ISO New England's Role in the Interconnection Review Process for Distributed Generation

"Why is Holistic Interconnection Focusing on Both Transmission and Distribution the Path Forward?"

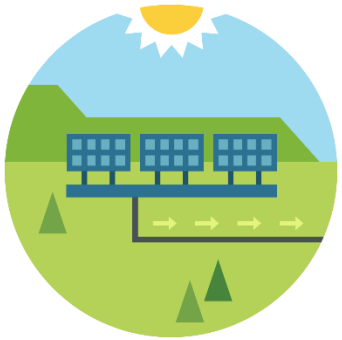
Alan McBride

DIRECTOR, TRANSMISSION STRATEGY AND SERVICES

RELIABILITY REVIEW

Study Coordination in New England

ISO New England's Section I.3.9 Process: Applicability



- The ISO's Section I.3.9 process applies to the interconnection of the following DG resources:
  - **New or increased generation ≥ 5 MW**
    - These projects must include PPA forms in their Section I.3.9 submittals to the ISO
  - **New or increased generation > 1 MW and < 5 MW**, where the ISO has determined such interconnection(s) will have a *cumulative impact* on the regional transmission system
    - Generator Notification Forms (GNF) are submitted to the ISO for projects of this size, unless the ISO identifies that a PPA is required
- As the Regional Transmission Organization (RTO) for New England, the ISO is responsible for reviewing and approving proposed system changes because these changes may impact the **stability**, **reliability**, or **operating characteristics** of the New England power system

ISO New England's Role in Identifying Cumulative Impacts to the Regional Power System

- From the **Transmission Operating Agreement**, Section 3.03(b):
  - The Participating Transmission Owner or its distribution company Affiliate, as applicable, shall notify the ISO of situations where the interconnection of multiple generators to distribution facilities that are not OATT Interconnection Distribution Facilities may have cumulative impacts affecting the facilities used for the provision of regional transmission service and shall, in such situations, consult with the ISO in its performance of such studies. The ISO will determine whether such interconnections will have a cumulative impact on facilities used for the provision of regional transmission service.
- In the case of non-OATT interconnections, the ISO's review of cumulative impact is conducted as part of the Section I.3.9 process
  - Transmission Owner's **early engagement** with ISO New England helps to ensure successful preparation for the I.3.9 review

ISO New England's Section I.3.9 Process: Key Points

- If the generator owner is not a Market Participant, the **Transmission Owner** must make the PPA or GNF submittal to the ISO on the generator's behalf
  - The ISO has 60 days to issue a **determination** (or 90 days if additional time is needed, with written notification to the Market Participant or Transmission Owner)
- The submittal must be supported by a transmission study that meets the requirements of ISO New England Planning Procedures to ensure **no significant adverse effect** upon the reliability or operating characteristics of the utility's transmission facilities, the transmission facilities of another utility, or the system of a Market Participant
- The Transmission Owner is **responsible** for scoping and conducting the study, in coordination with the ISO
- Once the study is complete, the Transmission Owner must present the study results and identification of any needed upgrades to the New England Power Pool (NEPOOL) **Reliability Committee** for an advisory vote
- After an advisory vote by the Reliability Committee, the ISO will issue a **determination** approving or denying the PPA or GNF

Interconnection Review Process for DG Proposals

DG Proposal > 1 MW and < 5 MW

Transmission Owner submits DG description(s) and any proposed groupings of projects to ISO New England

→

ISO New England determines whether project(s) require additional study by the Transmission Owner

→

ISO New England communicates level of study needed (e.g., limited review or full transmission system impact study)

DG Proposal ≥ 5 MW

Transmission Owner conducts study that meets the requirements of ISO New England's Planning Procedures

→

Transmission Owner submits PPA or GNF and supporting study to ISO New England for review and approval

→

PPA or GNF is added to NEPOOL Reliability Committee agenda for upcoming monthly meeting

NEPOOL Reliability Committee votes on whether to recommend the proposed plan would have no significant adverse effect

→

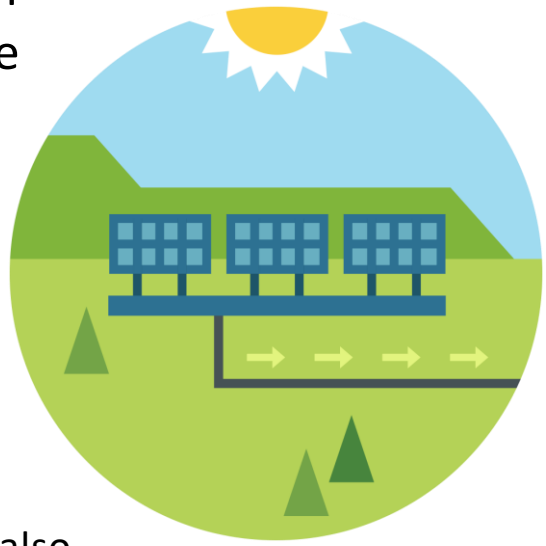
ISO New England concludes PPA or GNF review, with advisory input from NEPOOL Reliability Committee

→

ISO New England issues determination approving or denying PPA or GNF

Successful Study Coordination in the Region

- Large volumes of DG projects throughout New England have been presented to the NEPOOL Reliability Committee and approved by ISO New England in recent years
- Continued successful study coordination between the Transmission Owner and the ISO will facilitate continued Section I.3.9 approval of DG projects
- Transmission owners have also been encouraged by developers to use a cluster study approach
  - More efficient than serial individual studies
- Large accumulations are showing the need for **both distribution and transmission** upgrades
  - Cluster study approach is needed for distribution issues also



- Cluster studies can provide significant insight into future development expectations
  - Thresholds and breakpoints for major upgrades
  - Information for expansion planning

Role of ISO New England in State DG Interconnection Proceedings

- ISO New England has made itself available to state agencies, developers, and other stakeholders to **explain** the Section I.3.9 process and **clarify** the ISO's role in the interconnection review process
- ISO New England will continue to serve as a **technical resource** in state proceedings

BULK SYSTEM ESSENTIAL RELIABILITY SERVICES

The role of distributed energy resources

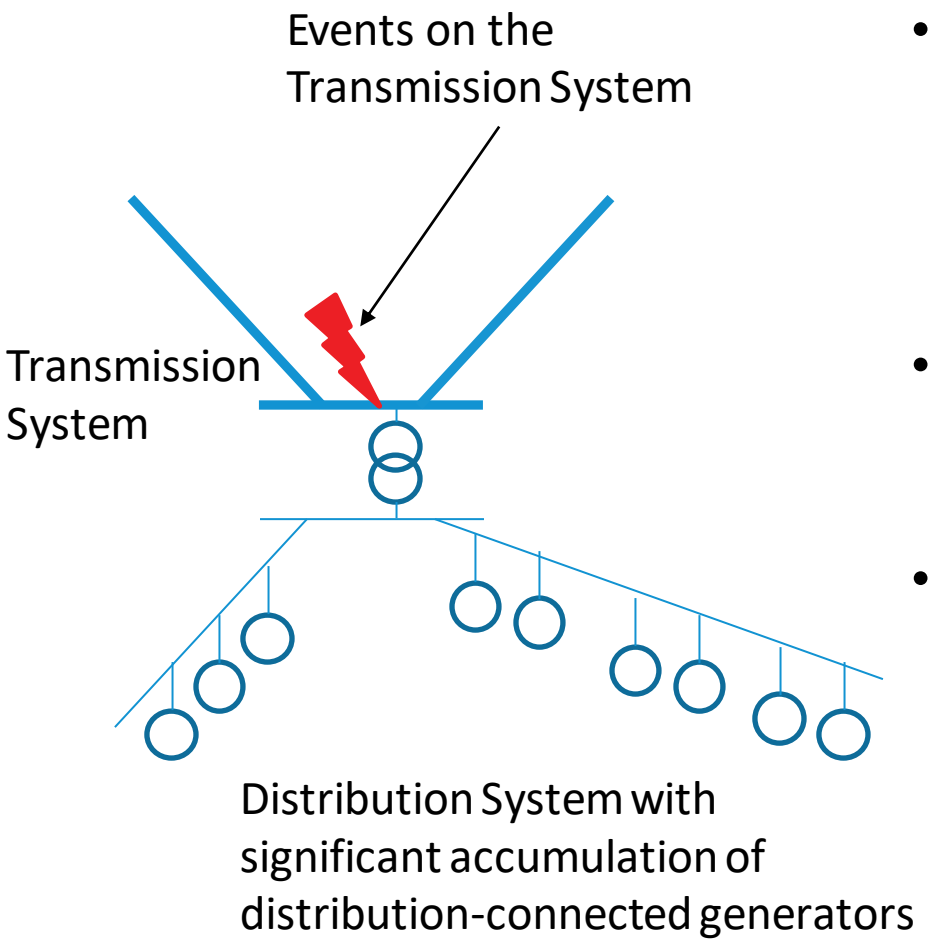
Overall Bulk System Ride-Through Performance

Addressed through interim IEEE 1547 Implementation

- ISO New England plans and operates the transmission system to ensure that the **loss of a large source of supply** (source loss) does not adversely impact the reliability of the Eastern Interconnection
- Historically, the concern has been source loss due to large generators being disconnected or going unstable and tripping
- Tripping of large quantities of distributed energy resources (DER) for a transmission fault would add to source loss
- If total source loss exceeds the amount allowed by the planning criteria, a system upgrade would be required, and this could **negatively impact** the benefits of state policies to encourage renewable energy
- The acceptable maximum source loss is limited by New England's interconnections to other regions to **approximately 1,200 MW** for normal design contingencies

Bulk System Essential Reliability Services

To be addressed through the full implementation of IEEE 1547



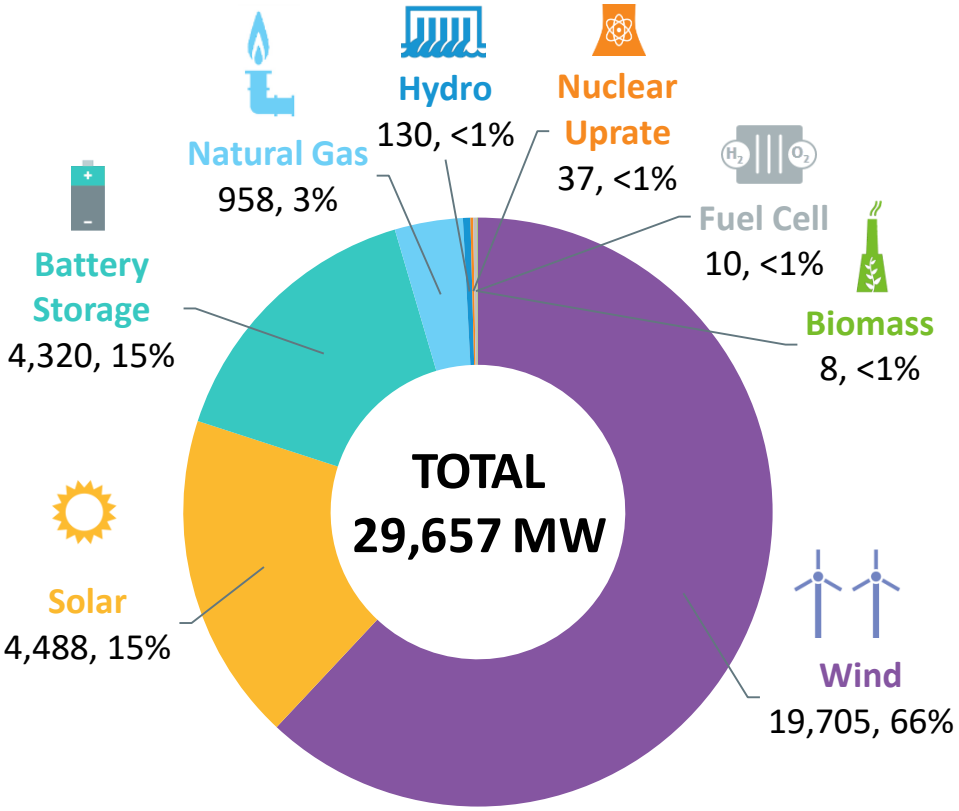
- Future system operation conditions may include scenarios where the majority of on-line generation will be distribution-connected
- The bulk system must still exhibit stable voltage and frequency responses to system events
- Essential reliability services such as voltage and frequency response can be provided by distributed generation – OR – additional upgrades may be required on the transmission system

NEW ENGLAND REGIONAL DEVELOPMENT

The changing resource mix and forward-looking planning

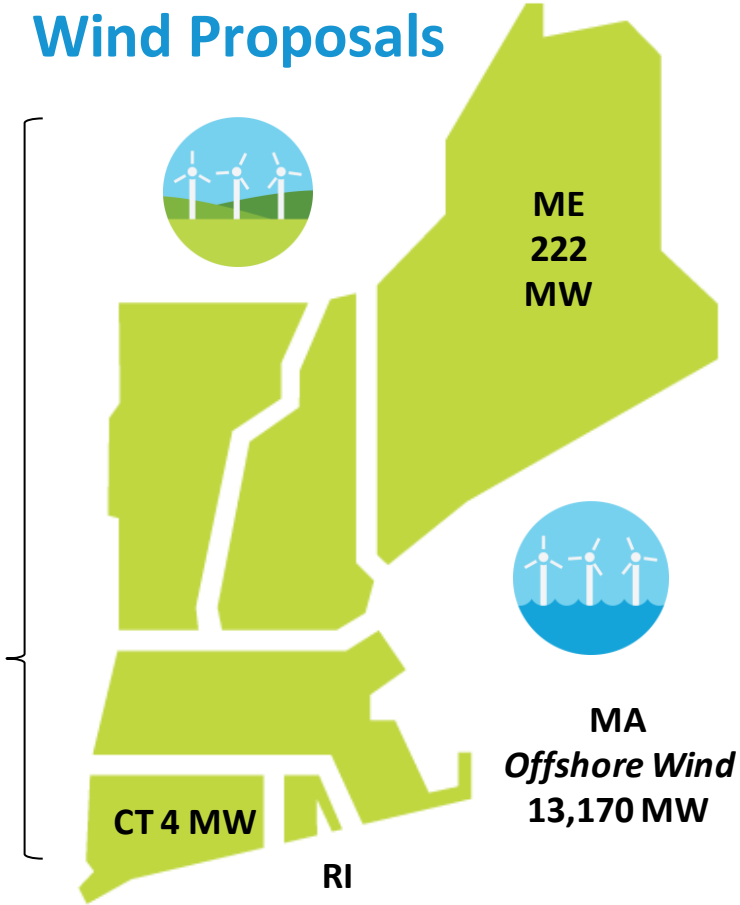
Renewables Make up >95 Percent of New Resource Proposals in the ISO Interconnection Queue

All Proposed Resources



Source: ISO Generator Interconnection Queue (May 2021)
FERC and Non-FERC Jurisdictional Proposals; Nameplate Capacity Ratings
Note: Some natural gas proposals include dual-fuel units (with oil backup).
Some natural gas, wind, and solar proposals include battery storage.

Wind Proposals

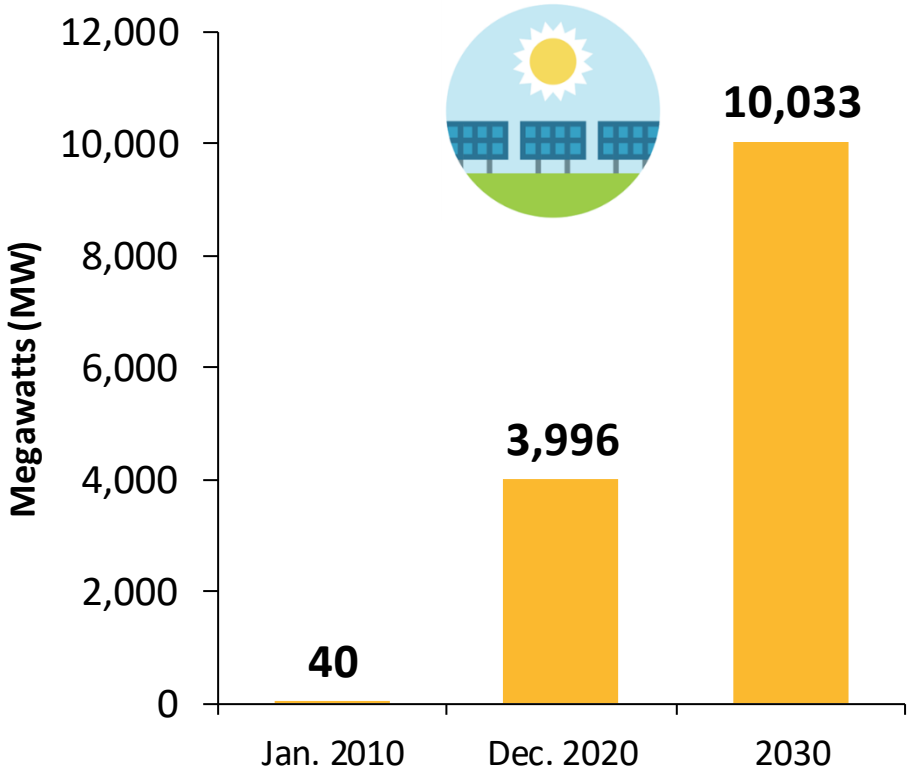


ISO New England Forecasts Strong Growth in Solar Photovoltaic (PV) Resources

December 2020 Solar PV Installed Capacity (MW_{ac})

State	Installed Capacity (MW_{ac})	No. of Installations
Connecticut	682.3	53,758
Massachusetts	2,502.3	114,487
Maine	68.8	5,591
New Hampshire	125.3	10,757
Rhode Island	223.8	9,688
Vermont	393.5	15,328
New England	**3,995.9**	**199,868**

Cumulative Growth in Solar PV through 2030 (MW_{ac})



Note: The bar chart reflects the ISO's projections for nameplate capacity from PV resources participating in the region's wholesale electricity markets, as well as those connected "behind the meter." The forecast does not include forward-looking PV projects >5 MW in nameplate capacity.

Source: Final 2021 PV Forecast (April 2021); and December 2020 Distributed Generation Survey Results; MW values are AC nameplate.

New Energy Storage Technologies Are Coming On Line

- **20 MW** of grid-scale battery storage projects have come on line since late 2015
- Over **4,320 MW** of grid-scale stand-alone energy storage projects are requesting interconnection
- New England has a successful history of operating the region's two large pumped-storage facilities, which can supply **1,800 MW** of power within 10 minutes for up to 7 hours

The ISO is Studying New England's Future Grid

- **Future Grid Reliability Study**: Stakeholder-led assessment of the future state (2040) of New England's power system under current energy and environmental policies
- **Pathways to the Future Grid**: Regional identification, exploration, and evaluation of potential market frameworks that may help support an evolution to a power grid that reflect states' policies
- **2050 Transmission Study** Transmission study (in support of the *New England States' Vision Statement*) to help states determine how to expand the system to incorporate wind, hydro, and distributed energy resources
- **Other studies/initiatives include:** Transmission Planning for the Clean-Energy Transition, Resource Capacity Contributions to Resource Adequacy, and Operational Impacts of Extreme Weather and Contingency Events

Questions