

# Second Cape Cod Resource Integration Study Status Update

---

*Planning Advisory Committee*



Al McBride

SYSTEM PLANNING



# BACKGROUND AND CHANGES SINCE THE LAST UPDATE

*Second Cape Cod Resource Integration Study*

# Background

- A Second Cape Cod Resource Integration Study (CCRIS) was initiated to study additional offshore wind interconnections in the Cape Cod area
  - To identify enabling infrastructure for remaining area Interconnection Requests that did not proceed forward in the First Cape Cod Cluster System Impact Study
- The ISO interconnection queue contained several Interconnection Requests for projects that will require common new transmission infrastructure to interconnect
- The ISO [notified the Planning Advisory Committee \(PAC\) of the initiation](#) of the cluster process to study these requests
- The ISO provided [preliminary results](#) to the PAC at the April 2022 meeting

# Scope of the Second CCRIS

- The Second CCRIS was scoped to build on the First Cape Cod cluster studies, by addressing the system limitations identified for offshore wind additions greater than 2,800 MW in the Cape Cod area
  - Loss of right-of-way (ROW) exposure
  - Stoughton – K Street 345 kV overloads
  - N-1 and N-1-1 export limitations near Cape Cod
- After the First Cape Cod cluster, there is now an additional approximately 1,200 MW of offshore wind generation currently seeking to interconnect to Cape Cod
- An additional 1,200 MW is also seeking to interconnect near Pilgrim substation
- Finally, the queue contains Elective Transmission Upgrade (ETU) requests to connect from offshore directly to Mystic station in Boston and an ETU request to add a connection from the Cape Cod area to Boston

# Proposed Opening of K Street Breaker

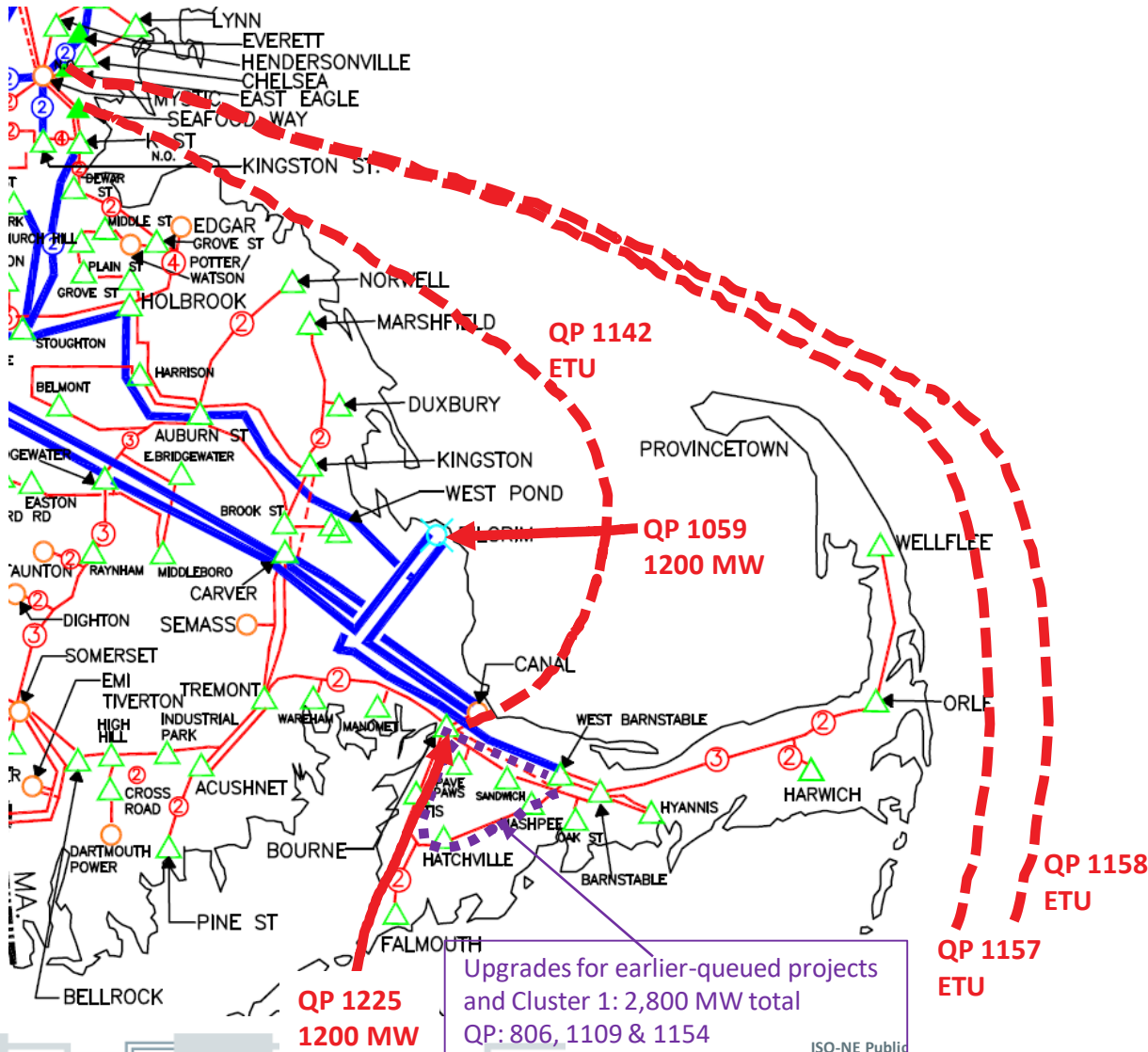
- At the March 2022 PAC meeting ISO-NE presented a proposal to [change the operating status](#) of breaker 103P or 103S at the K Street 345 kV substation in Boston to normally-open
- With this change, loss of one Stoughton-K Street cable results in one 345/115 kV autotransformer at K-Street to be left energized, but carrying no power flow
  - Increased effective impedance between K-Street 345 kV and 115 kV results in lower flow on the remaining Stoughton to K Street cable for loss of the parallel cable
- This system change alleviates one of the constraints identified in the scope for this Second CCRIS
  - Now focused on the ROW and export constraints from the Cape Cod area



# Update to Cluster Eligible Projects: Cluster 1 Withdrawal & Backfill

- In May 2022, three offshore wind projects that proposed to interconnect to Cape Cod withdrew from the ISO interconnection queue
  - Including one project that was participating in the First Cape Cod Cluster System Impact Study (CSIS)
- The First Cape Cod CSIS was backfilled pursuant to the backfilling provisions in Section 4.2.3.3.3 of the Large Generator Interconnection Procedures
- These actions have reduced the number of remaining cluster-eligible projects to participate in the Second CCRIS
  - The remaining relevant projects are depicted on the following slide

# Second CCRIS: Remaining Relevant Projects

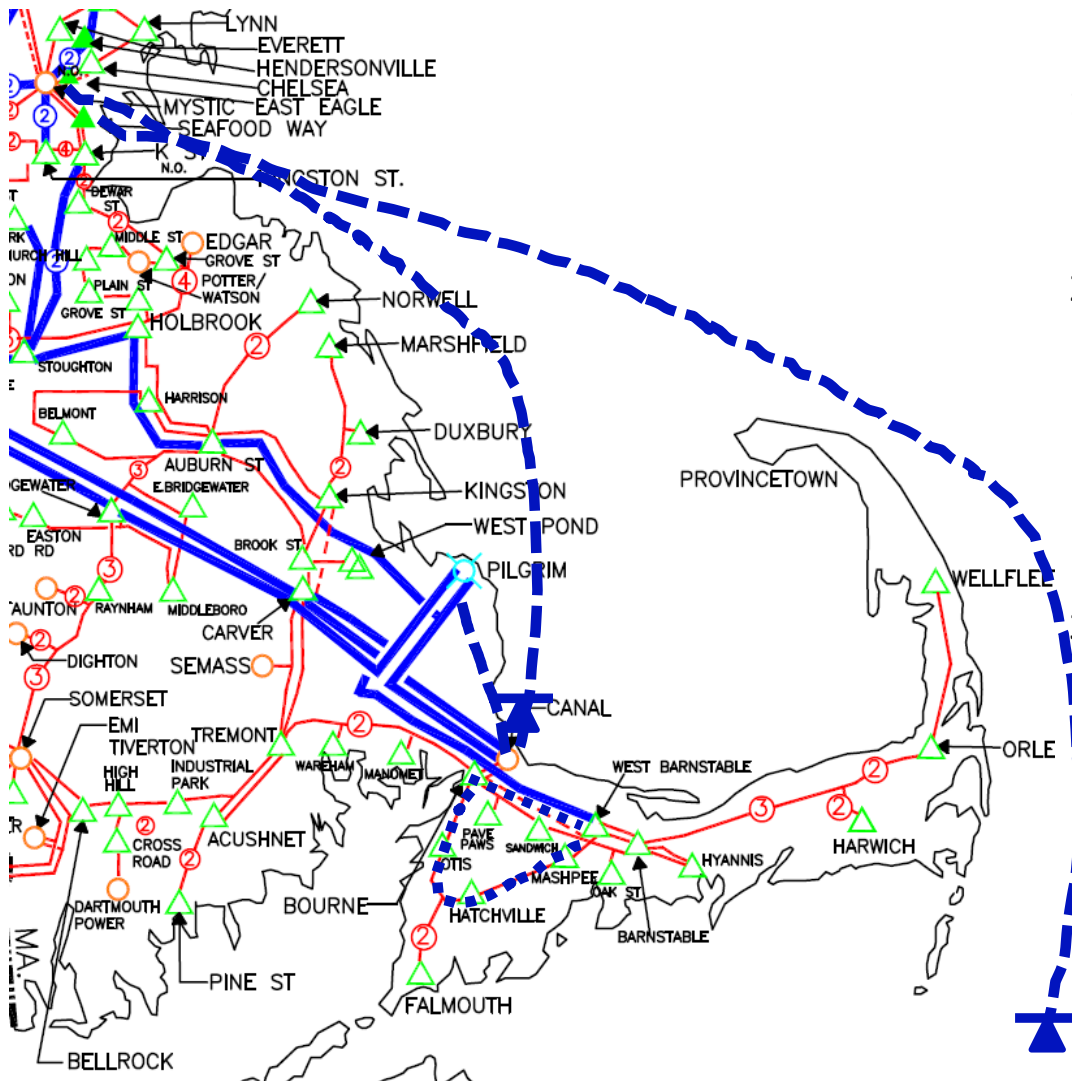


# SUMMARY OF THE PRELIMINARY RESULTS FINDINGS

*Second Cape Cod Resource Integration Study*



# Second CCRIS Potential Upgrade Alternatives



1. Additional on-shore AC 345 kV circuits would need to be in **separate right-of-way**
2. Separate right-of-way from the existing 345 kV on-shore circuits can be achieved using **submarine HVDC cables that bypass** the constraints identified in the First CCRIS
3. Submarine HVDC could also connect offshore wind generation **directly to the Boston area**

# AC Solution Alternative - Conclusions

- The AC solution provided additional system capability
- However, a significant number of additional circuits would have to be upgraded to realize the full combined output from the offshore wind farms
- The overall system dynamic performance in New England will worsen with the addition of Second Cape Cod Cluster with the AC alternative
  - This is mainly because more remote inverter-based generation will replace local synchronous generation to serve the New England loads
  - Moreover, multiple substations would become BPS in the SEMA and Boston areas
- Extreme contingency performance is an increased concern with the potential for extremely large loss-of-source



# HVDC Solution Alternative - Conclusions

- The HVDC connection from Cape Cod to Boston performed better than the AC solution in steady state testing
- The overall system dynamic performance in New England will worsen with the addition of Second Cape Cod Cluster with the HVDC connection from Cape Cod to Boston
  - This is mainly because more remote inverter-based generation will replace local synchronous generation to serve the New England loads
  - Moreover, multiple substations would become BPS in the SEMA and Boston areas
- Extreme contingency performance is an increased concern with the potential for extremely large loss-of-source

# HVDC Connection Directly From Offshore Wind Location to the Boston Area

- A new submarine HVDC Circuit connecting directly from offshore wind location to the Boston area does not exhibit any of the performance issues that were identified for the other alternatives
- Detailed testing in the system impact study would identify any requirements for the specific injection point



# STATUS UPDATE CONCLUSIONS

*Second Cape Cod Resource Integration Study*

# One Project No Longer Cluster Eligible

- QP 1059 is a proposed 1,200 MW radial offshore wind generation connection to the vicinity of the Pilgrim 345 kV substation
- This interconnection point is to the north of the extreme contingency issues that were identified in the preliminary results
- In addition, the Stoughton-K Street 345 kV cables overloads are no longer issues to be addressed by the 2<sup>nd</sup> CCRIS
- It no longer appears that common significant new transmission line infrastructure would be required to interconnect QP 1059 along with the other remaining cluster-eligible projects
- QP 1059 is no longer cluster-eligible and will proceed serially through the study process

# Cluster Enabling Transmission Upgrade (CETU)

- As a result of the preliminary findings of the Second CCRIS, the CETU for offshore wind generation proposals to the Cape Cod area, beyond those contemplated by the First CCRIS, will be a radial 1,200 MW HVDC connection from the offshore lease area(s) to the Mystic 345 kV substation in Boston



# Next Steps for the Second CCRIS

- Conclude the Second CCRIS
  - Targeting fourth quarter of 2022



# Questions

