Offshore Wind Development in New England

October 2021 Interconnection Process Update

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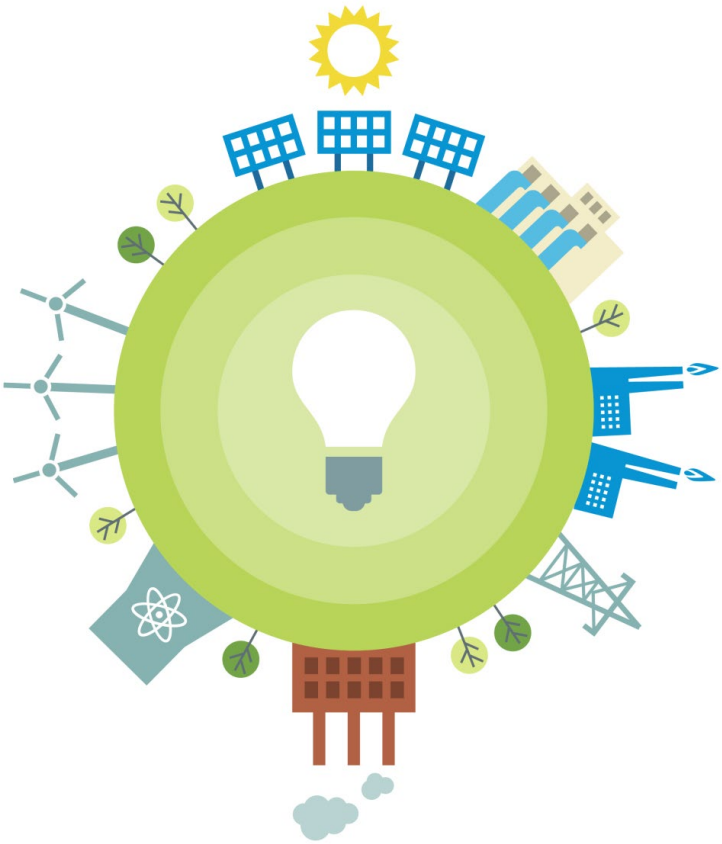
Presentation Overview

- State Policy Drivers
- Clean Energy Procurements
- ISO Interconnection Queue Update
- Cape Cod Resource Integration Studies



States Target Increases in Renewable and Clean Energy and Deep Reductions in CO_2 Emissions

≥80% by 2050	Five states mandate greenhouse gas reductions economy wide: MA, CT, ME, RI, and VT (mostly below 1990 levels)
80% by 2050 Net-Zero by 2050	MA statewide GHG emissions limit MA clean energy standard
90% by 2050	VT renewable energy requirement
100% by 2050 Carbon-Neutral by 2045	ME renewable energy requirement ME emissions goal
100% by 2040	CT zero-carbon electricity goal
100% by 2030	RI renewable energy goal

States Accelerate Clean Energy Procurements (2017-2021)

State	State Procurement Initiatives for Large-Scale Clean Energy Resources	Eligible Resources	RFP Target MW (nameplate)	Projected COD/ Selected MW
MA	2021 Offshore Wind RFP	Offshore Wind	400 to 1600 MW	TBD
ME	2020-2021 RPS RFP	ME RPS Class IA renewables	1,710,000 MWh	2022-2024
CT	2019 Offshore Wind RFP	Offshore Wind	400 – 2,000 MW	2026 804 MW
MA	2019 Section 83C II Offshore Wind RFP	Offshore Wind	800 MW	2025 804 MW
RI	2018 Renewable Energy RFP	Solar, Wind, Biomass and Other Eligible Resources	400 MW	2023 50 MW
CT	2018 Zero-Carbon Resources RFP	Nuclear, Hydro, Class I Renewables, Energy Storage	Approx. 1,400 MW (12,000,000 MWh)	2020-2026 11,658,080 MWh
CT	2018 Clean Energy RFP	Offshore Wind, Fuel Cells, Anaerobic Digestion	252 MW	2019-2023 252 MW
MA RI	2017 Section 83C I Offshore Wind RFP	Offshore Wind	800 MW (MA) 400 MW (RI)	2023 800 MW
MA	2017 Section 83D Clean Energy RFP	Hydro Import	Approx. 1,200 MW (9,554,000 MWh)	2022 9,554,940 MWh/year

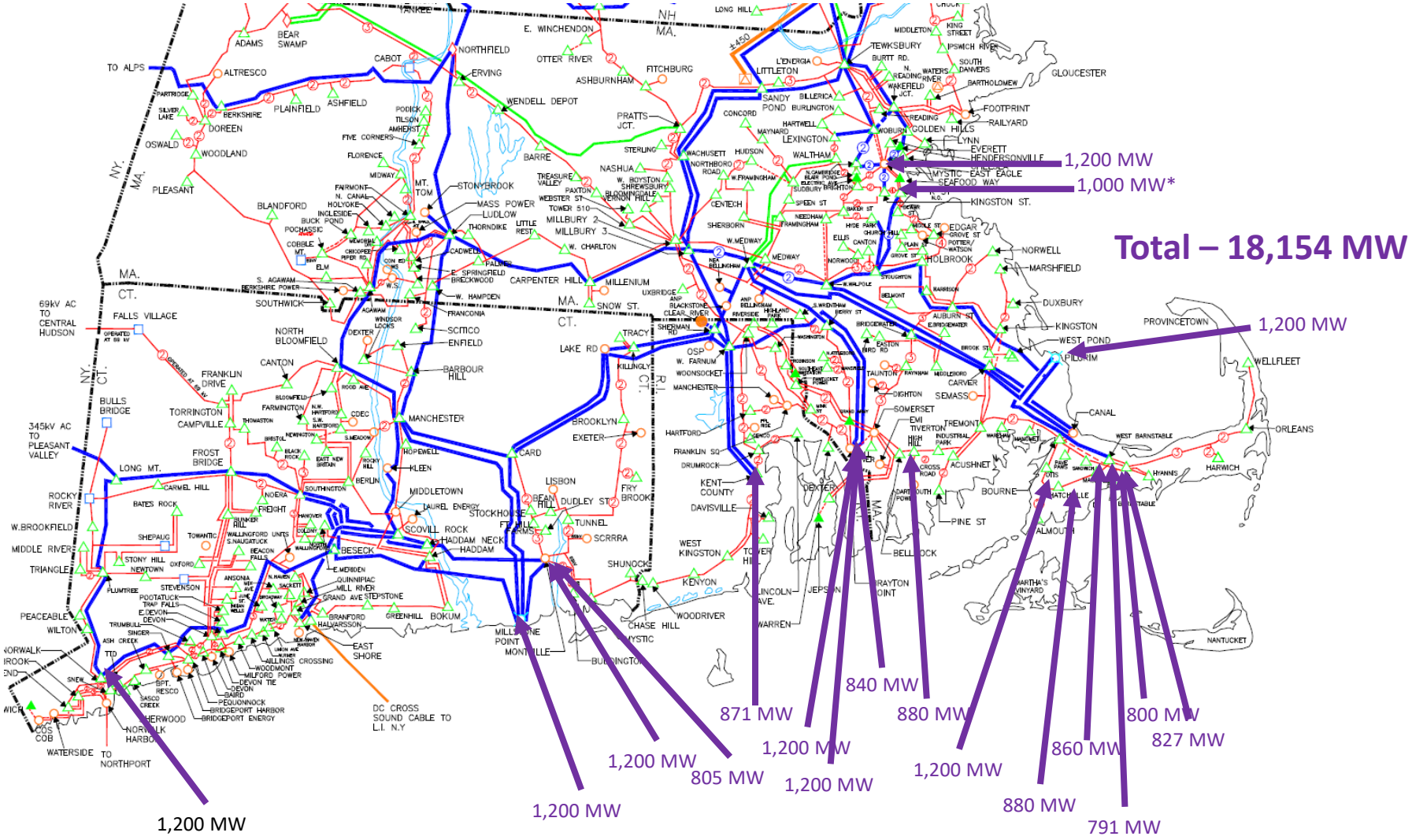
OFFSHORE WIND INTERCONNECTION STUDIES

Status Update

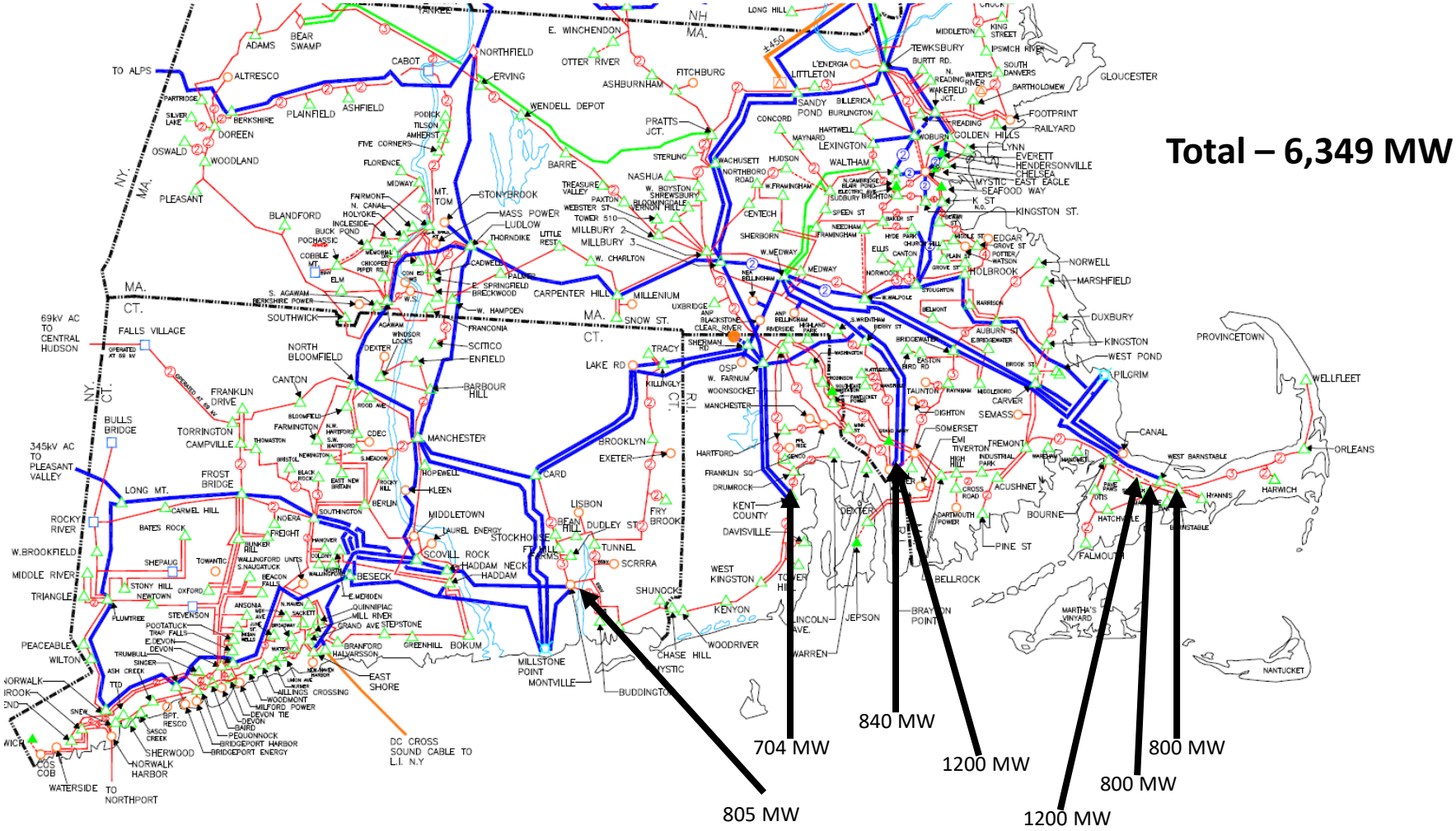
Interconnection Studies for Offshore Wind

- Offshore wind projects have entered the interconnection queue at several locations on the New England system
  - Under the ISO-NE interconnection procedures, projects can first request Feasibility Studies (screening-level study)
  - After the Feasibility Study, projects can request a System Impact Study (identifies definitive interconnection requirements)
  - These are summarized on the following slides

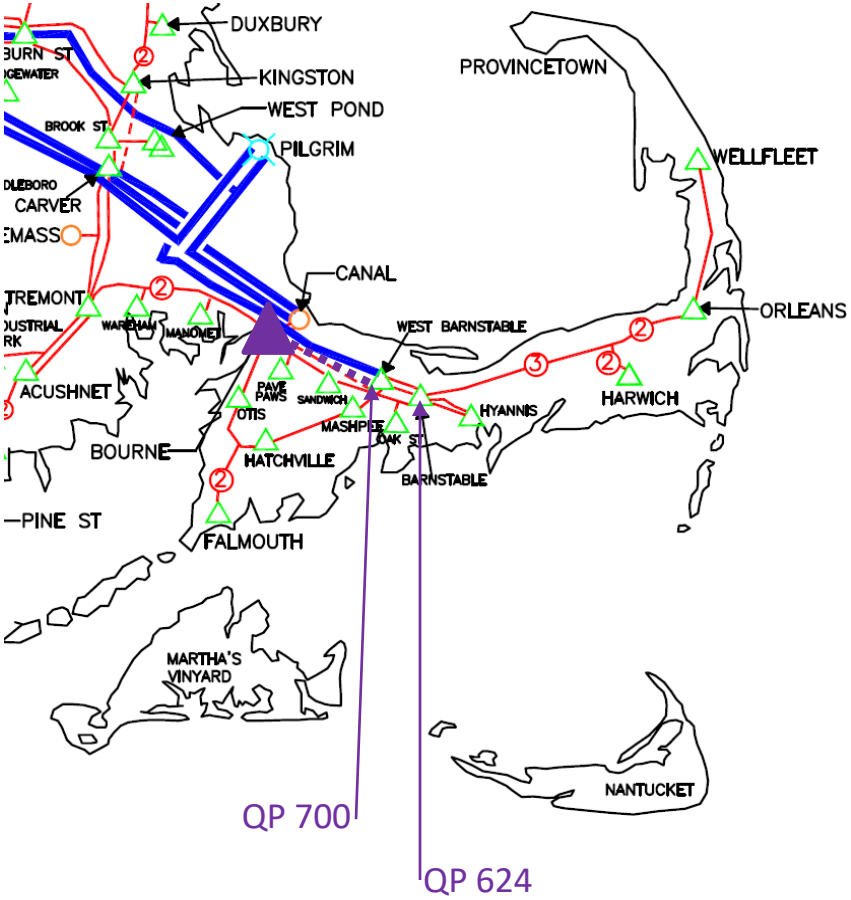
Injection Points for Offshore Wind with Completed Feasibility Studies



Injection Points for Offshore Wind with Completed System Impact Studies/Resource Integration Studies

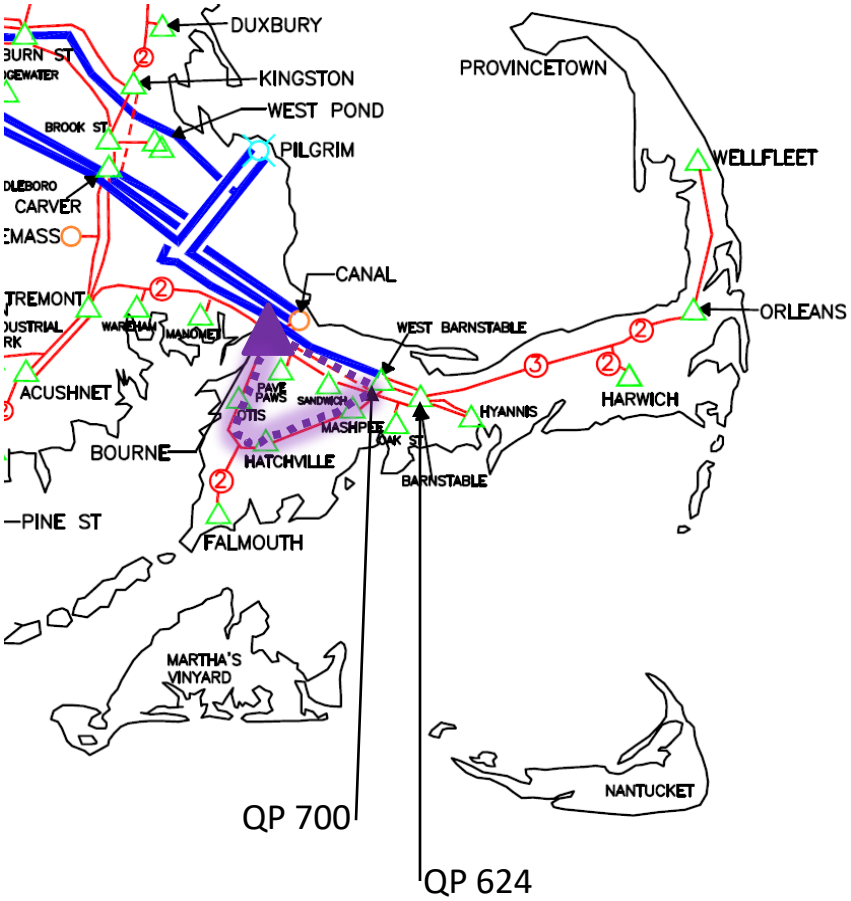


Status of the Interconnection Process on Cape Cod



- QP 624 (800 MW) has a completed System Impact Study and will be interconnecting to the Barnstable 115 kV substation
- QP 700 (800 MW) has a completed System Impact Study and will be interconnecting to the West Barnstable 345 kV substation and will require Network Upgrades, including the following:
  - A 345 kV line from West Barnstable to Bourne
    - Converting a planned 115 kV line to 345 kV
  - New Bourne 345 kV substation
  - New 345/115 kV autotransformer at West Barnstable
- These generators and these upgrades were assumed in the base case for the First Cape Cod Resource Integration Study (CCRIS)

Conceptual Cluster Enabling Transmission Upgrades



- The CCRIS focused on the addition of **new 345 kV transmission infrastructure between West Barnstable and Bourne**
- The CCRIS identified the **quantity of megawatts** that could be interconnected while also recognizing and further quantifying the overall export limitation from Cape Cod

First CCRIS Conclusions

- With the addition of a new 345 kV line between West Barnstable and Bourne, a total of 2,800 MW of offshore wind can be connected to Cape Cod
  - Without needing additional significant new transmission infrastructure beyond Cape Cod
- The N-1 constraint and loss of right-of-way performance are the primary limiting issues
- Synchronous condensers instead of STATCOMs may be needed for some of the new wind farms
  - Will be confirmed in the Cluster System Impact study
- 1,600 MW (QP 624 & QP 700) of offshore wind projects have already completed their Interconnection Studies
- This means that up-to an additional 1,200 MW can connect after the inclusion of the additional Bourne – West Barnstable 345 kV line

Cluster Entry

- After the publication of the final CCRIS report, the ISO opened the window for eligible projects to proceed to the Cluster System Impact Study (CSIS) phase
  - Eligible projects must meet the CSIS entry requirements, including the submittal of a Cluster Participation Deposit, to proceed into the CSIS
  - 1,200 MW (two projects) met the cluster entry requirements and are proceeding in the CSIS

Second CCRIS

- The Second CCRIS will build on the First, by addressing the issues identified for offshore wind additions greater than 2,800 MW in the Cape Cod area
  - N-1 345 kV overloads
  - Loss of right-of-way exposure
  - N-1-1 export limitation

Next Steps

- Continue Interconnection Studies for Offshore Wind
- Continue Cluster System Impact Study for the first Cape Cod cluster
- Continue the Second CCRIS to consider the integration of additional resources in the Cape Cod area

Questions