

# Offshore Wind Energy Development in the ▶ New York/New Jersey Bight

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Clean Ocean Action

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# Clean Ocean Action:

*Ocean Advocacy Since 1984*

**Established - 1984**

**Mission - “To improve the degraded water quality of the marine waters off the coast of New Jersey and New York.”**

**Geographical Focus: The New York/ New Jersey Bight the section of the Atlantic Ocean extending northeasterly from Cape May, New Jersey to Montauk Point, Long Island**

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# Outline of Presentation



State Goals and the Enthusiasm Behind Offshore Wind



Background and Overview - What Does Offshore Wind Energy Development Look Like?



Who Regulates Offshore Wind Development?



Status of Offshore Wind Development



Environmental Concerns with Offshore Wind





Clean Ocean Action's Offshore Wind Policy



# State Goals and the

- ▶ Enthusiasm Behind Offshore Wind

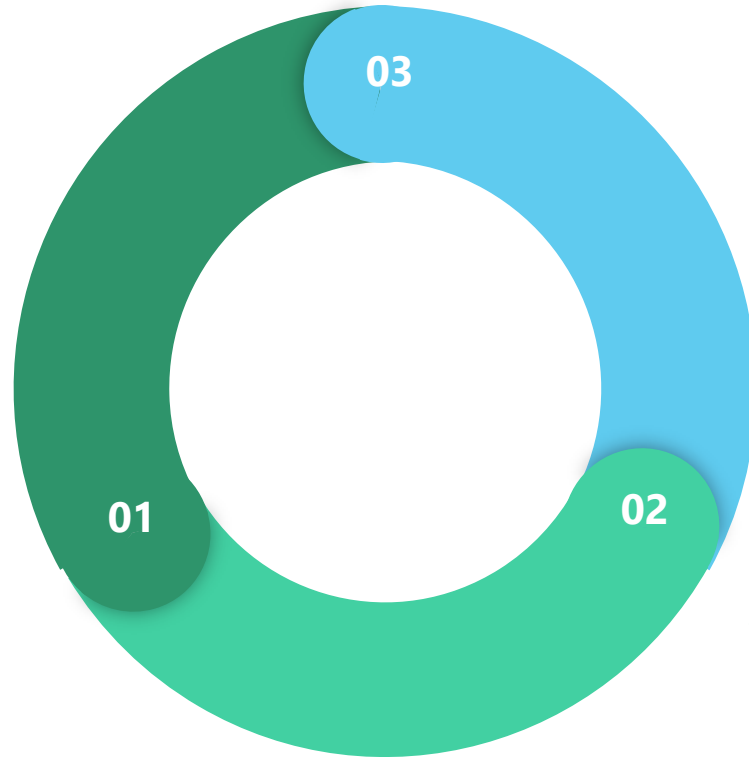
# State Offshore Wind Energy Goals

State	Goal
 New York	9,000 MW by 2035
 New Jersey	7,500 MW by 2035
 Massachusetts	3,200 MW by 2035
 Connecticut	2,000 MW by 2030
 Maryland	1,200 MW by 2030
Total	22,900 MW by 2035

# Why Are Coastal States So Enthusiastic About Offshore Wind?

## Addressing the Climate Crisis

To effectively address the climate crisis we need a swift transition to an energy system powered by clean renewable resources.



## Economic Development

Offshore wind energy brings a complex and large supply chain that has numerous manufacturing, construction, and maintenance jobs. The creation of this new industry means the creation of new jobs.

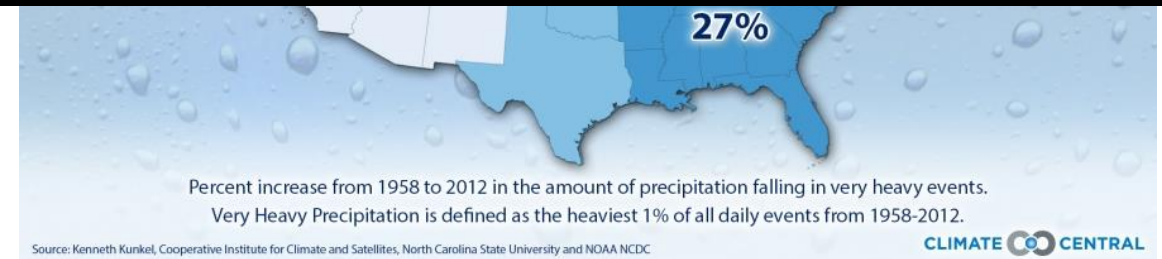
## Large Scale Reliable Renewable Generation

Offshore wind offers large scale energy generation that is more consistent than other renewable options and is located near large population centers.

# Addressing the Climate Crisis

## Indicators of Climate Change in New Jersey

- ▶ Increased temperatures
- ▶ Increased precipitation
- ▶ Stronger and more frequent extreme weather
- ▶ Sea Level Rise
- ▶ Ocean Acidification



# Large Scale Renewable Generation

- ▶ Offshore Wind has the following advantages over other renewable energy sources that make it attractive as an option for meeting climate and clean energy goals
  - ▶ Utility scale electric generation
  - ▶ Located near large population centers
  - ▶ Relatively stable and non-intermittent source of renewable energy



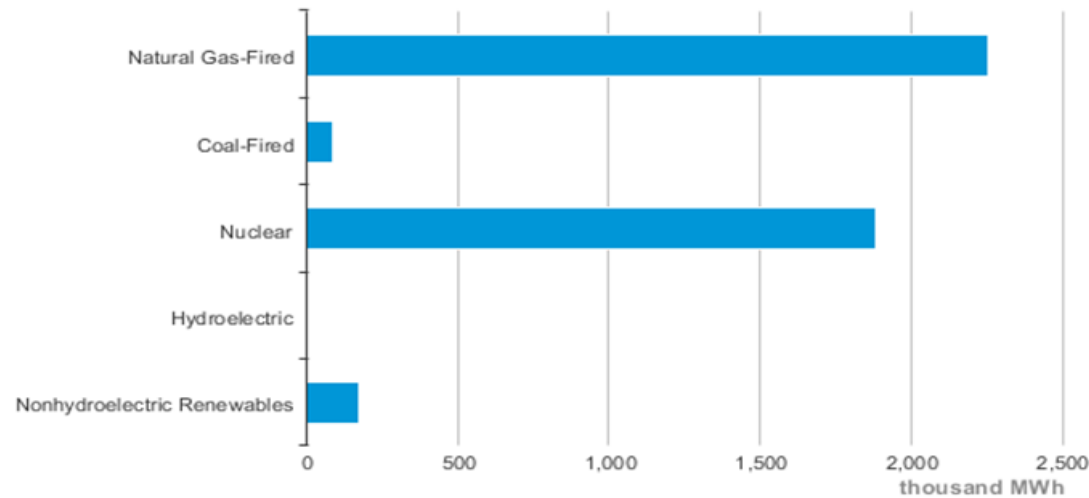


# Large Scale Renewable Generation (cont.)

The Global Warming Response Act  
NJ must reduce greenhouse gas emissions by 80 percent below 2006 levels

Executive Order No. 86 / Energy Master Plan - Mandates the state achieve 100% “clean energy” by 2050

New Jersey Net Electricity Generation by Source, Mar. 2020

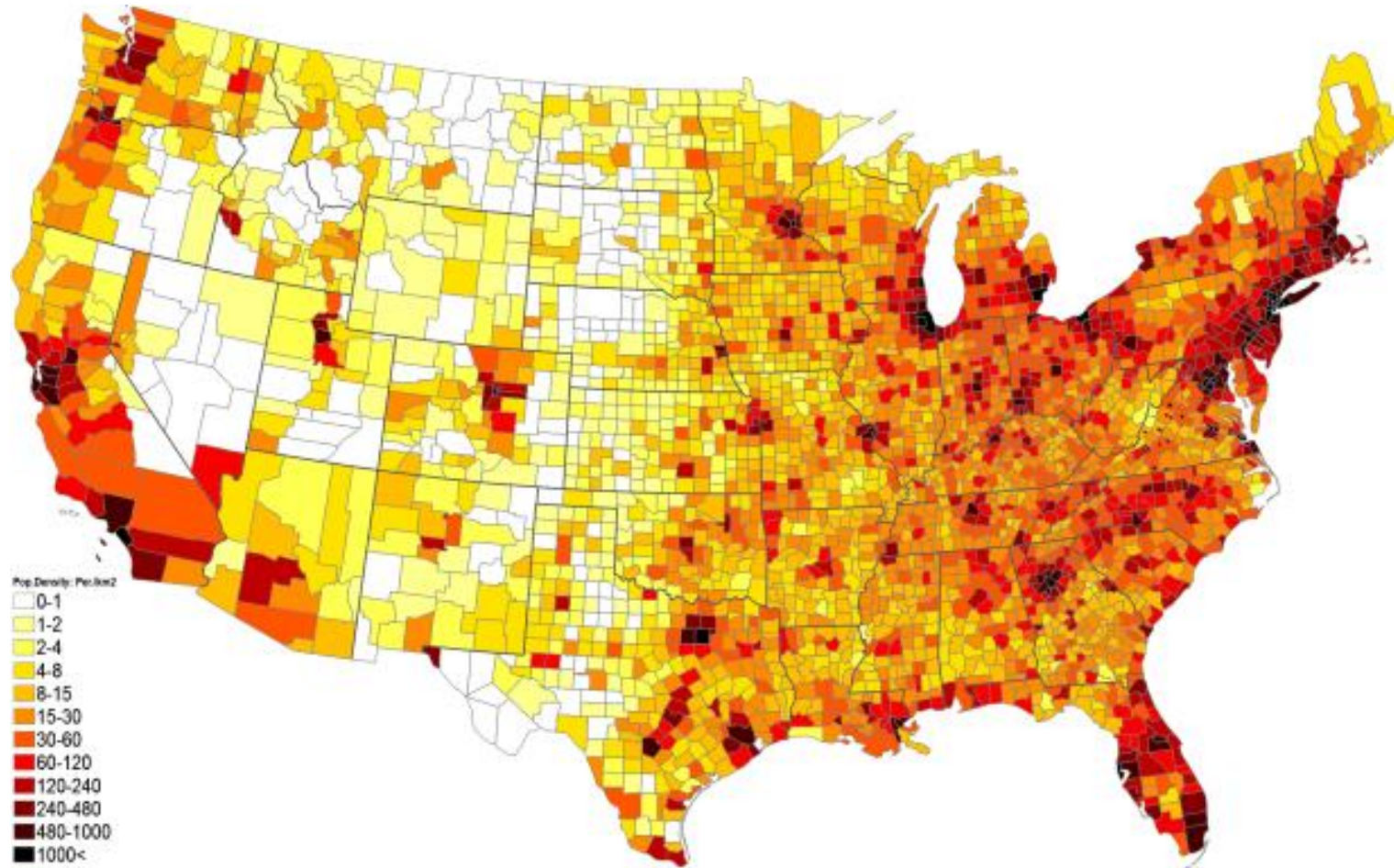


eia Source: Energy Information Administration, Electric Power Monthly

## Largest Renewable Generators in New Jersey

Facility Name	Capacity
Ben Morell Solar Farm	28.5 MW
Tinton Falls Solar Farm	19.9 MW
Pilesgrove Solar Farm	19.9 MW
Atlantic City Wind Farm	7.5 MW

# Location, Location, Location - Access to Large Population Centers

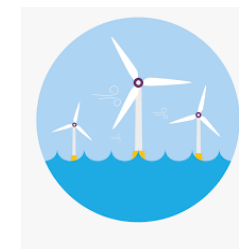
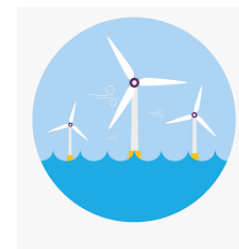
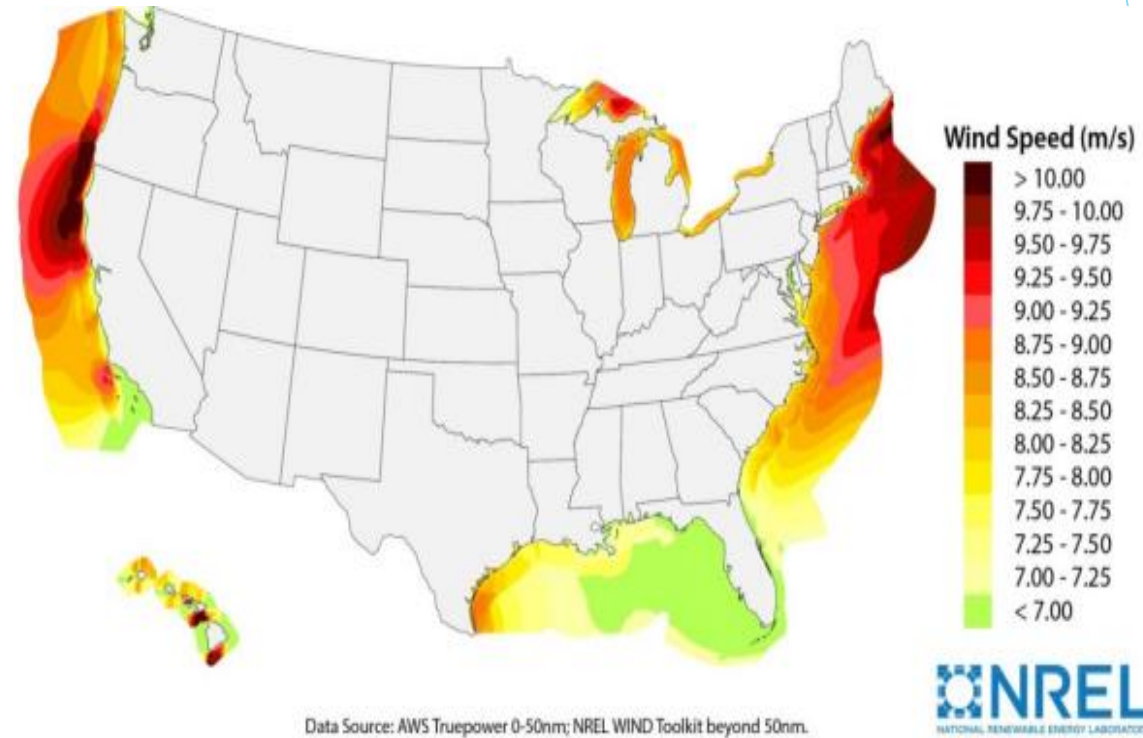


# Increase Stability and Non-Intermittent Energy

**Intermittent Energy** – Any source of energy that is not continuously available and outside direct control

**Non-Dispatchable** – any source of energy that can not be turned on or off, or ramped up or down to match societal needs

Offshore wind speeds are consistent and allow for a strong level of predictability. Data has also shown that offshore wind patterns track with daily demand patterns, and evening electric surges



# Economic Development - U.S. Offshore Wind Economic Impact Assessment [AWEA March 2020]



**\$12.5 - 25.4 billion**

Annual Economic Output by 2030



**45,000 - 83,000 Jobs**

Offshore Wind Jobs by 2030



**20,000 - 30,000 MW**

Offshore Wind Operating Capacity

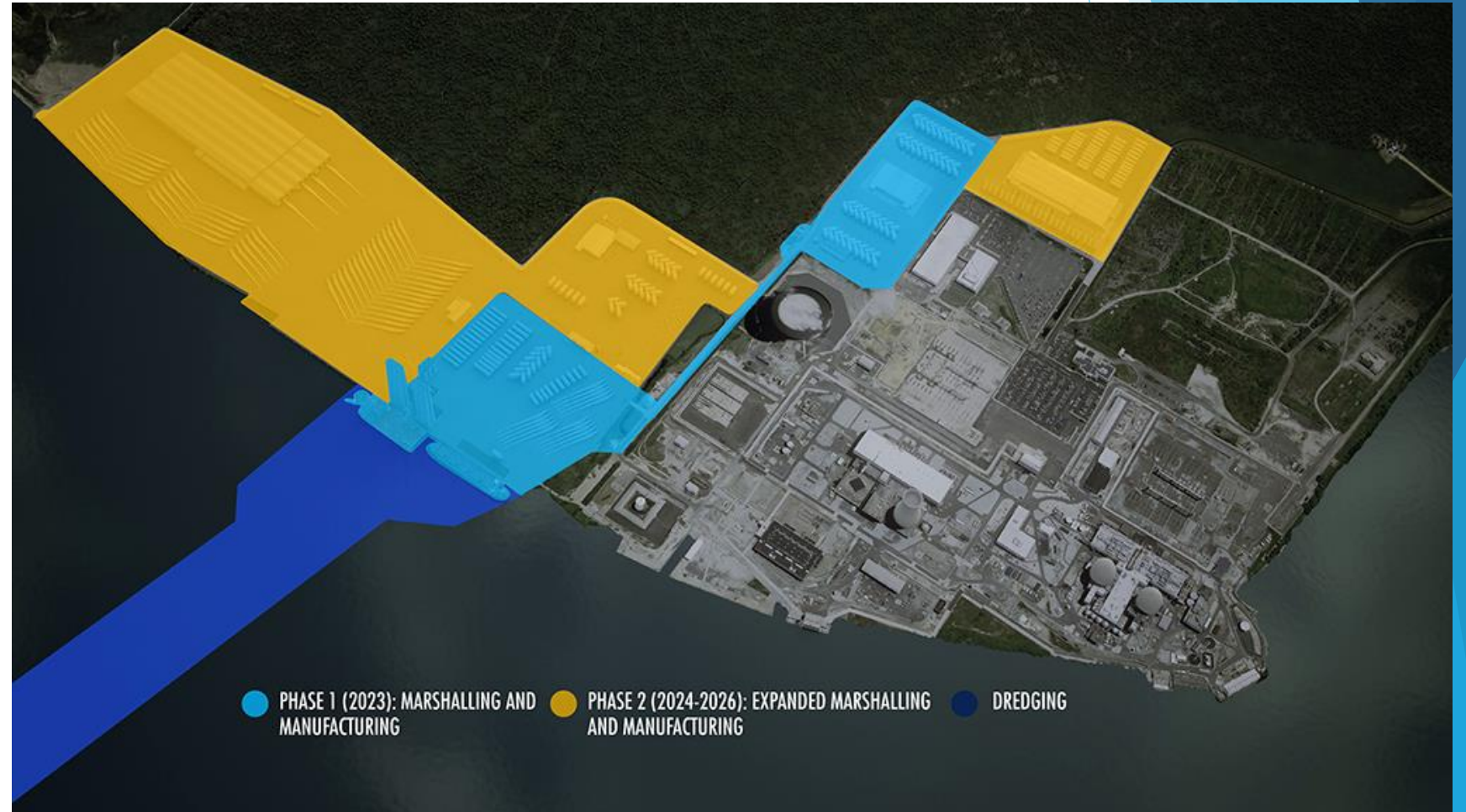


# New Jersey Prospective Economic Benefit

A sample of the jobs the offshore wind industry will create includes:

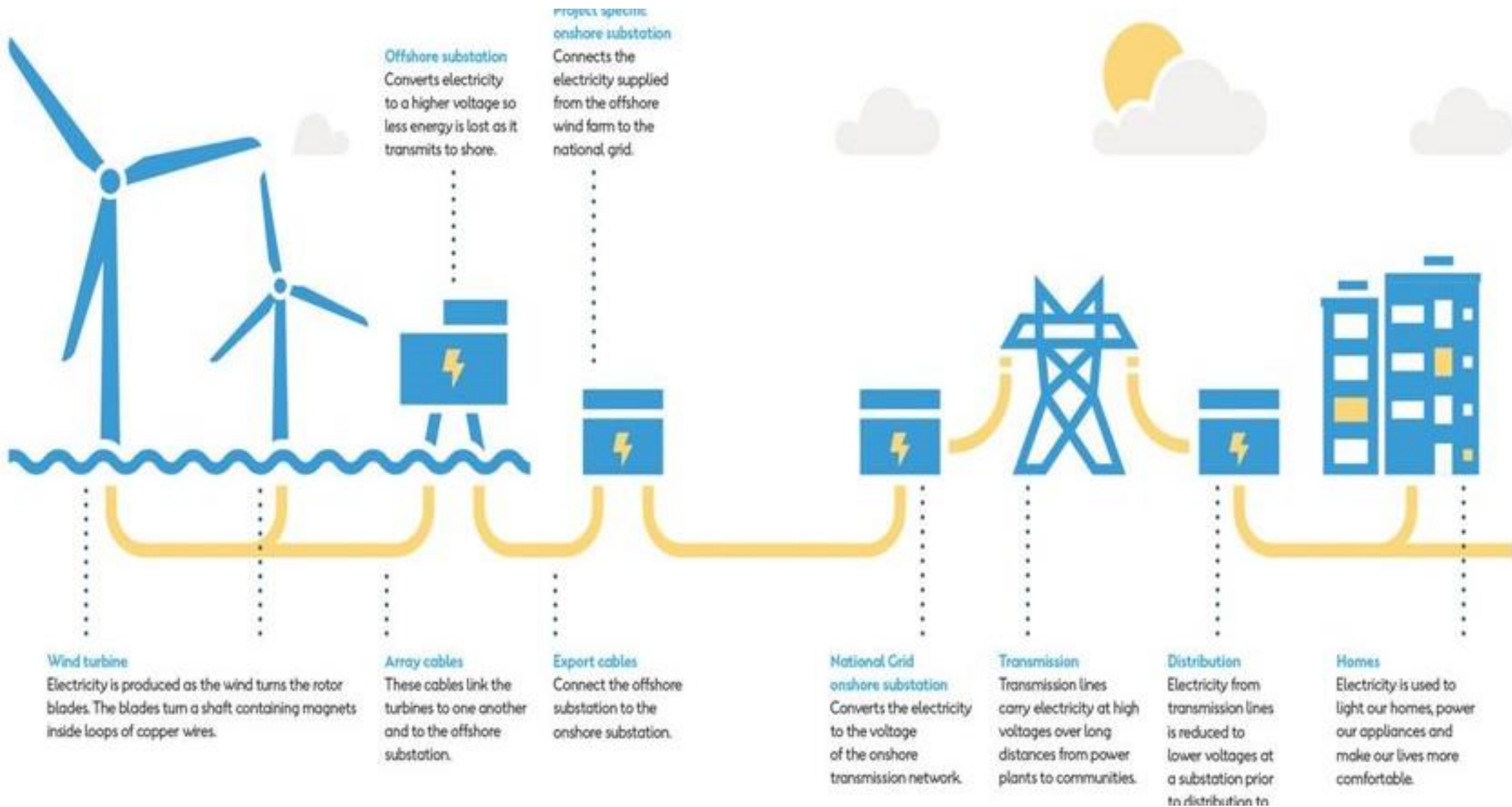
- ▶ Electricians
- ▶ Welder
- ▶ Turbine technicians
- ▶ Longshoremen
- ▶ Truck drivers
- ▶ Crane operators
- ▶ Ironworkers
- ▶ Pipefitters
- ▶ Pile drivers
- ▶ Engineers
- ▶ Mechanic
- ▶ Scientists, and
- ▶ Offshore-equipment and vessel operators.

## New Jersey Wind Port



# Offshore Wind: Background and Overview





**Offshore substation**  
 Converts electricity to a higher voltage so less energy is lost as it transmits to shore.

**project specific onshore substation**  
 Connects the electricity supplied from the offshore wind farm to the national grid.

**Wind turbine**  
 Electricity is produced as the wind turns the rotor blades. The blades turn a shaft containing magnets inside loops of copper wires.

**Array cables**  
 These cables link the turbines to one another and to the offshore substation.

**Export cables**  
 Connect the offshore substation to the onshore substation.

**National Grid onshore substation**  
 Converts the electricity to the voltage of the onshore transmission network.

**Transmission**  
 Transmission lines carry electricity at high voltages over long distances from power plants to communities.

**Distribution**  
 Electricity from transmission lines is reduced to lower voltages at a substation prior to distribution to

**Homes**  
 Electricity is used to light our homes, power our appliances and make our lives more comfortable.

# Major Components to Offshore Wind Development

## Offshore

Offshore wind farms have many similarities to their onshore counterparts, but the marine environment poses unique technical design challenges

Major offshore components of an offshore wind farm include:

- Foundations
- Turbines
- Inter-Array Cables
- Offshore Platform Substation
- Export Cables

## Onshore

Offshore wind farm development is not limited to the ocean, the development of this industry also requires significant onshore infrastructure as well.

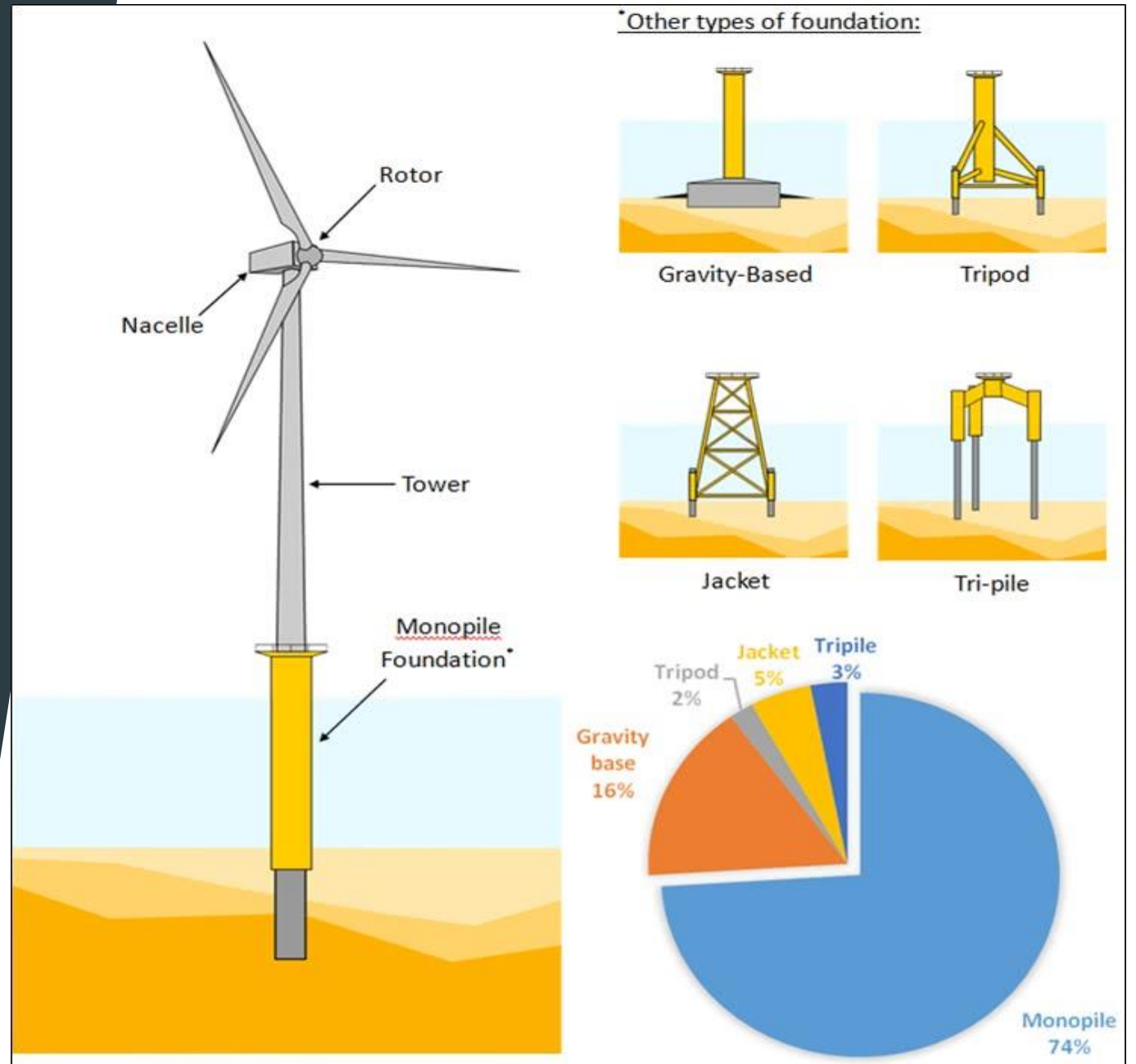
Major onshore components for an offshore wind farm include:

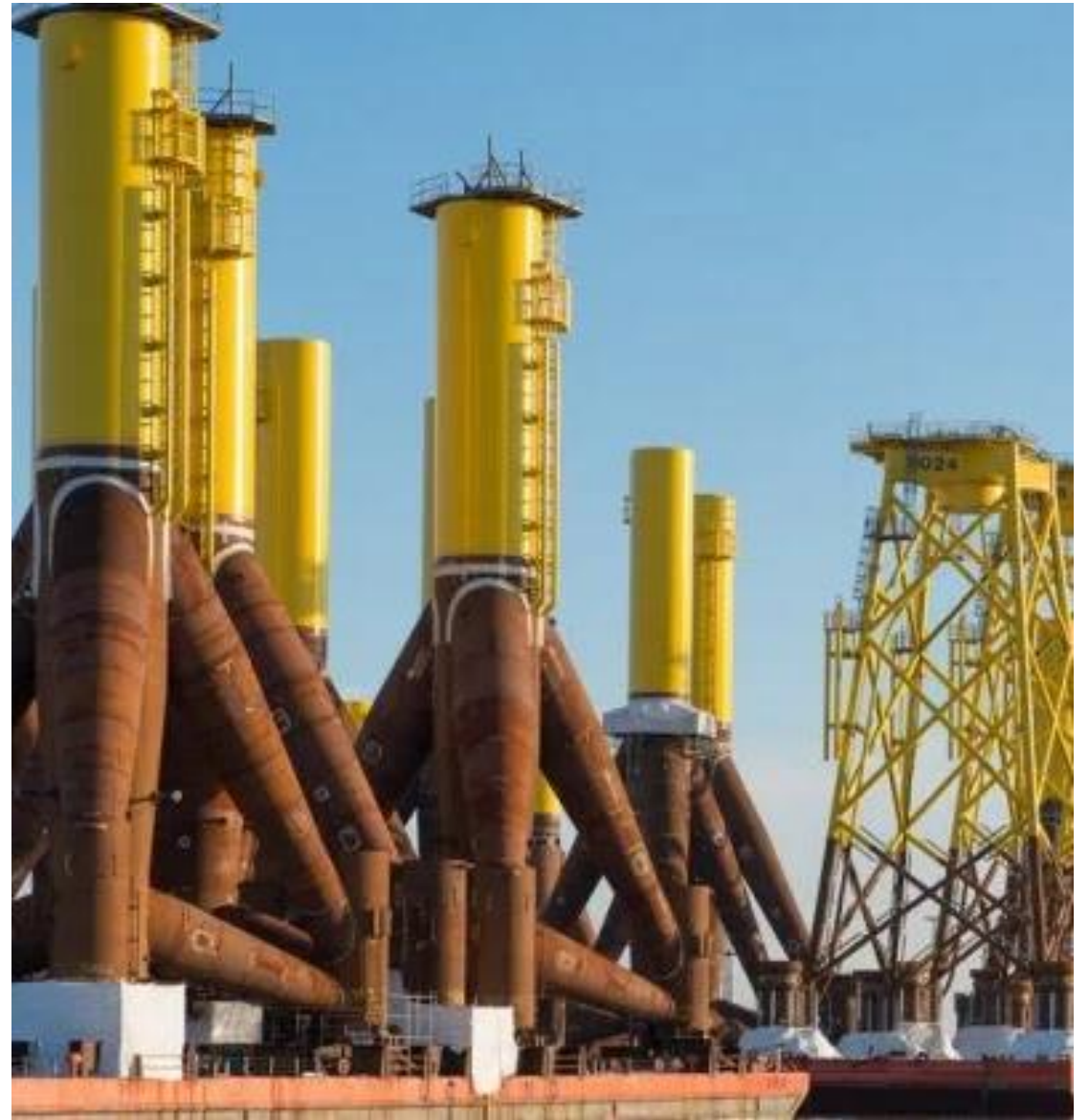
- Onshore transmission cables
- Onshore grid connection point
- Operation and maintenance ports
- Manufacturing centers
- Assembly / Marshalling ports



# Foundations

- ▶ How the Offshore Wind Turbine is fixed to the seafloor
- ▶ Different design options for different environments
- ▶ Monopile foundations are the most common
- ▶ Orsted's Ocean Wind Project off the coast of Atlantic City will utilize monopile foundations
- ▶ Equinor's Empire Wind Project off the coast of Sandy Hook will utilize various foundation types such as Foundations that include Gravity Base Structures Monopiles, and Jackets





# Turbines

The Block Island Wind Farm utilized five 6MW turbines to produce 30MW of energy production.

Turbine sizes are constantly increasing, which requires less turbines for larger energy output but increases concerns about the viability in the hostile marine environment.

Orsted intends to utilize the Haliade-X for Ocean Wind. The project will use 90 - 110 of the 12 MW turbines to power over 500,000 homes.

The Siemens Gamesa turbine, which the company's calling SG 14-222 DD, will be ready for a prototype in 2021 and commercially available in 2024.

**12 MW** capacity

220-meter rotor

107-meter long blades

260 meters high

67 GWh gross AEP

63% capacity factor

38,000 m<sup>2</sup> swept area

Wind Class IEC: IB

Generates **double the energy** as previous GE Haliade model

Generates almost **45% more energy** than most powerful wind turbine available on the market today

Will generate enough clean power for up to **16,000** European households per turbine, and up to **1 million** European households in a 750 MW configuration windfarm

**HALIADÉ-X 12 MW**

GE Renewable Energy is developing **Haliade-X 12 MW**, the biggest offshore wind turbine in the world, with **220-meter rotor**, **107-meter blade**, leading capacity factor (**63%**), and **digital capabilities**, that will help our customers find success in an increasingly competitive environment.

1063 ft  
324 m

853 ft  
260 m

1046 ft  
319 m

Eiffel Tower    Haliade-X 12 MW    Chrysler Building

# Scale and Size - Developing an Offshore Wind Farm

**itv NEWS**



**WORLD'S LARGEST  
WIND FARM**

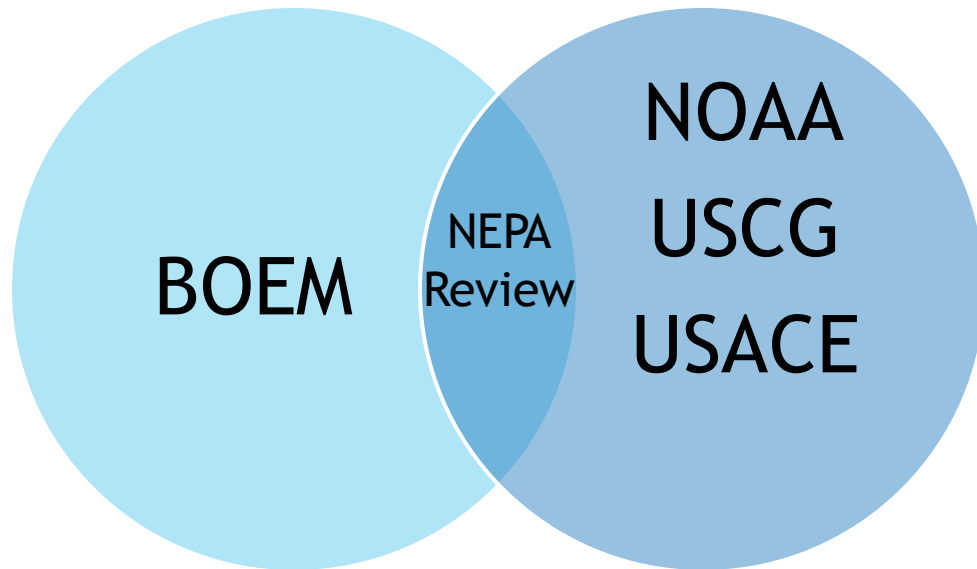


# Who Regulates the

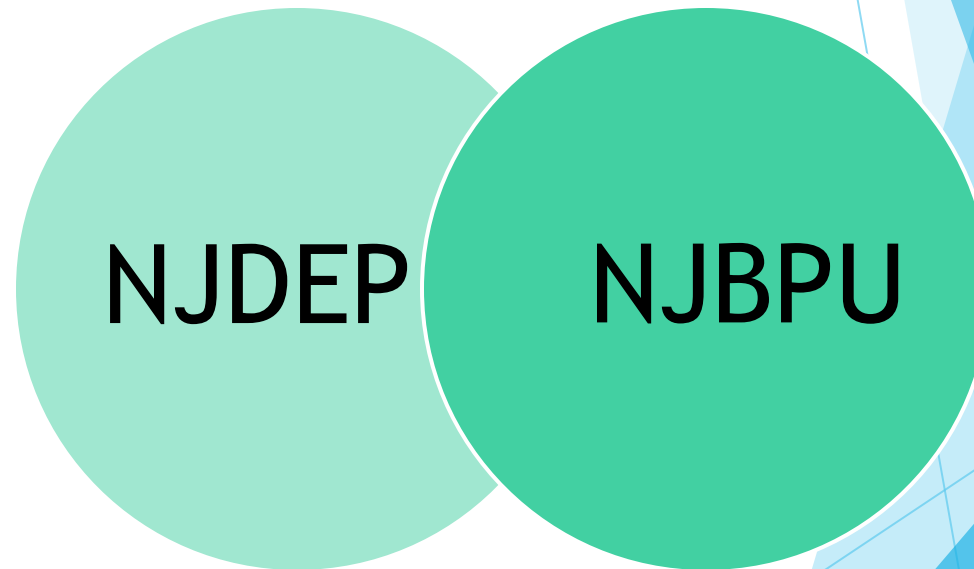
- ▶ Development of Offshore Wind?

# Split Authority - Role of the Federal and State Governments

Federal Authority - Permitting / Siting



State Authority - Coastal Permitting / Onshore Permitting / Energy Permitting



# BOEM - Four-Stage Permitting Process

## Step #1: Area Identification

BOEM determines if there is interest in OSW development and publishes Wind Energy Areas for public comment and undergoes Environmental Review

## Step #2: Leasing

Once the Wind Energy Areas (WEA) are finalized and the environmental review is completed, BOEM holds a lease sale to auction off specific areas of the WEAs.

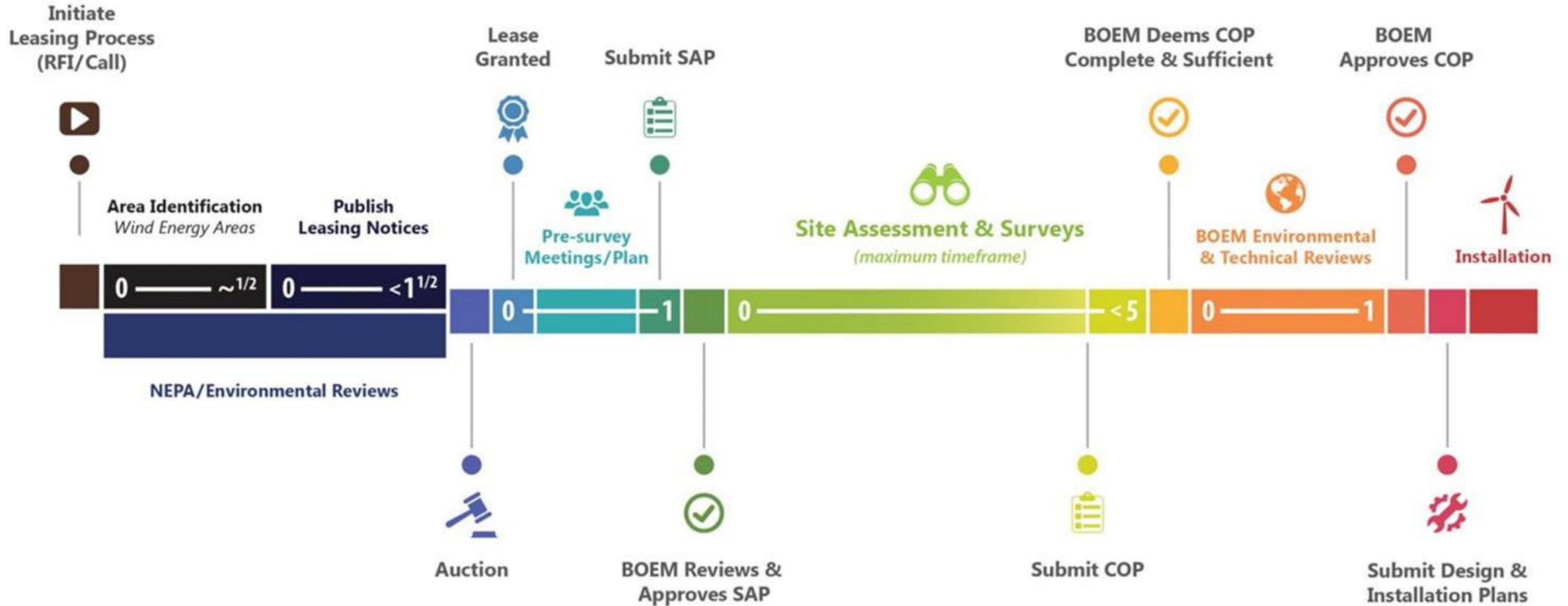
## Step #3: Site Assessment

Developer submits a Site Assessment Plan to BOEM that includes studies to better understand the lease area

## Step #4: Construction and Operation

The developer submits a COP, which is the final blueprint of the development. BOEM reviews the COP for technical completeness and conducts a final environmental analysis

# BOEM Leasing Process | Timeline





# State Authority - Environmental Permitting and Solicitation Process

- ▶ New Jersey Department of Environmental Protection
- ▶ The NJDEP is responsible for issuing permits for:
  - (1) All development within the state waters - first three miles offshore (cable routes)
  - (2) All onshore development for offshore wind (operation and maintenance facilities, assembly/manufacturing ports, cable routes)
- ▶ New Jersey Board of Public Utilities
- ▶ The NJBPU is responsible for determining which projects will connect to New Jersey through a solicitation process.
- ▶ The developer who wins the solicitation process is authorized to connect to New Jersey's energy system and is financed through the Offshore Renewable Energy Credit (OREC)

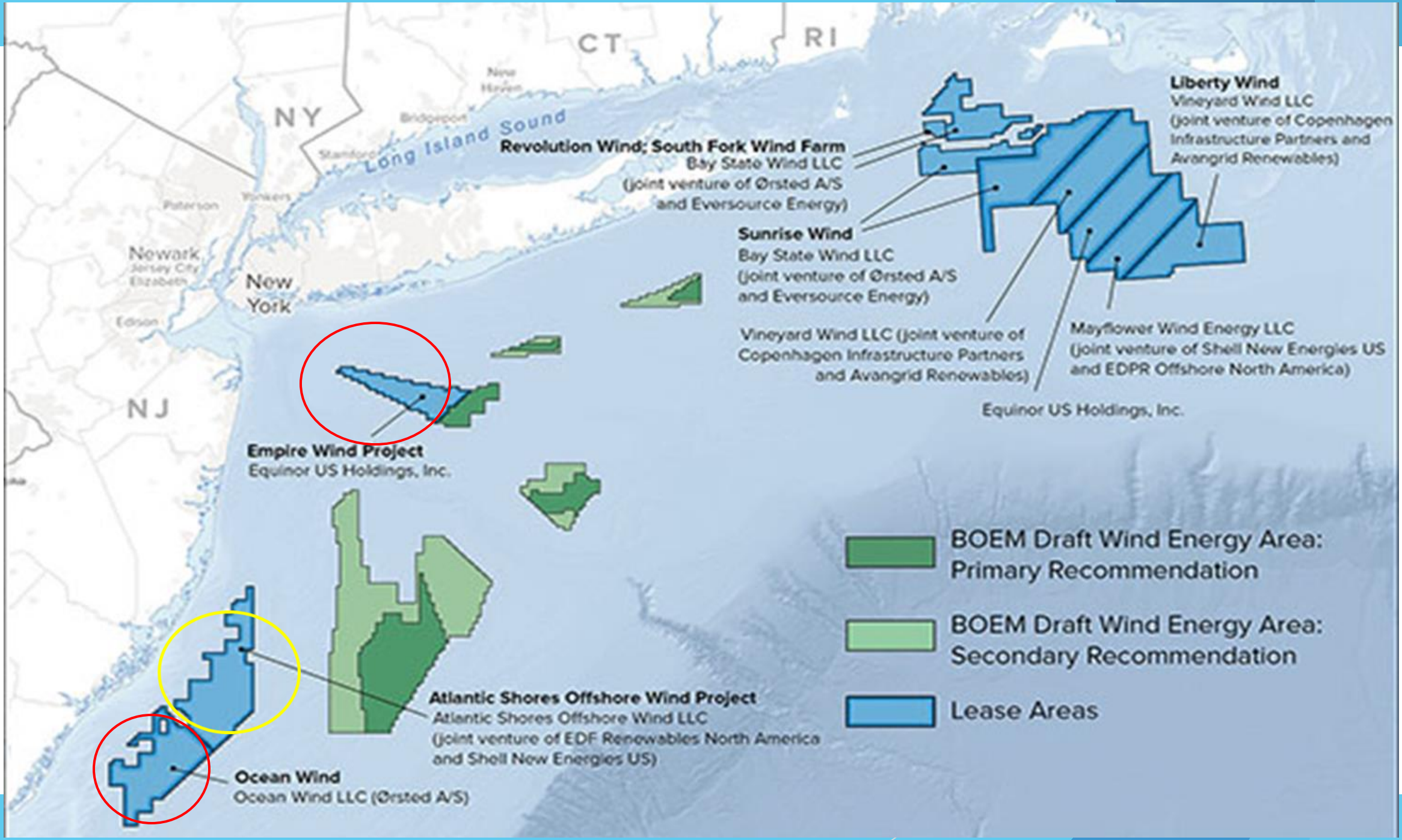


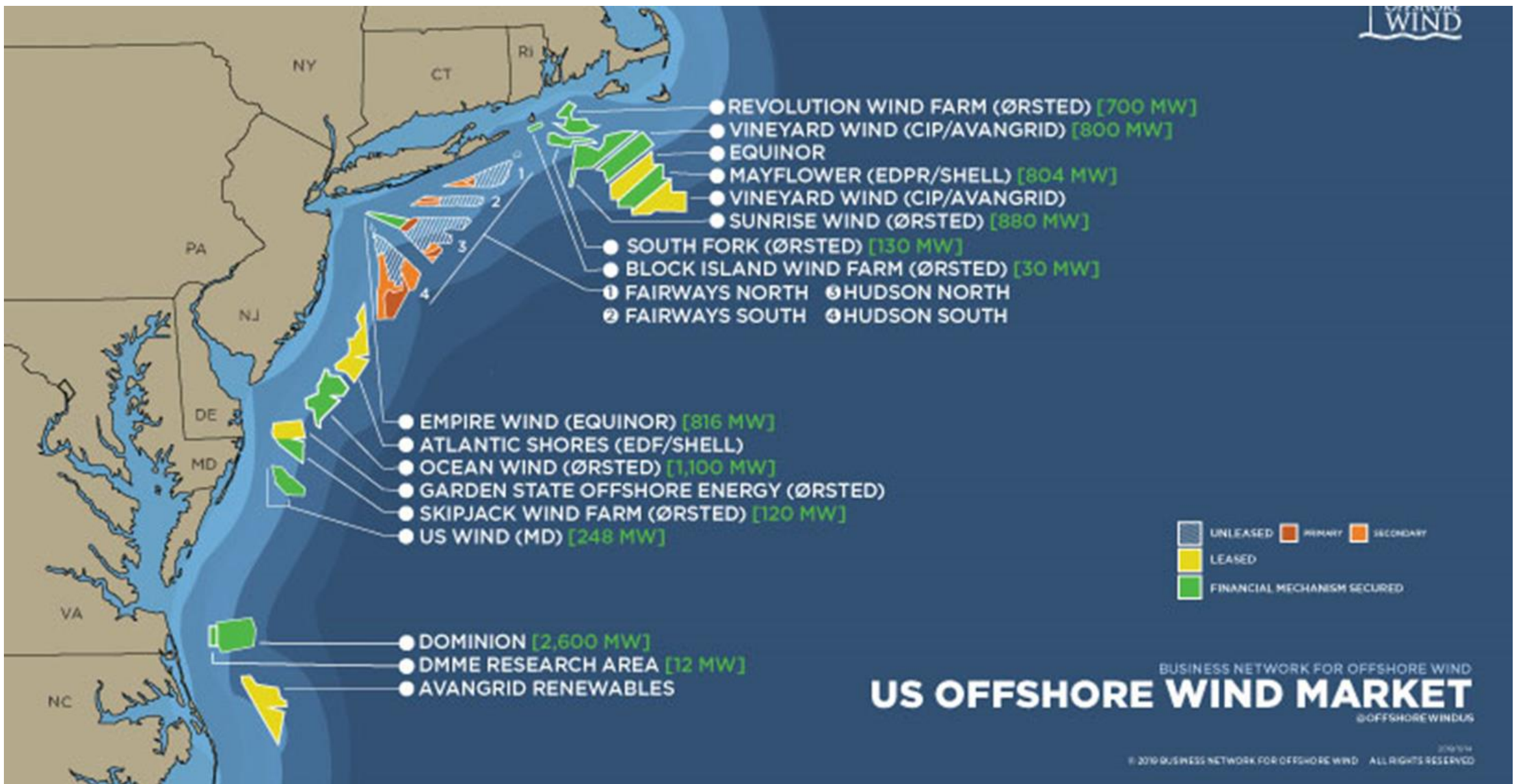
# Status of Offshore Wind

- ▶ Projects in the New York/ New Jersey Bight

# New Jersey's Solicitation Schedule - How We Get to 7,500 MW by 2035

SOLICITATION	CAPACITY TARGET	ISSUE DATE	AWARD DATE	ESTIMATED OPERATION
1 (Orsted - Ocean Wind)	1,100 MW	Q3 2018	Q2 2019	2024
2	1,200 MW	Q3 2020	Q2 2021	2027
3	1,200 MW	Q3 2022	Q2 2023	2029
4	1,200 MW	Q2 2024	Q1 2025	2031
5	1,400 MW	Q2 2026	Q1 2027	2033
6	1,400 MW	Q1 2028	Q1 2029	2035





# BUSINESS NETWORK FOR OFFSHORE WIND

## US OFFSHORE WIND MARKET

@OFFSHOREWINDUS

# Orsted - Ocean Wind

- ▶ Location: 15 miles off the coast of Atlantic City
- ▶ Capacity: 1,100 MW
- ▶ Turbines: 90-110, 12 MW Turbines
- ▶ Construction: 2021
- ▶ Operation: 2024
- ▶ Connection Point: Oyster Creek Nuclear Generating Station  
BL England Site
- ▶ Foundation: Port of Paulsboro  
Manufacturing
- ▶ Assembly Location: Port of Baltimore
- ▶ O&M Site: Atlantic City



# Equinor - Empire Wind

- ▶ Location: 20 miles east of Sandy Hook
- ▶ Capacity: 816 MW
- ▶ Turbines: 60 - 80, 10-14 MW Turbines
- ▶ Construction: 2021
- ▶ Operation: 2024
- ▶ Connection Point: Con Edison's Gowanus Substation
- ▶ Foundation: Port of Coeymans
- ▶ Assembly Site: South Brooklyn Marine Terminal\*
- ▶ O&M Site: South Brooklyn - Specific Point Unknown





# Environmental Concerns with ▶ Offshore Wind Development

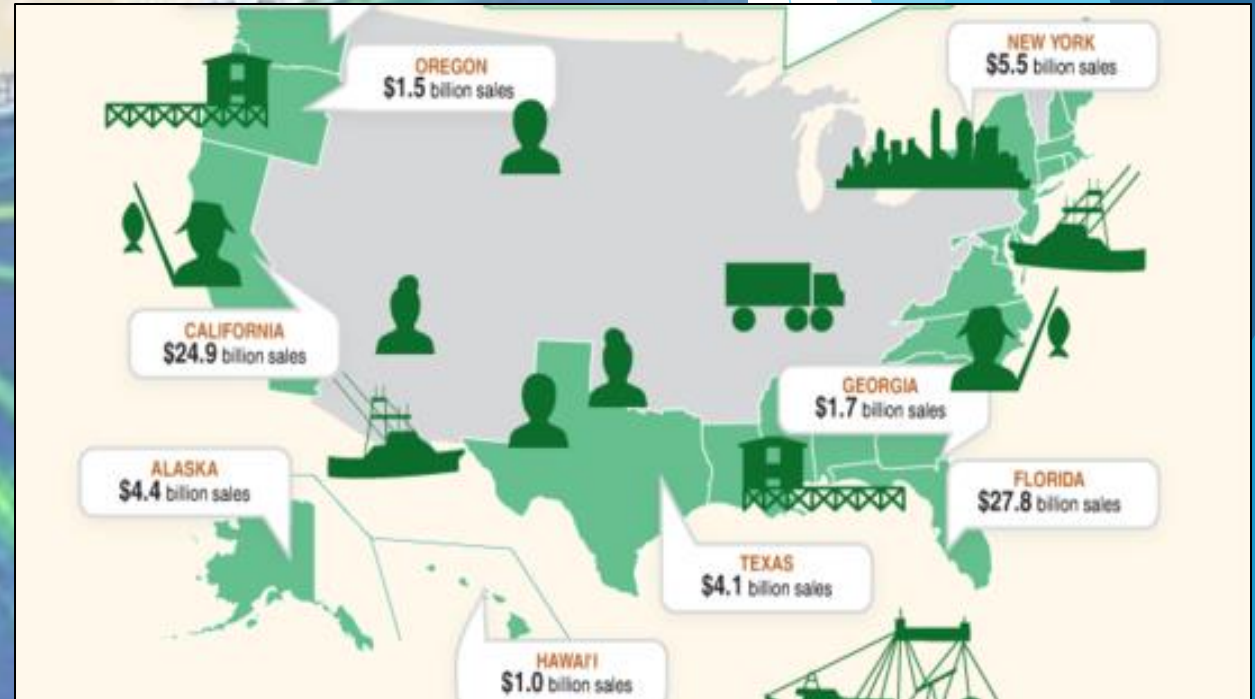
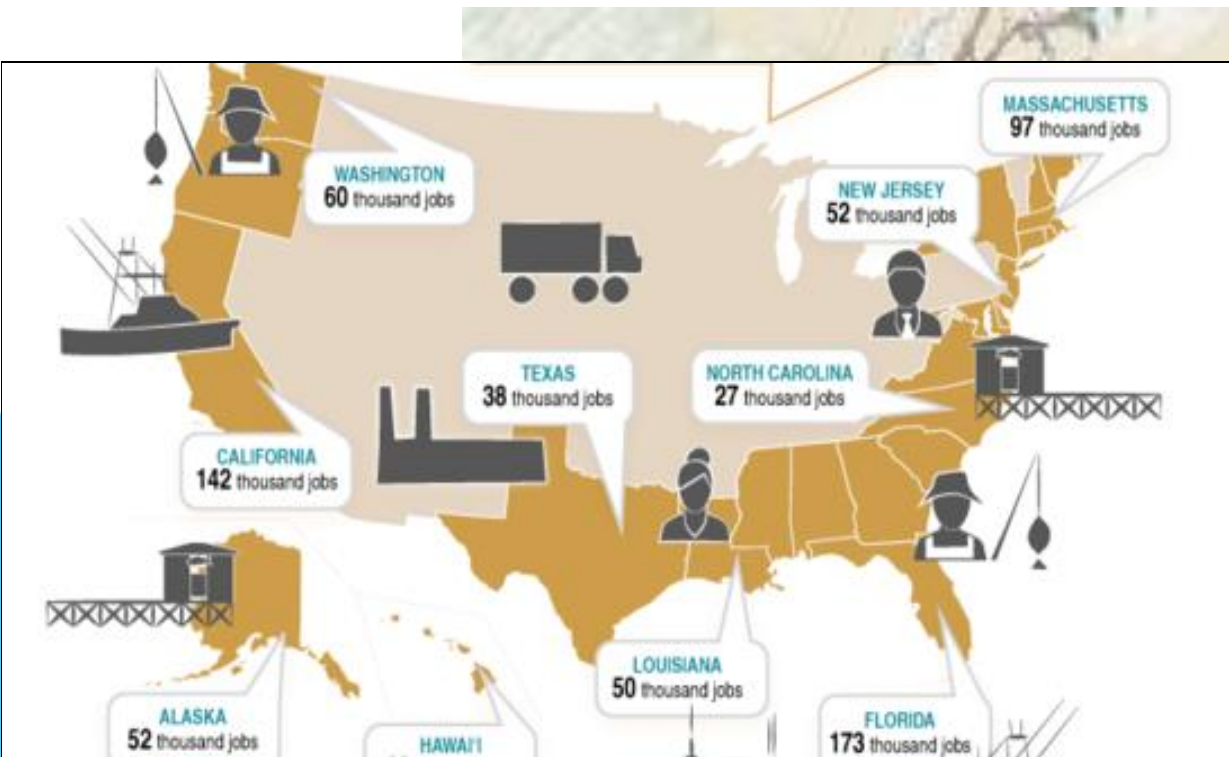


# Impacts to Wildlife

- ▶ Birds/ Avian Species
  - Displacement of Habitat
  - Migration Barriers
  - Risk of Collision
- ▶ Fish/ Benthic Species
  - Electromagnetic Fields
  - Habitat Change
- ▶ Marine Mammals
  - Noise Pollution from Construction & Operation
  - Vessel Strikes



# Impacts to Existing Ocean Uses - Fishing and Navigation



# Coastal Development and Industrialization

## Operation and Maintenance

### Important Considerations for O&M:

1. Type of maintenance approach
2. Proximity to the offshore wind farm
3. Storage capabilities for spare components
4. Bearing capacity
5. Depth requirements

#### Supporting Operations

**Onshore logistics** – port-side activity, warehousing and on-site office space

**Offshore logistics** – equipment, planning and resources required to move people and equipment at sea including work boats, offshore bases, helicopter services and jack-up services

**Back office, administration and operations** – performance monitoring, electricity sales etc.

#### Equipment Maintenance

**Turbine maintenance** – the technicians and equipment needed to inspect and repair the wind turbines

**Export cable and grid connection** – the technicians and equipment needed to inspect and repair the connection of the offshore power plant to the onshore power transmission system, including onshore and offshore electrical substations and export cables

**Array cable maintenance** – the technicians and equipment needed to inspect and repair the subsea cables that connect the turbines to create a unified power plant

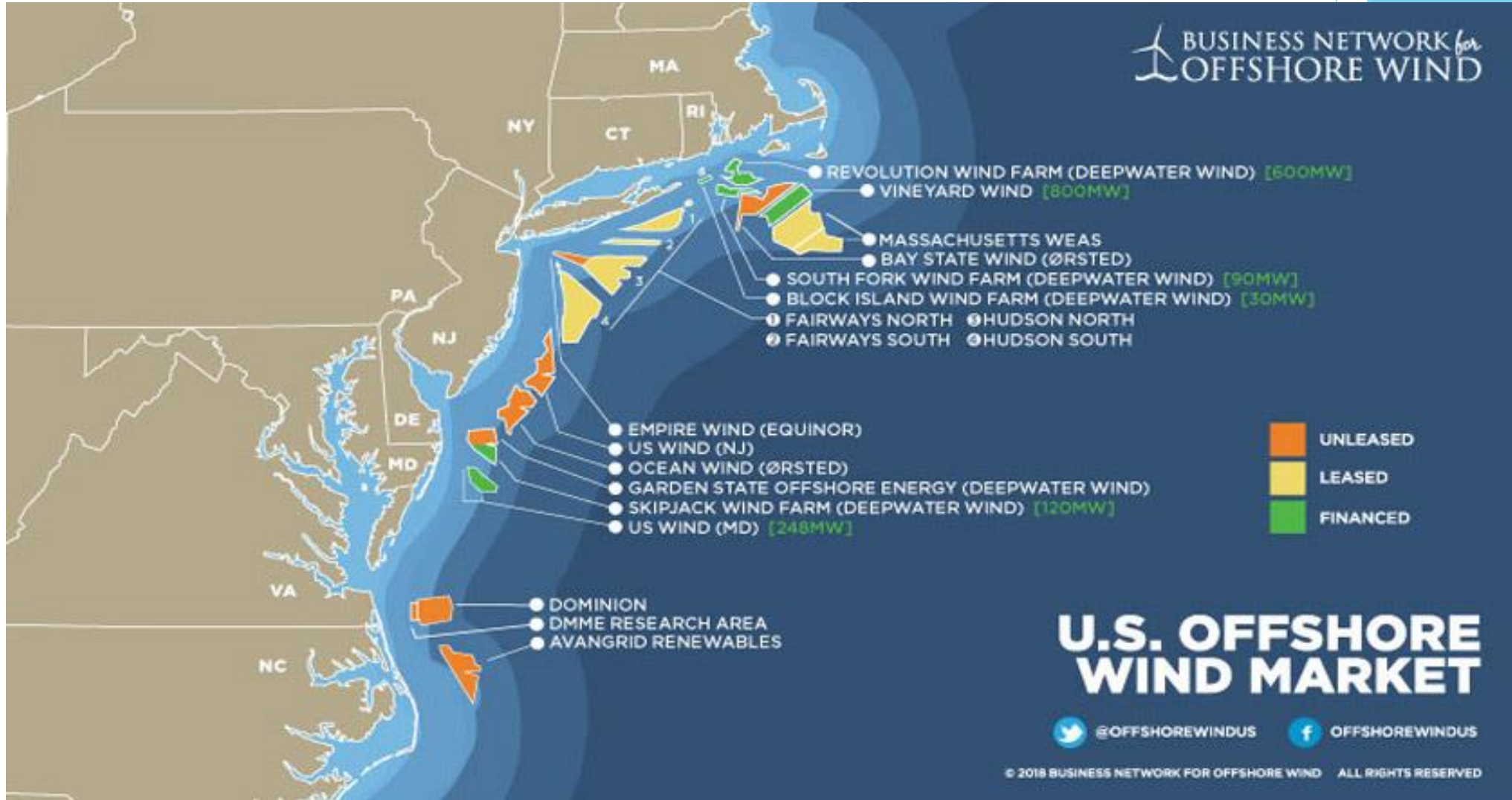
**Foundation maintenance** – the technicians and equipment needed to inspect and repair the turbine foundations and sub-sea structures

# Coastal Development and Industrialization

- ▶ Manufacturing and Marshalling Ports



# Lack of Knowledge and Cumulative Impacts





# ▶ Clean Ocean Action's Offshore Wind Policy

# Overarching Policy: *To ensure all offshore wind development in the New York/New Jersey Bight is done in the most environmentally sustainable manner possible*

## **Doing What We Do Best** -

Protection and enhancement of the ocean and coastal environment which provides critical ecological and economic services

**Minimizing the Unavoidable** - working to minimize impacts on the ocean and coastal environment which cannot be avoided

## **Minimizing the Need** -

prioritization and aggressive implementation of energy efficiency and conservation strategies

**Ensuring Responsible Onshore Development** - working to mandate all land-based facilities and development are designed to minimize the overall impact on the environment, are energy efficient, and properly sited

## **Holistic Approach to Clean Energy** -

ensuring an inclusive approach to achieving New Jersey's clean energy goals that includes offshore wind but also onshore renewable generation

## **Comprehensive Planning**

- Ensure that the state develops a comprehensive plan that provides a true and fair analysis of the cumulative impacts of multiple offshore wind projects and mandates that all individual permit decisions be evaluated under this plan and include a robust cumulative analysis

**Avoiding Harm** - Ensuring all offshore development is properly sited to avoid conflicts with marine life and existing ocean uses, and will not create additional hazards such as navigational impacts

**Leveraging Experience to Gain Results** - Utilize COA's history and connections to inform policy makers to ensure sound decision making at every step of development and planning.

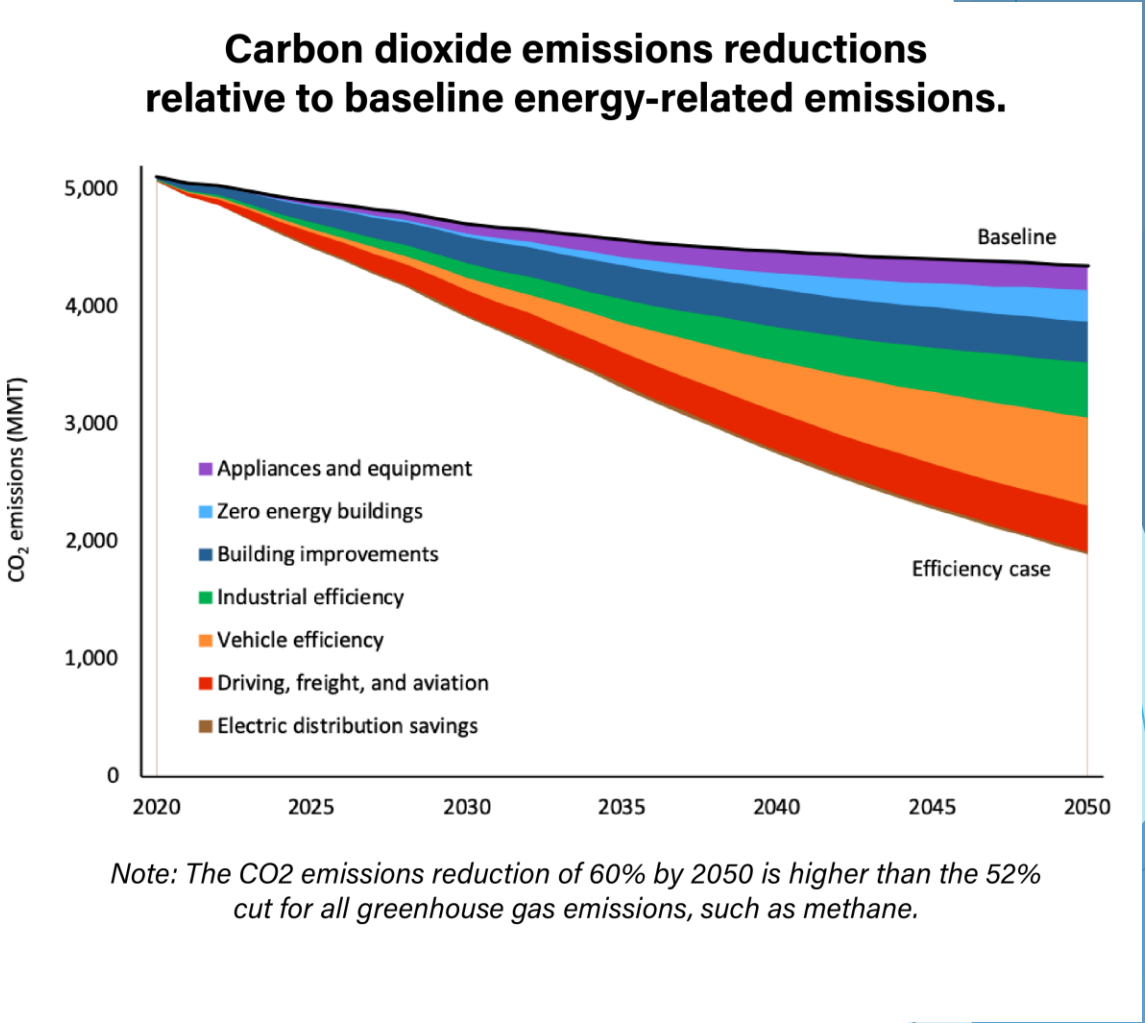
# Doing What We Do Best

- ▶ Clean Ocean Action will do what we do best which is be critical, yet fair in our evaluations of offshore wind.
- ▶ We understand the importance of creating a clean energy economy and the benefits offshore wind can have in terms of helping New Jersey and the region transition away from fossil fuels. However we will not ignore the legitimate concerns that this development has on the marine and coastal environment.
- ▶ We will hold ourselves to a high level of accountability and expect the same from the state and offshore wind developers.





# Minimizing the Need - prioritization and aggressive implementation of energy efficiency and conservation strategies



Work to make the State of New Jersey a leader in energy efficiency and conservation to lower overall energy demand and reduce greenhouse gas emissions

A report by the Council for an Energy Efficiency Economy (ACEEE) found that new efficiencies in transportation, building, and industrial sectors can reduce GHG emissions in the U.S. by 50% by 2050.

### What the State of New Jersey Must Do

Aggressive energy efficiency resources standards and targets for all utilities

Develop innovative Time of Use Rates and Demand Side Management Programs to cut down on peak energy usage

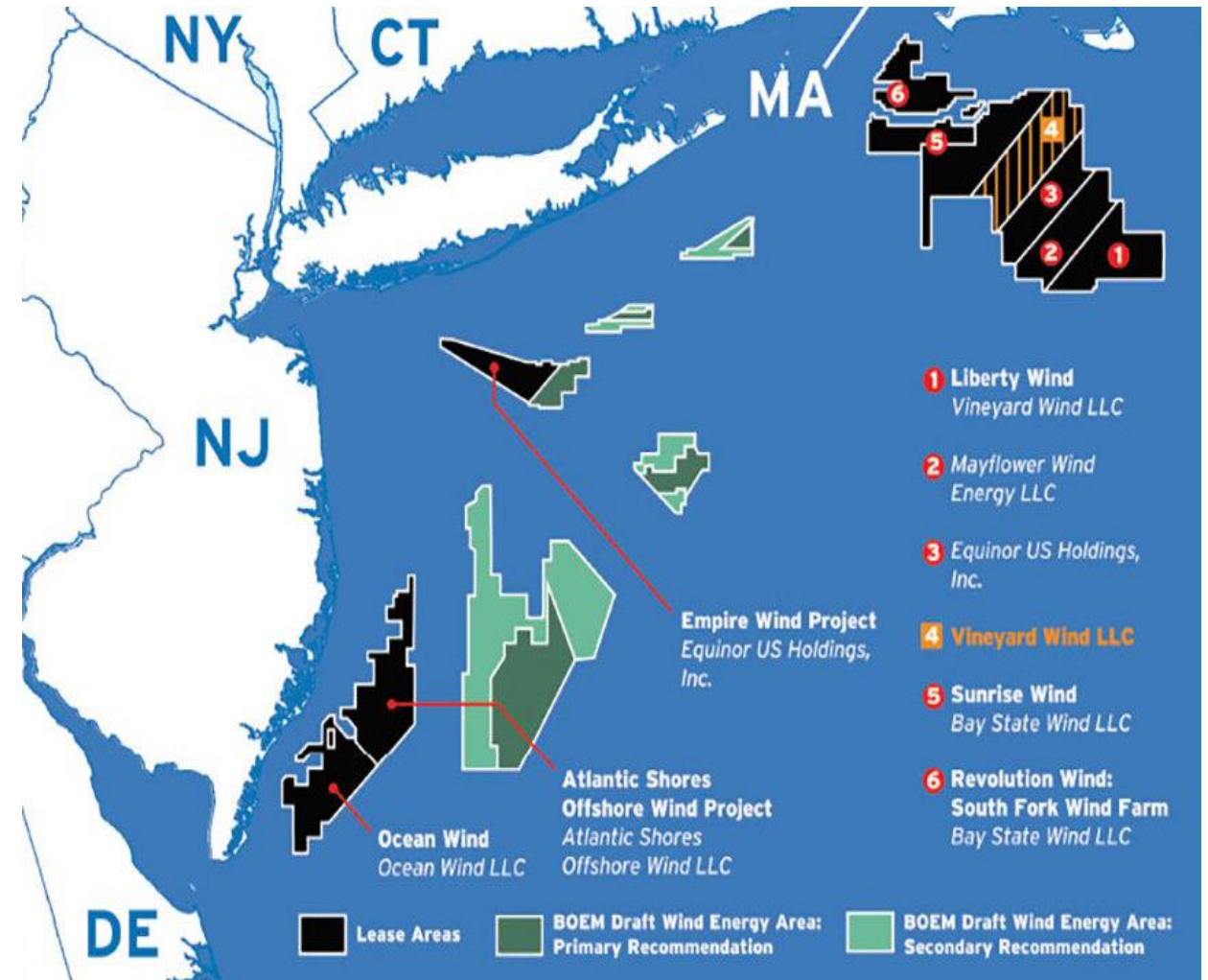
# Holistic Approach to Clean Energy

- ▶ Advocate for an inclusive approach to achieving New Jersey's clean energy goals that includes offshore wind but also new means to significantly increase onshore renewable generation.
- ▶ While solar cannot be developed to the same scale onshore in New Jersey, there are ways the state can significantly increase solar capacity
  - ▶ Keep building utility scale solar where possible utilizing brownfields, parking lots and dual-use solar on agricultural land
  - ▶ Require all new warehouses and large homes / apartment buildings to have solar.
  - ▶ Create a better pricing mechanism for solar energy to better reflect the environmental and energy benefits while making it more affordable for consumers



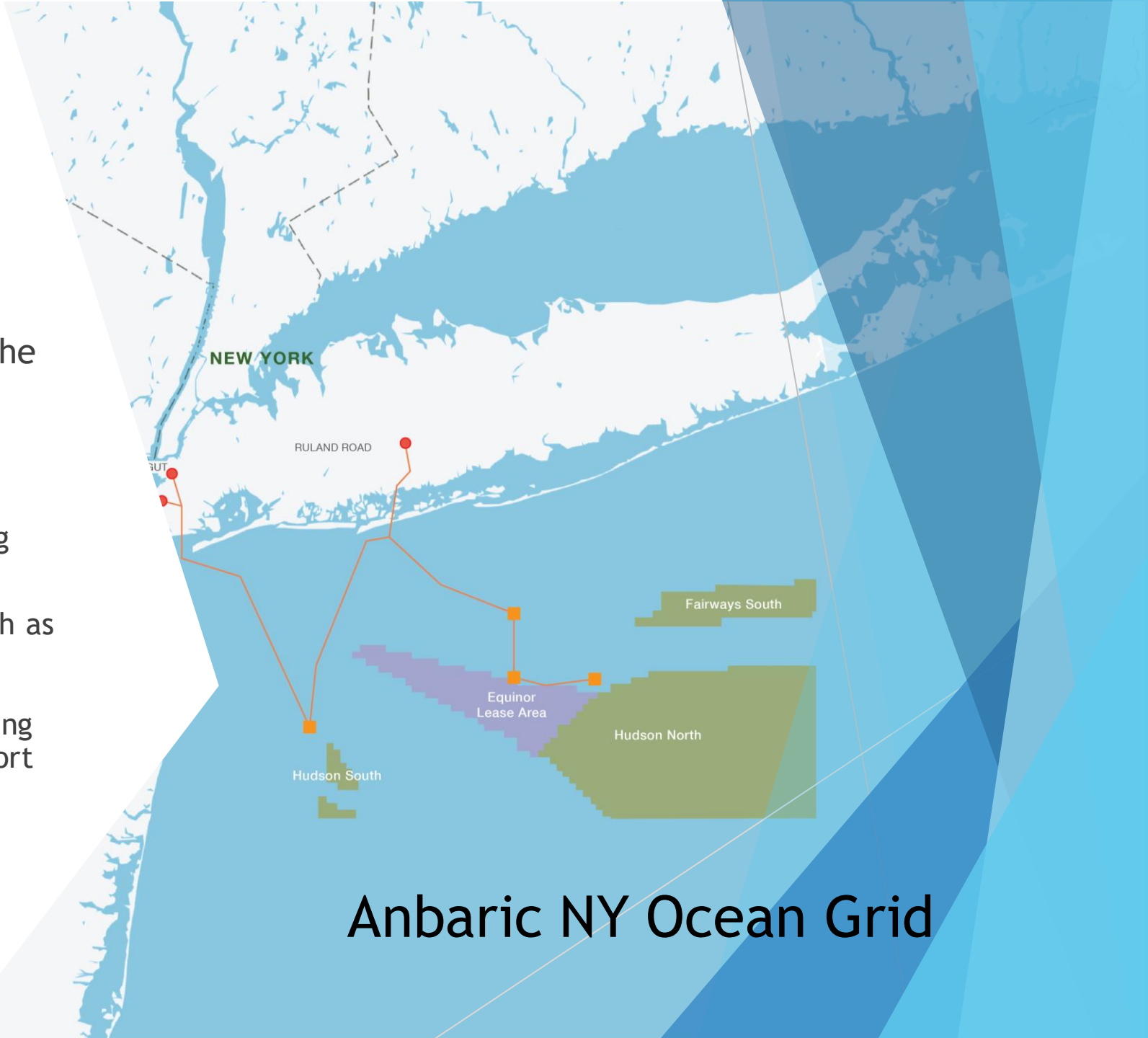
## Avoiding Harm - Proper Siting of Offshore Wind Resources

- ▶ Ensuring all offshore development is properly sited to avoid conflicts with marine life and existing ocean uses.
- ▶ COA will engage with our network of over 125 ocean and coastal organizations to work on both the state and federal level.
- ▶ To date we have met with all three developers pursuing projects off the coast of New Jersey (Orsted, Equinor, EDF Renewables/Shell) and have engaged throughout the entire BOEM process on the wind energy areas.



# Minimizing the Unavoidable

- ▶ Working to minimize impacts on the ocean and coastal environment which cannot be avoided.
- ▶ This can include
  - ▶ (1) Mitigation funds for the fishing industry
  - ▶ (2) Centralized infrastructure such as a potential shared backbone transmission line which may limit environmental concerns by avoiding the need for project specific export cables.



# Ensuring Responsible Onshore Development

- ▶ Ensure all land-based facilities and development are designed to minimize environmental impacts.
- ▶ Specifically, COA will advocate that all land-based facilities are developed and designed:
  - ▶ (1) To reduce the overall footprint; and
  - ▶ (2) To be climate resilient; and
  - ▶ (3) To be as energy efficient as possible; and
  - ▶ (4) Sited in environmentally friendly locations.



# Comprehensive Planning

- ▶ Ensure that the state develops a comprehensive plan that provides a full and fair analysis of the cumulative impacts of multiple offshore wind projects and that all permitting decisions be evaluated under this plan.
- ▶ New Jersey Offshore Wind Strategic Plan
  - ▶ Draft Released - July 13, 2020
  - ▶ Public Meeting - August 3, 2020
  - ▶ Public Comment - August 17, 2020.

# Leveraging Our Experience

- ▶ Utilize COA's history and connections to inform policy makers to ensure sound decision making at every step of development and planning.
- ▶ Clean Ocean Action (COA) is a broad-based coalition of 125 active boating, business, community, conservation, diving, environmental, fishing, religious, service, student, surfing, and women's groups.
- ▶ We will utilize this network of "Ocean Wavemakers" to advocate for sensible and environmental responsible development with clear, transparent and informed decision-making that includes robust public input.



# Questions



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