MAYFLOWER WIND

Mayflower Wind Project Update

Falmouth Public Forum

June 8, 2022

Mayflower Wind

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

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

Fighting climate change by building offshore wind

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

The project will **eliminate over 4 million metric tons of GHGs annually**

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

The Mayflower Wind Project will account for approximately **8% of the U.S. National goal** of 30 GW of OSW by 2030

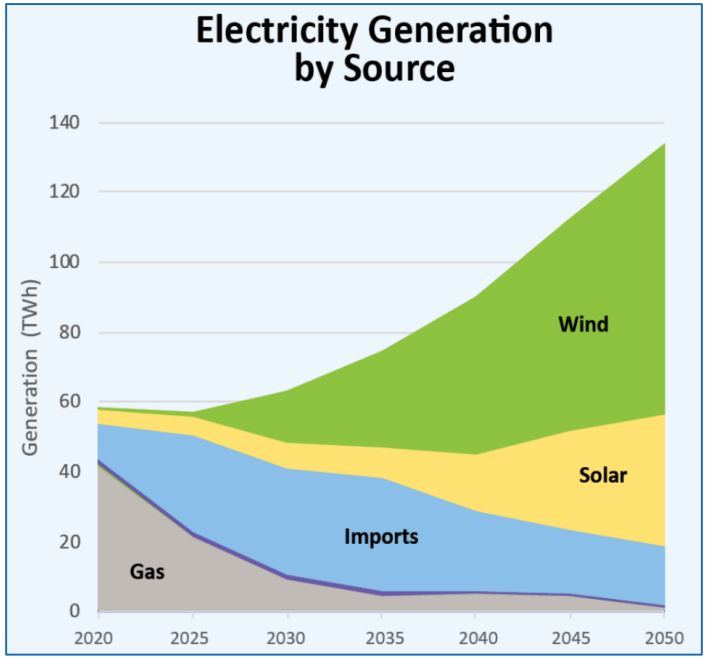
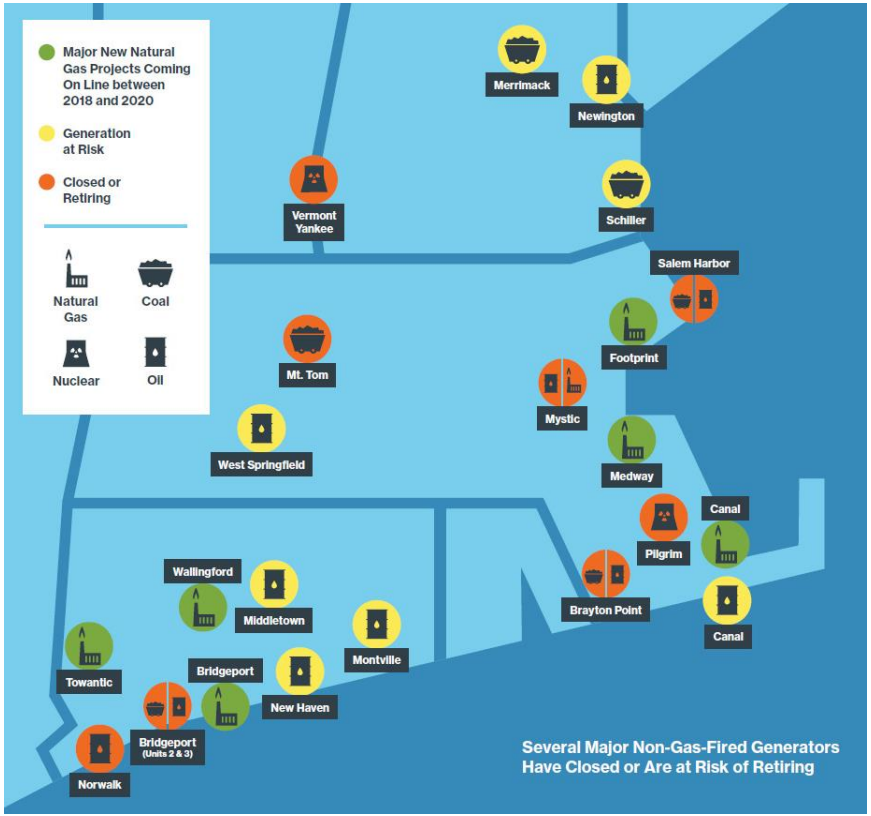


Image source: MA Decarbonization Roadmap Report, 2020

New England Power Grid in Transition



The transition to a Net Zero carbon future calls for new generation to power the electrification of our heating and transportation sectors, while supplementing the fossil fuel and nuclear power plants that are being retired across the New England grid

Offshore wind will **offset the need for imported fossil fuels** and **enhance the limited energy supply mix** available to serve the electric load on Cape Cod and southeastern Massachusetts

By accelerating the transition to a renewable clean energy future, the Project will support the **sustainability of the natural environment** and **improve the quality of life in the region**.

Source: ISO-NE

* MW= megawatt (measures bulk power). 1 MW= enough to power > 650+ homes

New England/New York Offshore Wind Procurements

Massachusetts (3,200 MW)

- Vineyard Wind 1 – 800 MW
- Mayflower Wind – 1,200 MW
- Commonwealth Wind – 1,200 MW

Connecticut (1,108 MW)

- Revolution Wind – 304 MW
- Park City Wind – 804 MW

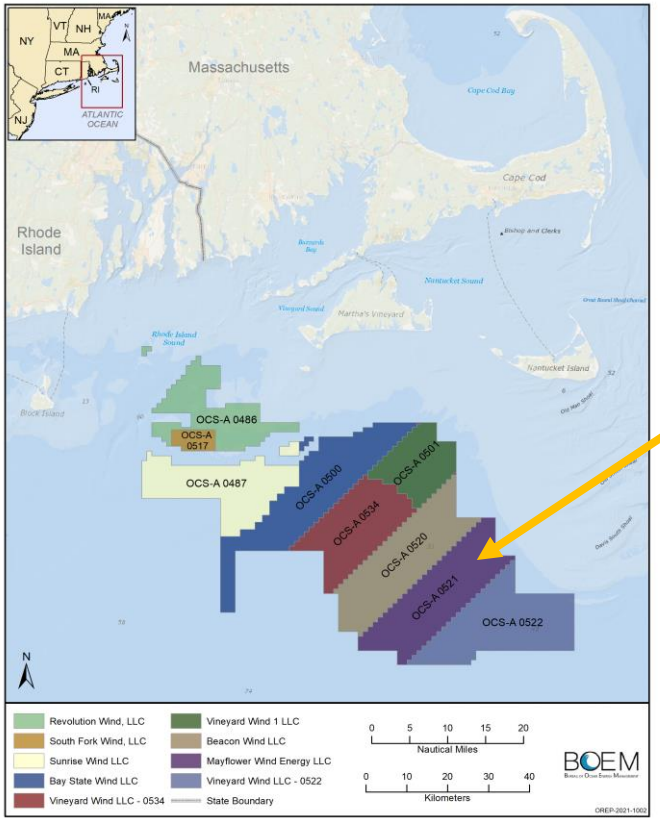
Rhode Island (400 MW)

- Revolution Wind – 400 MW

New York (4,366 MW)

- South Fork Wind – 132 MW
- Sunrise Wind – 924 MW
- Beacon Wind – 1,234 MW
- Empire Wind 1 – 816 MW
- Empire Wind 2 – 1,260 MW

*These contracts do not represent the potential full build-out of each lease area



Mayflower Wind Lease Area

Mayflower's Grid Connections

- Mayflower has a commitment to provide 1,200 MW of power to the Commonwealth by the end of this decade.
- The transmission system will require significant grid upgrades to be able to accept the offshore wind power planned to connect in Falmouth.
  - While ISO-New England and the transmission owners resolve those issues, Mayflower will continue to pursue the interconnection in Falmouth to prudently prepare for upcoming offshore wind procurements for the benefit of the people of Massachusetts and the region.
- Mayflower will deliver the first 1,200 MW awarded through the 83C II and III procurements to Brayton Point, Somerset, because that delivery point will be ready first.

Mayflower intends to deliver the next 1,200 MW energy from the lease area via the Falmouth project in a subsequent phase.

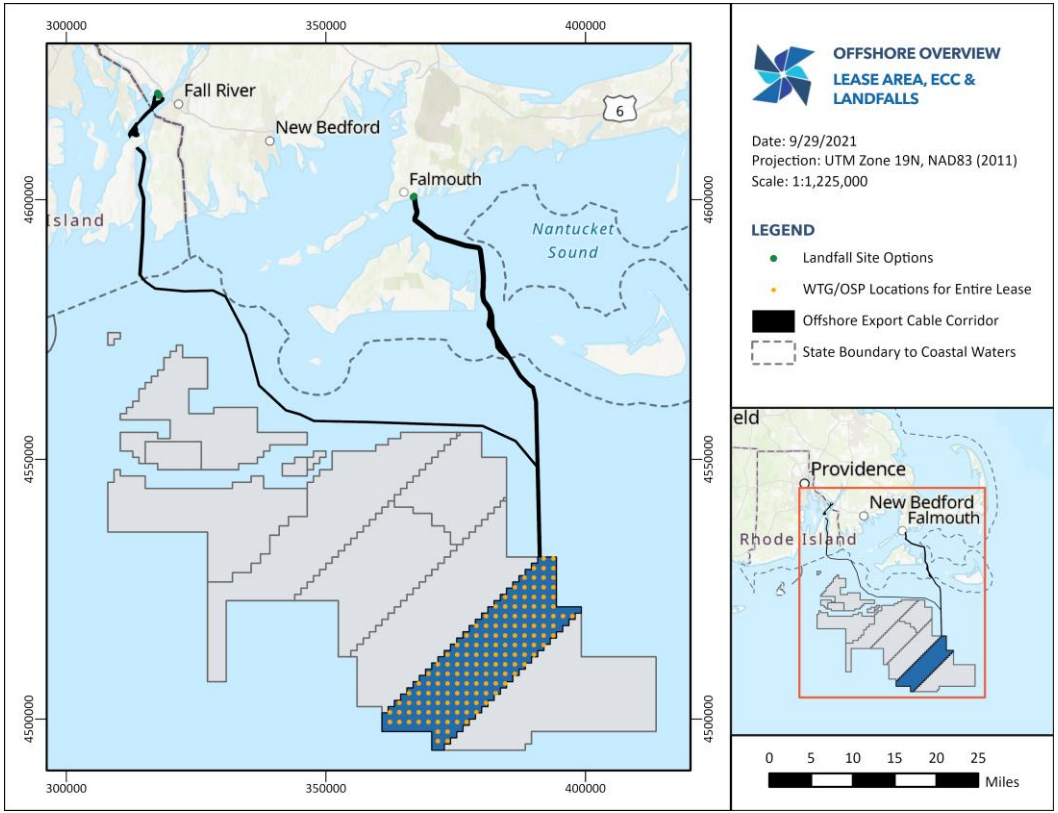
Mayflower Wind Projects

Lease Area

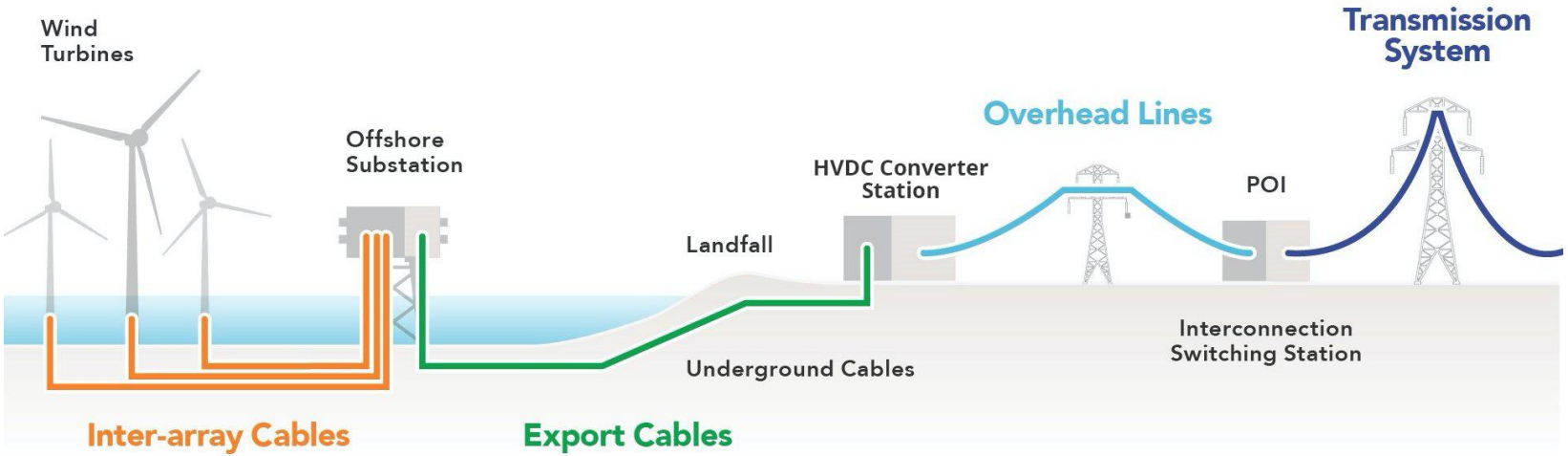
- 127,000 acres
- Wind turbine technology allows an estimated 2,400 MW from lease area to shore
- Regional limitations with the onshore transmission system requires multiple points of interconnection

Two Points of HVDC Interconnection

- Falmouth Project (1,200 MW)
- SouthCoast Project (1,200 MW)

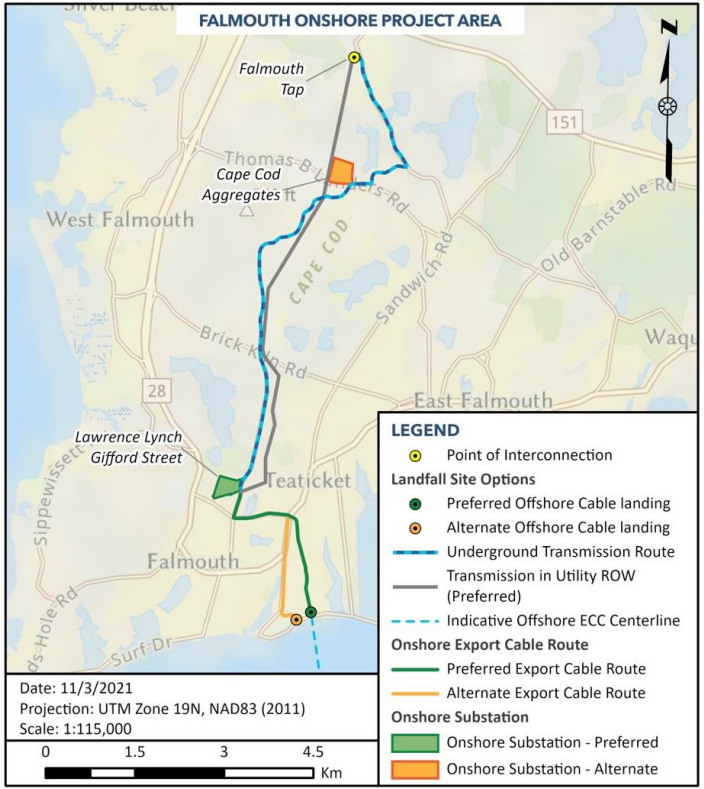


Wind Farm Design – Offshore to Onshore

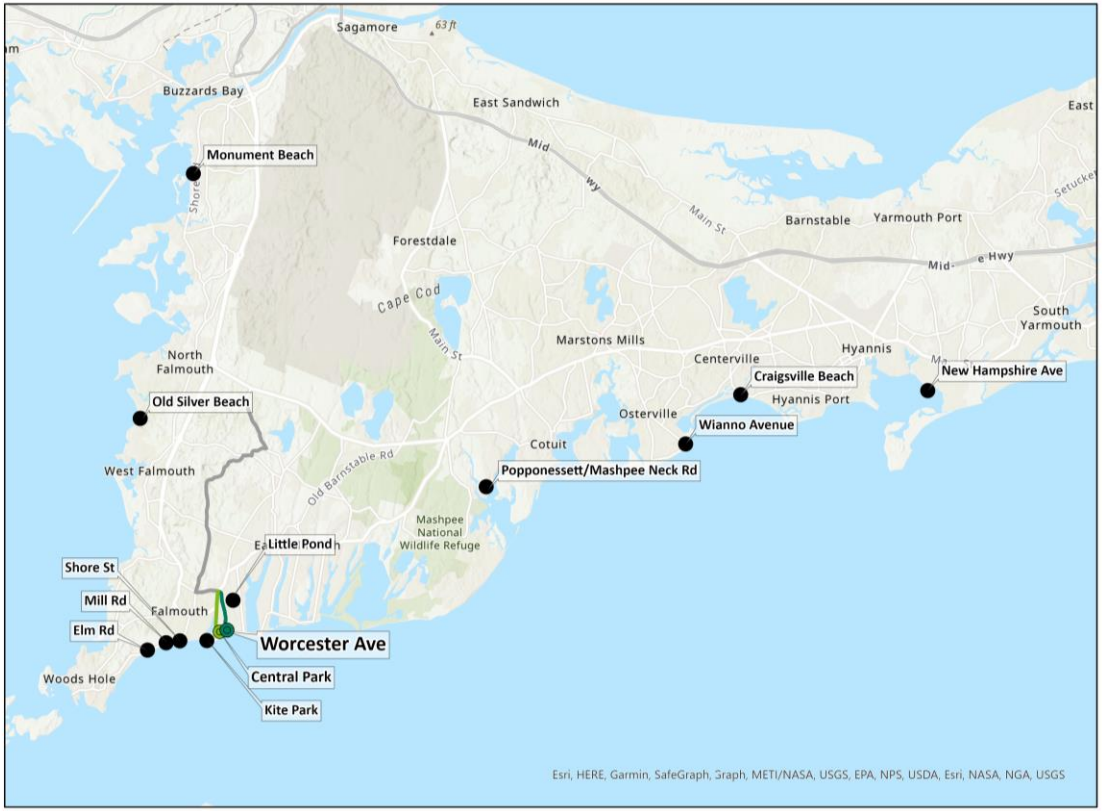


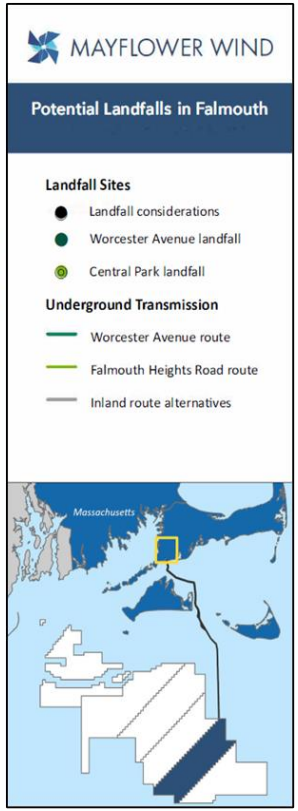
Falmouth Onshore Project

- Preferred route: ~ 2 miles along roads
- Alternate route: Up to 8.1 miles along roads
- Underground HVDC export cables will be installed onshore to a new HVDC converter station
  - HVDC export cables: 2 power cables, +/- 320 kV
- From Mayflower's HVDC converter station, power will connect to the grid via the existing Falmouth Tap substation further inland
  - HVAC interconnection: up to 9 power cables, +/- 345 kV
- State requirements re: environmental justice communities were incorporated



Landfall Selection Considerations



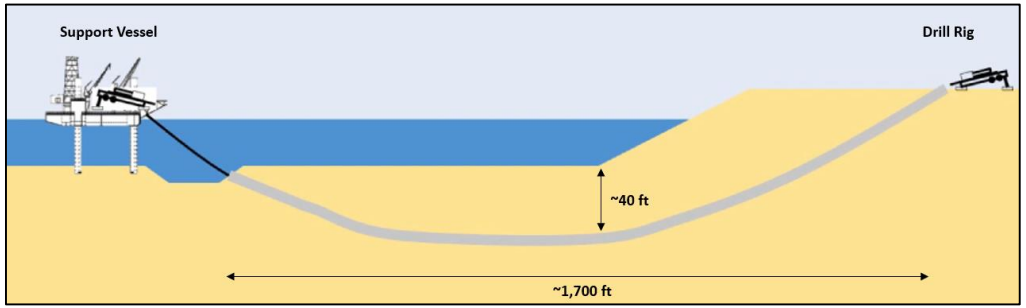


Horizontal Directional Drilling (HDD)

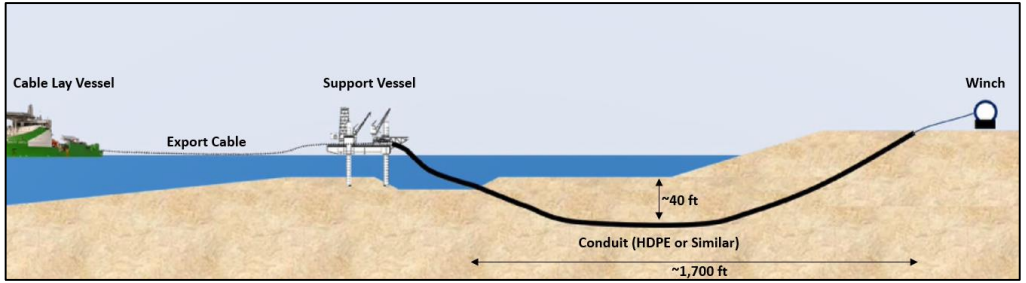
Horizontal Directional Drilling (HDD)

- Used at all landfall sites to avoid and/or mitigate disturbance to seabed and nearshore environmental resources such as eelgrass beds as well as public access and use of coastal areas and beaches during installation
- Permanent surface impacts will be minimal and at the buried cable vaults

Indicative Dimensions – Under Development



Horizontal Directional Drilling (image courtesy of DEME Offshore US)



Cable Pull-In (image courtesy of DEME Offshore US)

High Voltage Direct Current (HVDC)

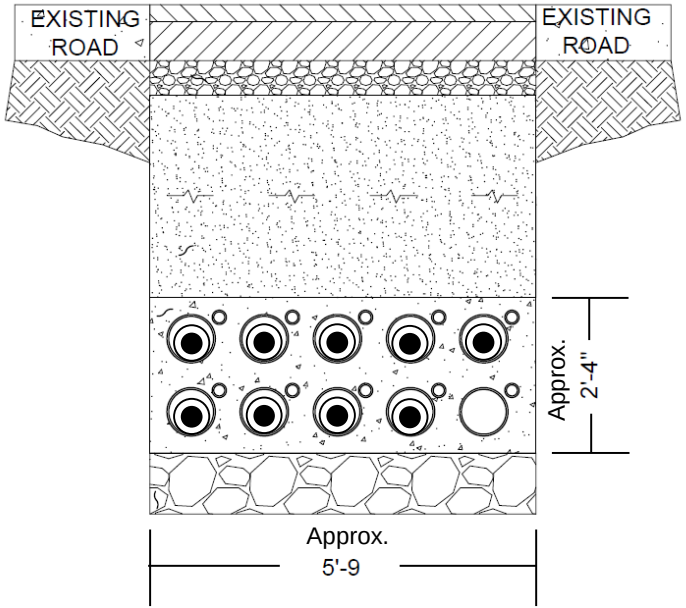
- Both High Voltage Alternating Current (HVAC) and High Voltage Direct Current (HVDC) technologies are widely used for transmitting energy to remote load.
- HVDC is the preferred technology for long-distance power transmission.
- HVDC transmission technology has been widely deployed within the US (a few examples provided below):
  - Cross Sound Cable – New Haven, CT to Long Island, NY
  - Neptune Regional Transmission System – Sayreville, NJ to Long Island, NY
  - Trans Bay Cable – San Francisco, CA to Pittsburg, CA

High Voltage Direct Current (HVDC)

- **Smaller Footprint:** HVDC transmission requires less disruption including:
  - Fewer cables coming ashore
  - Smaller trenching footprint for underground cable installation
  - Smaller substation (HVDC converter station) footprint
- **More Efficient:** Over long distances, HVDC transmission moves power with lower losses compared to HVAC.
- **EMF produced from HVDC transmission creates static magnetic fields resembling Earth's magnetic field:**
  - Existing AC electric systems produce EMF in the form of an oscillating magnetic field.
  - DC transmission does not oscillate and resembles the earth's static DC geomagnetic field, which humans have lived in the presence of for tens of thousands of years.
  - Mayflower's conservative modeling reports are published on our website.

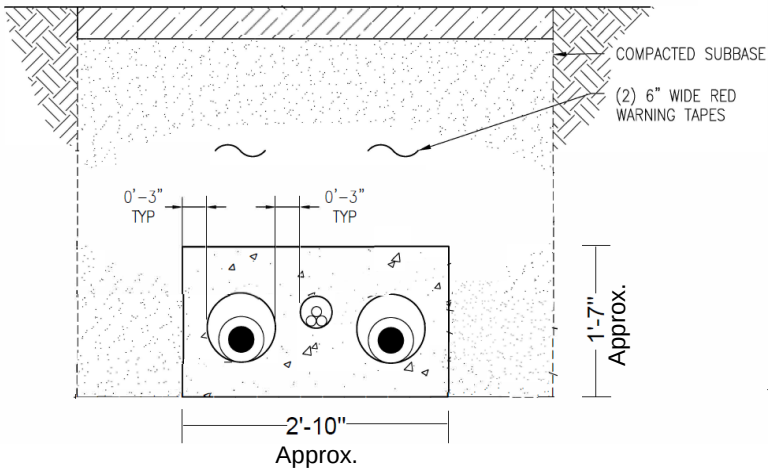
HVAC vs. HVDC Technologies

HVAC Duct Bank Cross Section



HVAC interconnection:
up to 9 power cables, +/- 345 kV

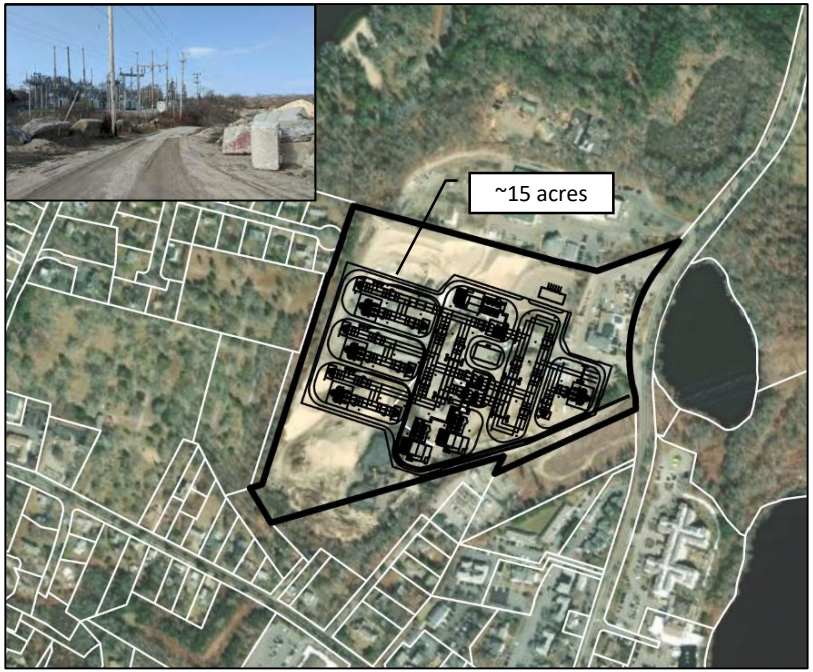
HVDC Duct Bank Cross Section



HVDC export cables:
2 power cables, +/- 320 kV

Proposed Converter Station Layouts – Lawrence Lynch

HVAC Substation Layout at Preferred Site



HVDC Converter Station Layout at Preferred Site

Proposed Converter Station Layouts – Cape Cod Aggregates

HVAC Substation Layout at Noticed Alternative

HVDC Converter Station Layout at Noticed Alternative

Onshore Construction Impacts

- Onshore construction in Falmouth is expected to last 2 – 3 years
  - Horizontal Directional Drilling is expected to take 3 – 5 months
- Onshore cable installation will occur **outside of the busy summer season** to the maximum extent possible. Any high season or night-time construction would be done in coordination with and with the approval of the Town.
- **Lane or road closures will use a rolling setup**, so only a section of the roadway is worked on at a given time.
- Mayflower will **comply with all applicable construction noise requirements** and implement mitigations:
  - Temporary noise barriers at HDD locations
  - Maintaining equipment with functioning mufflers
  - Low-noise generators
- Mayflower will create a **construction schedule webpage** to alert residents of construction locations, dates, activities and traffic control measures.

Community Benefits

- A Host Community Agreement (HCA) between Falmouth and Mayflower Wind will provide annual revenue to the Town once the project has been constructed.
- Continued participation in community events:
  - Falmouth Fireworks: July 2022
  - Mayflower Wind Cape Cod Marathon: October 2022
- Memberships: Cape Cod Chamber, Falmouth Chamber, Friends of Nobska Light
- Cape Light Compact agreement: $5 million towards strategic electrification to reduce electric bills for low-income customers.
- Support for STEM and renewable energy education programs for local students. Mayflower supports local workforce training, in collaboration with existing vocational schools, community colleges and other area providers.
- Construction of the underground cables and onshore substation in Falmouth will create job opportunities for a variety of qualified local contractors. Local retail and hospitality businesses will see increased activity for goods and services.

Falmouth Project Timeline

What is influencing the Project's timeline?

- ISO-NE transmission system studies and need for major transmission infrastructure upgrades for additional offshore wind interconnections on the Cape. Studies are ongoing and could take another year or more. Upgrades will take longer.
- Mayflower taking time to carefully consider input from Falmouth officials and residents.
- Future procurements for offshore wind in Massachusetts and the region
- Prudent and efficient planning to meet the clear need in the next ten years for large amounts of renewable clean energy from offshore wind to serve the public interest
- Given its proximity to the lease area and development activities that have already occurred, a Falmouth delivery of offshore wind energy still makes sense if transmission system issues can be adequately addressed by ISO-NE and the transmission owners.

Thank You

Questions and Comments?