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 CO₂ Emissions

<table>
<thead>
<tr>
<th>Target</th>
<th>Description</th>
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<tbody>
<tr>
<td>≥80% by 2050</td>
<td>Five states mandate greenhouse gas reductions economy wide: MA, CT, ME, RI, and VT (mostly below 1990 levels)</td>
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<tr>
<td>80% by 2050</td>
<td>MA statewide GHG emissions limit</td>
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<tr>
<td>Net-Zero by 2050</td>
<td>MA clean energy standard</td>
</tr>
<tr>
<td>90% by 2050</td>
<td>VT renewable energy requirement</td>
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<tr>
<td>100% by 2050</td>
<td>ME renewable energy requirement</td>
</tr>
<tr>
<td>Carbon-Neutral by 2045</td>
<td>ME emissions goal</td>
</tr>
<tr>
<td>100% by 2040</td>
<td>CT zero-carbon electricity goal</td>
</tr>
<tr>
<td>100% by 2030</td>
<td>RI renewable energy goal</td>
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## States Accelerate Clean Energy Procurements (2017-2021)

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

Total – 18,154 MW
Injection Points for Offshore Wind with Completed System Impact Studies/Resource Integration Studies

Total – 6,349 MW

704 MW
840 MW
1200 MW
800 MW
1200 MW
805 MW
800 MW
704 MW
840 MW
1200 MW
800 MW
1200 MW
805 MW
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)
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