

**MINUTES OF THE
PLANNING ADVISORY COMMITTEE (PAC)
MEETING HELD ON JULY 25, 2023
VIA WEBEX & TELECONFERENCE**

Attendee	Organization
J. Truswell – Chair	ISO New England
J. Macura – Secretary	ISO New England
J. Adadjo	Eversource
S. Adams	ISO New England
Z. Ahmed	ISO New England
R. Albrect	Consulting Energy
S. Allen	Eversource
B. Anderson	NEPGA
B. Andrew	Eversource
E. Annes	CT DEEP
P. Asarese	ISO New England
J. Babu	Eversource
K. Bane	ISO New England
D. Basler	Chaco Companies
S. Beale	NESCOE
P. Bernard	ISO New England
L. Borsoi	Avangrid
C. Bothwell	DOE
D. Bradt	Oxford Power
H. Bruan	London Economics
J. Breard	ISO New England
J. Burlew	ISO New England
D. Burnham	Eversource Energy
D. Cavanaugh	ENE
L. Cecere	VELCO
E. Chapin	Onward Energy
A. Chaplin	New Leaf Energy
P. Chardavoyne	ISO New England
S. Chen	RLC Engineering
R. Collins	ISO New England
B. Conroy	RLC Engineering
W. Coste	ISO New England
K. Csizmesia	National Grid
B. D’Antonio	Eversource
T. Dalakos	RWE
F. Dallorto	ISO New England

J. Dannels	Shell
V. DeIVillano	Eversource
F. Dieng	Eversource
J. Dong	Eversource
B. Donmez	Long Road Energy
J. Donovan	MA AG
M. Doolin	Eversource
M. Drzewianowski	ISO New England
L. Durkin	ISO New England
F. Etti	VELCO
J. Fenn	FENSCO LLC
B. Forshaw	Energy Market Advisors
N. Forster	NESCOE
K. Fougere	Avangrid
B. Fowler	Wheelabrator North Andover Inc.; Exelon Generating Company LLC; Nautilus Power; Dynegy Power Marketing, LLC; Entergy Nuclear Power Marketing LLC; Great River Hydro, LLC
K. Frank	Treadwood
J. Frost	Synapse
J. Fu	DOE
J. Fundling	Eversource
A. Gagnon	MA AG
R. Gahagan	Treadwood
S. Garwood	NHT
E. Golyshevskiy	Anbaric
M. Grover	Eversource
J. Halpin	Eversource
R. Harvey	IEEE
M. Haskell	Maine PUC
P. Holloway	MA DOER
N. Hutchings	NextEra Energy
J. Iafrati	Customized Energy Solutions
C. Jylkka	Daymark Energy Advisors
S. Keane	NESCOE
A. Krich	Boreas Renewables
F. Kugell	Central Maine Power Company
R. Lafayette	Eversource Energy
K. Lagunilla	RIE
S. Lamotte	ISO New England
A. Landry	ME Office of Public Advocate
A. Lawton	Advanced Energy United

Z. Logan	Central Maine Power Company
L. Looman	VELCO
P. Lopes	MA DOER
J. Lowe	ISO New England
X. Luo	ISO New England
E. Mailhot	ISO New England
S. Marien	Eversource Energy
J. Marinstein	Invenergy LLC
J. Martin	New England Power Company
C. Mattioda	Synapse
B. McKinnon	South Hadley Electric Light & Norwood Municipal
A. Mitchell	National Grid
A. Nichols	ISO New England
S. Nikolov	ISO New England
B. Oberlin	ISO New England
A. O'Connell	MA AG
F. Omokaro	Eversource Energy
A. Patel	Eversource Energy
D. Patnaude	Eversource Energy
M. Perben	ISO New England
D. Phelan	NH PUC
J. Porter	National Grid
H. Presume	VELCO
K. Quach	ISO New England
M. Ribeiro-Dahan	ISO New England
C. Richards	PPL
H. Rimkunas	Avangrid
B. Robertson	Eversource Energy
E. Ross	ISO New England
J. Rotger	Customized Energy Solutions
M. Safi	RIE
Z. Samuels	Eversource Energy
B. Sanderson	Anbaric
M. Saravanan	ISO New England
K. Schlichting	ISO New England
D. Schwarting	ISO New England
M. Scott	National Grid
P. Shattuck	Anbaric
J. Slocum	MA Dept. Transportation
B. Snook	CT AG
P. Sousa	South Coast Wind
A. Spinu	RIE

R. Stein	H.Q. Energy Services
E. Steltzer	Mott MacDonald
B. Swalwell	Tangent Energy
T. Sweeney	NH Dept. of Energy
C. Szmodis	PPL
L. Szmot	Strata Clean Energy
Z. Teti	Avangrid
B. Thomson	RIE
A. Trotta	United Illuminating
P. Turner	Conservation Law Foundation
G. Twigg	NECPUC
J. Vaile	Eversource Energy
M. Valencia-Perez	ISO New England
P. Vijayan	ISO New England
S. Walcott	Eversource Energy
A. Yahiaoui	United Illuminating
J. Zhang	ISO New England

Item 1.0 – Chairs Remarks

Ms. Jody Truswell welcomed PAC and reviewed the day’s agenda.

Item 2.0 – V5, U6, & S8 115kV Line Asset Condition Project **CEII**

Mr. Austin Mitchell (National Grid) presented V5, U6, and S8 115 kV lines’ asset condition projects. The proposed changes and associated costs include:

V5/U6

- Replace 167 double circuit lattice structures with engineered steel structures on concrete foundations.
- Replace 20 miles of 636 MCM ACSR conductor on mainline and taps with 795 MCM ACSS “Drake” conductor.
- Remove 20 miles of 3 #6 CW shield wire and install 20 miles of OPGW and 20 miles of 3/8” EHS (Extra High Strength) shield wire
- Total Cost is \$131.98M (+50/-25%), 100% PTF

S8

- Replace 182 wood pole H-frame structures with 163 direct imbed steel poles at tangent locations and 19 engineered steel structures on concrete foundations
- Replace 20 miles of 628.7 MCM ACSR conductor on mainline and taps with 795 MCM ACSS “Drake” conductor
- Remove 20 miles of 3#5 CW shield wire and install 20 miles of OPGW
- Total Cost is \$88.24M (+/- 10%), 100% PTF

In response to stakeholder questions, National Grid issued the following statements:

- Construction generally begins 18-24 months before the in-service date.
- Likely, concrete was selected over a directly embed solution because it is stronger to support two circuits.
- Leaving the V5/U6 in a double circuit tower configuration provides adequate transmission over the next 10-years. Separating the double circuit towers does not seem necessary at this time.
- Inspections highlighted these projects as a priority. National Grid can provide more information on the history of the lines and any major changes to interested stakeholders.

Item 3.0 – 2028 New England Short Circuit Needs Assessment **CEII**

Ms. Sarah Lamotte (ISO-NE) presented a short circuit analysis performed on a 2028 model of the New England transmission system to assess the performance of all PTF breakers.

In response to stakeholder questions, ISO-NE issued the following statements:

- All needs are time-sensitive.
- ISO will consider parallel efforts which may increase short circuit currents.
- PPA approved synchronous condensers are included.
- PPA studies evaluate account short circuits.
- This presentation was designated as CEII because its content presents the initiating event and reveals the location of equipment with interrupting capability concerns.
- BPS testing primarily looks for protection system redundancy, not breaker ratings.
- DER clusters may affect breakers.
- This testing includes All PPA approved projects. The short circuit assumptions incorporate the various offshore wind projects connecting to the system in Barnstable.
- In Maine, significant DERs came online and contributed to over-duties. Larabee substation was part of MPRP.
- There was one instance where there was a modeling error for a transmission impedance.
- When reviewing for significant adverse impact, there is a threshold requiring a 1% increase. If there are multiple projects below the threshold, it is possible to end up over the circuit breaker rating.

The following comments were issued:

- It could be beneficial to avoid presenting CEII material.

Item 4.0 – Connecticut Structure Replacement & OPGW Installations

Mr. Dave Burnham (Eversource Energy) presented Connecticut's structure replacements and OPGW installations. Inspections indicated significant structural degradation along Lines 364, 328, and 1726. Eversource seeks to replace 21 existing wood structures with weathering light duty steel H frame structures and replace 50.46 circuit miles of shield wire with OPGW to

support long-term reliability on the transmission system. The total estimated PTF costs are \$31.17M (-25%/+50%).

There were no stakeholder questions.

Item 5.0 – Northboro Road Substation Breaker Replacements

Ms. Kelley Csizmesia (National Grid) presented Northboro Road Substation’s breaker replacements. National Grid considered two alternatives. Option 1 (preferred) seeks to replace 69kV and 115kV oil circuit breakers. The estimated cost of service is \$6.38M (-25%/+50%), with an in-service date of July 2024. Option 2 is not viable because the proposed comprehensive circuit breaker refurbishment lacks manufacturer parts and support.

In response to stakeholder questions, National Grid issued the following statements:

- The \$1.15M non-PTF cost on slide 8 are associated the G7 and M11 circuit breakers and their disconnects.
- The H160 breaker is PTF and is unrelated to the Hudson-Sudbury line.

Item 6.0 – UI’s 115kV Derby Junction to Ansonia Line Rebuild Project

Mr. Zach Logan (Avangrid) presented UI’s update to the costs for the 115 kV Derby Junction to Ansonia line rebuild project. Due to increases in scope and other factors, the cost of the project has increased since it was last presented in September 2021. The updated estimated cost is \$70.98M.

There were no Stakeholder questions.

Item 7.0 – Economic Planning for the Clean Energy Transition (EPCET) Pilot Study – 2032 Multiple Weather Year Results

Mr. Ben Wilson (ISO-NE) presented 2032 Multiple Weather Year results from the EPCET Pilot Study. The presentation focused on the impacts of increased electrification demand by running 20 years of weather data through the 2032 MENS model with updated load profiles.

In response to stakeholder questions, ISO-NE issued the following statements:

- Price drives zero-cost resources to displace natural gas, rather than fuel oils. Slide 10 shows gas generation dropping, and coal and oil increasing, due to increased load and continuing fuel constraints. On cold winter days, fuel oil generation is higher in comparison to today’s numbers. Most emission savings occur in the spring, summer, and fall months.
- All announced retirements and base case assumptions in the database were modeled.
- MWs by generation type were included in an earlier presentation.
- The ISO may consider modeling emissions reductions with an alternative to economic dispatch.

- Fuel blending is beyond the scope of this project. The ISO is focused on existing infrastructure.
- The EPCET Pilot Study strives to provide the scale of resources required, not indicate exact numbers. EPCET is still in its research and development phase and has not been incorporated into ISO's Tariff yet.
- Resource Adequacy Assessments (RAAs) are outside the scope of the study's 2032 production costs. Individual generator outages are not modeled. ISO is considering integrating resource adequacy in 2050 to better understand capacity expansion. The 10-year ICR did not indicate Resource Adequacy concerns in New England.
- EPCET cannot address coal-fired generation questions because it does not focus on individual generating units. The data is based on confirmed retirements.
- The Policy Scenario a 2050 capacity expansion study.
- RENEW's requested sensitivity results will be shared at the next PAC meeting.
- The ISO expects to publish a short, high-level report summarizing the EPCET study at its conclusion.

The following comments were issued:

- A stakeholder requested ISO to expand timeframes beyond the 21 Day Average Generation period referenced on slide 37.
- This presentation is a great indicator of future energy needs.

Item 8.0 – RNS Rate and Asset Condition Projects Update

Mr. David Burnham (Eversource Energy, on behalf of PTOs) presented the five-year RNS rate forecast through 2028. This presentation was a request by NESCOE to address asset condition projects' impact on RNS rates. The RNS rate increased \$12.71, which was primarily driven by the 5-quarter average of regional project additions, estimated around \$1.8B. The RNS rate starting January 1, 2024 is \$154.35/kW-year.

In response to stakeholder questions, Eversource issued the following statements:

- Eversource is still coordinating when it will bring the Boston area underground projects to the PAC.
- The design voltage of the A201 and B202 lines will be discussed in a future presentation.

The following comments were issued:

- NESCOE commented the presentation's intent was to bring greater visibility and discipline to transmission costs. NESCOE is seeking feedback on useful information necessary to perform a meaningful review of transmission projects.
- Multiple stakeholders expressed gratitude to Dave and the PTOs for the presentation and an effort to increase transparency.
- A stakeholder suggested incorporating right-sizing into the RSP, with an emphasis on investing in equipment that will serve the long-term grid, rather than rebuilding old infrastructure.

Item 9.0 – Requirements for Modeling Resources with Contracts in Needs Assessments

Mr. Pradip Vijayan (ISO-NE) explained ISO’s modifications to the Transmission Planning Process Guide (TPPG). The TPPG explains modeling requirements for resources with contracts in Needs Assessments (NAs) and solution development. TPPG modifications seek to: 1) clarify the minimum information that must be provided in the resource contract; 2) specify the required modeling information to ensure each resource is sufficiently modeled; 3) identify the resource’s point of contact if clarification is required to model the upgrades; and 4) establish an annual review process to ensure significant changes are reflected in the NAs and solution development.

In response to stakeholder questions, ISO-NE issued the following statements:

- ISO will present a follow up presentation in August to clarify any stakeholder confusion regarding the Information Policy.
- The ISO is requesting additional information with the TPPG changes to help support the conduct of Needs Assessments.
- New generation projects will still go through a system impact study (SIS) process like any other generator, separate from their inclusion in a Needs Assessment.
- After an SIS is complete, ISO will post the modeling information to the website. There may be some restrictions, but it is posted as “final.”
- When a project has a contract, ISO initially relies on information available from the states or parties to the contract. If new information arises, ISO will update its modeling information as necessary.
- Needs Assessments focus on determining transmission system reliability in serving load.
- The proposed TPPG changes aim to gather the information necessary to fulfill Tariff requirements under Attachment K.

The following comments were issued:

- A stakeholder expressed Information Policy concerns regarding ISO receiving confidential information from developers.

Item 10.0 – 2050 Transmission Study – Key Takeaways and Transmission Development Roadmaps

Mr. Dan Schwarting (ISO-NE) presented key takeaways from the 2050 Transmission Study. Preliminary lessons indicated peak load reduction significantly reduced transmission costs, high-likelihood results can be prioritized, and incremental upgrades are feasible. A high-level roadmap of the 2050 Transmission Study will detail the evolution of certain portions of the transmission system, incorporating likely concerns. The North-South transfers and Boston imports will cover road maps focused on rebuild-priorities, new 345 kV overhead transmission, new HVDC transmission (overhead, underground, or submarine), and networked offshore connections between offshore wind farms.

In response to stakeholder questions, ISO-NE issued following statements:

- ISO created roadmaps to reflect both the pros and cons of different transmission alternatives throughout the region. ISO is exploring a broad range of alternatives, including that may involve municipal systems.
- ISO does not have a definitive timeline for Tariff changes related to Extended-Term Transmission Phase 2, but is actively engaged with the States in coordinating this effort.
- ISO has not considered blanket policies, such as converting all conductors from 69 kV to 115 kV.
- This study did not target load reduction at specific substations in the 51 GW 2050 winter peak, but instead, decreased a specific percentage throughout New England.
- April 2023's presentation focused on the big trends that occur over multiple years over both the summer and winter peaks.
- NPCC's requirement to analyze extreme contingencies such as the loss of all transmission lines on a right of way may be a concern for some roadmaps. ISO is reviewing the best way to apply this extreme contingency criteria.
- ISO has been in communication with NYISO and PJM through IPSAC about lifting the 1200 MW loss-of-source criteria but that falls outside the scope of the 2050 Transmission Study.
- This study reflects overall assumptions, where wind, offshore wind, and solar are based from the Energy Pathways to Deep Decarbonization Study, which focused on New England's transition to a decarbonized grid. Those assumptions were given on a state-by-state basis. For the 2050 Transmission Study, ISO took all those numbers and divided it between the individual substations based on today's distribution of load among individual substations.
- The 2050 Transmission Study looks for needs under peak load conditions.
- Any analysis of congestion on the North-South interface would need to look at all 8760 hours of the year. This goes a bit beyond the 2050 Transmission Study scope. Future studies may look beyond peak loads to better analyze the need for increased interface capabilities.
- There are few ways to approach expanding capacity for new generator interconnections in New England. ISO is hesitant about allowing new automatic generation rejection schemes because it adds complexity to the system, causing it to react undesirably under certain conditions. Looking at re-dispatch between contingencies, the requirement to complete any redispatch within 30 minutes was observed in the 2050 Transmission Study.
- Upgrades at voltages higher than 345 kV (for example, 500 or 765 kV) were not considered because the worst contingency would likely become the loss of new transmission lines over 345 kV, and the concerns observed could be resolved without needing to go to higher voltage levels.
- The "cone of uncertainty" is less extreme in closer years. 2035 and 2040 depict what is coming a bit sooner or at some point in the region, and there is less uncertainty in these snapshots.
- The 2050 Transmission Study includes 2035 and 2040 snapshots, which aid in identifying high likelihood concerns.

- The complexity of multi-terminal offshore HVDC grids was limited to acknowledge significant unknowns in cost and technology availability.
- Reanalyzing the data to include a loss of source limit greater than 1200 MW is beyond the scope of the 2050 Transmission Study.
- The ISO is still working on final report specifics, but the current plan is to generate a report summary and technical appendices.
- The 5% assumption for offshore wind output under summer peak conditions (slide 25) is inconsistent with the SIS because the assumptions are different.

The following comments were issued:

- A stakeholder complimented ISO's work, stating it was producing reasonable options.

Item 11.0 – Transmission Planning Technical Guide Update

Ms. Annalyse Nichols (ISO-NE) presented updates to the Transmission Planning Technical Guide (TPTG). The guide has added details for studying winter peak-load conditions and long-duration energy storage systems. TPTG now models DER at a unity power factor and National Grid and non-National Grid DER as one machine with the same parameters. The DER loss gross-up for non-peak conditions were removed and Electricity Energy Storage Systems (EESS) modeling was added.

The following comment was issued:

- A stakeholder commented that the ISO should consider that sometimes storage facility charging may put stress on the system.

Item 12.0 – Closing Remarks/Adjourn for the Day

Ms. Truswell announced the next PAC meeting is on Wednesday, August 16, 2023. Ms. Truswell reminded PAC members to clearly state and spell your first name, last name, and affiliation when calling in for CEII presentations. She encouraged dialing into meetings early to allow for screening and a prompt start.

The meeting adjourned at 2:20 P.M.

Respectfully submitted,

_____/s/____

Jillian Macura

Secretary, Planning Advisory Committee