

**Planning Advisory Committee
WebEx Teleconference
June 16, 2021**

Attendee	Organization
J. Truswell - Chair	ISO New England Inc.
M. Lyons - Secretary	ISO New England Inc.
M. Ainspan	NRG
R. Albrecht	National Diesel Bio Board
S. Allen	Eversource Energy
B. Anderson	NEPGA
R. Andrew	Eversource Energy
E. Annes	Connecticut Public Utilities Commission
M. Babula	ISO New England Inc.
N. Baldenko	Eversource Energy
D. Bergeron	Maine Public Utilities Commission
P. Bernard	ISO New England Inc.
P. Boughan	ISO New England Inc.
J. Breard	ISO New England Inc.
J. Brodbeck	Marble River
D. Burnham	Eversource Energy
E. Camp	Synapse Energy Economics Inc.
D. Capra	NESCOE
D. Cavanaugh	Energy New England
Q. Chen	ISO New England Inc.
R. Collins	ISO New England Inc.
S. Conant	ST Advising

D. Conroy	RLC Engineering
W. Coste	ISO New England Inc.
F. Dallorto	ISO New England Inc.
B. D'Antonio	NESCOE
M. Drzewianowski	ISO New England Inc.
J. Fenn	Versant Power
B. Forshaw	CMEEC
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
N. Gangi	Eversource Energy
M. Gardner	NextEra Energy
J. Gordon	CPV Towantic
L. Guilbault	HQ US
P. Holloway	Massachusetts Department of Public Utilities
N. Hutchings	ISO New England Inc.
J. Iafrati	Customized Energy Solutions
S. Judd	ISO New England Inc.
T. Kaslow	First Light Power Management
S. Keane	Massachusetts Department of Public Utilities
S. Kirk	Exelon Generation Company
A. Kniska	ISO New England Inc.
R. Kornitsky	ISO New England Inc.
M. Kotha	ISO New England Inc.
N. Krakoff	Conservation Law Foundation
A. Krich	Boreas Renewables

B. Kruse	Calpine
K. Kumar	ISO New England Inc.
S. Lamotte	ISO New England Inc.
C. Malone	Avangrid
A. Margolis	Vermont Public Utilities Commission
T. Martin	New England Power Company
A. McBride	ISO New England Inc.
B. McKinnon	Norwood Municipal, South Hadley Municipal
E. McNamara	Vermont Public Utilities Commission
W. Naura	Dominion
A. Nichols	ISO New England Inc.
B. Oberlin	ISO New England Inc.
K. O'Hora	Eversource Energy
H. Presume	VELCO
M. Purdie	Dominion
J. Rotger	Galt Power, Cross Sound Cable, BP Energy, Mercuria Energy and DTE Energy
E. Runge	Day Pitney
H. Saarela	ISO New England Inc.
M. Saravanan	ISO New England Inc.
D. Schwarting	ISO New England Inc.
C. Sedlacek	ISO New England Inc.
T. Shakespeare	Massachusetts Department of Public Utilities
P. Shattuck	Anbaric Development Partners
P. Silva	ISO New England Inc.
C. Soderman	Eversource Energy

P. Sousa	Massachusetts Department of Public Utilities
M. Spencer	Jericho Power
K. Sreenivasachar	ISO New England Inc.
R. Stein	Generation Group Member, NRG Power Marketing, HQ Energy Services, PSEG Energy Resources & Trade, SunEdison
B. Thomson	MMWEC
P. Turner	Conservation Law Foundation
R. Vega	ISO New England Inc.
P. Vijayan	ISO New England Inc.
P. Wong	ISO New England Inc.
A. Worsley	Boreas Renewables
J. York	LS Power
F. Zeng	ISO New England Inc.
J. Zhang	ISO New England Inc.

Item 1.0 – Chairs Remarks

Ms. Jody Truswell welcomed the committee and reviewed the days' agenda.

Ms. Truswell spoke to the committee regarding the recent passing of Michael Henderson on May 22, 2021. Mike retired from his Director of Regional Planning and Coordination position with the ISO in April 2020 after more than two decades of service. For much of his tenure, Mike spearheaded the creation of the Regional System Plan and the associated coordination with the Planning Advisory Committee and internal stakeholders. He was a dedicated team member, an active member in many professional organizations such as IEEE, and advanced transmission planning in New England throughout his long-standing career. Though his clever New York wit always garnered a laugh, Mike will perhaps be most remembered for the enthusiasm he displayed both for engineering and for helping mentor those in the field. He was always quick to give of his time and talent as colleagues and mentees pursued their engineering career goals. We will certainly miss his presence and continue to be inspired by his dedication.

Item 2.0 – Line 690 Rebuild and Asset Condition Project

Mr. Chris Soderman (Eversource Energy) reviewed the Line 690 Rebuild and Asset Condition Project.

In response to stakeholder questions Eversource Energy stated other portions of the Line 690 toward Falls Village in Connecticut were rebuild for 115 kV and the ground clearance requirements are compliant with 115 kV line standards.

Item 3.0 – 115 kV and 230 kV Wood Pole and Shield Wire Replacement Project

Mr. Chris Soderman (Eversource Energy) reviewed the 115 kV and 230 kV Wood Pole and Shield Wire Replacement Project.

In response to a stakeholder question Eversource stated that the Connecticut portion of the project was previously identified and been addressed. This new project work associated with the 115 kV and 230 kV lines is a result of continuous inspections that have identified worsening degradation of the structures.

Item 4.0 – Representative Future Locational Reserve Needs for Current Reserve Zones

Mr. Fei Zeng (ISO-NE) provided a review of the future representative operating reserve needs for the years 2021-2025 (summer and winter periods) for the current reserve zones of SWCT, Connecticut and NEMA/Boston. The future reserve needs are evaluated through probabilistic simulations using input variables such as transmission import capability, largest generation contingency, assumed major generator additions or retirements, and load (BTM PV, heat pumps, EV's, and passive demand resources). Study assumptions use historical operational data, 2021 CELT Report and transmissions limits assumed for Installed Capacity Requirement calculations to be conducted in 2021. Study results for the reserve needs for Southwest Connecticut and

Greater Connecticut are forecasted to be zero as a result of area transmission upgrades, addition of efficient gas generators, and minimal impact of area generation retirements. Reserve needs for NEMA/Boston are expected to be 0-250 MWs in 2022, 0-150 MWs for 2023 & 2024 (decrease expected due to the Wakefield/Woburn 345 kV line coming into service), 100-600 MWs for 2025 (increase due to the Mystic 8 & 9 retirements and reduction of import capability).

Questions mostly focused on the meaning and interpretation of some of the slides. There was some discussion on the ISO market setup for procuring reserve products, and if there was a need for improvement from the current process. In addition, a question was asked if the ISO can provide the claimed 30-minute reserve capability in each reserve zone, which may be used to fulfill the reserve requirement. ISO commented that we would take back the market related questions and relay them to the market department, and Market Committee may be a more proper forum to raise and address these questions. ISO will also work to identify the available information on the claimed 30-minute reserve capability and provide updates.

Item 5.0 – Regional System Plan Transmission Projects and Asset Conditions – June 2021 Update

Mr. Kannan Sreenivasachar (ISO-NE) reviewed the Regional System Plan Transmission Projects and Asset Conditions – June 2021 Update.

A stakeholder commented that slide 13 of the presentation is incorrect. The Reliability Committee approved the PPAs associated with the Eastern Connecticut 2029 Transmission Reliability Project at their June 15, 2021 meeting.

Item 6.0 – Net Installed Capacity Requirements (ICRs), Representative Future Net ICRs and Operable Capacity Analysis for 2021 Regional System Plan

Ms. Manasa Kotha and Mr. Mark Babula (ISO-NE) reviewed the Net Installed Capacity Requirements (ICRs), Representative Future Net ICRs and Operable Capacity (OpCap) Analysis for 2021 Regional System Plan. Their presentation reviewed system wide and local capacity resource needs as well as system wide operable capacity analysis under 50/50 and 90/10 demand peak conditions. The results of this review will be published in RSP21.

Ms. Kotha's portion of the presentation entitled "Review System Wide and Local Capacity Resource Needs" showed that the past four FCAs (FCAs 12 – 15) the market provided more capacity supply obligations than net ICR, averaging 1250 MWs above the net ICR. The representative net ICR during the 10-year study period is estimated to remain between 31,700 MWs to 32,400 MWs. If additional capacity is needed, the region intends to rely on the 25,800 MWs of capacity currently in the Queue.

Mr. Babula's portion of the presentation entitled "OpCap Analysis" shows that under 50/50 peak demand conditions, the region has a positive system OpCap margins for both the summer and winter periods (841 MW average for the next three summers, 910 MWs average for the next three winters). After CCP 2024-2025, the 50/50 peak demand OpCap margin becomes negative (-881 to -1095 MWs summer, -1148 to -2196 MWs winter). For the 90/10 peak demand conditions, both the summer and winter periods have a negative OpCap condition (-973 to -3115 MWs summer, -628 to -3926 MWs winter). To address any deficiencies, load and capacity relief will come from ISO invocation of OP 4 actions and if necessary, OP 7 actions.

In response to stakeholder questions, ISO-NE provided the follow statements:

- The reserve margin values are decreasing due to a change in the load forecast assumptions. The calculations for the actual net ICR used last year's CELT Report load forecast (reflecting a higher load forecast) and the reserves are expressed in percent of the current CELT load forecast (reflecting a lower load forecast). The calculations for the representative net ICR used this year's CELT Report load forecast (reflecting a lower load forecast). The decrease in the reserve margin values for the Rep NICR period CCP 2026- 2027 through CCP 2030-2031 is because the supply resources are held constant (using the FCA 15 ICR case) to meet the growing New England load for year 2026 through 2030.
- Regarding the treatment of regional LNG fuel supplies and the assumptions used for generators contracting for delivery of such supplies during cold winter days, ISO-NE noted that they have developed a regional gas demand equation which is driven by winter temperatures. For each week of the winter season, ISO-NE can estimate the total regional gas demands (from the residential, commercial and industrial sectors), and from this, the regional residual (unused) pipeline capacity can be estimated. This is subsequently converted into a capacity (MW) value for the projected amount of single-fuel, gas-only generation that may be "at-risk" due to fuel unavailability. Mr. Babula stated that he would contact the stakeholder to continue the discussion on wintertime fuel supply modeling.

Item 7.0 – 2021 Economic Study – Future Grid Reliability Study Phase I – Overview of Assumptions – Part 3

Mr. Patrick Boughan (ISO-NE) reviewed the 2021 Economic Study – Future Grid Reliability Study Phase I – Overview of Assumptions – Part 3. Presentation reviewed the remaining assumptions for the 2021 Economic Study. Assumptions reviewed the wind and solar resources, EVs, and 36 hour battery modeling. For ancillary services simulations, historical 2019 solar PV data will be used from the ISO operations support vendor instead of the DNV data. DNV data is in one-hour increments and the ISO vendor data is in five-minute increments, which will result in less processing of the existing data. EV distribution of load and injections will be distributed

proportionally based on summer peak loads instead of census data. Batteries will be held back for energy reserves for wind and solar droughts. Remaining preliminary production costs results for Scenario 1, Scenario 3, alternative scenarios, and variations in load and resources will be presented to the PAC in July and August. Preliminary ancillary services analysis results for Scenario 1 will be presented in September and the results for all other scenarios are expected in Q3/Q4 2021. Questions mostly focused on the meanings within the many charts and graphs.

In response to stakeholder question regarding the presentation, ISO stated that the weather values used in the study are from 2019. In addition, the must-run resources used in the study include nuclear resources, some landfill gas resources and municipal solid waste resources.

Item 8.0 – 2021 Economic Study – Future Grid Reliability Study Phase I – Preliminary Production Cost Results – Part 1

Mr. Patrick Boughan and Mr. Richard Kornitsky (ISO-NE) reviewed the 2021 Economic Study – Future Grid Reliability Study Phase I – Preliminary Production Cost Results – Part 1.

Presentation reviewed the preliminary production cost results for the various scenarios in the 2021 Economic Study. In Scenario 1, load and resources are balanced resulting in minimal curtailments. In Scenario 1C, the retirement of the nuclear units resulted in an increased gas generation dispatch, increased production costs (46% increase) and increased emissions (40%). The transmission interface limits for Surowiec South (52% over the limit) and Maine/New Hampshire (28% over the limit) are exceeded for large portions of the year in an unconstrained simulation. This will require additional review for high-level transmission analysis to evaluate the benefits of increased limits. Load serving Entity Energy Expenses (LSEEE) and uplift costs increase 52%. Nuclear unit retirements increase average annual LMPs by 63%. Curtailed energy decreases by 82% without nuclear units. EV flex charging is more impactful in the shoulder months when LMPs are at their lowest. Modeling challenges exist for the energy-banking model between HQ and ISO-NE. Possible options are to implement a threshold price equal to the import cost. When the ISO LMP falls below the threshold, the resource will not supply energy to ISO. Another option is to place a penalty price (\$20?) on the interface that is the gap between the export threshold price (\$-25) and the import threshold price (\$-5) to ISO. Another consideration is if energy is exported to HQ and not returned to ISO, it will be tracked and reported as part of curtailment metrics. Questions (Bob Stein) mainly focused on ISO's Energy Banking Model challenges and potential solutions.

Questions mainly focused on ISO's Energy Banking Model challenges and potential solutions.

Item 9.0 – Transmission Planning for the Clean Energy Transition: Pilot Study Preliminary Results

Mr. Dan Schwarting, Ms. Meena Saravanan, and Mr. Andrew Kniska (ISO-NE) reviewed the Transmission Planning for the Clean Energy Transition: Pilot Study Preliminary Results.

Presentation reviewed the tradeoff between cost and the ability of the transmission system to accommodate high amounts of renewable resources. The study will aid in the development of assumptions for use in future needs assessments and determine reliability concerns that may arise under the new system conditions. The pilot study looks at six different scenarios of future system conditions that are critical to transmission system reliability. The scenarios focus on spring weekend mid-day and nighttime, minimum load conditions with high and low levels of renewable energy, and summer weekday mid-day and evening peak load conditions with high and low levels of renewable energy. All future transmission PPA approved projects, preferred solutions for Boston, NH, Maine and Eastern CT, generation projects with FCM obligations as of FCA 14 or binding contracts as well as all known generation retirements or de-lists were included in the study. The preliminary steady state results for N-1 shows marginally high voltages in Maine, due to an increased penetration of wind and PV leading to lower ability to control voltage. N-1-1 Steady State results shows higher voltages in CT and Maine under minimum load conditions. The increase in wind and PV continues to lead to voltage control issues. The Stoughton to K Street 345 kV lines that connect SEMA to Boston show overloads in a peak load N-1-1 condition. Preliminary stability results based on the faults studied show a need for additional analysis of the response to transmission system faults. In addition, future analysis will review the acceptable MW limits on DER tripping as well as what mitigation measures will be needed for large amounts of DERs tripping. Additional review of steady state and stability will be presented to the PAC in July with the final presentation as well a proposal for new study assumptions for load, solar and wind presented at the August PAC. The final document with the new study conditions for load, solar and wind will be presented in September

In response to a stakeholder comment, ISO agreed to look into the possibility of modeling distributed generation in voltage control mode for the Versant Power territory in Maine. ISO also agreed to review the stakeholder comment that the Stoughton to K Street 345 kV line could be considered interconnection costs associated with the offshore Cape Cod wind projects instead of system upgrades. There was also a stakeholder suggestion to allow retiring generators to act as synchronous condensers on the system if there were a cost recovery market for it. ISO replied that we would look into that suggestion.

Item 10.0 – Closing Remarks

The next PAC meeting will be Thursday, July 22, 2021 via WebEx Teleconference.

Meeting Adjourned at 3:40 PM

Respectively submitted,

Marc Lyons
Secretary, Planning Advisory Committee