFSHORE



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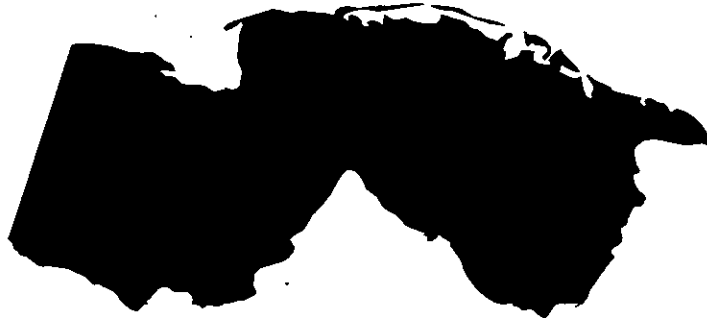
NEW YORK

BUSINESS NEWS
OFFSHORE WIND



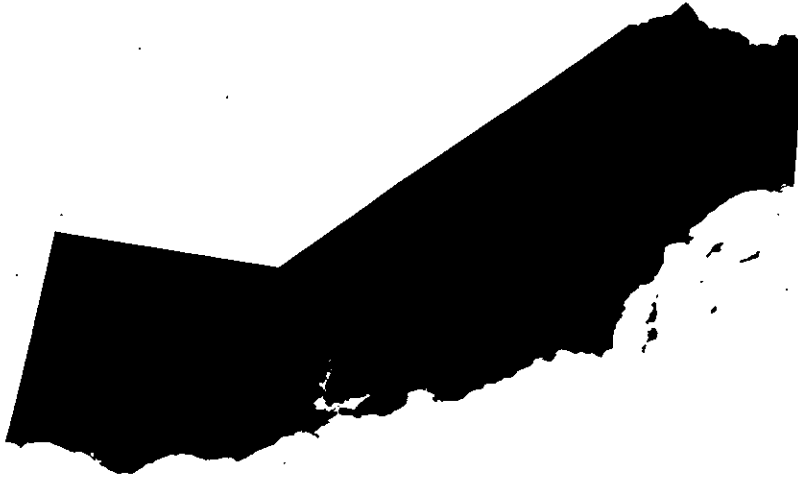
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NEW JERSEY



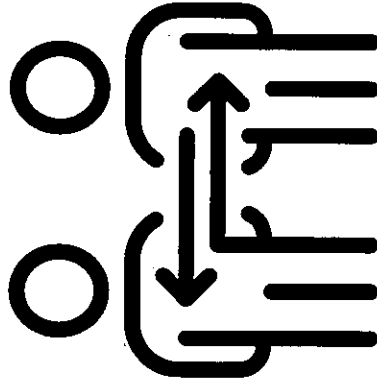
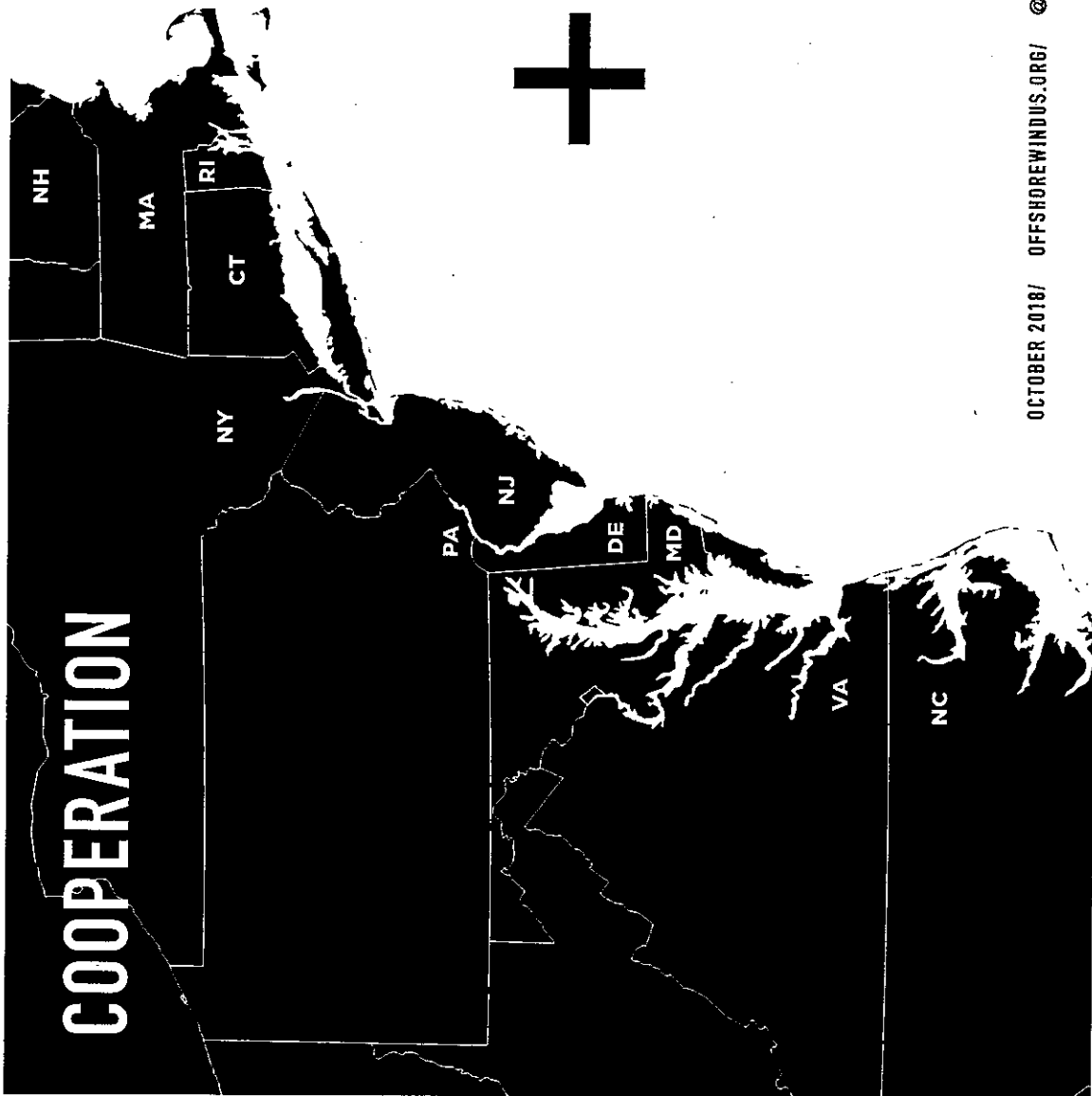
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CALIFORNIA



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COOPERATION



PORT INFRASTRUCTURE



SUPPLY CHAIN GAPS

- 1 Vessels - Specialty vessels
- 2 Nacelle and blade manufacturing
Large wind components for Nacelles
- 3 Cables
- 4 O&M - Workforce training

OSW INSIDER PODCAST



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SUPPLY CHAIN PORTAL

Supply Chain Portal

Step 1 Step 2 Step 3 Step 4

Business Network for Offshore Wind Supply Chain Portal

Engineering. Construction. Manufacturing. Offshore wind is the work of many. The Business Network for Offshore Wind is a nonprofit organization connecting industry to opportunity. Over 70 businesses strong – working together to learn, connect, and participate in the new global market.

Please fill out our supply chain questionnaire by clicking the Next button below. With only 10 short questions, it includes more than 110 categories that help us identify which services and products you can provide for the development, construction, operations and maintenance of offshore wind projects. We also share this information with developers and OEM prime contractors looking for partners. Additionally, the Network disseminates targeted information and RFPs to our members. Explore details about membership [here](#).

NEXT →

The screenshot shows a web form titled "Business Network for Offshore Wind Supply Chain Portal". It includes a progress bar at the top with steps 1 through 4. The form contains various input fields and checkboxes for user information, company details, and project specifications. A "Next" button is visible at the bottom right of the form.

OUTLOOK AND SUMMARY

BEST EVER

5-8 GW pipeline: most installed by 2025

>10 GW by 2030

PPA prices downward trend

Continual need for European expertise with US 'local' business participation

Streamlining of lease and permitting processes

Uptake of Floating Offshore Wind

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**OFFSHORE WIND
MARKET INSIGHT.
CONNECTIONS.
KNOWLEDGE.**

IPF19
BUSINESS NETWORK
FOR OFFSHORE WIND

APRIL 8-11, 2019 NEW YORK CITY

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Katz Government Affairs, LLC

Carol R. Katz
Principal

Adam S. Guziejewski
Senior Director,
Government Affairs

Mark T. Connelly
Policy Advisor

COMMENTS TO THE PROPOSED ENERGY MASTER PLAN SUBMITTED ON BEHALF OF THE MARITIME ASSOCIATION OF THE PORT OF NEW YORK AND NEW JERSEY

The Maritime Association of the Port of New York and New Jersey is pleased to offer these comments relative to the development of offshore wind projects as part of the Energy Master Plan review.

We request that all offshore wind development projects include several critical safety measures. These measures are vital to navigational safety and the environmental health of our coastal waters.

It is imperative that every possible precaution is taken to avoid collisions between ships and wind turbines, or between vessels that are confined to narrower channels as a result of the placement of wind turbines. The consequences of such events are potentially disastrous for our coastal waters and for the operation of our Port. The appropriate measures to do our collective best to prevent them are right at hand.

Any offshore wind development project must satisfy the following requirements:

- All in-water construction should at a minimum, be equipped with perimeter Automatic Identification System (AIS) transponders to allow proper detection.
- All in-water construction should include both weather observation capabilities and cellular telephone repeaters.
- A minimum setback of 5 miles must be established from all entry and exit points of historical and established waterway transit lanes, including internationally recognized traffic separation schemes and traditional deep-draft, and near-shore lanes
- A two-mile setback must be established from all other traffic lanes. This setback will protect against the potential for impacts between vessels and project developments, and will allow a clear field of vision for any vessels that may be emerging from a developed field.
- There must be clearly delineated contingency plans for any incident which may impede vessel traffic in the area.
- All continuous developed areas should have allowances for clear "cut-through" passages to allow marine traffic to pass through a field.
- Lighting must be constructed so as not to interfere with mariners' night vision capabilities.

The mission of the Maritime Association of the Port of New York and New Jersey is to promote the safety of navigation, the security of marine assets, and the sustainability of the marine environment. We thank the BPU staff for its serious consideration of these proposed safety criteria.