MAYFLOWER WIND

Mayflower Wind
Project Introduction

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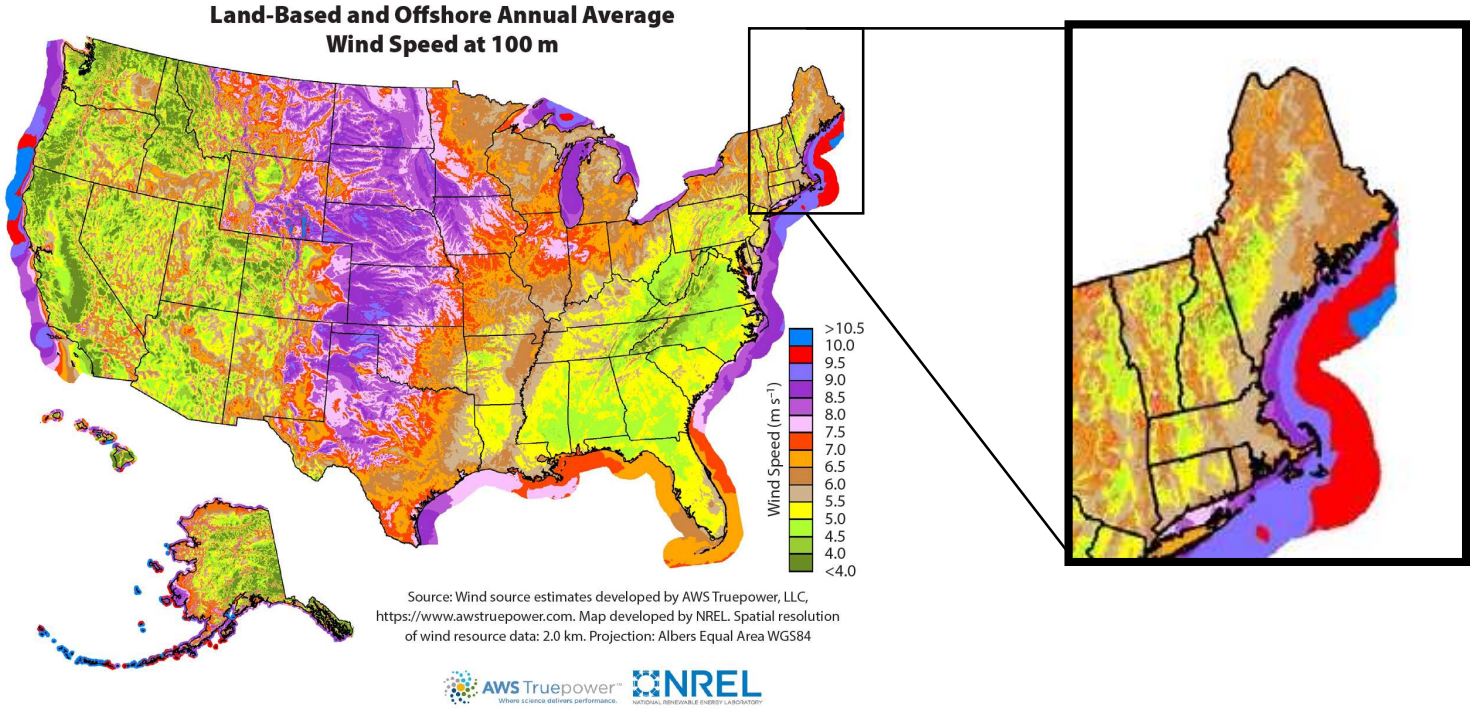
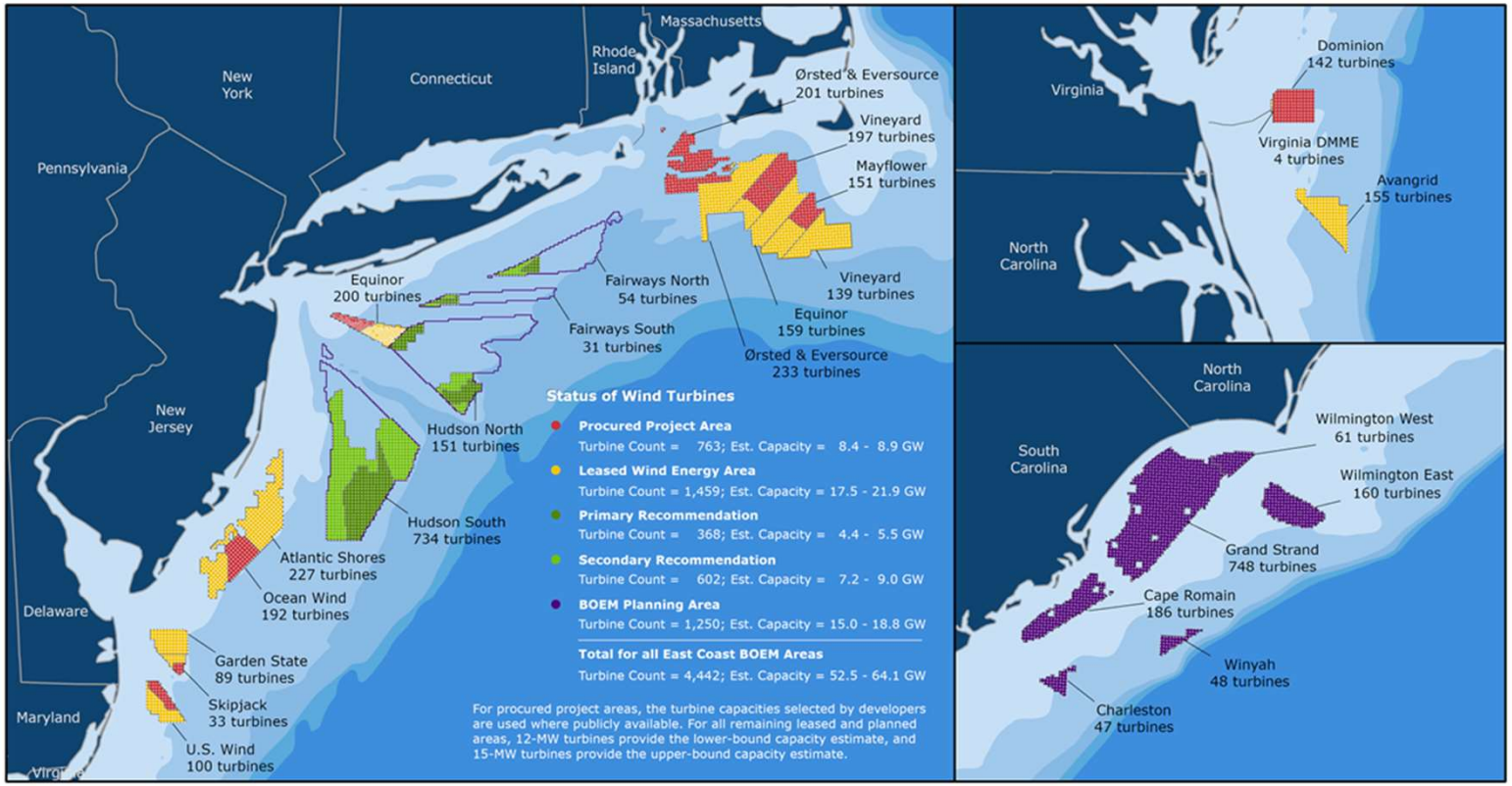
Agenda

- Intro
- Current Offshore Wind Landscape
  - Massachusetts' procurement efforts
- About Mayflower Wind
- Project Components
- Permitting and Developing an Offshore Wind Project
- Concluding Remarks

Wind speeds average between 21-23 mph in offshore New England

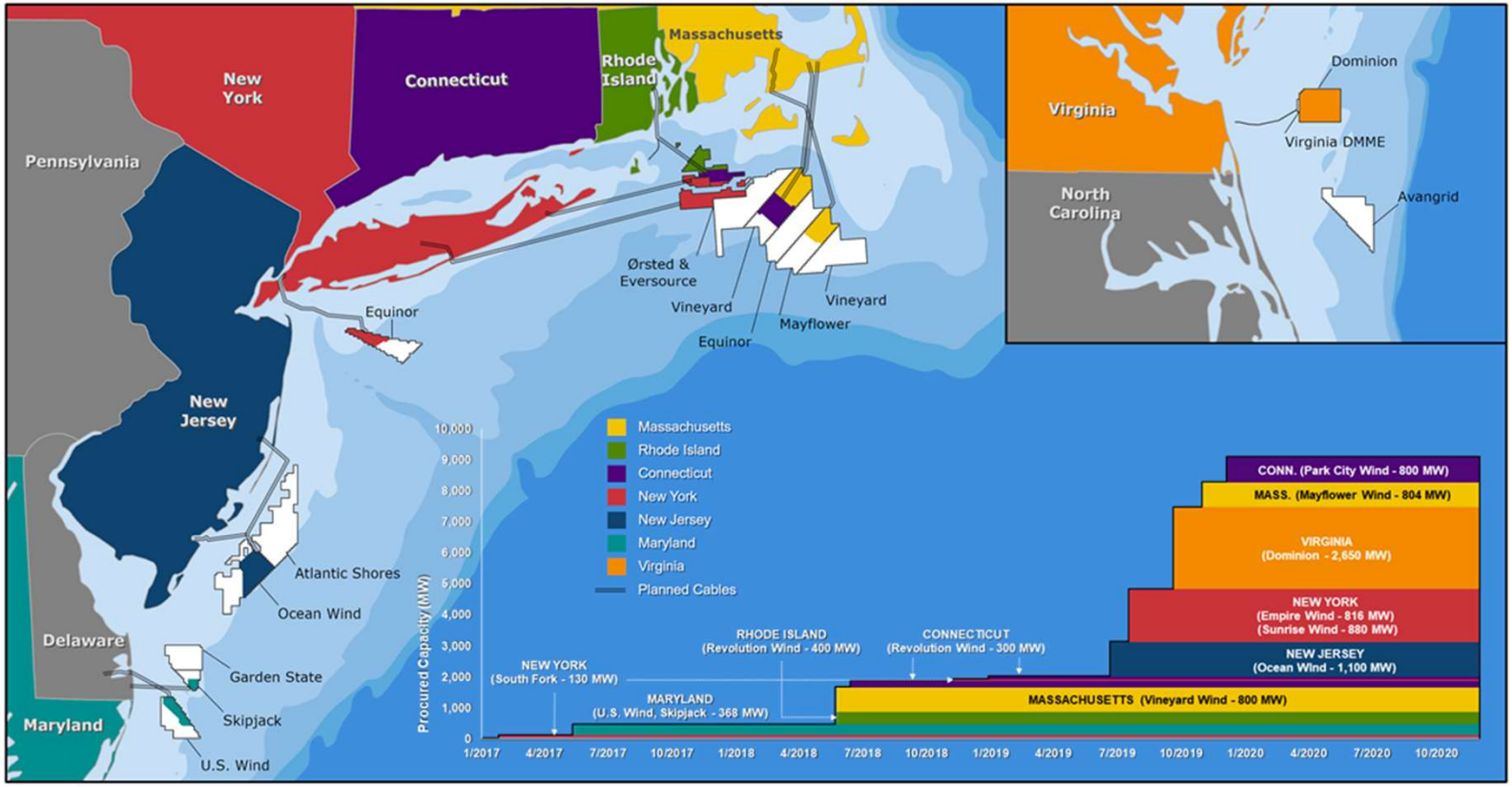


Offshore Wind areas are being developed up and down the US east coast

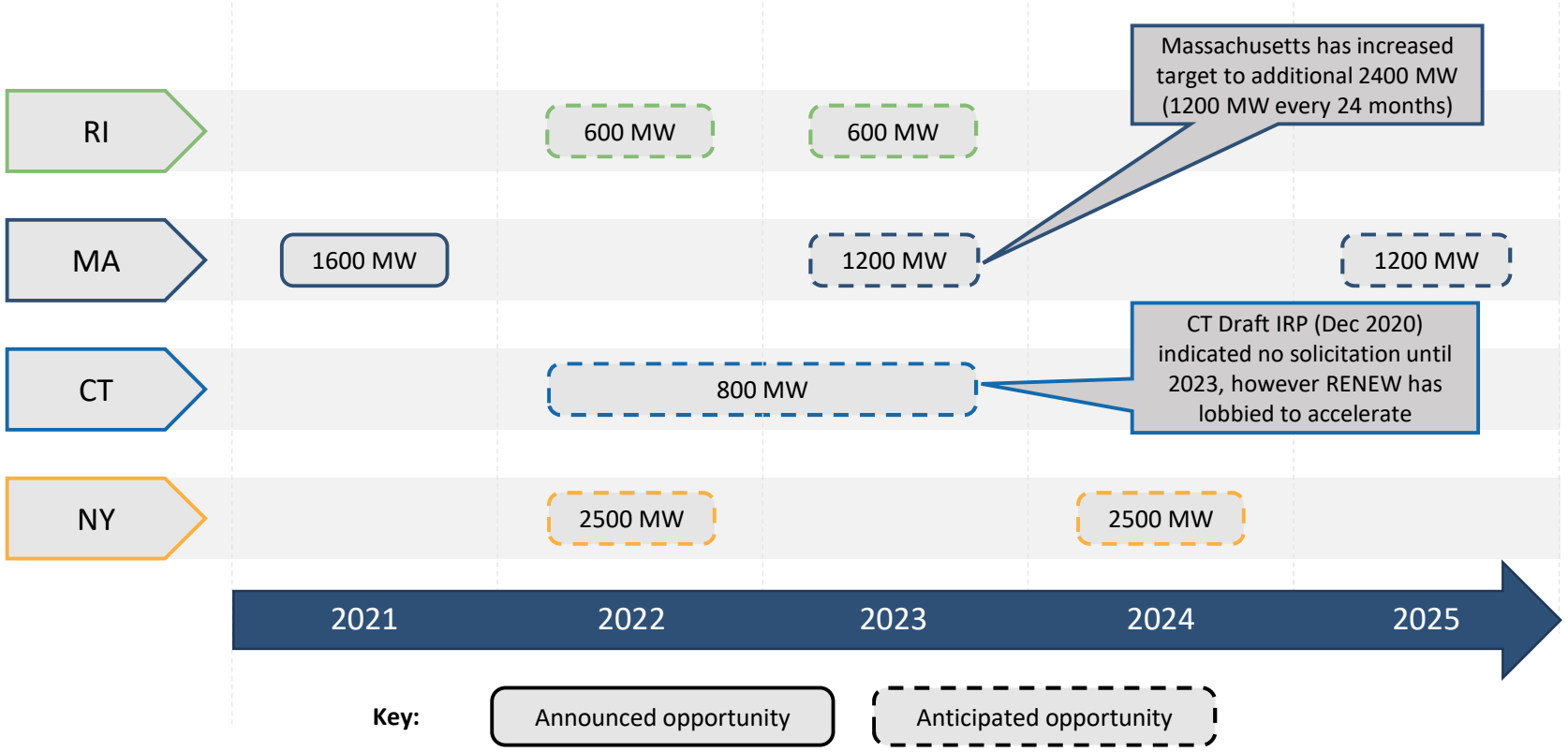


Source: Kelly Smith / Tufts

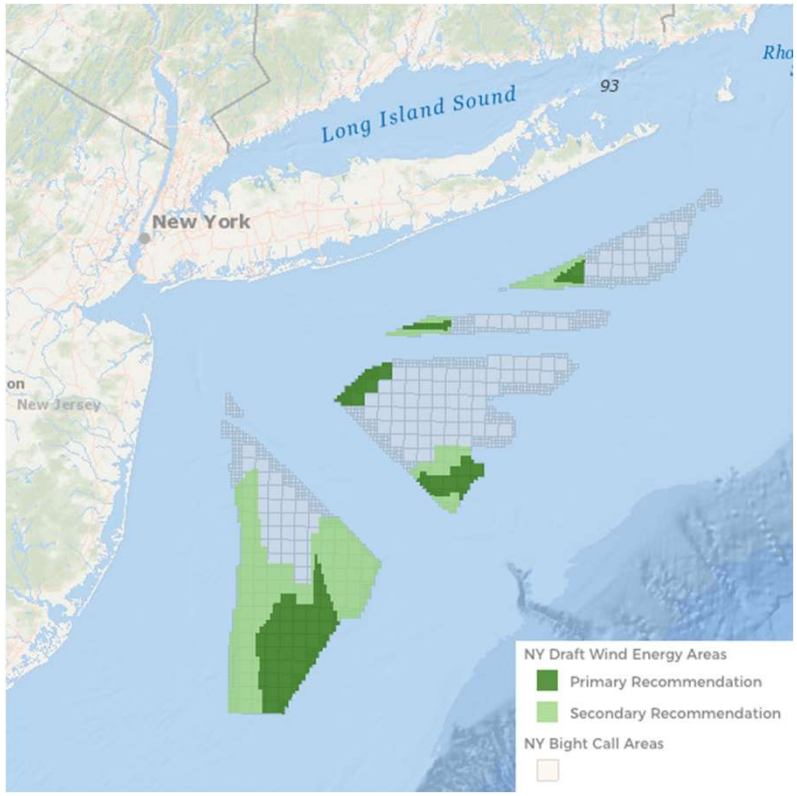
State procurement efforts are heating up



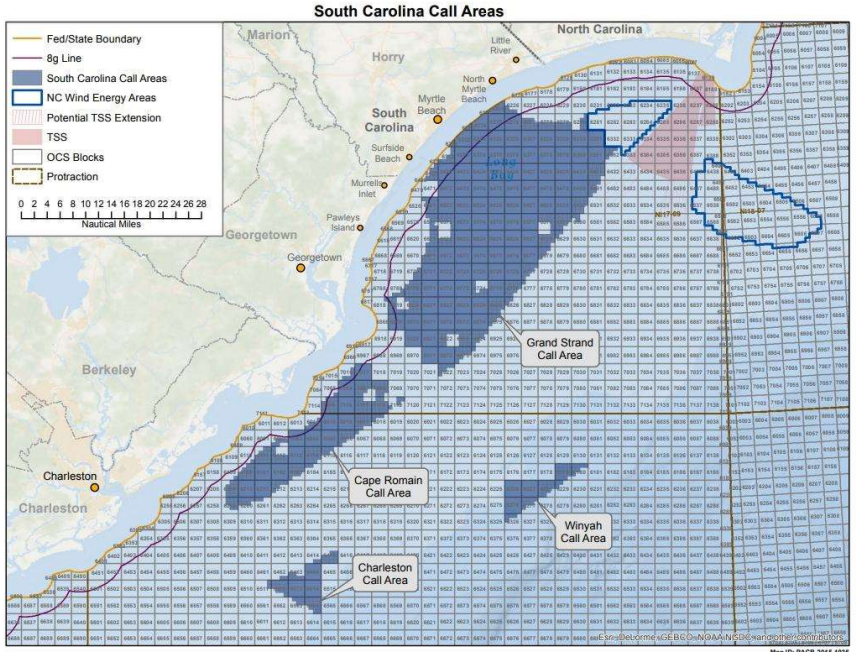
We expect additional offtake opportunities in the next few years



BOEM is creating additional lease areas in 2021-2022

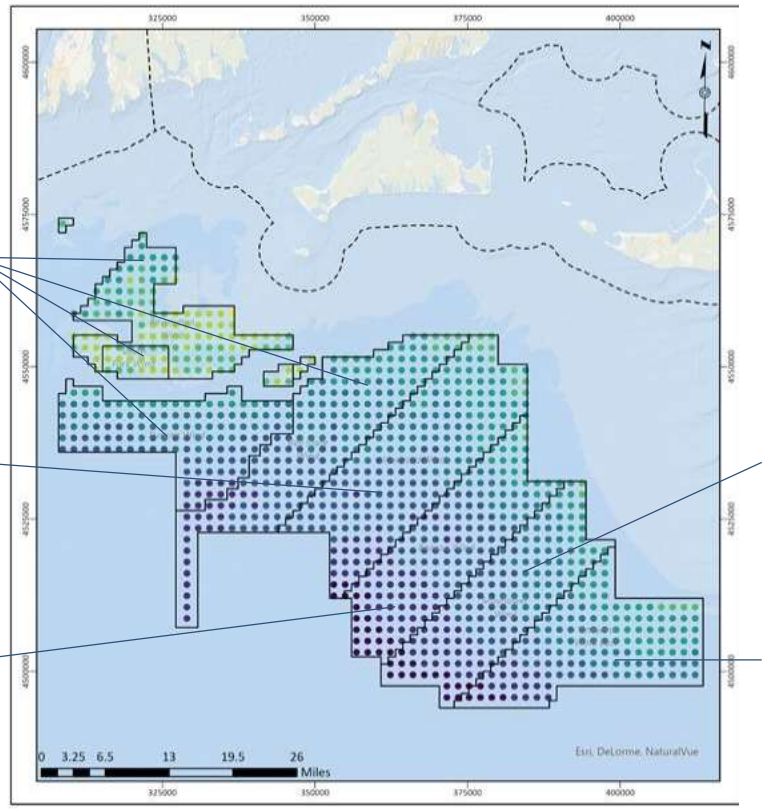


Source: Northeast Ocean Data

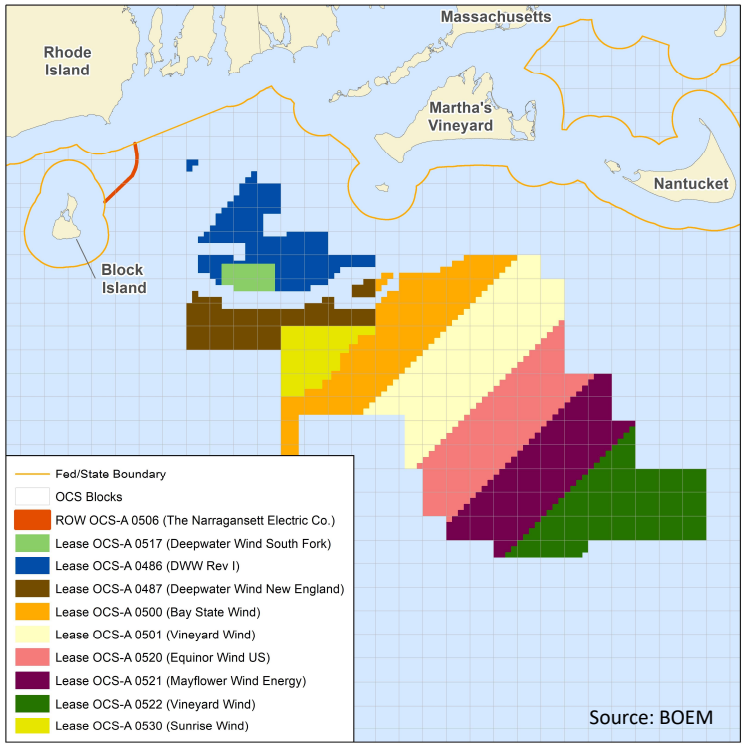


Source: BOEM

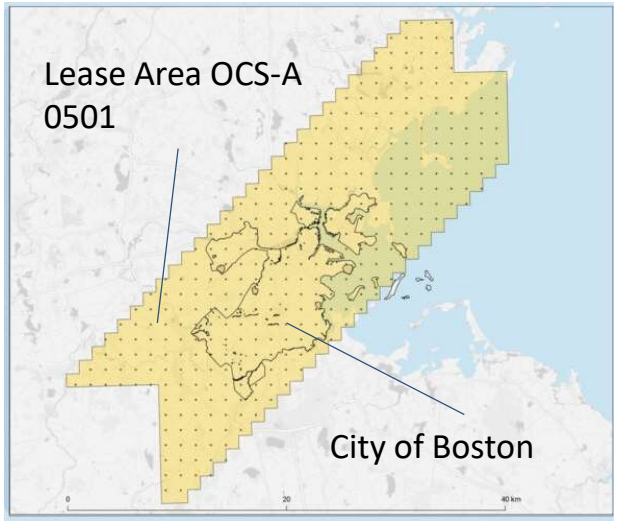
Mayflower's project is in the RI-MA Wind Energy Area



How big are these lease areas?

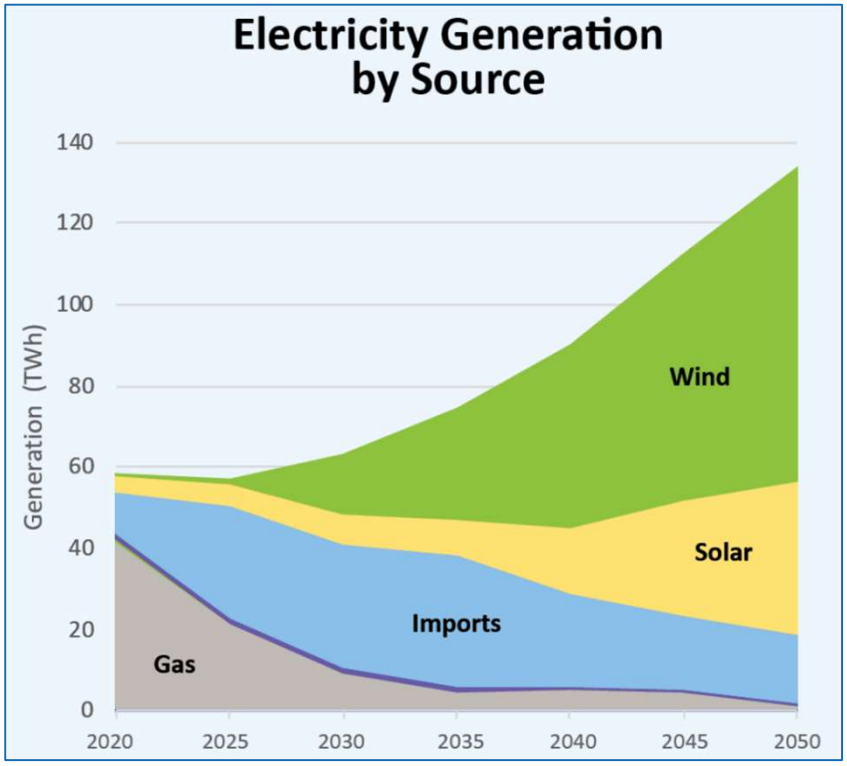


Source: BOEM



Source: Lautec

Massachusetts' Net-Zero Carbon Emissions Goals



Source: MA Executive Office of Energy & Environmental Affairs

"[MA Energy and Environment Secretary] Theoharides said […] that getting to **net-zero by 2050** is projected to require having about **15 gigawatts of offshore wind power** on the grid. To get there, she said, Massachusetts will need to hit a pace in the 2030s where it has about 1 GW of new offshore wind power coming online each year."

State House News Service, February 3, 2021

Massachusetts: An Offshore Wind Hub

- Mayflower Wind has committed to invest in programs administered by MassCEC over 25 years that help make the Commonwealth a hub for offshore wind energy:
  - $35 million – ports & infrastructure
  - $10 million – innovative technologies
  - $5 million – workforce development
  - $5 million – applied research

"As we look ahead, we need to take steps now to position the Commonwealth of Massachusetts as a national leader making the most of our ocean resource. To stop now would squander great environmental and economic potential,"
Patricia Haddad, State Representative, 5th Bristol

Source: https://commonwealthmagazine.org/opinion/next-steps-on-offshore-wind/

MA 83C III RFP at a glance

- **Maximum price is $77.76/MWh**
- Selection committee consists of:
  - EDCs (Eversource, National Grid, Until)
  - Department of Energy Resources (DOER)
  - Independent Evaluator
  - Secretary of Housing and Economic Development
- Maximum total award of 1600 MW
- Proposals may be between 200–1600 MW, no preferred size
- Required submissions:
  - Price Worksheet; Bid response form; exceptions to form PPA; attestations; Bid Fees
  - Economic Development Summary Worksheet
  - Independent Energy Yield Analysis Report
  - Diversity & Inclusion Plan (Supplier Diversity Program Plan & Workforce Diversity Plan)
  - System Impact Study/Deliverability Constraint analysis

Key Milestones

Event	Date
Issue RFP	7 May
Bidders' Conference	18 May
Submission of Confidential Proposals	16 September
Submission of Public Proposals	23 September
Selection of Proposals for Negotiation	17 December

Mayflower Wind is a 50-50 JV between Shell and OW

Backed by two global energy companies with deep experience in working alongside communities and managing the complexities of offshore and onshore energy development projects

Shell's ambition is to become a net-zero emissions energy business by 2050 or sooner

Ocean Winds – a joint venture of EDP Renewables and ENGIE – share a vision where renewables, particularly offshore wind, play an essential role in the global energy transition

Mayflower Wind is guided by our core values

Investing in Communities

We are committed to building responsible partnerships by supporting economic development and providing jobs

Zero Harm

We are committed to treating our people, community, and environment with care.

We believe in safety first and safety always

Innovation and Industry Development

We expect innovation will continue to drive the rapid decline in the cost of wind energy and aim to be a leader in this industry

Mayflower Wind – Timeline

DEC
2018

Mayflower Wind was awarded the federal offshore lease area OCS-A-0521

JAN
2020

Mayflower Wind executed a 20-year power purchase agreement in January 2020 for 804 MW with the Massachusetts electric distribution companies

MID
2020s

We expect to deliver clean energy from the project by the mid-2020s

We expect to bid on other solicitations to provide additional MWs of clean energy to New England

Mayflower Wind

- Mayflower Wind will be among the single largest contributors towards the Commonwealth's net-zero emissions goal

The project will **eliminate over 2 million metric tons of GHGs annually,** which is equivalent to removing 5 million cars from the road

Ratepayers will **save over $2 billion** over the life of the project, according to the MA Department of Energy Resources

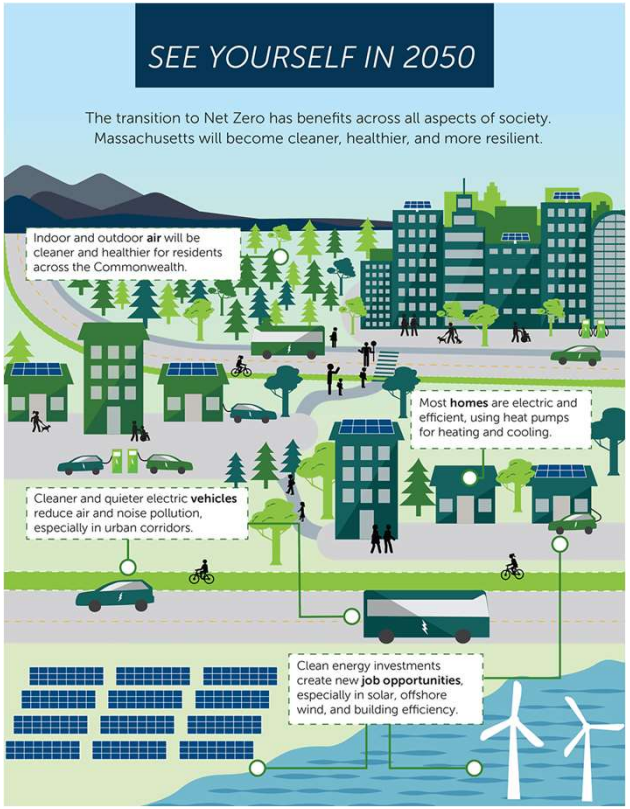
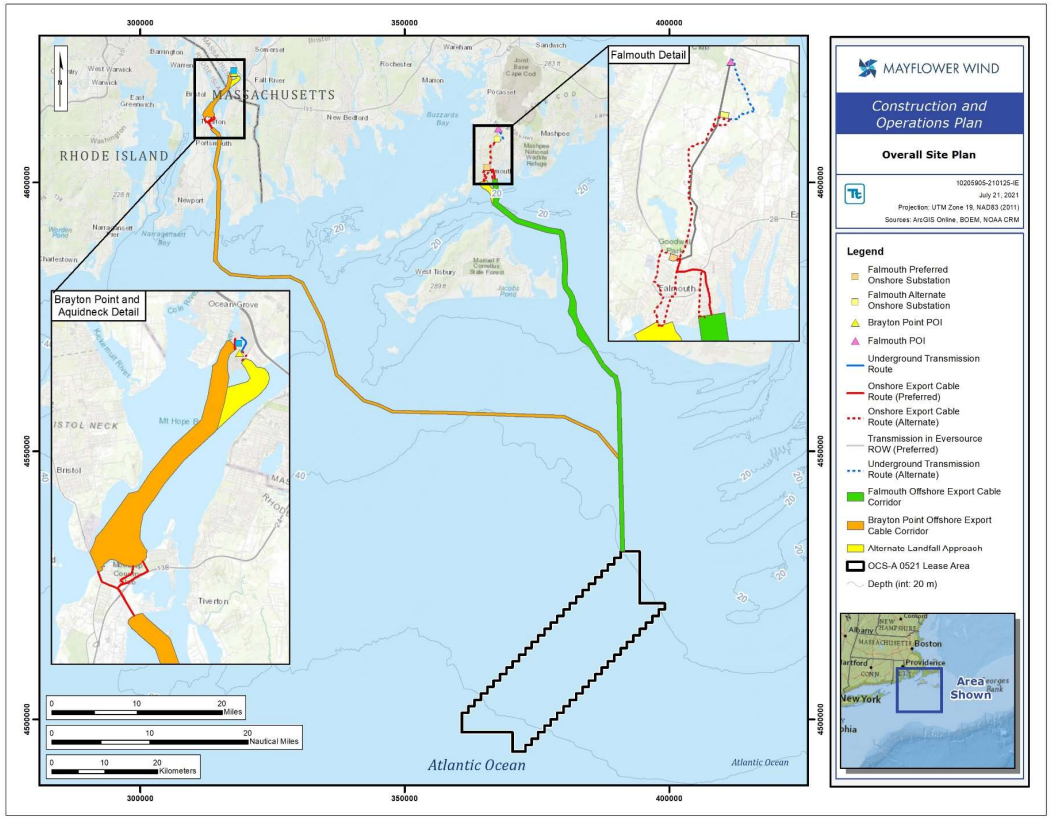


Image source: MA Decarbonization Roadmap Report

Project Area Overview

- OCS-A 0521 Lease Area
  - 127,388 acres
  - 20 nm (37 km) to Nantucket; 26 nm (48 km) to Martha's Vineyard
- 2 offshore export cable corridors
- Two points of interconnection:
  - Falmouth, MA
  - Brayton Point, Somerset, MA



Mayflower Wind

Lease: OCS-A 0521

Area: 127,000 acres (520 km^2)

Water depth

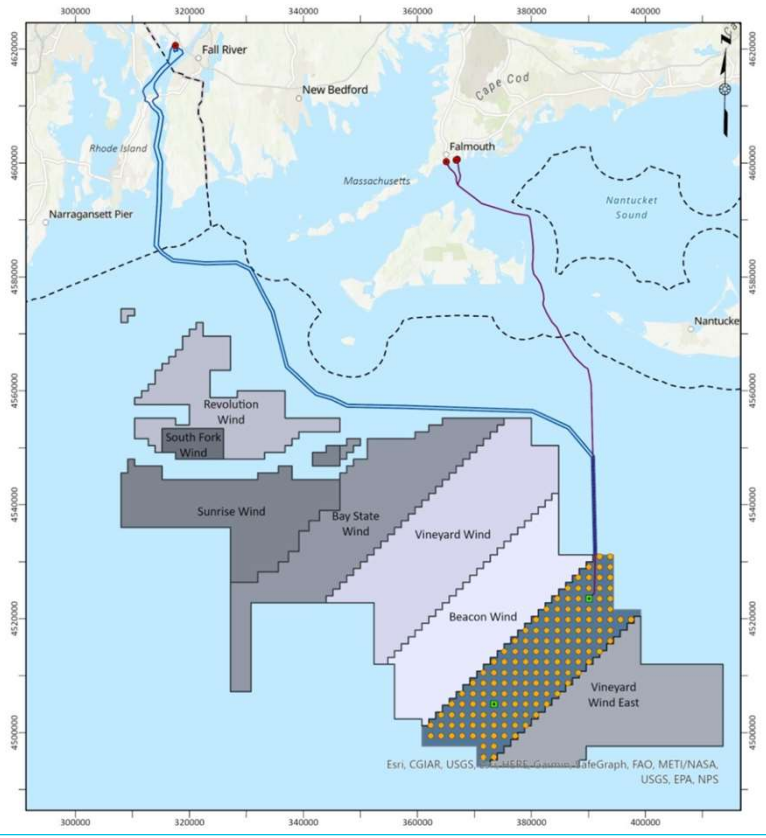
- 64% < 180 ft (55m)
- 36% > 180 ft (55m)

Average wind speed at 135m

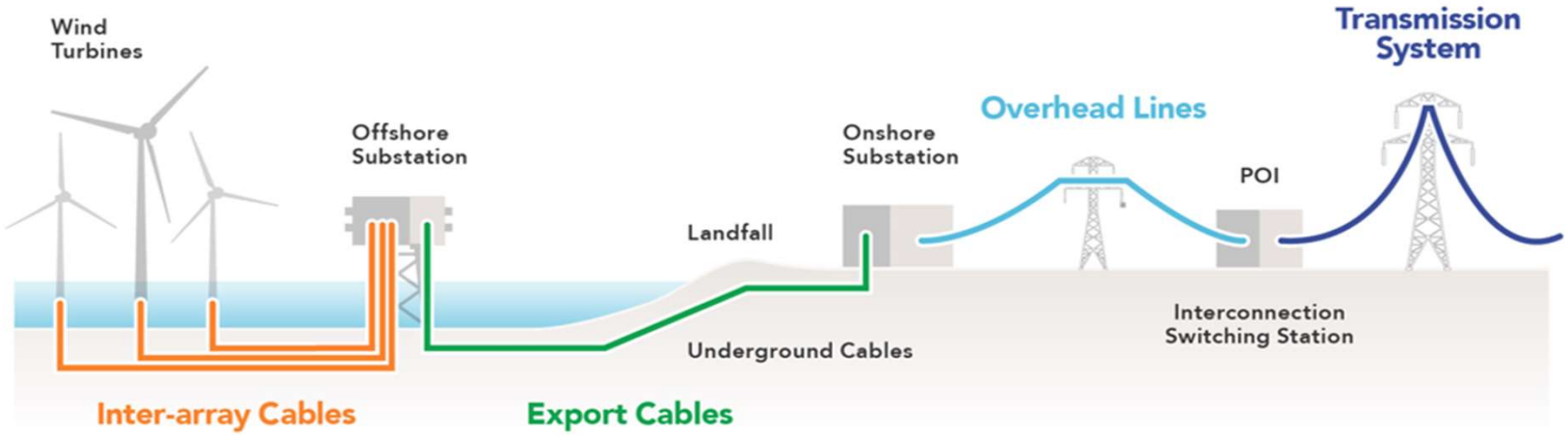
- 33 ft/s (10.1 m/s)

Potential

- ~2,000 MW depending on technologies

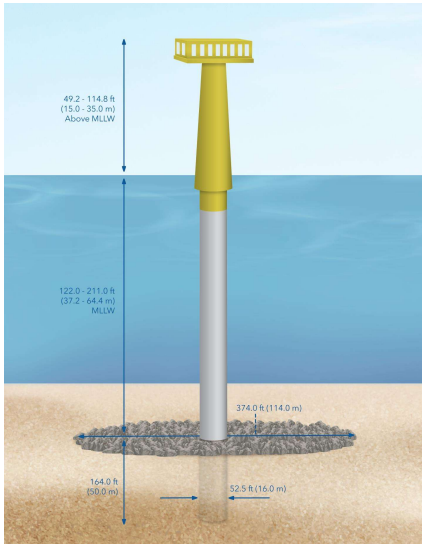


How Offshore Wind Works

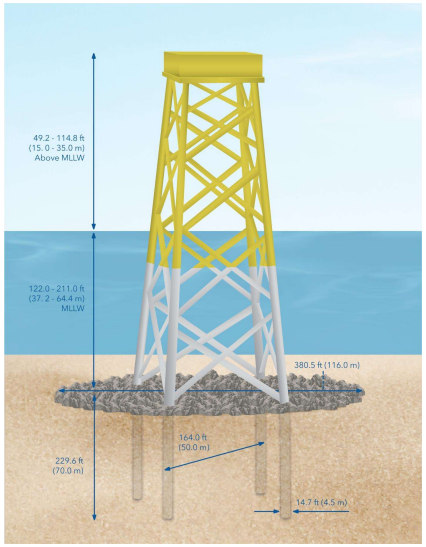


Foundations & Substructures

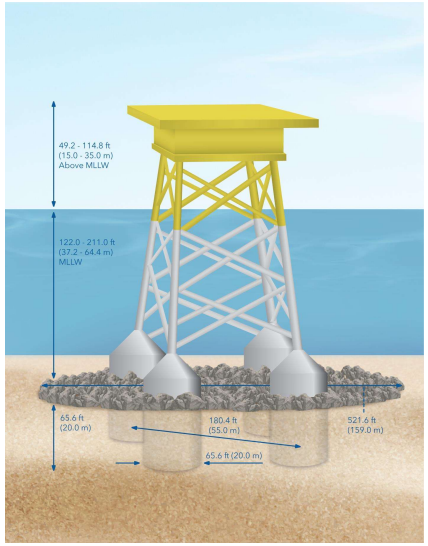
Monopile



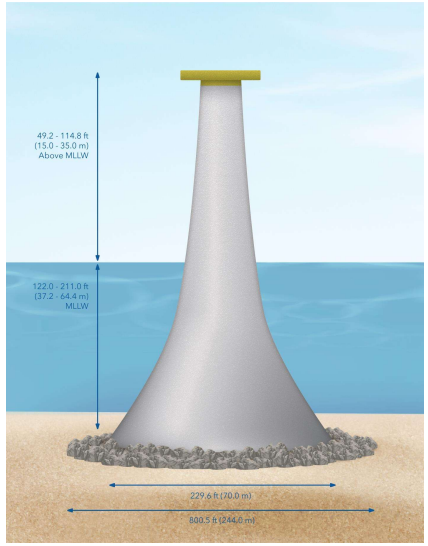
Pin Piled Jacket



Suction Bucket Jacket

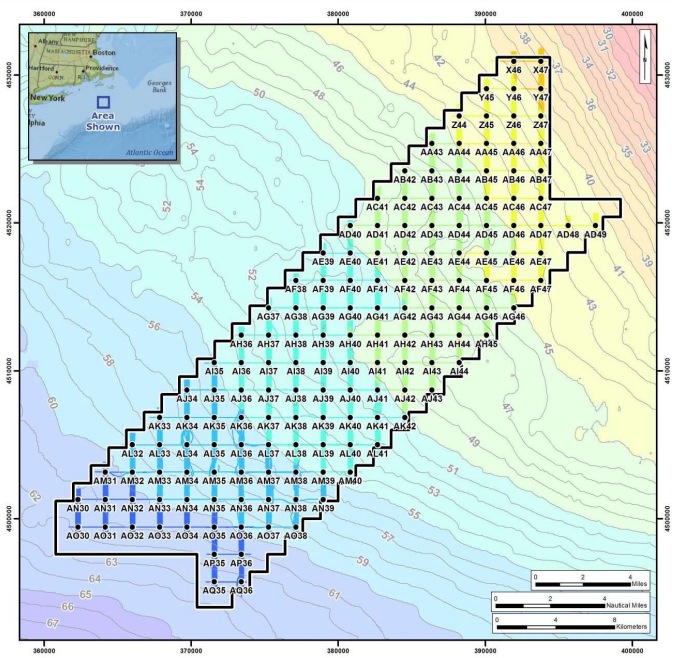


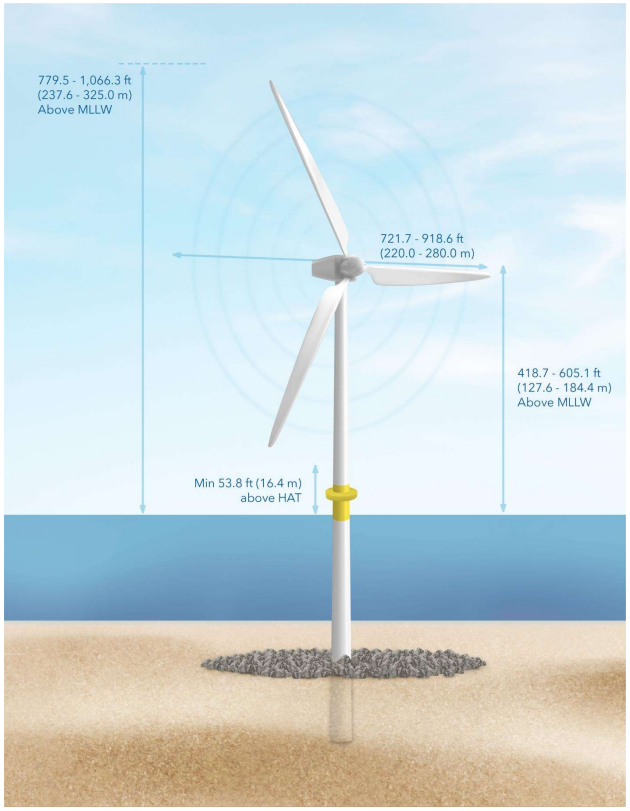
Gravity Base



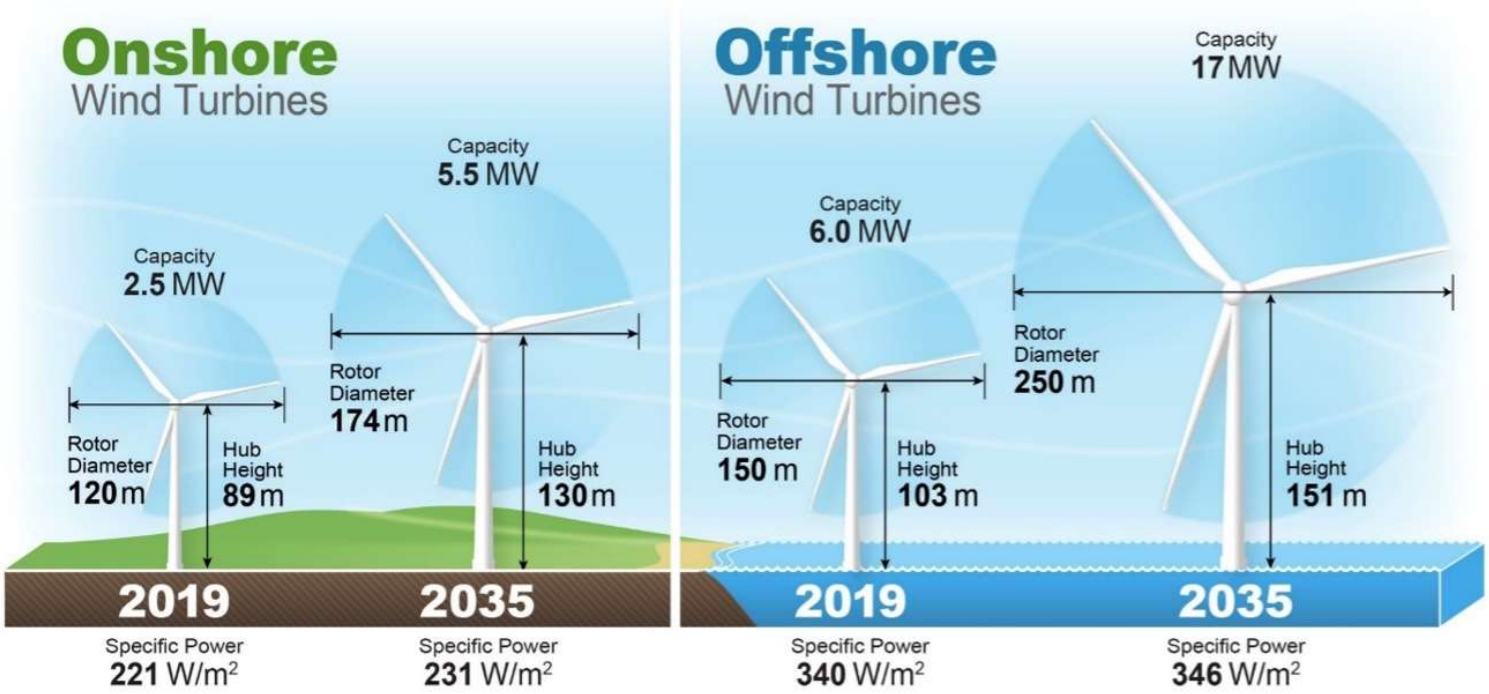
Wind Turbine Generators

- Up to 149 positions
- 1 nm x 1 nm grid layout



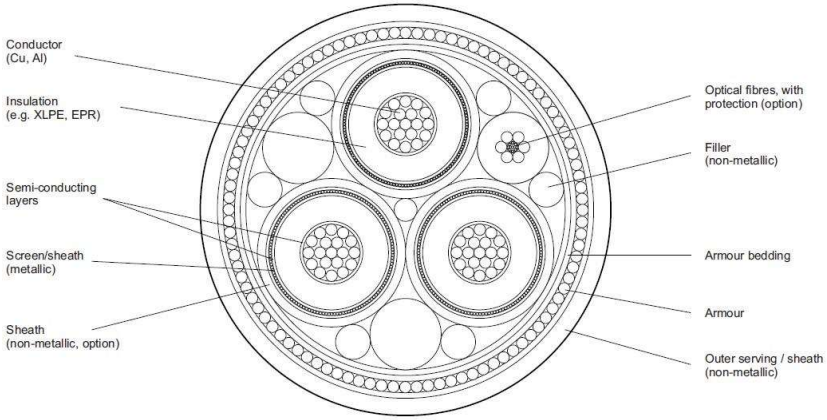


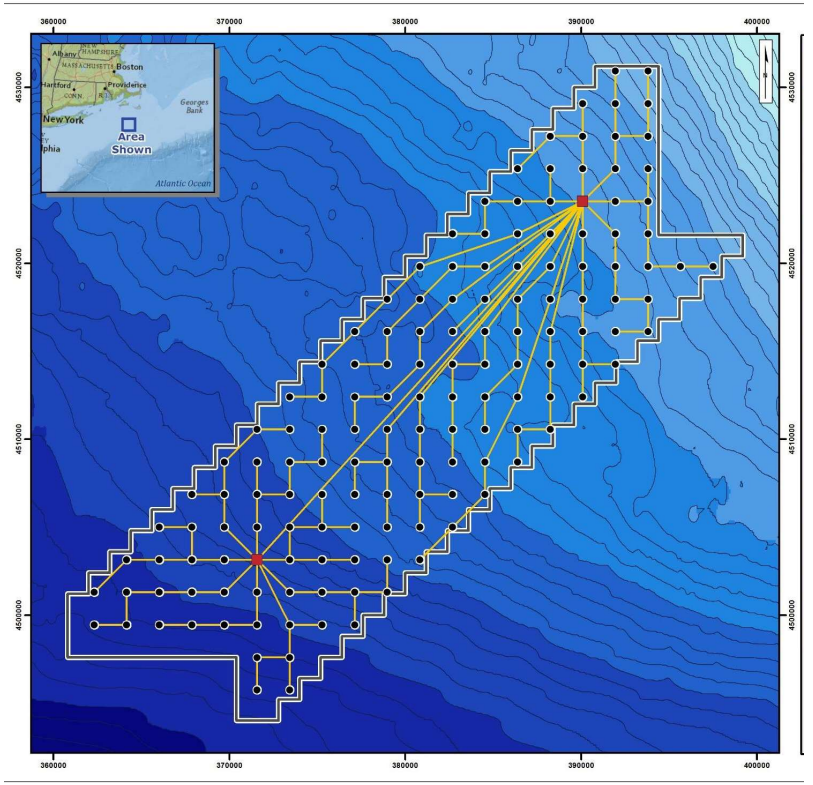
Wind Turbine Generators keep getting bigger



Inter-Array Cables

- Nominal voltage: 60 kV – 72.5 kV
- Final layout depends on site characterization data, WTGs, cable capacity, installation/operating conditions
- Total IAC length: 125 – 500 mi (200 – 800 km)



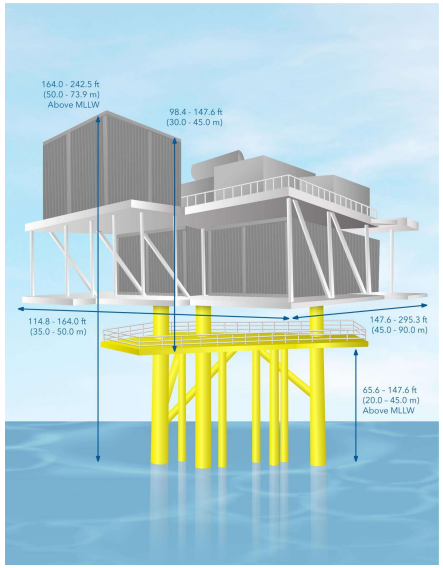


Indicative Inter-Array Cable Layout

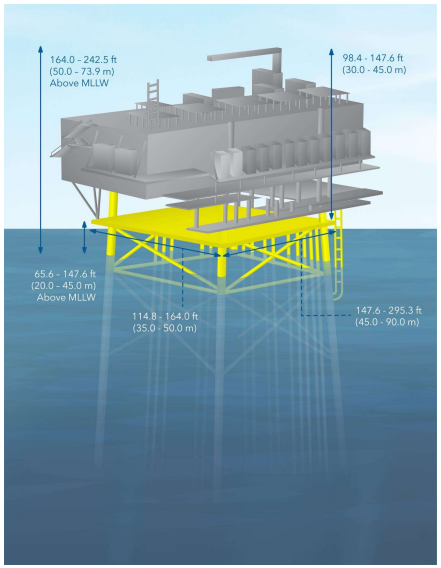
Offshore Substation Platforms

- Up to 5 OSPs in 1 nm x 1 nm grid layout

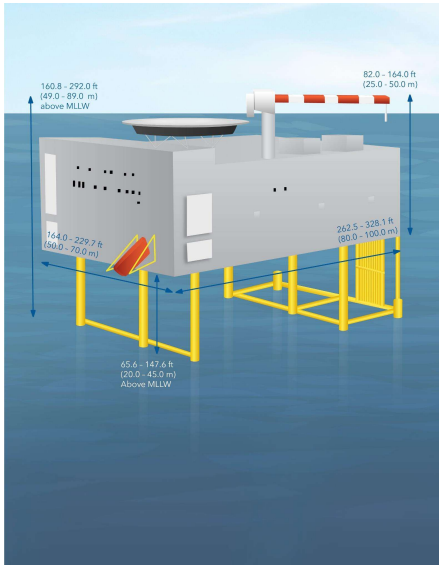
Modular OSP



Integrated OSP



DC Converter w/ Jacket



DC Converter w/ GBS

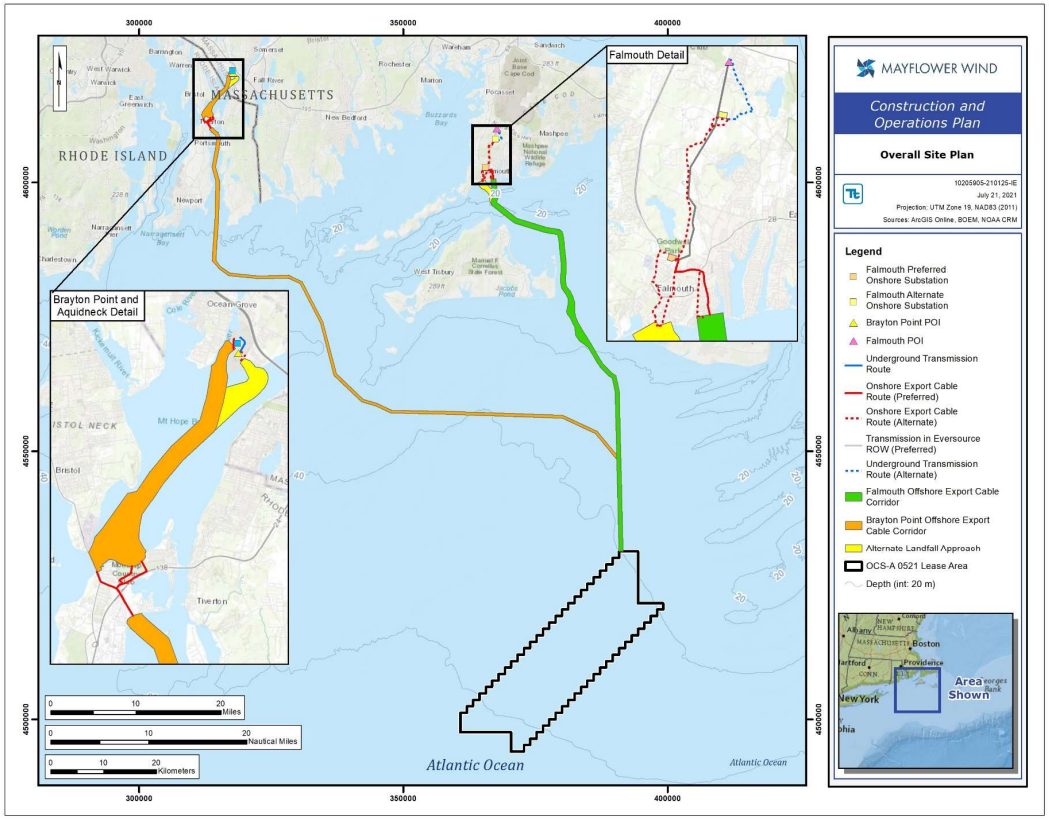
Export Cables

Falmouth ECC

- **Number of cables:** up to 5 HVAC cables
- **Voltage:** 200 – 300 kV
- **Cable length:** 51.6 – 87.0 mi (83 – 140 km) per cable

Brayton Point ECC

- **Number of Cables:** up to 6 HVDC cables (2 cable bundles)
- **Voltage:** ±320 kV
- **Cable Length:** 97 – 124 mi (156 – 200 km) per cable



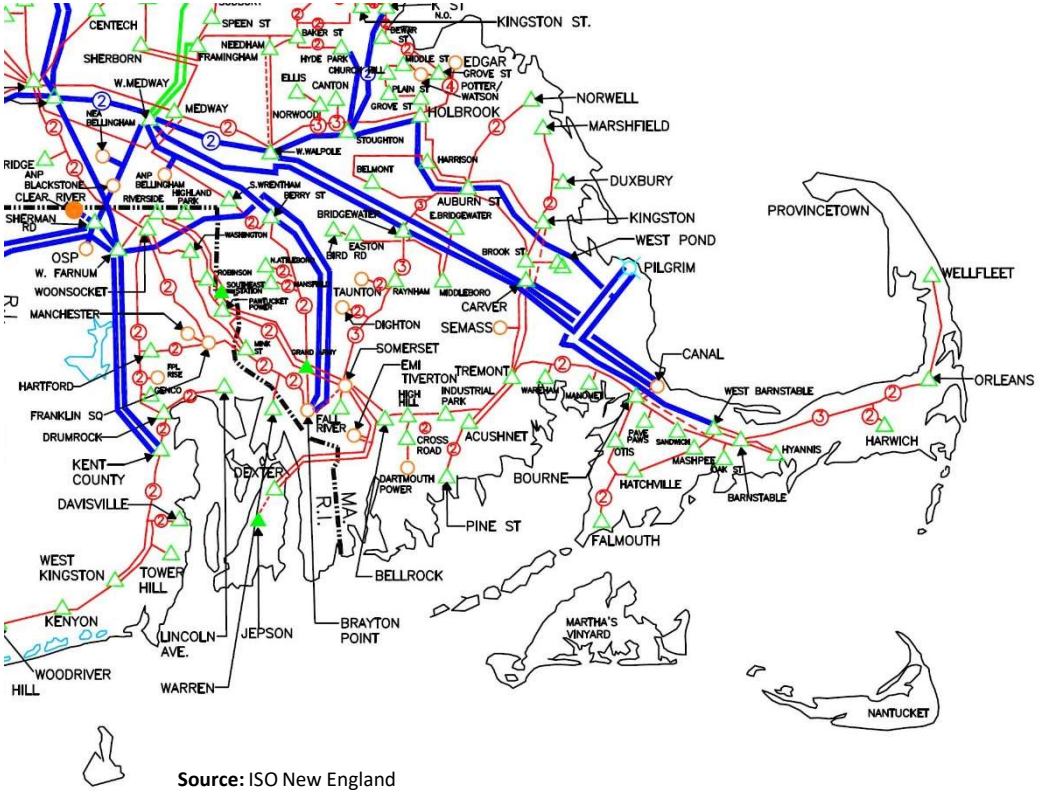
Converter Station – Brayton Point

- Commissioning new onshore HVDC converter station to convert export cables to HVAC transmission circuit to connect to POI
- Converter station to be located on Brayton Point property

Indicative layout of converter station at Option 1 and 2

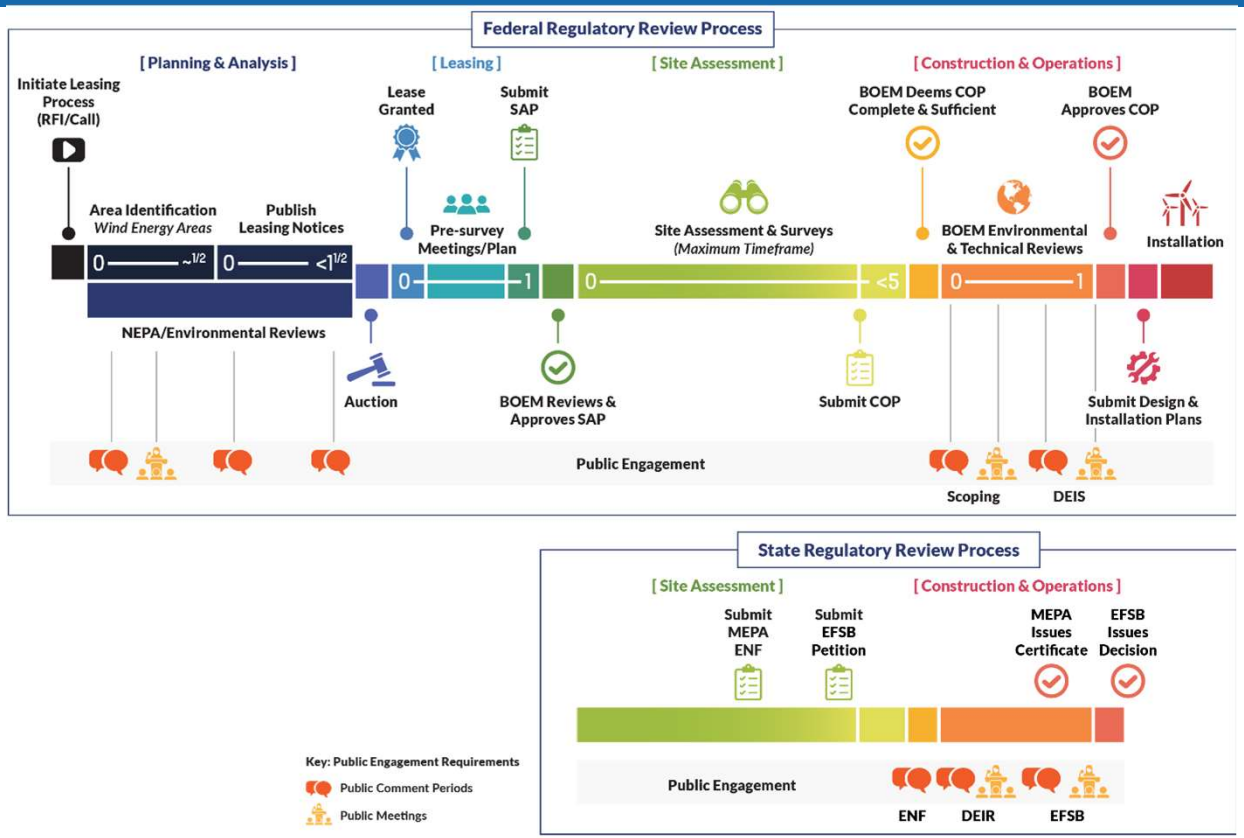
Grid Connection and Onshore Transmission Evaluation

- Mayflower Wind is progressing through the Independent System Operator – New England (ISO-NE) study process to determine where and how the project can safely and reliably interconnect into the New England transmission system
- Routing analysis for the onshore transmission infrastructure takes into consideration multiple factors to minimize impacts to the local community and environment, while maximizing efficiency of design and engineering



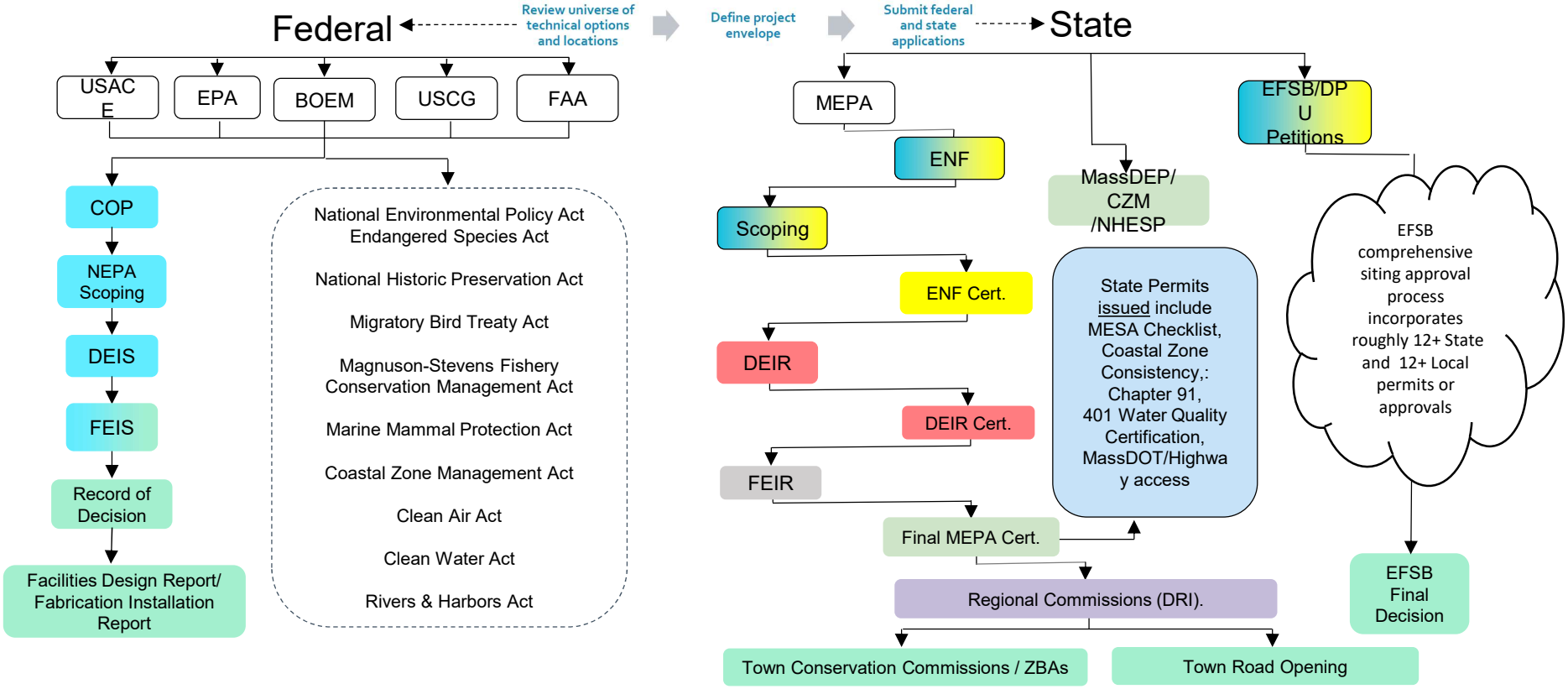
Source: ISO New England

Permitting Process At-a-Glance



Source: BOEM

Permitting Plan



Studies and Assessments Overview

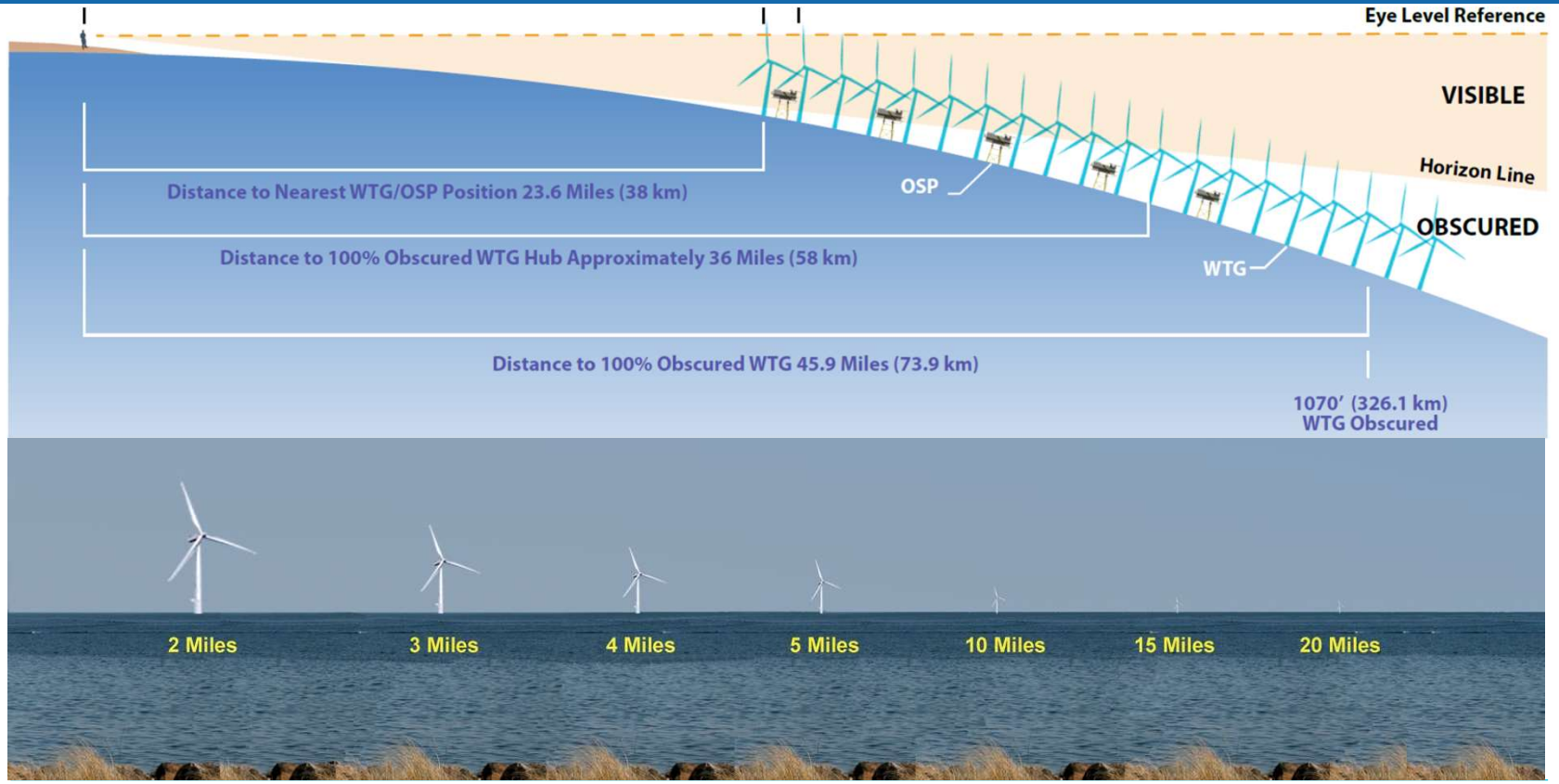
Physical environment studies
- Geology and sediment quality
- Geotechnical surveys
- Wind and metocean conditions

Fauna studies
- Fisheries (including benthic habitat)
- Birds and bats
- Marine mammals
- Sea turtles
- Subsea noise propagation modeling

Flora studies
- Wetlands and onshore ecology
- Seafloor surveys

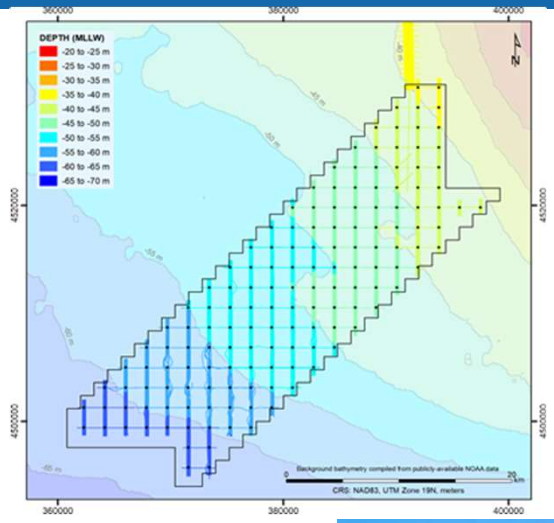
Socioeconomic studies
- Marine transportation and hazard studies
- Archaeology and historic properties
- Aviation studies
- Supply chain, ports and harbor evaluation
- Noise and traffic impact studies

Visual Impact Assessment



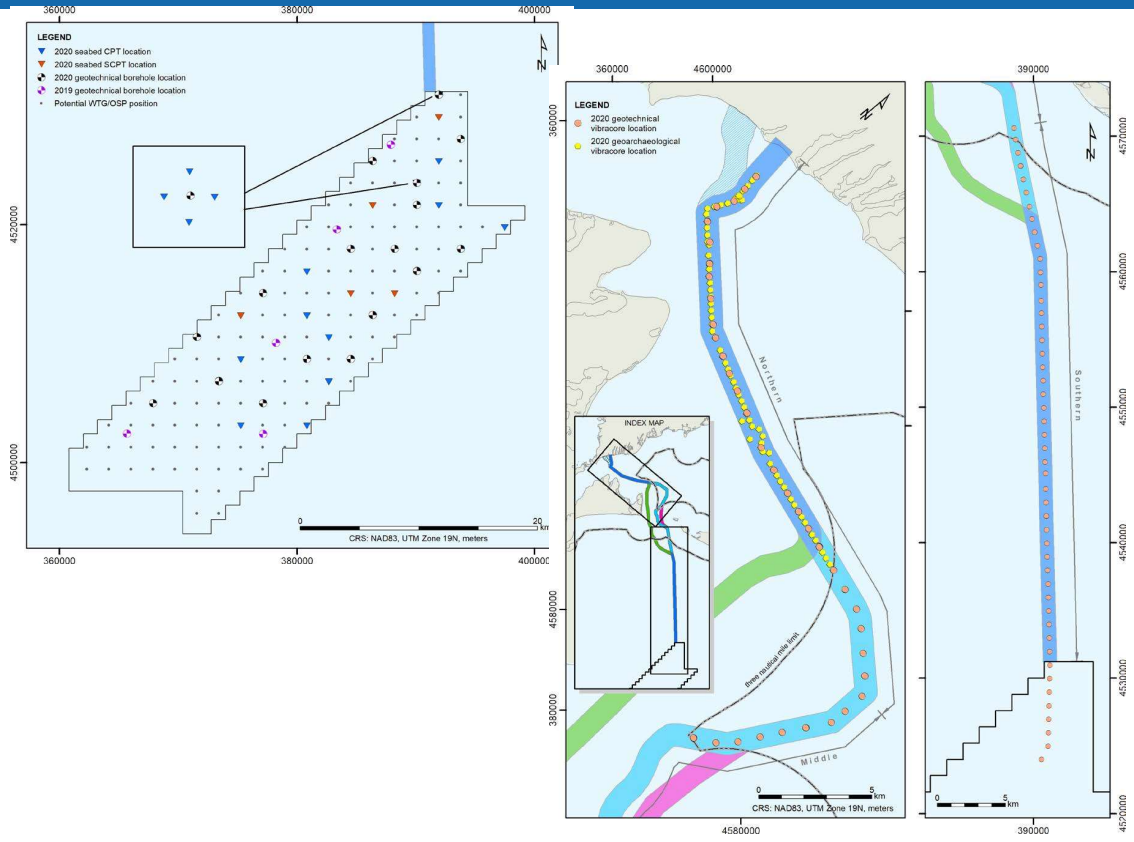
Geophysical Surveys

- **2019:** reconnaissance high-resolution geophysical (HRG) survey within Lease Area
- **2020:** HRG surveys to characterize seabed conditions within Lease Area and along Falmouth export cable corridor (ECC)
- **2021:** ongoing HRG surveys within Lease Area and along both ECCs
  - 2021 surveys include Brayton Point ECC



Geotechnical Surveys

- **2019:** reconnaissance geotechnical investigation within Lease Area
- **2020:** collected CPTs and deep boreholes within Lease Area and geotechnical and geoarchaeological vibracores along Falmouth ECC
- **2021:** ongoing geotechnical investigations within Lease Area and along both Falmouth and Brayton Point ECCs



G&G Surveys 2021

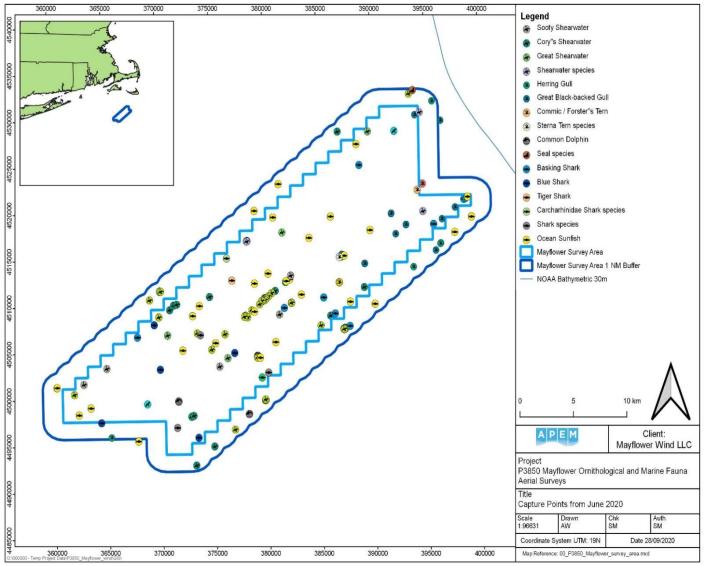
GO Pursuit 2021 crew

Avian and Marine Wildlife Surveys

- Boat-based avian surveys conducted by onboard avian biologists during 2019 G&G surveys
- Digital high-resolution aerial surveys conducted Nov 2019 – Oct 2020 across Lease Area
  - Surveys flown once per month
  - Doubled up survey efforts in April, May, and August 2020 to capture migration patterns
- Data collected included in Avian Exposure Risk Assessment and corresponding biological COP sections

Great Black-backed Gull observed during August 2020 Aerial Survey

Gannet observed during 2019 Geotechnical Survey



Distribution of all birds, marine mega-fauna recorded in the June 2020 Mayflower Survey

Offshore wind will march forward

- Public wants it
- Private capital is available
- Policy goals in place to support it

Learn More

Visit our website at mayflowerwind.com for more information about the project and to sign up for news and project updates.

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Thank you!

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