



ISO's 2050 Transmission Study for the New England States

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2050 Transmission Study: Developed in Response to NESCOE's 2020 Vision



- In October 2020, NESCOE released the “*New England States’ Vision for a Clean, Affordable, and Reliable 21st Century Regional Electric Grid*”
 - ISO-NE to conduct a comprehensive, long-term regional transmission planning study to inform all stakeholders of the transmission infrastructure needed to cost-effectively integrate clean energy resources and distributed energy resources across the region to meet New England states’ energy policy requirements and goals
- The scope of the 2050 Transmission Study:
 - Focuses on transmission required to serve peak loads
 - Evaluates thermal overloads
 - (*Does not evaluate voltage or stability concerns*)



2050 Transmission Study: “Snapshots”

- Evaluates:
 - Summer daytime and evening peaks, and
 - Winter evening peak
- Snapshots for 2035, 2040, and 2050
- Assumptions drive outcomes:
 - New England shifts from a summer to a winter peaking area
 - Increases utilization of renewables resources

Power Consumption by Snapshot (MW)				
Year	Summer Daytime Peak	Summer Evening Peak A (Overall Peak)	Summer Evening Peak B (Northern NE Peak)	Winter Evening Peak
2035	29,375	26,749	25,741	35,116
2040	32,447	32,968	31,968	43,046
2050	40,004	38,601	38,492	56,997

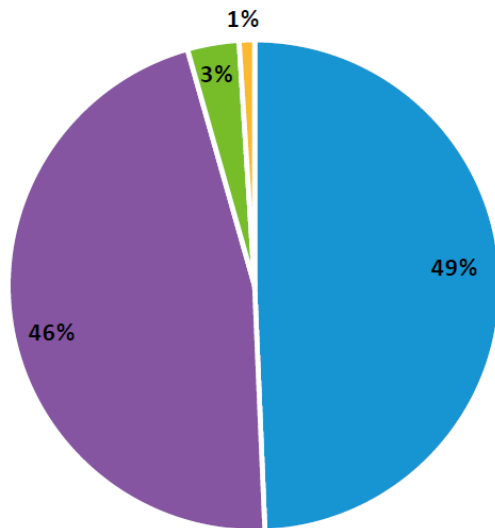


2050 Transmission Study: Takeaways

In 2050, overloads occur on ~50% of the total transmission line miles ...

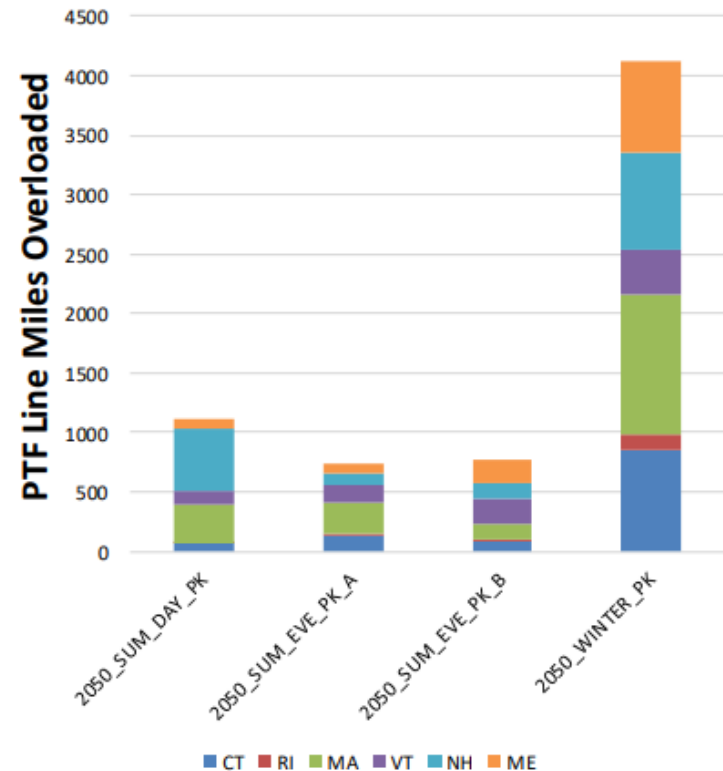
... mostly during the winter evening peak, driven by high heating load

Total PTF Line Miles Overloaded in 2050



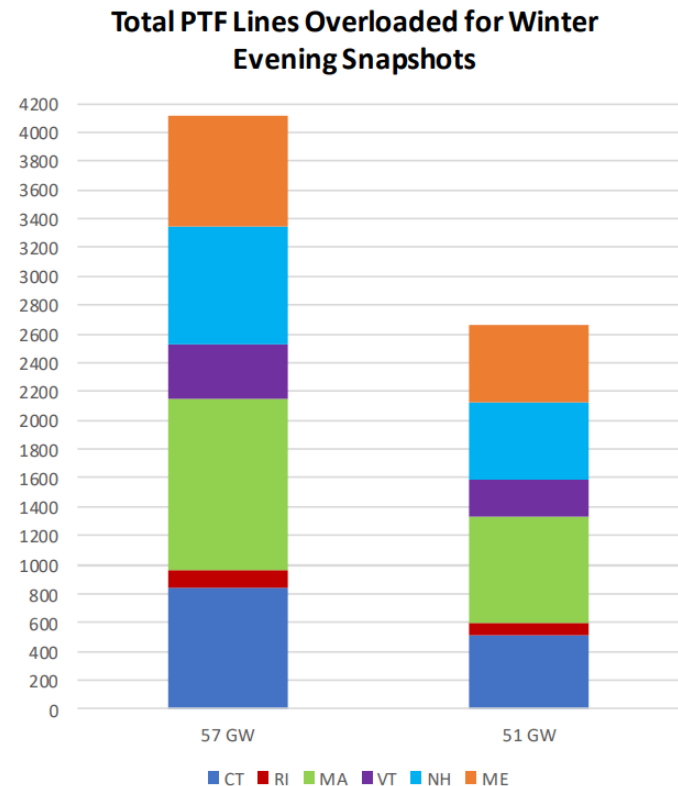
- Miles not Overloaded
- Overhead Miles Overloaded
- Underground Miles Overloaded
- Hybrid Miles Overloaded

Total PTF Line Miles Overloaded for the 2050 Cases



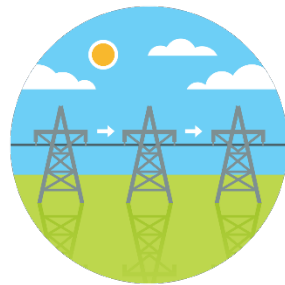
2050 Transmission Study: Takeaways, *cont.*

- North-South paths need significant reinforcement
- What Now?
 - Rebuilds will not do the trick
 - Modest adjustments to assumptions will not resolve the overloads
 - Significant new lines are needed
- Remember:
 - This is thermal, steady-state evaluation, so far
 - Voltage and stability studies need to happen too
(hold that thought)



What's Next?

- Identify potential transmission **solutions** for the states to consider
- Develop high-level **costs estimates** to develop the infrastructure
- Then the hard part: ***How does it get paid for?***
- Then the really hard part: ***How can this get sited?***



Some Final Thoughts

- This is **not** your Mother's power system anymore ...
 - ... the power system as a whole will behave differently than the one we have today and it will be **more challenging to operate** (*remember the needed voltage and stability studies*)
- **Inverter-based resources** do not have the same dynamic performance profile as thermal generators, however ...
 - ... they **can** provide fast frequency response following a contingency **IF** equipped with the controls to allow it, although sustaining this response will be limited
- **Recommendation:** The region needs to require deployment of these controls to increase operational flexibility
 - Will require significant improvements to planning and operational models

