

# Ørsted U.S. Offshore Wind



September 2019



# Ørsted overview and business units

Ørsted develops energy systems that are green, independent and economically viable



- Revenue (2018): DKK 76.9 bn (USD 11.6 bn)
- EBITDA (2018): DKK 30.0 bn (USD 4.5 bn)
- Credit Rating: Moody's Baa1 (stable), S&P BBB+ (stable)
- 6,080 employees
- Active in USA, Scandinavia, United Kingdom, Germany, The Netherlands, France, Taiwan and Japan

## Major Shareholders (voting share %)

- |                 |       |
|-----------------|-------|
| • Danish State  | 50%   |
| • Seas NVE      | 10%   |
| • Capital Group | 5-10% |

## Offshore



- Global market leader in offshore wind
- Develop, construct, own and operate offshore wind farms
- 5.6 GW operational capacity
- 4.3 GW build-out plan towards 2022
- Ambition of 15 GW installed offshore wind capacity by 2025

## Onshore



- Develops, constructs, owns and operate onshore wind, solar and energy storage projects
- 813 MW onshore wind operational capacity in the US
- 625 MW under construction and pipeline of 1.5 GW
- Energy storage solutions with a first 20MW battery storage project in operation
- 400MW Permian Solar PV plus 85MW of projects under development with PPAs secured

## Markets & Bioenergy



- Heat and power plants converted from coal and gas to biomass and waste-to-energy
- #1 in Danish heat and power generation with 25% of market
- Energy supply solutions for B2B customers
- Provides route-to-market for own and customers' generation portfolio
- Market trading operations to optimize hedging contracts



## Ørsted Offshore: Global overview

# Ørsted is the global leader in offshore wind

Over **5,600 MW**  
in operation

Over **4,300 MW**  
under construction

**~1,150** turbines  
spinning world-wide

**25** offshore wind  
farms in operation

**1991** → **2019**  
25+ years of experience and  
unparalleled track record

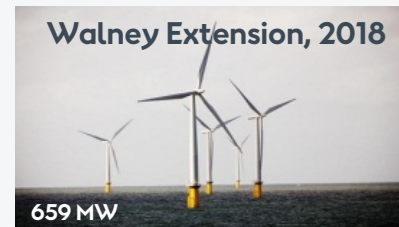
The world's **first**



America's **first**



The world's  
**largest**



# Creating the leading offshore wind platform in the U.S.

Ørsted acquired Deepwater Wind in November 2018

New combined U.S. operations headquartered in Providence and Boston

- **Longstanding expertise in originating, developing and permitting offshore wind projects in the U.S.**

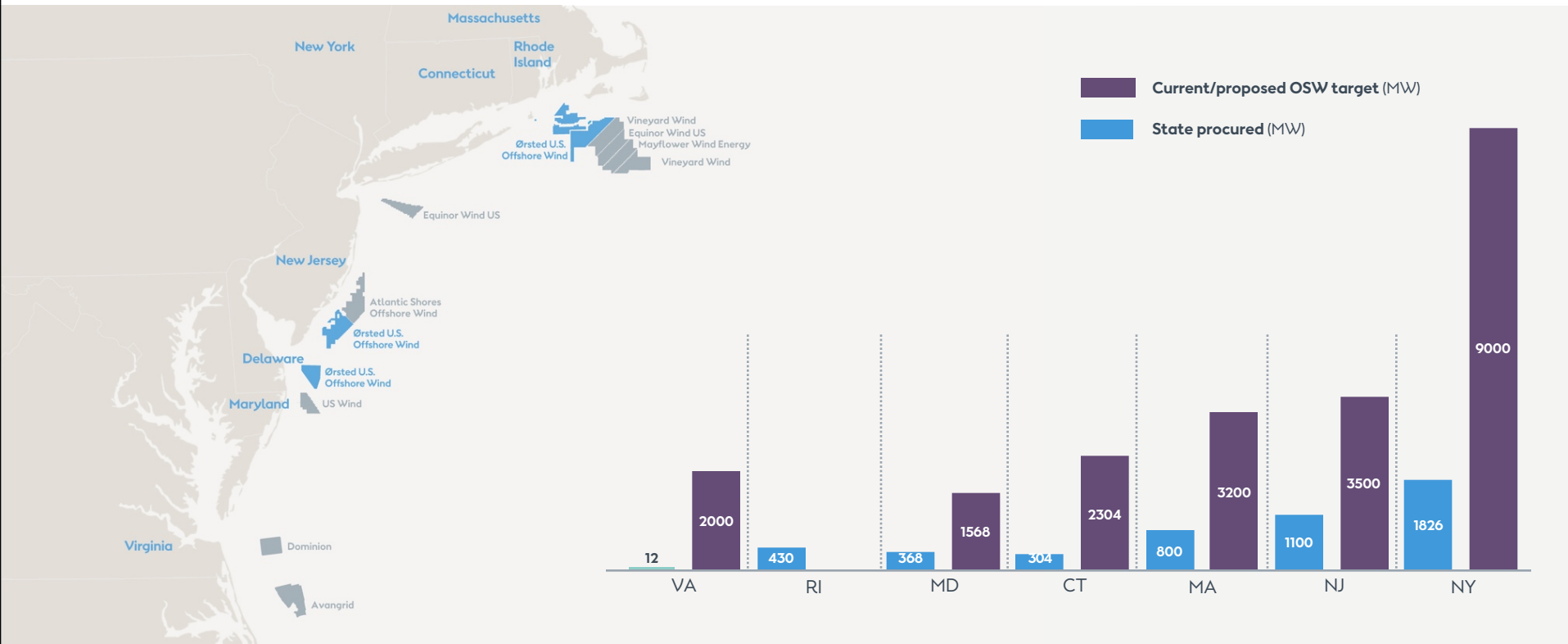


- **Unparalleled track-record in engineering, constructing, and operating large-scale offshore wind farms**



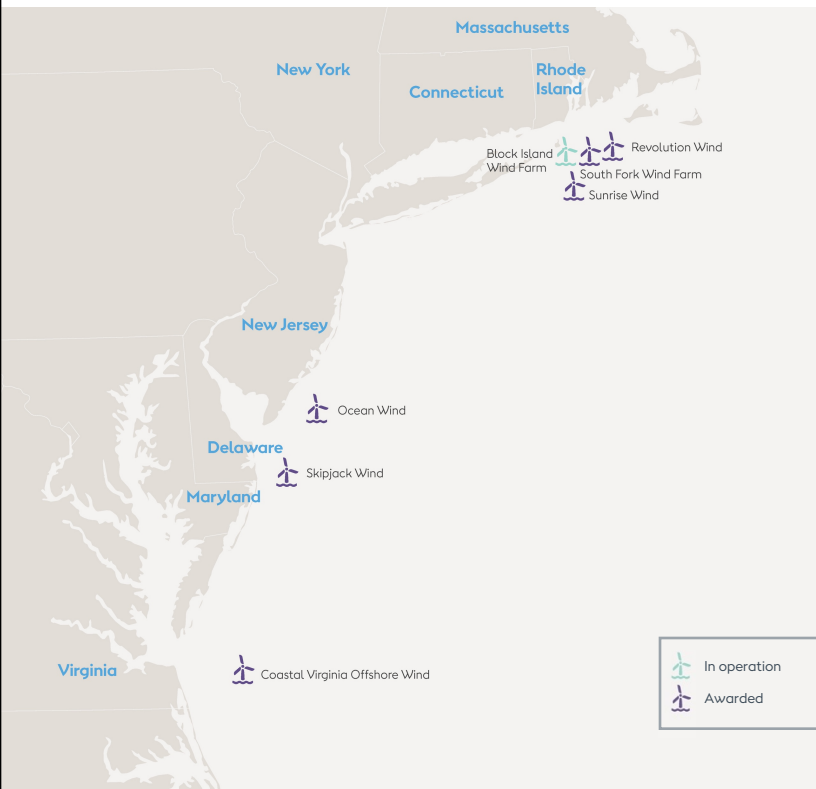
The logo for Ørsted, featuring a stylized blue 'Ø' symbol followed by the word 'rsted' in a bold, sans-serif font. A horizontal line with a downward-pointing chevron is positioned above the logo.

# Offshore wind market on the East Coast



# Ørsted U.S. Offshore Wind portfolio

Attractive and geographically diverse portfolio of offshore wind assets



## In Operation

**Block Island Wind Farm** 30MW

## Awarded

**Revolution Wind** (50/50 JV w/ Eversource): 704MW (400MW to RI, 304MW to CT)

**South Fork Wind Farm** (50/50 JV w/ Eversource): 130MW

**Sunrise Wind** (50/50 JV w/ Eversource): 880MW

**Ocean Wind** (with the support of PSEG): 1,100MW

**Skipjack Wind** 120MW

**Coastal Virginia Offshore Wind** (EPC contract): 12MW demo project

# Ørsted U.S. Offshore Wind – Development pipeline



## Under development

**Bay State Wind** (50/50 JV w/ Eversource): up to 2GW of development

**Garden State Offshore Energy** (50/50 JV with PSEG ): up to 1GW of development



Under development



# Ørsted U.S. Offshore Wind

Attractive and geographically diverse portfolio of offshore wind assets: potential for 8-10GW



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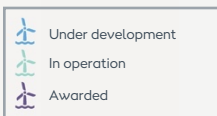
**Skipjack Wind** 120MW

**Coastal Virginia Offshore Wind** (EPC contract): 12MW demo project

## Under Development

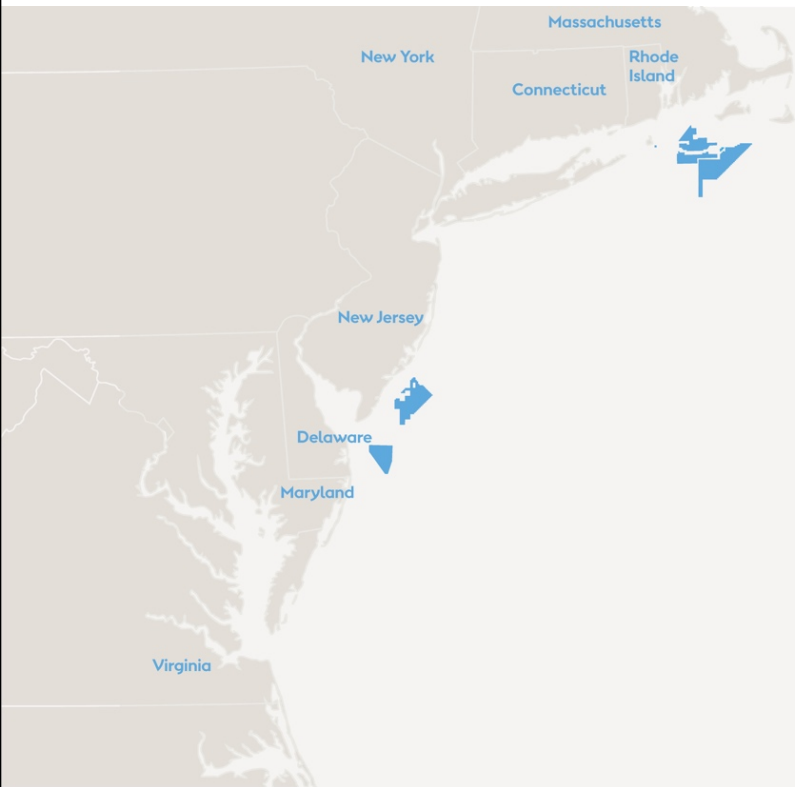
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# Ørsted U.S. Offshore Wind

Attractive and geographically diverse portfolio of offshore wind assets: potential for 8-10GW



## Scale

Large scale cluster projects in the North East (MA, CT, RI, NY) and Mid Atlantic (NJ, DE, MD)



## Site proximity

Adjacent sites allow for significant synergy potential



## Geographic coverage

Most comprehensive geographic coverage with opportunity to bid into all states from MA to VA



## Attractive partners

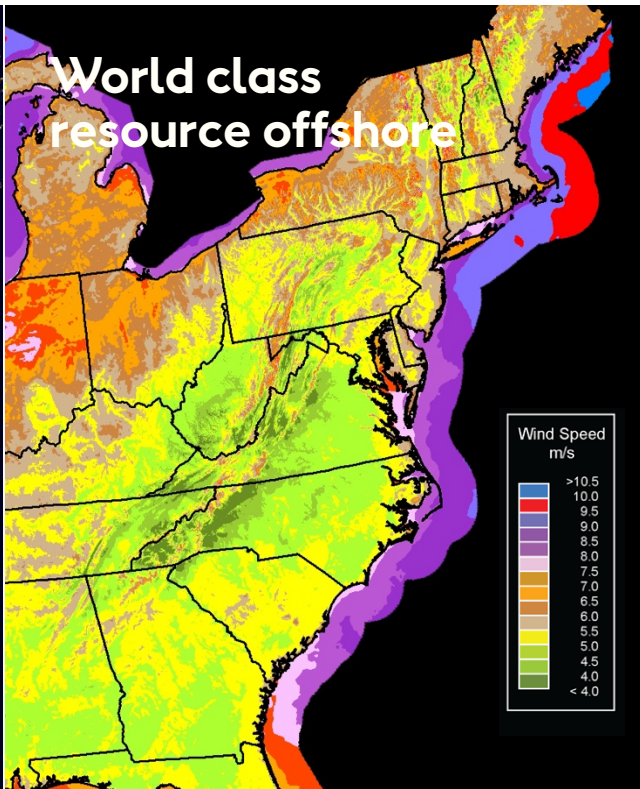
Joint ventures with leading utilities in New England (Eversource) and New Jersey (PSEG) bring strong, local transmission know-how

## Why offshore wind

**Huge coastal  
electricity demand**



**World class  
resource offshore**



**Large buildable  
continental shelf**

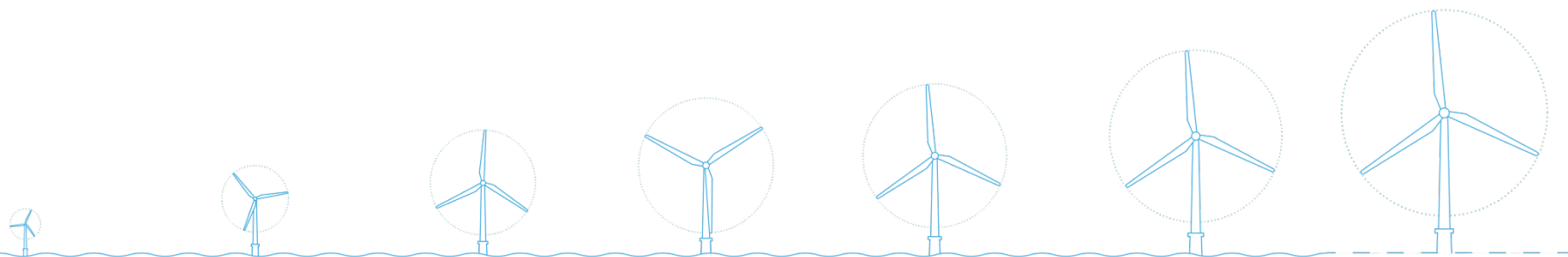


# Rapid Advances in Offshore Turbine Technology



**Boeing 747**

Length: 250 ft



## **Vindeby**

Year: 1991  
Diameter: 115 ft  
Tower Height: 115 ft  
Capacity: 0.45 MW

## **Middelgrunden**

Year: 2001  
Diameter: 250 ft  
Tower Height: 210 ft  
Capacity: 2.00 MW

## **Anholt**

Year: 2013  
Diameter: 392 ft  
Tower Height: 268 ft  
Capacity: 3.60 MW

## **Anholt**

Year: 2013  
Diameter: 394 ft  
Tower Height: 270 ft  
Capacity: 3.60 MW

## **Block Island Wind Farm**

Year: 2016  
Diameter: 505 ft  
Tower Height: 335 ft  
Capacity: 6.00 MW

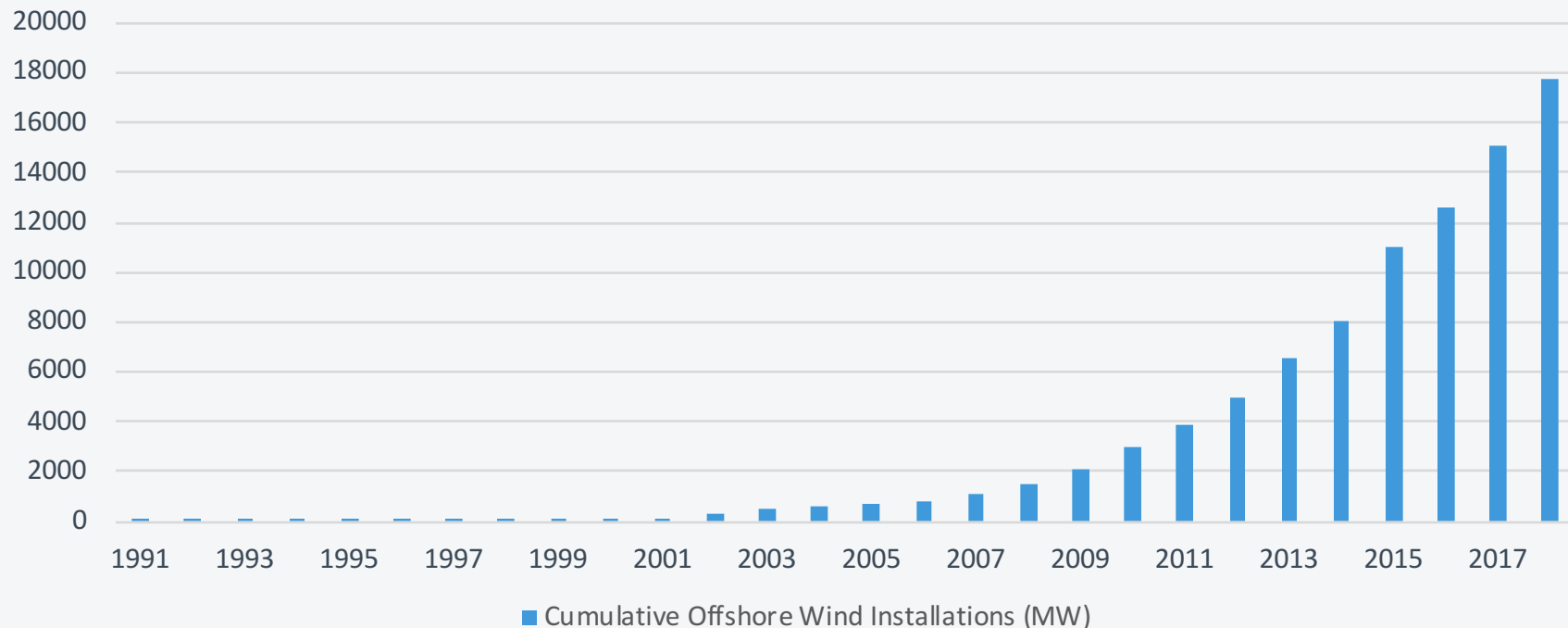
## **Burbo Bank Extension**

Year: 2017  
Diameter: 538 ft  
Tower Height: 370 ft  
Capacity: 8.00 MW

Year: 2022  
Diameter: 722 ft  
Tower Height: 502 ft  
Capacity: 12.00 MW\*

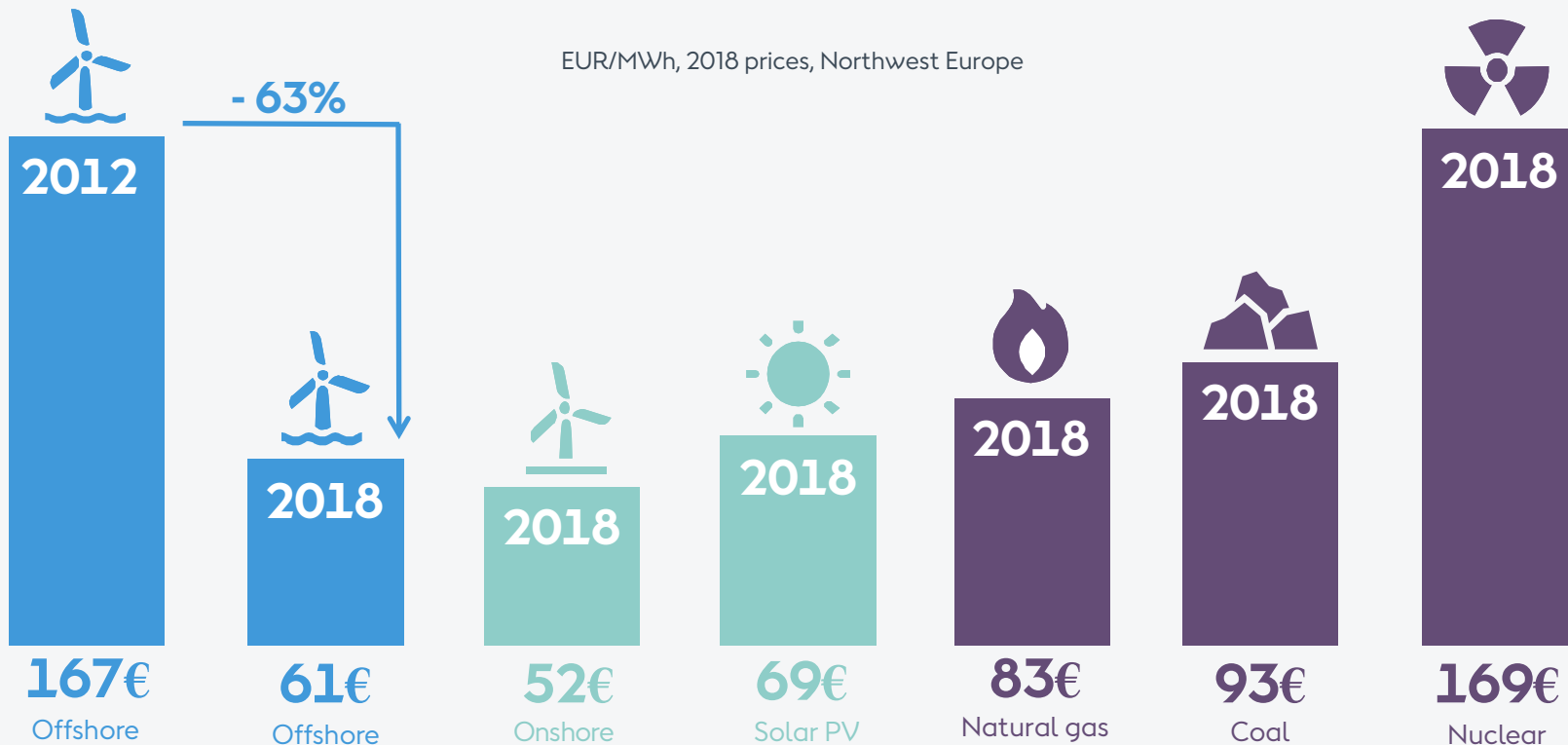
## Growth of Offshore Wind Globally

17.8GW in operation – 4,543 turbines spinning – 2.7 GW added in 2018



# Levelized cost of electricity for different technologies

The rapid cost reductions in the industry, have made offshore wind power competitive relative to conventional power generation based on fossil fuels



Source: Bloomberg New Energy Finance – 2H 2018 LCOE Update, current LCOE.

Onshore wind: average of DE, DK, NL and UK mid-scenarios. Solar PV, Gas: average of DE, UK mid-scenarios. Coal: DE mid-scenario. Nuclear: UK mid-scenario.

Offshore wind: 2012 generic offshore wind, Northwest Europe, FID 2012. In 2012 our goal was to reduce offshore wind costs to EUR 100 per MWh in 2020. 2018: average of relevant projects in NL, UK and DE with COD 2022-2024. NL: Hollandse Kust (zuid) I&II, UK: CfD Round 2, DE: OWP West, BRW I, BRW II. For DE and NL, additional EUR 15 per MWh assumed as transmission cost. Exchange rate EUR:USD: 0.88, YoY inflation 2017-2018: 1%.

# Winter Reliability in New England

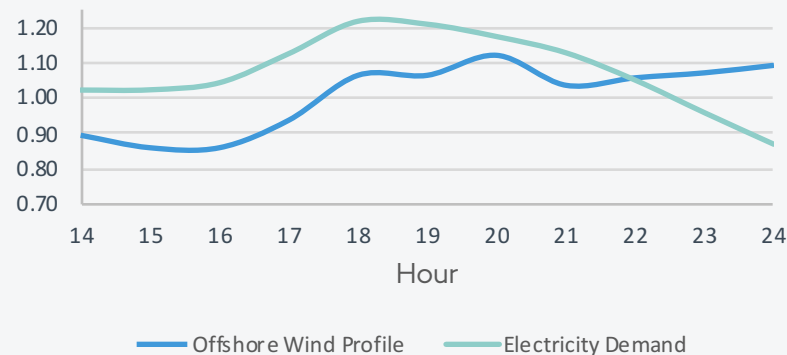
To meet demand during winter months, the New England region becomes extremely dependent on oil and natural gas.

Offshore wind is most productive in the winter, aligning with the region's electricity needs.

In the winter of 2017/2018 over a two week period:

- Customers paid an additional \$700 million dollars in wholesale electricity costs
- 85-90 million gallons of oil was burned, leading to an increase of 1 million tons of greenhouse gas emissions

Offshore Wind Generation vs Electricity Demand  
During Afternoon Hours  
(January)





# Investing in American Port Infrastructure



## Rhode Island

- Two ports: ProvPort and Quonset
- Investing \$40 million in upgrades
- Construction, fabrication, and operations for multiple projects



## New London

- Investing \$22.5 million in upgrades
- Committing an additional \$35 million in new capital expenditures for State Pier infrastructure improvements
- Supporting construction for regional projects



## Baltimore

- Former Bethlehem Steel site is an excellent heavy construction facility
- Investing \$38 million in fabrication and port upgrades
  - \$13.2 million invested at Tradepoint Atlantic
- Serving the Skipjack Wind Farm project



## Long Island

- Constructing a new Operations and Maintenance (O&M) hub in the greater Port Jefferson area
- Creating up to 100 permanent full-time jobs and economic investment for Long Island
- Will be used to dock our Service Operation Vessel



# Block Island Wind Farm

America's first offshore wind farm



**30MW project**



**17,000 homes**



**First in the nation**



# Project Updates

# Revolution Wind

## Awarded

- 50/50 JV with Eversource, New England's largest energy company
- Three power contracts to date
  - CT 200MW - approved by regulators in December 2018
  - RI 400MW - contract approved by RI PUC in June 2019
  - CT 104MW - awarded
- Will power over 400,000 CT and RI homes

## Schedule

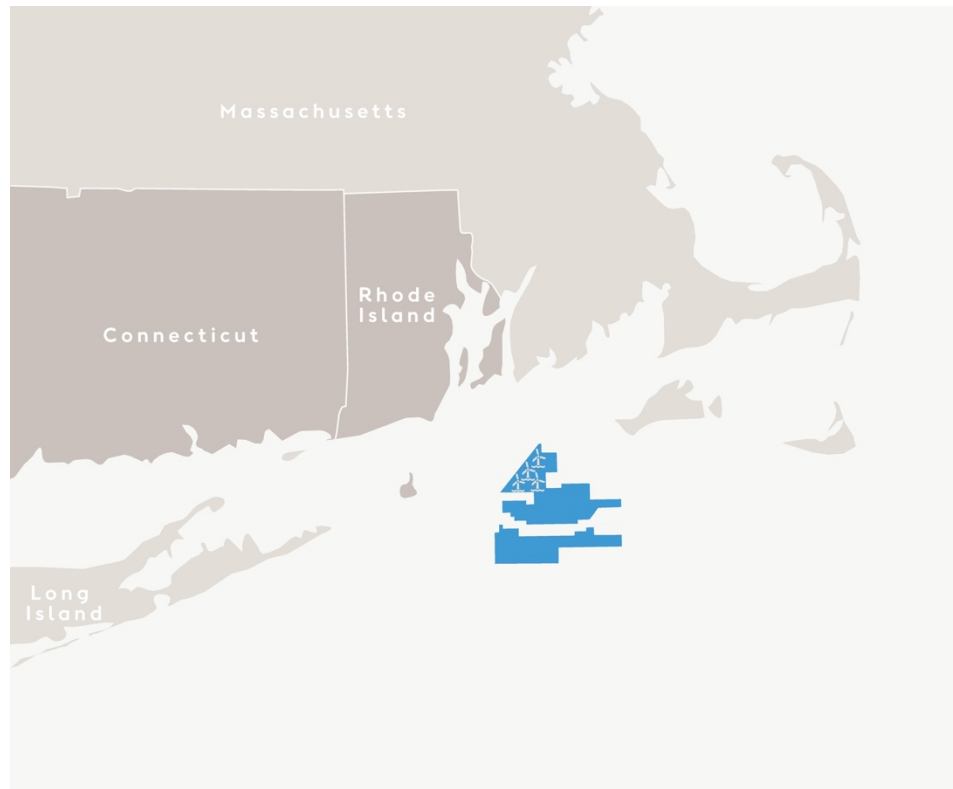
**Ongoing** Stakeholder meetings

**2019** Apply for permits

**2021** Permit approvals

**2021** Installation begins offshore

**2023** Commercial operations



# South Fork Wind Farm

## Awarded

- 50/50 JV with Eversource, New England's largest energy company
- Approximately 130 MW
- 35 miles east of Montauk Point
- Will power 70,000 Long Island homes
- The South Fork Export Cable will deliver power to the substation located off Cove Hollow Rd in the Town of East Hampton

## Schedule

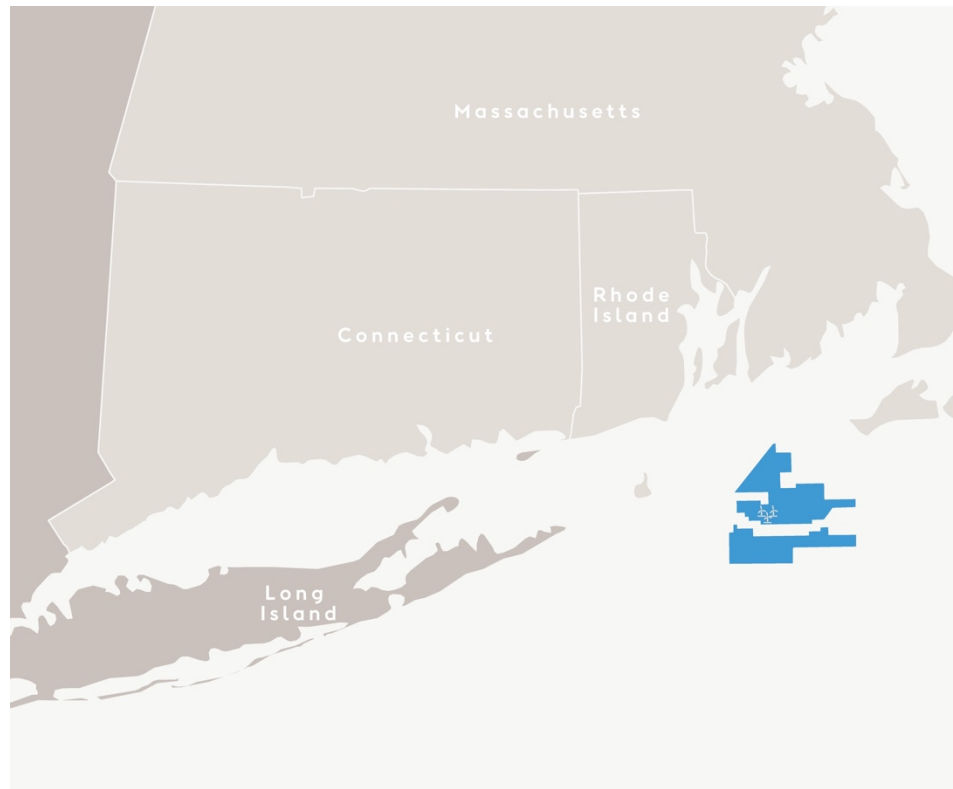
**Ongoing** Stakeholder meetings

**2018** Apply for permits

**2020** Permit approvals

**2021** Installation begins offshore

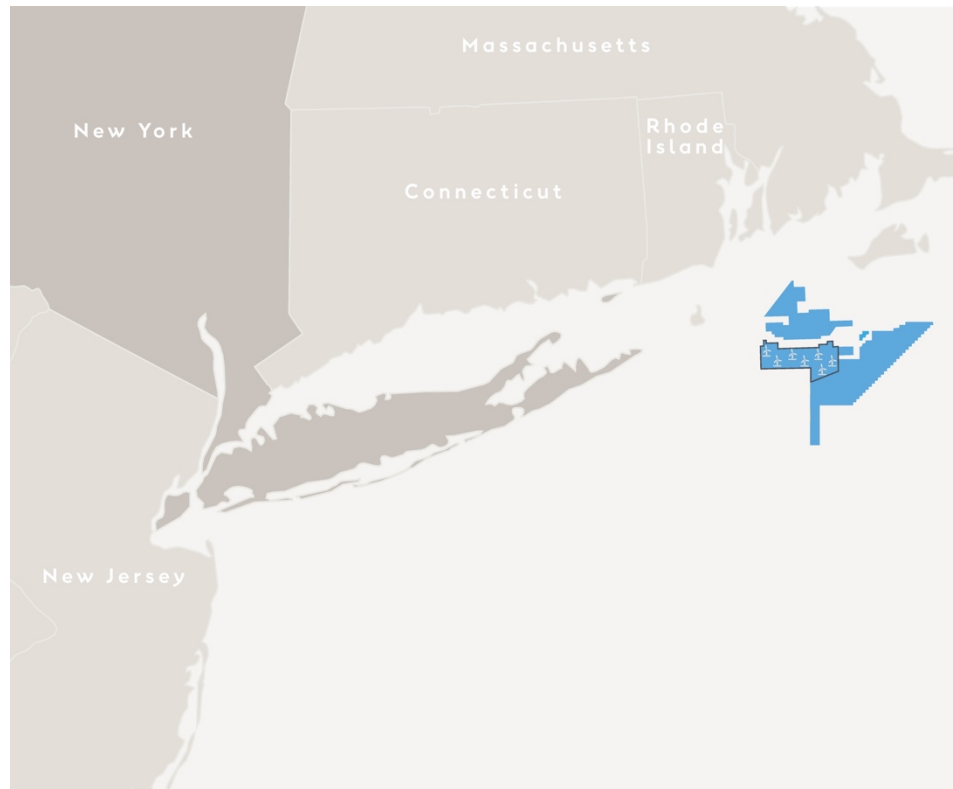
**2022** Commercial operations



## Sunrise Wind

### Awarded

- 50/50 JV with Eversource, New England's largest energy company
- 880 MW – New York's largest offshore wind farm
- 30 miles east of Montauk Point
- Will power over 500,000 homes
- Sunrise Wind is supported by Con Edison Transmission and NYPA, who will cooperate in the development of the transmission system
- Construction is planned to start in the early 2020's, with the wind farm operational in 2024



## Ocean Wind

### Awarded

- Support from PSEG
- 1,100 MW - the **largest** offshore wind farm in the U.S. to date
- 15 miles off the coast of Atlantic City to minimize visual impacts
- Will power over half a million NJ homes
- Construction is planned to start in the early 2020's, with the wind farm operational in 2024



# Skipjack Wind

## Awarded

- 19 miles off the coast of Delaware
- Awarded 120 MW ORECs by State of Maryland
- Clean energy will be delivered to the Delmarva peninsula at an existing coastal substation
- Will power over 35,000 homes

## Schedule

**Ongoing** Stakeholder meetings

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**2019** Apply for permits

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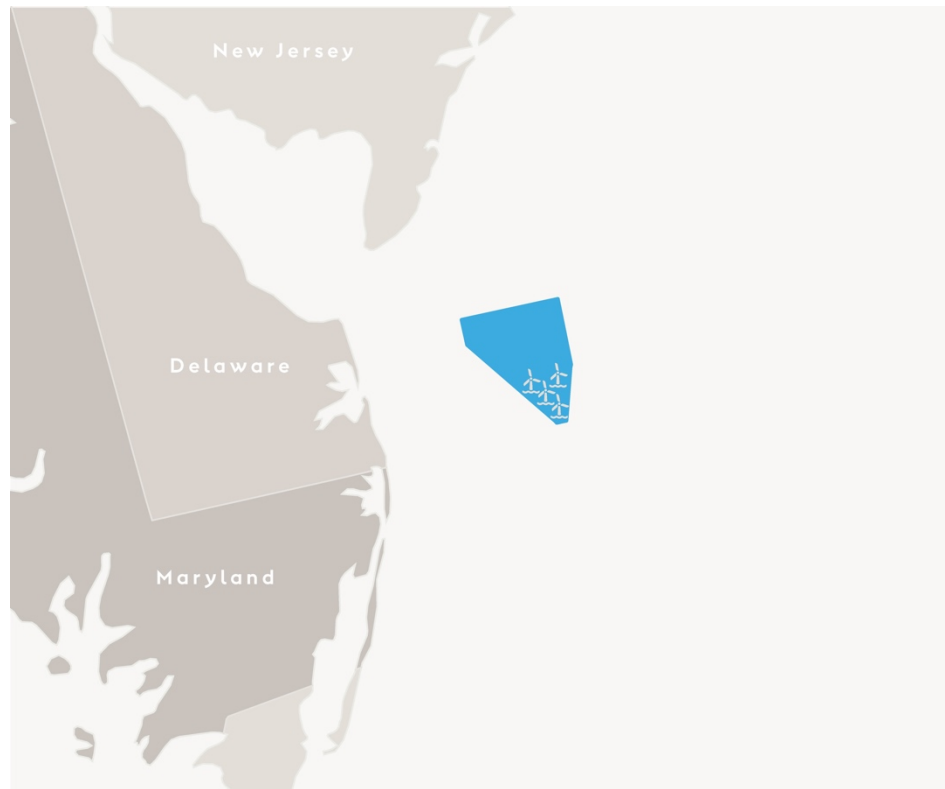
**2021** Permit approvals

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**2022** Installation begins offshore

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**2022** Commercial operations



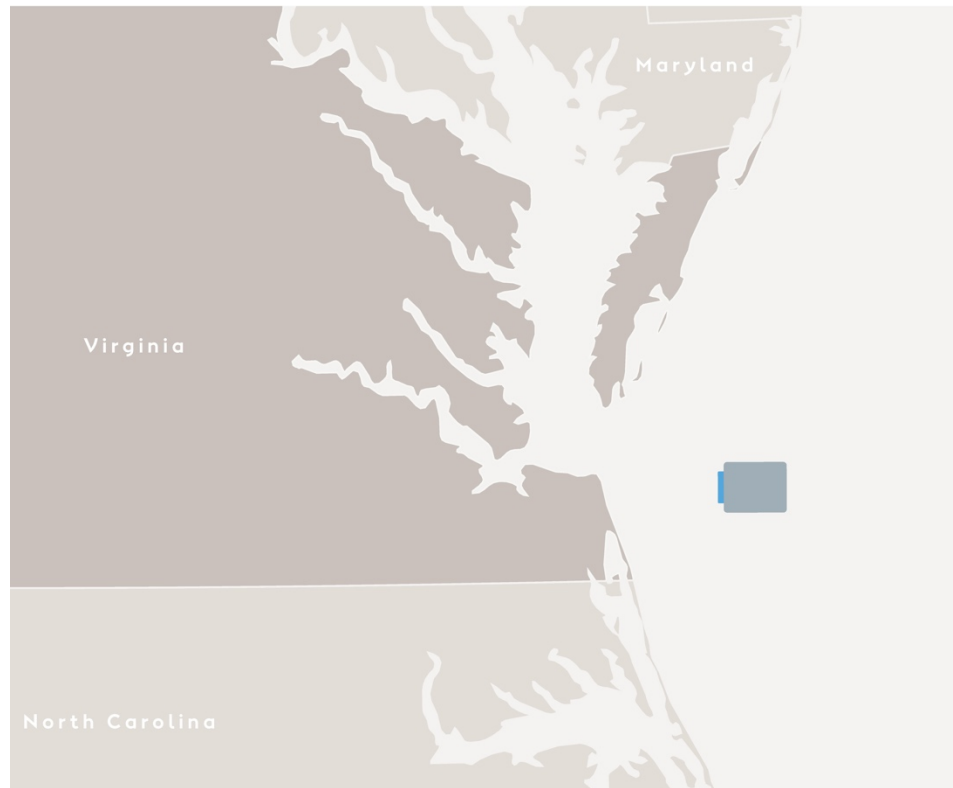
# Coastal Virginia Offshore Wind (CVOW)

## Awarded – EPC contract

- Ørsted is the EPC contractor for Dominion Energy on the CVOW project
- 12MW (2 six-megawatt turbines) demonstration project – enough to power 3,000 homes
- Located in a BOEM research lease held by the Department of Mines, Minerals and Energy approximately 27 miles from the City of Virginia Beach
- Located adjacent to the Virginia Commercial Wind Energy lease Area held by Dominion Energy
- The cable will come onshore at Camp Pendleton, located in the City of Virginia Beach

## Schedule

<b>2019</b>	Onshore construction begins
<b>2019</b>	Fabrication of turbines and foundations
<b>2020</b>	Installation begins offshore
<b>2020</b>	Commercial operations

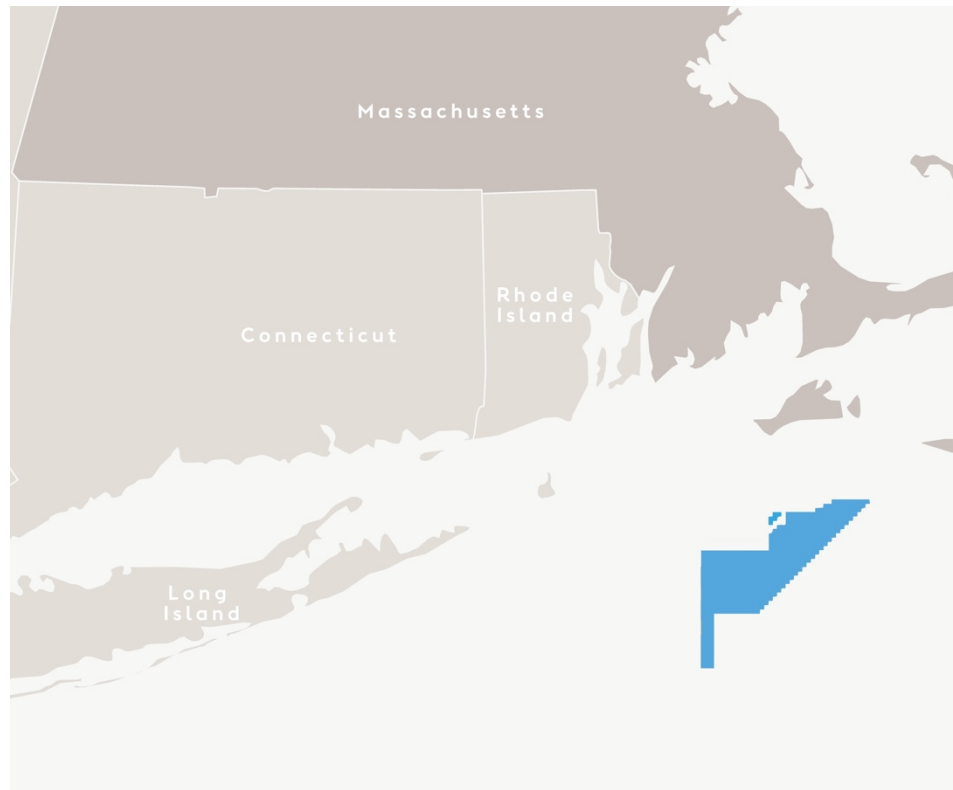




## Bay State Wind

Under development

- 50/50 JV with Eversource, New England's largest energy company
- ~14 miles south of Martha's Vineyard
- 73,657 acres within Massachusetts Wind Energy Area Lease OCS-A 0500
- Up to 2,000MW potential capacity



**We are committed to  
our stakeholders**

# RODA and Ørsted Partnership



This **first-of-its-kind partnership** will create an unprecedented opportunity for commercial fishermen to provide direct input to the wind energy industry on matters of significant interest to their businesses.

*“It is extremely vital that our nation’s fishermen are heard when offshore wind projects are being developed. We need to develop solutions for offshore wind energy and commercial fishing to coexist.”*

— Annie Hawkins, RODA Executive Director

## POLITICO

### Ørsted partners with fishing industry group to address conflicts

By DANIELLE MUOIO

Ørsted, a Danish offshore wind company, has partnered with a group representing the fishing industry to improve communications between developers and industry leaders.

The first-of-its-kind partnership, announced today in a press release, comes as New Jersey and New York face opposition from the fishing industry over a proposal to open new areas for offshore wind leasing in the New York Bight, which stretches from Long Island to Cape May. The industry has raised concern that development may impede navigation to popular fishing spots.

## SouthCoastTODAY

### New partnership develops with goal of improving talks between offshore wind, fishing

By Michael Donner

Posted Jan 17, 2019 at 8:19 PM

Updated Jan 17, 2019 at 8:19 PM

**NEW BEDFORD** — The pool of organizations aiming to generate a mutually beneficial relationship between offshore wind and the commercial fishing industry grew on Thursday.

The Responsible Offshore Development Alliance (RODA) announced a partnership with Ørsted U.S. Offshore Wind that is meant to improve communications between the fishing industry and offshore wind developers.

While the agreement was described as a “first-of-its-kind” partnership in the press release, it’s not the first pact agreed upon with the hopes of improving communication.



Great news for @RODA and @ØrstedNA communicating between #offshorewind and #fisheries! This is progress.

**Joe Marlowe** *Executive Director* [@jmarlowe](#)  
Really nice. I've heard a lot of good things about the idea to progress. The hope is that the fishing industry and offshore wind can work together to improve communication and address the challenges of offshore wind development.

10:45 AM - 17 Jan 2019

1 Retweet 1 Like



@RODAfisheries & @ØrstedNA have announced a partnership to improve communications between commercial fishing & #OffshoreWind.

**RODA and Ørsted Partner to Address Fisheries and Offshore Wind**  
January 17, 2019 — BOSTON — The following was released by the Responsible Offshore Development Alliance and Ørsted: The Responsible Offshore Development Alliance (RODA) today announced a partnership with Ørsted U.S. Offshore Wind to improve communications between the commercial fishing industry and offshore wind developers.

12:00 PM - 17 Jan 2019

1 Retweet 1 Like

## north american WINDPOWER

### New Ørsted Partnership To Strengthen Fisheries, Offshore Wind Coexistence

Article Reprinted January 17, 2019

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The Responsible Offshore Development Alliance (RODA) has entered into a partnership agreement with Ørsted U.S. Offshore Wind to improve communications between the commercial fishing industry and offshore wind energy developers.

The new fishing partnership is designed to give commercial fishermen the opportunity to provide direct input to the wind energy industry on matters of significant interest to their businesses. RODA is located from mid-coast Maine to the Outer Banks of North Carolina.



@reNEWS\_

Follow

Developer @Ørsted has entered into an agreement to improve communications between the commercial fishing industry and #offshorewind energy developers [renews.biz/51049/](https://renews.biz/51049/)



9:34 AM - 17 Jan 2019

1 Retweet 2 Likes

# Fisheries Outreach Resources



Fisheries Liaisons



Fisheries Representatives



Outreach – early and often



Input on project layout  
and design



Collaborative design



# Fisheries Outreach Philosophy



## We will...



Promote the smart growth of the American offshore wind industry



Focus on maintaining access and navigation in and around our wind farms for all ocean users



Complete scientific research collaboratively with the fishing community



Be accessible and available

# Engagement across the spectrum of stakeholders



## Local community –

Engagement early and often in the local communities near the project location



## NGOs –

Local, state, regional, and national non-profits



## Fishing –

Commercial and recreational, plus shore-side supply chain



## Academic –

University, college, and other academic partners



## Research and Development –

National labs, research institutions, private entities