EBC 7th Annual Offshore Wind Conference

2020 Vision: Procurements, Permits, Ports and Jobs
Welcome

Daniel Moon

President & Executive Director

Environmental Business Council of New England
Introduction and Program Overview

Wayne Cobleigh

Conference Co-Chair and Moderator

Vice President

GZA GeoEnvironmental, Inc.

Environmental Business Council of New England
Energy  Environment  Economy
Federal Offshore Wind Energy Program Outlook

Michelle Morin

Chief, Environment Branch for Renewable Energy
Bureau of Ocean Energy Management
U.S. Department of the Interior
Federal Offshore Wind Energy Program Outlook

EBC Seventh Annual Offshore Wind Conference: 2020 Vision – Procurements, Permits, Ports and Jobs

February 14, 2020

Michelle Morin | Chief, Environment Branch for Renewable Energy
Federal Offshore Wind Energy Program Outlook

Construction
Planning & Leasing
Construction & Ops Plans
Decisions
Staffing
Stakeholders
Streamlining
Studies
For more information on the BOEM’s renewable energy program, visit
www.boem.gov/Renewable-Energy
Offshore Wind Energy in the Commonwealth of Massachusetts

Patrick Woodcock
Commissioner
Department of Energy Resources
Commonwealth of Massachusetts
Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth

COMMONWEALTH OF MASSACHUSETTS
Patrick Woodcock, Commissioner

Offshore Wind Energy in the Commonwealth of Massachusetts

February 14, 2020
83C Procurements

• Original authorization for 1,600 MW through Energy Diversity Act of 2016
• Power Purchase Agreement (PPAs)
  – Contracts with the Electric Distribution Companies (EDCs)
  – Energy and Environmental Attributes (RECs)
  – RFP allows to paired storage
  – Total price includes transmission costs
• Round 1 (2018) - Selected Vineyard Wind 800 MW project
  – 8.4 cents/kwh (Nominal Levelized)
83C Procurements

• Round 2 (2019) - Selected Mayflower Wind 804 MW project
  – 7.8 cents/kwh (Nominal Levelized)
  – 13% decline in pricing in real dollars from Round 1
  – Includes significant economic development commitments

• With the Selection of Mayflower Wind, the EDCs have solicited the original authorization of 1,600 MW
Looking Beyond the First 1,600 MW...

2018 - An Act to Advance Clean Energy

- Offshore Wind Study
  - Required under an Act to Advance Clean Energy of 2018
  - DOER conducted robust stakeholder process and analysis
  - Study Published May 2019

- DOER directed the EDCs to solicit for an additional 1,600MW for a total of 3,200 MW of Offshore Wind
  - Recommend Predictable, Staggered Procurement Schedule
    - Takes advantage of technology cost declines, strong development signal to the market and facilitates coordination with other states
Looking Beyond the First 1,600 MW...

- Possible Separate OSW Transmission Solicitation
  - Recommended that DOER solicit written comment and hold a technical conference to gather data on whether and/or how a solicitation for independent transmission should occur
  - Written Comment Request on January 15, Due February 18
  - Technical Conference on March 3
Gulf of Maine Intergovernmental Taskforce

- First meeting held December 12, 2019
- Participation from federal agencies, state, local and tribal representatives from Maine, Massachusetts, and New Hampshire.
- Undertake planning and analysis to assess potential for wind energy areas.
- Early stage of development and identifying existing data.
THANK YOU
Offshore Wind Energy in the Commonwealth of Massachusetts

Bruce Carlisle

Managing Director, Offshore Wind
Massachusetts Clean Energy Center
Offshore Wind in Massachusetts: Update from MassCEC
Overview

- Offshore wind project pipeline
- Ports and infrastructure
- Workforce
- Supply chain
- Marine surveys and studies
- Research and innovation
MassCEC – offshore wind

• Advance and support the responsible development of offshore wind and increase local jobs and economic activity in offshore wind

- **Planning, Analysis and Engagement** – Technical projects and stakeholder engagement on fisheries, wildlife, met-ocean, transmission, etc.

- **Sector Development** – In coordination with partner agencies, expand manufacturing, suppliers, and services and support workforce development

- **Research, Monitoring and Evaluation** – Support for and collaboration with MA institutions, with industry and government, to advance technology innovation, learn from early deployments, and expand offshore energy research in Commonwealth
• 7 LEASE AREAS
• 1,418 MILES²
• 4 DEVELOPER TEAMS
• 6 PROJECTS SELECTED
• 4,110 MW
Offshore leases and status

- Ørsted/Eversource, #486, 487, 500
  - South Fork Wind - 130 MW (LIPA)
  - Revolution Wind - 700 MW (RI & CT)
  - Sunrise Wind - 880 MW (NY)
  - Bay State Wind
- Vineyard Wind (CIP/Avangrid), #501, 522
  - Vineyard Wind 1 - 800 MW (MA)
  - Park City Wind - 800 MW (CT)
- Equinor, #520
- Mayflower Wind (Shell/EDPR), #521
  - Mayflower Wind 1 - 800 MW (MA)
• Need for port locations for staging, assembly, and manufacturing of foundations, TPs, and other turbine components, as well as O&M

• MassCEC study to evaluate existing port and waterfront infrastructure as potential locations

• 19 sites evaluated:
  - Engineering assessment
  - Redevelopment scenarios and reuse cases
  - Permitting, regulatory processes, and timelines
  - Limitations and conditions
Wind Technology Test Center
Workforce

- MassCEC FY19 OSW/workforce training and development grant awards
  - Global Wind Organization and other core training programs
  - Mass Maritime Academy – 1st GWO basic safety program for offshore wind in US
  - OSW Power Technician Certificate programs
  - Education programs and certificates

- MassCEC FY20 workforce grant solicitation
  - Training partnerships with OEMs and Tier 1 suppliers
  - Expanding access to OSW jobs
  - OSW program development
Massachusetts OSW Supply Chain Directory
- New platform: directory.masscec.com
- Inventory of business information, capabilities, contacts, opportunities

Supply chain forums, “Meet the Buyer” events, and specific assistance
- Connecting OSW industry with local services and suppliers

MassCEC FY20 grant solicitation - OSW supply chain development
- Lead to site readiness, expand capacity
- Cost-shared investments in infrastructure, other assets
Surveys and studies

• Large whales and sea turtles (2011-2020)
  - Long-term funding from MassCEC and BOEM
  - Led by New England Aquarium
  - Campaign 6 support from developers

• OSW/fisheries pilot studies
  - Funding from MassCEC, BOEM, RIDEM
  - 3 topic areas informed by white paper
  - Awards late February

• Regional wildlife science entity for OSW
  - Collaboration on regional monitoring and research: structure, funding, priorities
  - Workshop held on January 31
- Infrastructure analysis to connect OSW
  - Feasibility and upgrades necessary to connect 500 to 3000 MW at existing 345kv substations

- OSW impacts during severe cold spell (ISO-NE)

- ISO study underway on integration of 4-7 GW of OSW by 2035
  - 7GW at certain interconnections could avoid major additional reinforcements
  - Production costs and GHG emissions decrease

- Massachusetts OSW Transmission Technical Conference – March 3
Research and innovation

• National Offshore Wind Research and Development Consortium
  - Board of Directors, Finance Committee, and Review Teams

• MassCEC funding: AmplifyMass, InnovateMass

• Massachusetts Research Partnership
  - Hub for offshore wind research
  - Convening of national Partnership for Offshore Wind Energy Research [www.power-us.org/](http://www.power-us.org/)
Thank you

Visit us at www.MassCEC.com/offshore-wind

Sign up for our Daily News Digest, Events Newsletter and more!
masscec.com/email-updates

Follow us on social media

[Icons for Twitter, Facebook, LinkedIn]
Presentations from Offshore Wind Developers

Moderator: Nathalie Schils

Conference Co-Chair

Director of Offshore Wind – East Coast, Tetra Tech
Vineyard Wind LLC & Park City Wind, LLC

Nathaniel Mayo

Manager, Development and Policy
Vineyard Wind LLC
Project Update: Environmental Business Council
Boston, MA
February 14, 2020
WHO ARE WE?

- Leading provider of renewable power in the United States
  - Over 6,500 MW in 22 states
  - Part of Iberdrola, the world leader in the renewable energy industry
  - 30+ GW in operation
  - 10 GW of offshore wind under development, construction, or operations

- Long-term, clean energy investment focus
  - 6,000+ MW offshore development portfolio worldwide
  - Extensive offshore wind experience

- Local non-profit partner
  - Dedicated to community-oriented renewable energy
  - Closely involved in development activities
  - Guidance on local issues; local benefits

February 2020
Agreement with Environmental Groups on Right Whale Protection

- January 2019
- Achieved with Conservation Law Foundation, National Wildlife Federation, Natural Resources Defense Council
- Sets a standard to avoid Right Whale impacts
- Stipulates seasonal restrictions, activity restrictions, robust monitoring, and others

Host Community Agreement with Barnstable

- October 2018
- Partnership to support the project while protecting local interests
- Town input and coordination on design and construction
- Significant Long-term benefits for the town
HISTORY OF OFFSHORE WIND AREAS

MULTI-YEAR, STAKEHOLDER PROCESS

• 2010: BOEM established, Task Force initiated
  • Multi-Agency, Intergovernmental
  • Extensive stakeholder meetings
  • Fisheries and Habitat working groups

• 2012: Environmental Assessment, Call for Information

• 2014: Lease Sale Notices

• 2015: Auction and Lease issuance: Vineyard Wind Awarded Lease 501

• 2018: Auction and Lease issuance: Vineyard Wind Awarded Lease 522

PROJECT OUTREACH

• 2009-Present: Fisheries, communities, environmental outreach on-going
  • First Fisheries representative
  • First Community Benefits Agreement: Vineyard Power

WIND AREA REDUCED THROUGH PUBLIC PROCESS

2010

2019
**PROJECT OVERVIEW**

- **Generation Capacity:** 800 MW
  - Enough energy for over 400,000 homes and businesses
  - Carbon reductions: 1.6 Million tpy
  - Carbon emissions avoidance equivalent to 325,000 cars off the road

- **Turbine area:** OCS A-501 lease area
  - ~15 miles from Martha’s Vineyard and Nantucket
  - ~35 miles from Cape Cod at closest point
  - Grid connection in Barnstable, MA

- **Use of local ports:**
  - New Bedford: Construction, staging and deployment base
  - Vineyard Haven: Operations and Maintenance

- **Electrical interconnection:** Barnstable Switch Substation
  - Host Community Agreement with Barnstable
  - Enhances grid strength at weak area
PERMITTING PROCESS (JAN 2019)

Federal
- ACOE
- EPA
- BOEM
- USCG
- NMFS
- FAA

COP
- NEPA Scoping
- DEIS
- FEIS
- Record of Decision
- Facilities Design Report & Fabrication Installation Report

State
- MEPA
- ENF
- MEPA Cert.
- DEIR
- DEIR Cert.
- SDEIR
- FEIR
- Final MEPA Cert.
- EFSB
- CZM / CRMC
- State Permits (including):
  - Chapter 91
  - 401 WQC
  - Highway
  - Railroad

National Environmental Policy Act
Endangered Species Act
National Historic Preservation Act
Migratory Bird Treaty Act
Magnuson-Stevens Fishery Conservation Management Act
Marine Mammal Protection Act
Coastal Zone Management Act
Clean Air Act

Begun
Complete

February 2020
PERMITTING PROCESS (FEB 2020)

Federal

ACOE  EPA  BOEM  USCG  NMFS  FAA

COP  NEPA Scoping  DEIS  SEIS  FEIS

National Environmental Policy Act
Endangered Species Act
National Historic Preservation Act
Migratory Bird Treaty Act
Magnuson-Stevens Fishery
Conservation Management Act
Marine Mammal Protection Act
Coastal Zone Management Act
Clean Air Act

 Facilities Design Report & Fabrication Installation Report

State

MEPA  ENF  MEPA Cert.  DEIR  DEIR Cert.  SDEIR  SDEIR Cert.  FEIR  Final MEPA Cert.

EFSB  CZM / CRMC  State Permits (including): Chapter 91 401 WQC Highway Railroad

Cape Cod Commission & MV Commission  Town Conservation Commissions  Town Road Opening

Begun  Complete

Federal

State

ACOE  EPA  BOEM  USCG  NMFS  FAA

COP  NEPA Scoping  DEIS  SEIS  FEIS

National Environmental Policy Act
Endangered Species Act
National Historic Preservation Act
Migratory Bird Treaty Act
Magnuson-Stevens Fishery
Conservation Management Act
Marine Mammal Protection Act
Coastal Zone Management Act
Clean Air Act

 Facilities Design Report & Fabrication Installation Report

Begun  Complete

February 2020
LONG-TERM CONTRACT UNDER NEGOTIATION
December 2019: 20-yr PPA with Connecticut EDCs

LOCATION
Lease Area OCS-A 0501, southwest of Vineyard Wind 1 and south of Martha’s Vineyard and Nantucket; Grid connection on Cape Cod, MA

SIZE & GENERATION
804 MW project will produce enough to power 400,000 Connecticut households; Comparable emissions benefits to Vineyard Wind I

CONSTRUCTION, STAGING, OPERATIONS
Primary construction port, Operations and Maintenance in Bridgeport, CT
THANK YOU

Nathaniel Mayo
nmayo@vineyardwind.com

For the latest project information and document access please visit:
www.vineyardwind.com
Mayflower Wind Energy, LLC

Ruth Perry

Marine Science and Regulatory Policy Specialist
Mayflower Wind Energy, LLC
Project Overview
February 14, 2019
ABOUT MAYFLOWER WIND

Mayflower Wind is a joint venture of Shell New Energies (50%) and EDP Renewables (50%). We are backed by the combined capability, experience, commitment to innovation, and financial strength of a world-leading offshore energy developer and a world-leading wind power and renewable energy developer.

CORE VALUES

- **Safety first, safety always.** We are committed to treating our people, community, and environment with care.
- **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 space.
- **Investing in Communities.** We are committed to building responsible partnerships with local communities by supporting jobs, economic development, and innovation that will flourish for decades to come.
SITE: CHARACTERISTICS

- **Location**: Atlantic Coast Outer Continental Shelf
- **Lease**: OCS-A 0521
- **Area**: 127,000 acres (520 km²)
- **Water Depth**: 64% < 55m
  - 36% > 55m
- **Average wind speed at 135m**: 10.1 m/s
- **Distance to shore**: 85-105 km
- **Connection point**: Bourne, MA
- **Distance to grid connection**: 125 km
- **Potential**: up to 1,600 MW (depending on technology)
MAYFLOWER WIND PROPOSALS

Massachusetts Section 83C II process (parallel bids in complementary CT process)

Low Cost Energy
804 MW

Lowest cost for offshore wind energy in the U.S.

Long-term & Ongoing funding for initiatives to support the industry and local economy

Unanimously selected by MA Utilities on 10/30/19
PPAs submitted to MA DPU on 2/10/20

Infrastructure and Innovation
804 MW

Adding immediate capital for investment in port infrastructure

Adding near term funding to spur innovation

Massachusetts Manufacturing
804 MW

Additional direct investment in a new manufacturing facility creating additional 250 direct jobs
Project Updates

- **Fisheries Activities**
  - Fisheries Representative agreements in progress with New Bedford Port Authority & Massachusetts Lobstermen’s Association
  - Interviewing Fisheries Liaisons Officers
  - Preparing fisheries surveys with SMAST (to start early 2020)

- **Lease Surveys**
  - Bird and marine life surveys initiated
  - Completed site characterization geophysical surveys in 2019
  - Preparing for 2020 G&G surveys (anticipated to commence April 2020)
Project Updates

- **Metocean buoy deployed in January 2020**
  - Data streams will be available by IOOS NERACOOS
  - Collecting meteorological and ocean data and recording telemetered animal movements around the lease area
CONTACT INFORMATION

- Project Hotline: 508-589-3557

- Project website: www.mayflowerwind.com

- Project Email: Email: info@mayflowerwind.com
Thank You

Questions? Comments?

Ruth Perry
Marine Science & Regulatory Specialist
ruth.perry@shell.com
(346) 410 – 9355
Ørsted & Eversource Energy

Stephanie Wilson

Head of U.S. Permitting

Ørsted
Ørsted Offshore: Global overview
25+ years of experience and unparalleled track record

The global leader in offshore wind

› **5,600 MW** in operation

› **4,300 MW** under construction/in development

› **1,150+** turbines spinning

› **25** offshore wind farms in operation

---

The world’s first
Vindeby, 1991
5 MW

America’s first
Block Island Wind Farm, 2016
30 MW

The world’s largest
Walney Extension, 2018
659 MW
Offshore wind market on the East Coast

- Current/proposed OSW target (MW)
- State procured (MW)
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
Ørsted U.S. Offshore Wind portfolio
Awarded over 2,900 MW of offshore capacity on the East coast

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 Farm: 120MW
Coastal Virginia Offshore Wind (EPC contract): 12MW demo project
Block Island Wind Farm
America’s first offshore wind farm

30MW project

17,000 homes

First in the nation
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
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

2020
Apply for permits

2022
Permit approvals

2022
Installation begins offshore

2023
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
Skipjack Wind Farm
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 a new coastal substation
- Will power over 35,000 homes

Schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing</td>
<td>Stakeholder meetings</td>
</tr>
<tr>
<td>2019</td>
<td>Apply for permits</td>
</tr>
<tr>
<td>2021</td>
<td>Permit approvals</td>
</tr>
<tr>
<td>2022</td>
<td>Installation begins offshore</td>
</tr>
<tr>
<td>2022</td>
<td>Commercial operations</td>
</tr>
</tbody>
</table>
Ocean Wind
Awarded

• 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
• Support from PSEG

Schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing</td>
<td>Stakeholder engagement</td>
</tr>
<tr>
<td>2019</td>
<td>Apply for permits</td>
</tr>
<tr>
<td>2022</td>
<td>Permit approvals</td>
</tr>
<tr>
<td>2022</td>
<td>Onshore construction begins</td>
</tr>
<tr>
<td>2023</td>
<td>Offshore construction begins</td>
</tr>
<tr>
<td>2024</td>
<td>Commercial operations</td>
</tr>
</tbody>
</table>
Coastal Virginia Offshore Wind (CVOW)
Awarded – EPC contract

- 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

2019  Onshore construction begins
2019  Fabrication of turbines and foundations
2020  Installation begins offshore
2020  Commercial operations
Bay State Wind / Constitution 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

• Will have the capacity to power up to half a million homes
Rhode Island

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

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

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
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
Thank you

Stephanie Wilson
Head of Permitting
stepw@orsted.com
Equinor Wind US

Scott Lundin

Head of Permitting – New England
Equinor Wind US
Status Update from Equinor Wind US
Lease Area OCS-A 0520

Scott Lundin - Head of Permitting – New England
**Building a profitable offshore wind portfolio**

<table>
<thead>
<tr>
<th>Bottom fixed</th>
<th>Floating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheringham Shoal</td>
<td>Hywind demo**</td>
</tr>
<tr>
<td>In production</td>
<td>Hywind Scotland</td>
</tr>
<tr>
<td>317 MW</td>
<td>In production</td>
</tr>
<tr>
<td>Dudgeon</td>
<td>Hywind Tampen</td>
</tr>
<tr>
<td>In production</td>
<td>In construction</td>
</tr>
<tr>
<td>402 MW</td>
<td>2.3 MW</td>
</tr>
<tr>
<td>Arkona</td>
<td>30 MW</td>
</tr>
<tr>
<td>In production</td>
<td></td>
</tr>
<tr>
<td>385 MW</td>
<td></td>
</tr>
<tr>
<td>Dogger Bank</td>
<td></td>
</tr>
<tr>
<td>In construction</td>
<td></td>
</tr>
<tr>
<td>3600 MW</td>
<td></td>
</tr>
<tr>
<td>Empire Wind</td>
<td></td>
</tr>
<tr>
<td>In development</td>
<td></td>
</tr>
<tr>
<td>816 MW</td>
<td></td>
</tr>
</tbody>
</table>

* Figures: Installed capacity, 100% basis.
** Sold to Unitech, January 2019
# Massachusetts Lease Area OCS-A 0520

## Site Key Data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>128,811 acres</td>
</tr>
<tr>
<td>Water Depth</td>
<td>~120 – 200 ft</td>
</tr>
<tr>
<td>Distance to shore</td>
<td>~ 19 miles SW of Nantucket</td>
</tr>
<tr>
<td>Mean Wind (90 masl)</td>
<td>9-10 m/s</td>
</tr>
<tr>
<td>Total Potential</td>
<td>&gt;2,000 MW</td>
</tr>
</tbody>
</table>

Potential example development scenarios:

- Phase development: multiple
- Capacity per phase: ~ 800 MW
- Wind turbine size: 12+ MW
- Number of interconnection points: subject to grid and offtake

---

Classification: Internal 2012-10-24 © Statoil ASA

---

Preliminary
Wind Energy Facility Development

Survey Planning & Consultation
Underway

Assessment Activity
2020 - 2021

Federal & State Permits Submission
2022

Permit Review & Public Hearings
2022-2024

Construction & Operation
2024+

Stakeholder Consultation

Development
2020-2024

Construction
2024+

Operation
25+ years

Decommissioning

FLiDAR Deployment

Survey Planning & Consultation
Underway

Assessment Activity
Q2, 2020

Plan Submission
Q3, 2020

Buoy Deployment
Q4, 2020
# Aerial Wildlife Survey Program

## Planned Surveys

<table>
<thead>
<tr>
<th>Month</th>
<th>Surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec-19</td>
<td>2 surveys</td>
</tr>
<tr>
<td>Jan-20</td>
<td>2 surveys</td>
</tr>
<tr>
<td>Feb-20</td>
<td></td>
</tr>
<tr>
<td>Mar-20</td>
<td></td>
</tr>
<tr>
<td>Apr-20</td>
<td>2 surveys</td>
</tr>
<tr>
<td>May-20</td>
<td>2 surveys</td>
</tr>
<tr>
<td>Jun-20</td>
<td></td>
</tr>
<tr>
<td>Jul-20</td>
<td></td>
</tr>
<tr>
<td>Aug-20</td>
<td>2 surveys</td>
</tr>
<tr>
<td>Sep-20</td>
<td>2 surveys</td>
</tr>
<tr>
<td>Oct-20</td>
<td></td>
</tr>
<tr>
<td>Nov-20</td>
<td></td>
</tr>
</tbody>
</table>

Total Number of Surveys = 16

## Reporting

- Monthly
- Quarterly
- Annual

---

**ReMOTe**

Remote Marine and Onshore Technology (ReMOTe) is Normandeau’s secure, real-time data portal. ReMOTe provides the ability to access, analyze, and visualize a variety of species information in a secure, user-friendly platform. ReMOTe provides real-time outputs as well as details on how data was accessed and analyzed.
Preparing to Deploy our FLiDAR in the Lease Area – Mid 2020

- HRG Survey & Benthic Grabs will be collected in Q2, 2020
  - Survey Area: 3,000m x 600m
  - Up to 5 grab/image locations for benthic assessment are planned
- Site Assessment Plan approval from BOEM anticipated in Q3, 2020
- Buoy deployment expected in fall, 2020
Preparing for a 2020 Lease-Wide Survey Campaign

- HRG Survey
  - Mobilization expected in Q2, 2020
  - Up to 30m lines spacing across entire lease area
  - Full suite of equipment required by BOEM for COP
  - Plan to obtain an IHA to allow for 24 hour operations
    - Seeking concurrence from BOEM/NMFS to start daylight only operations while IHA is in review
- Geotechnical Survey
- Benthic Assessment
  - Grab sample and Imagery (Plan & Profile) at each location
- Cable Routing Reconnaissance
- Robust marine mammal mitigation measures will be implemented
2020 Survey Campaign
Benefits of the Survey ROV vs. Traditional Survey

• Potentially 25% more efficient due to surveying at higher speeds and quicker line turns
• Less waiting on weather <5%
• Less infill / re-runs due to better line / off-track control
• Less impact on marine mammals – less dissipation of energy due to the close proximity of SBP to the seabed.
• Single vessel campaign
Anticipated Assessments for Massachusetts

<table>
<thead>
<tr>
<th>Field Surveys</th>
<th>Technical Desktop Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine Mammals/Sea Turtle Surveys</td>
<td>Navigation Risk Assessments</td>
</tr>
<tr>
<td>Benthic Habitat Survey</td>
<td>Water Quality/Sediment Assessment</td>
</tr>
<tr>
<td>Avian and Bat Surveys</td>
<td>Air Quality Assessment</td>
</tr>
<tr>
<td>Onshore Archeological and Historic Property Resource Survey</td>
<td>In-Air Acoustic Assessments</td>
</tr>
<tr>
<td>Marine Archeological Resource Survey</td>
<td>Hydroacoustic Assessments</td>
</tr>
<tr>
<td>Wetland and Wildlife Survey</td>
<td>Electromagnetic Field Assessment</td>
</tr>
<tr>
<td>Visual Impact Survey</td>
<td>Aviation Risk Assessments</td>
</tr>
<tr>
<td>Architectural Reconnaissance Survey</td>
<td>Fisheries Resource Assessment</td>
</tr>
</tbody>
</table>

Wind Energy Facility Development

- **Survey Planning & Consultation:** Underway
- **Assessment Activity:** 2020 - 2021
- **Federal & State Permits Submission:** 2022
- **Permit Review & Public Hearings:** 2022-2024
- **Construction & Operation:** 2024+
Thank you!

Contact: Scott Lundin
Head of Permitting – New England
SCLU@equinor.com
Twitter:
@EquinorWindUS
U.S. Supply Chain & Washington Update

- Jason Folson, National Sales Director, U.S. MHI Vestas Offshore Wind
- Laura Smith Morton, Senior Director Policy and Regulatory Affairs, AWEA
- Raya Treiser, Partner, WilmerHale

Environmental Business Council of New England
Energy Environment Economy
Impact Mitigation & Stakeholders Panel

Moderator: Eric Nestler

Conference Co-Chair

Senior Principal Scientist, Normandeau Associates, Inc.
Impact Mitigation & Stakeholders Panel

Moderator: Eric Nestler, *Conference Co-Chair, Normandeau Associates*

Panelists:
- Bruce Carlisle, *Massachusetts Clean Energy Center*
- Jack Clarke, *Mass Audubon*
- Fiona Hogan, *Responsible Offshore Development Alliance*
- Scott Lundin, *Equinor Wind US*
- Nathaniel Mayo, *Vineyard Wind LLC*
- Michelle Morin, *BOEM*
- Ruth Perry, *Mayflower Wind Energy, LLC*
- Stephanie Wilson, *Ørsted*
EBC 7th Annual Offshore Wind Conference

2020 Vision: Procurements, Permits, Ports and Jobs