Maine (ME) 2027 Needs Assessment Scope of Work

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Purpose

- Present the Maine (ME) 2027 Needs Assessment Scope of Work

Overview

- Background
- Objectives
- Study area description
- Modeling assumptions
- Peak load dispatches and transfer levels
- Summary of peak load dispatches
- Minimum load assumptions and dispatches
- Short circuit assumptions
- Study methodology
- Schedule/Next steps

BACKGROUND

Background

- On June 29, 2017, the ISO posted a Notice of Initiation of the ME Needs Assessment
  - https://www.iso-ne.com/static-assets/documents/2017/06/2027_me_needs_assessment_study_initiation_pac_notice.pdf
- The triggers for the Needs Assessment are:
  - (i): "*a need for additional transfer capability is identified by the ISO in its ongoing evaluation of the PTF's adequacy and performance*."
  - (v): "*as otherwise deemed appropriate by the ISO as warranting such an assessment*."
- A ME 2023 Needs Assessment report was finalized December 2014, and an addendum report to the ME 2023 Needs Assessment report was finalized in April 2016. Efforts to develop solutions to address the ME time sensitive needs identified in the ME 2023 Needs Assessment addendum report were suspended in February of 2017 in order to accommodate a review of ISO-NE criteria, assumptions and methodologies that would likely impact the studies conducted for Needs Assessments and Solutions Studies. This review of ISO-NE criteria, assumptions and methodologies has sufficiently progressed to allow the initiation of a new Needs Assessment for the ME study area. The Needs Assessment will examine if needs still exist for the study area, and will identify the time-sensitivity of any identified needs

OBJECTIVES

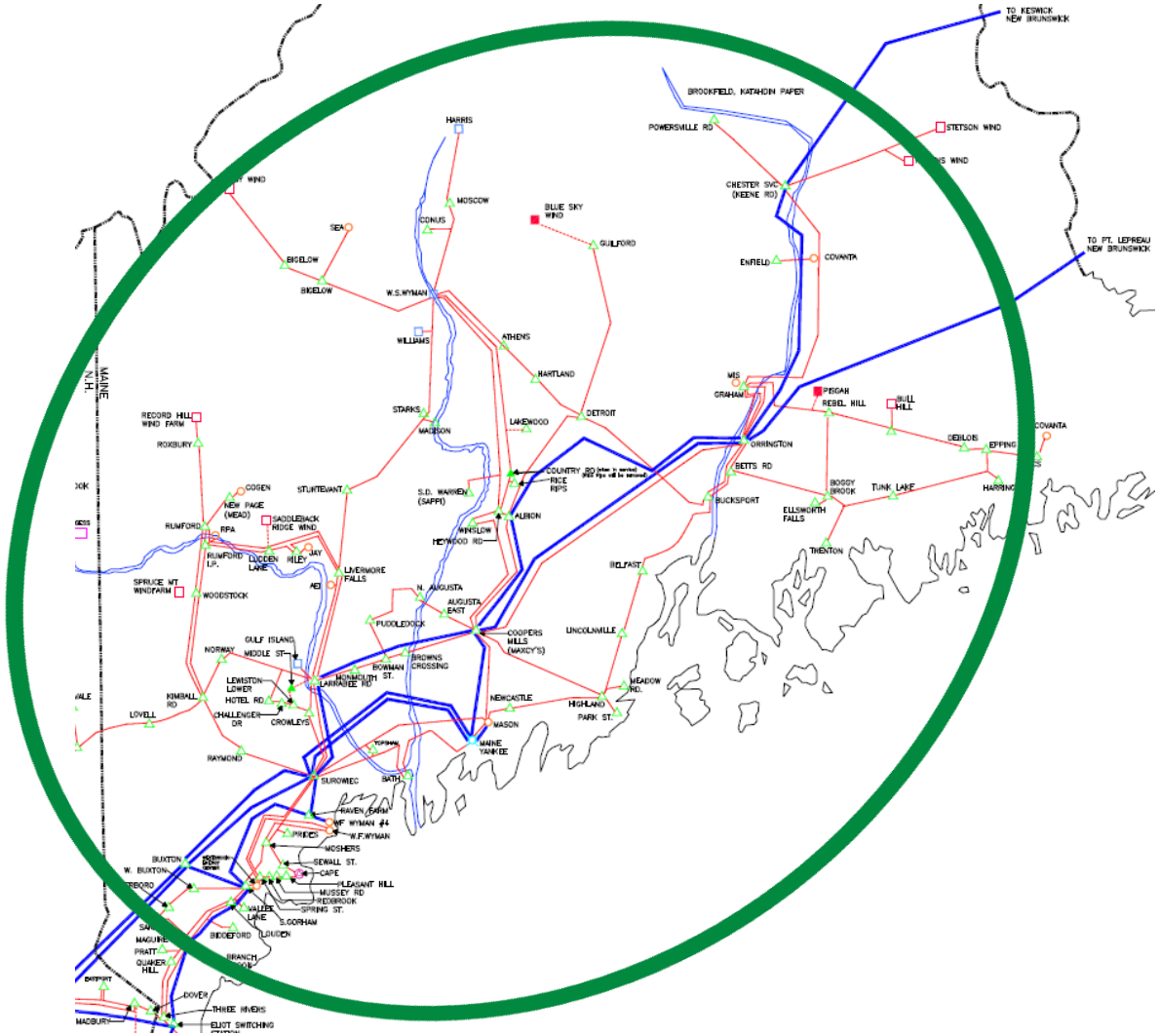
Objectives

The objective of the Maine (ME) Needs Assessment study is to evaluate the reliability performance and identify reliability-based needs in the ME study area for the year 2027 while considering the following:

- Future load distribution
- Resource changes in New England based on FCA 11 results, 2017 PV forecast and 2017 EE forecast
- Reliability over a range of generation patterns and transfer levels
- Coordination with New Hampshire Needs Assessment
- All applicable North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Corporation (NPCC) and ISO New England transmission planning reliability standards

STUDY AREA DESCRIPTION

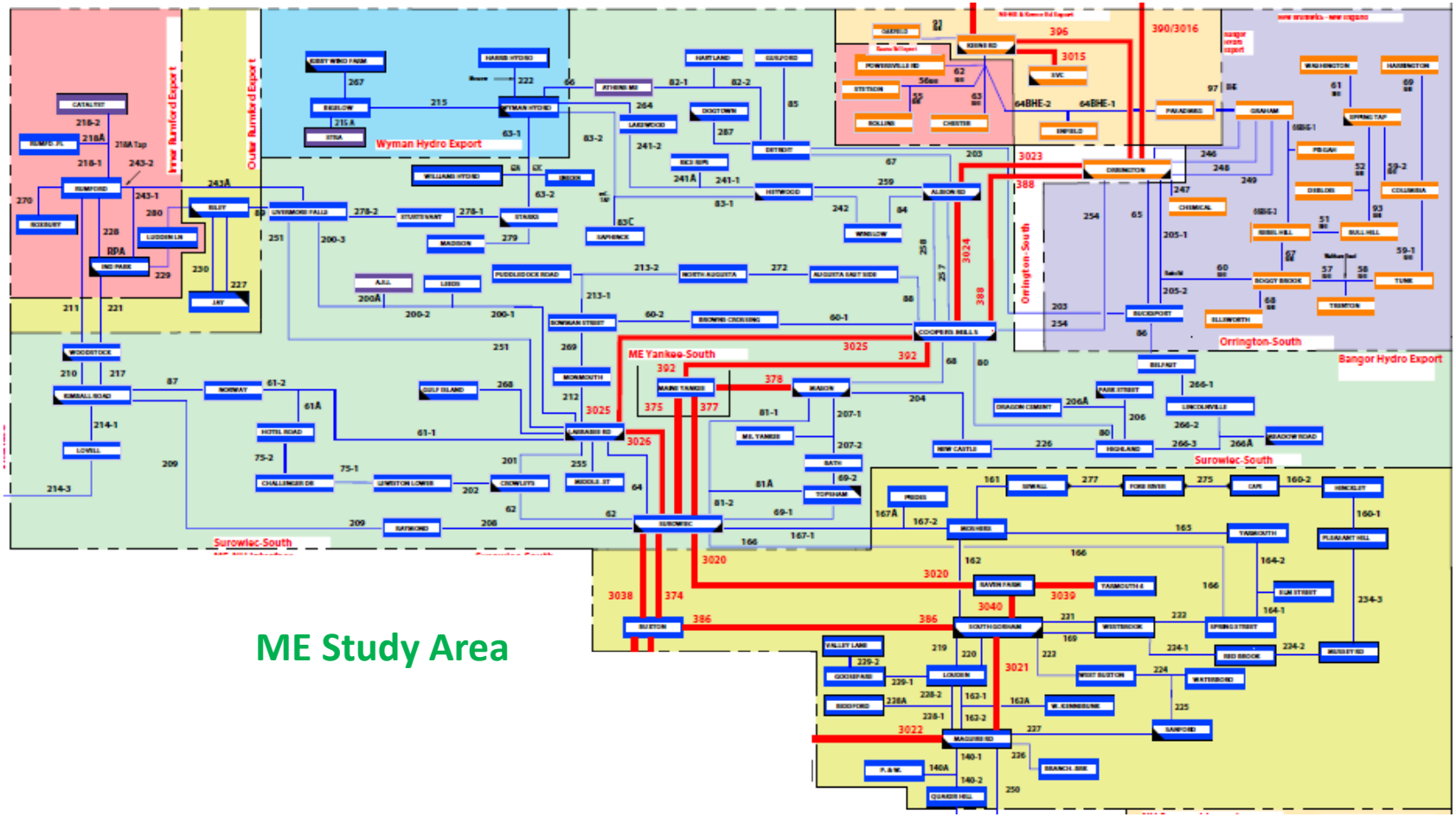
ME Geographical Map



ME Study Area

The map is shown for reference only and does not include all of the latest topology changes.

Maine One Line Diagram



The diagram is shown for reference only and does not include all of the latest topology changes.

MODELING ASSUMPTIONS

Initial Study Files

- The draft initial 2027 Needs Assessment cases and files and the draft Summary Document for 2017 Transmission Planning Base Case Library Review were posted on June 30, 2017 for stakeholder review and comment
- After the stakeholder comment period, the ISO posted:
  - the final initial 2027 Needs Assessment cases and study files, that will be used for the ME Needs Assessment,
    - https://smd.iso-ne.com/operations-services/ceii/pac/2017/08/ceii_final_2027_needs_assessment_cases.zip
    - Any other changes made to the initial study files since their posting on 8/4/17 will be reflected in the scope of work report and will be included in the intermediate study files
  - the final Summary Document for 2017 Transmission Planning Base Case Library Review, and
    - https://smd.iso-ne.com/operations-services/ceii/pac/2017/08/ceii_summary_document_for_2017_transmission_planning_base_case_library.zip
  - the document responding to stakeholder comments
    - https://www.iso-ne.com/static-assets/documents/2017/08/response_to_stakeholder_comments_on_the_2017_transmission_planning_base_case_library_review.pdf

Modeling Assumptions

- Study Horizon
  - This study will be focused on 2027 for the ten-year horizon utilizing the 2017 Capacity, Energy, Loads, and Transmission (CELT) report
- Existing Topology
  - All transmission and generation facilities that are in-service as of June 1, 2017 are included in the base cases
- Load Levels
  - The 2017 Capacity, Energy, Loads, and Transmission (CELT) report was used to determine the forecasted loads for the peak load demand level evaluated
    - **34,870 MW** - 90/10 summer peak load (includes T&D losses)
  - A minimum load analysis will be performed at a fixed New England load of 8,000 MW (includes T&D losses and manufacturing loads)

Modeling Assumptions, cont.

- Demand Resource Assumptions
  - New England Demand Resource Performance Assumptions

Load Level	Passive DR	Active DR	Forecasted EE
Summer Peak (90/10)	100%	75%	100%

  - **2,826 MW*** - 100% of Passive DR that cleared in the Forward Capacity Market through FCA 11 (June 1, 2020 – May 31, 2021)
  - **373 MW*** - 75% of Active DR that cleared in the Forward Capacity Market through FCA 11 (June 1, 2020 – May 31, 2021)
  - **1,715 MW*** - 100% of 2017 CELT Energy Efficiency (EE) forecast for the period beyond May 31, 2021

- Future Generation Assumptions
  - All cleared generator additions through FCA 11 will be modeled
  - All submitted retirement delist bids through FCA 12 will be excluded from the base cases

* Includes 5.5% distribution losses

Modeling Assumptions, cont.

- Photovoltaic (PV) Generation Modeled utilizing the 2017 CELT PV Generation Forecast

PV generation Modeled as Negative Load		Study Year
		2027 Summer Peak (MW)*
New England	A – PV generation (nameplate) in New England	4,732
	B – 5.5% Reduction in Distribution Losses	+260
	C – Unavailable PV generation (A+B)x(100%-26%)	-3,694
	PV generation Modeled in Case as Negative Loads (A+B)-C	**1,298**

* These values exclude explicitly modeled PV generators.

Modeling Assumptions, cont.

- New England New Load Levels (Excludes Transmission Losses)

Category	Summer Peak 2027 90/10 Load (MW)	Minimum Load 2027 (MW)
CELT Forecast	34,043	N/A
Fixed New England load	N/A	7,495
Non-CELT Manufacturing load in New England	320	320
Available FCA-11 Passive DR (modeled as negative load)	-2,826	0
Available FCA-11 Active DR (modeled as negative load)	-373	0
Available 2017 CELT EE Forecast for study year (modeled as negative load)	-1,715	0
Available 2017 CELT PV Forecast for study year (modeled as negative load)	-1,298	0
Net load modeled in New England (Excludes Station Service)	**28,151**	**7,815**

Modeling Assumptions, cont.

- Transmission Upgrades Included in the Base Cases:
  - RSP Project Tracking Sheet - All reliability upgrades in the June 2017 RSP Project List (Table 1a and 1b) that were Proposed, Planned and Under Construction were included in the base cases
  - Asset Condition Tracking Sheet - In general, all Asset Condition projects that are listed in the June 2017 Asset Condition listing that were Planned, Proposed, or Under Construction are included in the base cases
  - Local System Plan (LSP) Projects Tracking Sheet – Using the information from the 2016 TOPAC, all future LSP projects for which the ISO had modeling data available have been included in the base cases
  - Approved PPAs Tracking Sheet - Transmission projects with an approved PPA as of June 1, 2017 that are not covered under the previously discussed tracking sheets and are not in-service as of June 1, 2017 have been included in the base cases
  - See Appendix E of the Summary Document for 2017 Transmission Planning Base Case Library Review to access all of the tracking sheets
    - https://smd.iso-ne.com/operations-services/ceii/pac/2017/08/ceii_summary_document_for_2017_transmission_planning_base_case_library.zip

State Sponsored Request For Proposals (RFPs)

- Section 4.1(f) of Attachment K states:

  "Specifically, the ISO shall incorporate or update information regarding resources in Needs Assessments that have been proposed and (i) have cleared in a Forward Capacity Auction pursuant to Market Rule 1 of the ISO Tariff, (ii) have been selected in, and are contractually bound by, a state-sponsored Request For Proposals, or (iii) have a financially binding obligation pursuant to a contract." (*underlining added*)

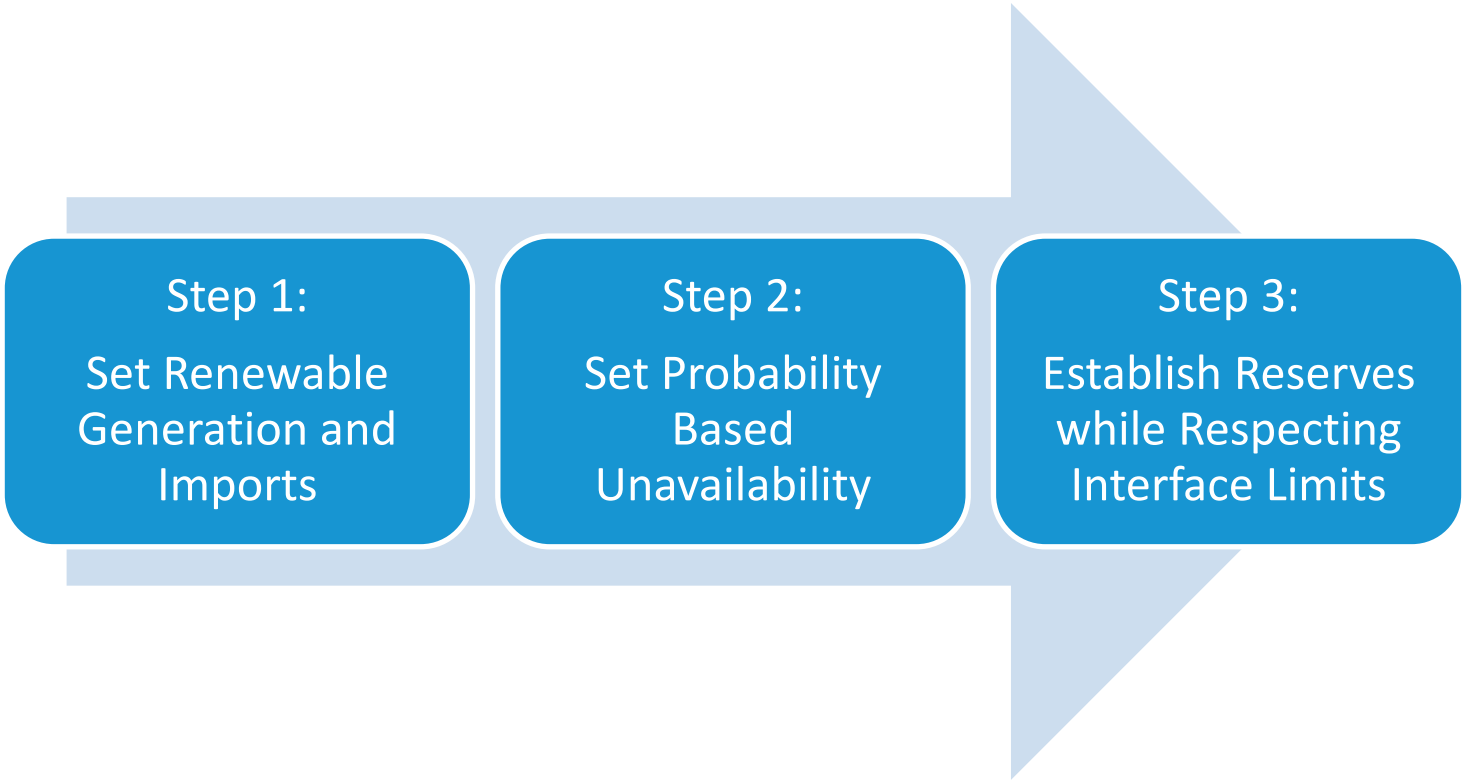
  "With respect to (ii) or (iii) above, the proponent of the market response shall inform the ISO, in writing, of its selection or its assumption of financially binding obligations, respectively."

- If there are any resources that meet criteria (ii) and (iii) stated above that the ISO should consider for inclusion in the respective study area Needs Assessments, the proponents shall do the following no later than Sunday, December 3rd:
  - Notify the ISO in writing via pacmatters@iso-ne.com
  - Provide the contract as part of the notification to the ISO

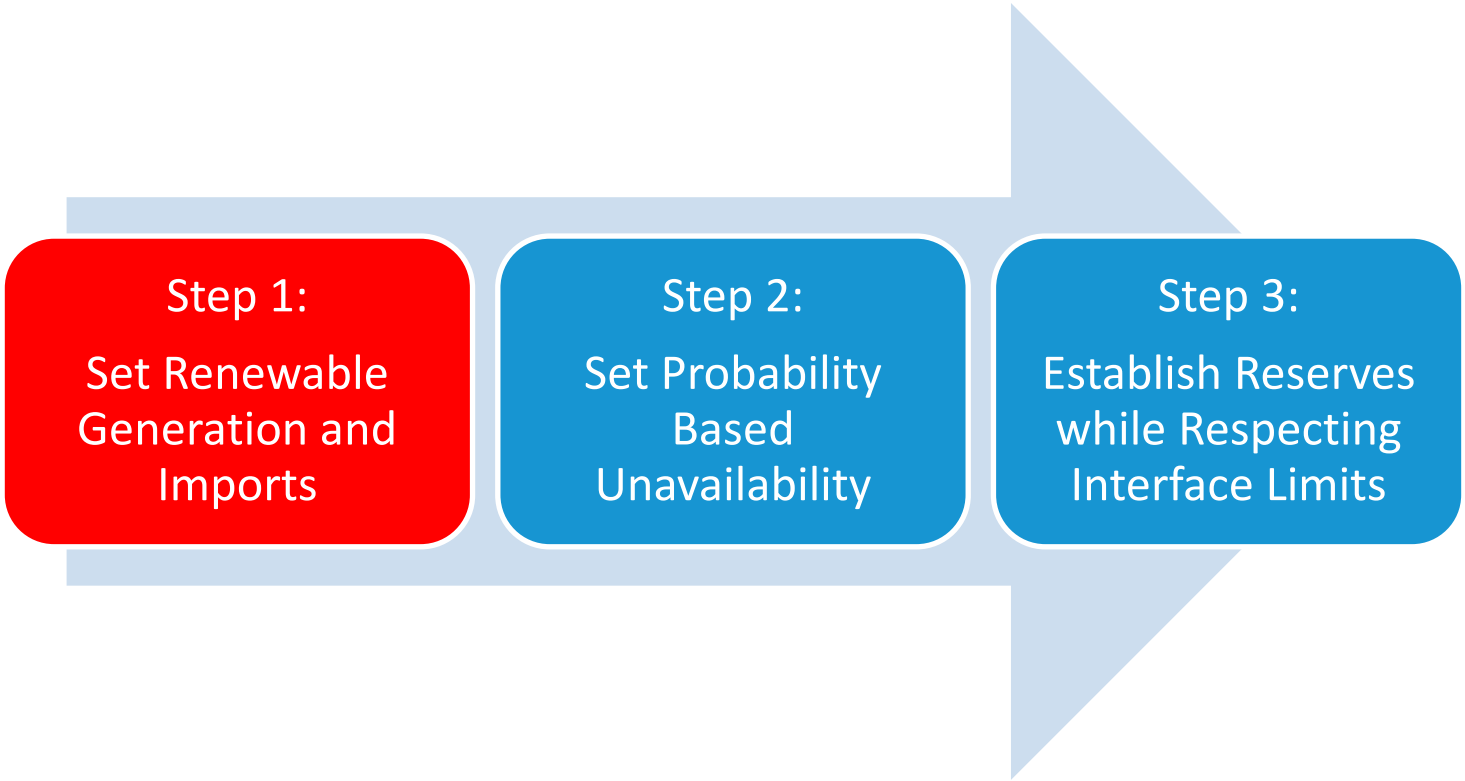
PEAK LOAD DISPATCHES AND TRANSFER LEVELS

Steps to Create the Needs Assessment Dispatches

- The following process was used to create the ME study area dispatches



Steps to Create the Needs Assessment Dispatches

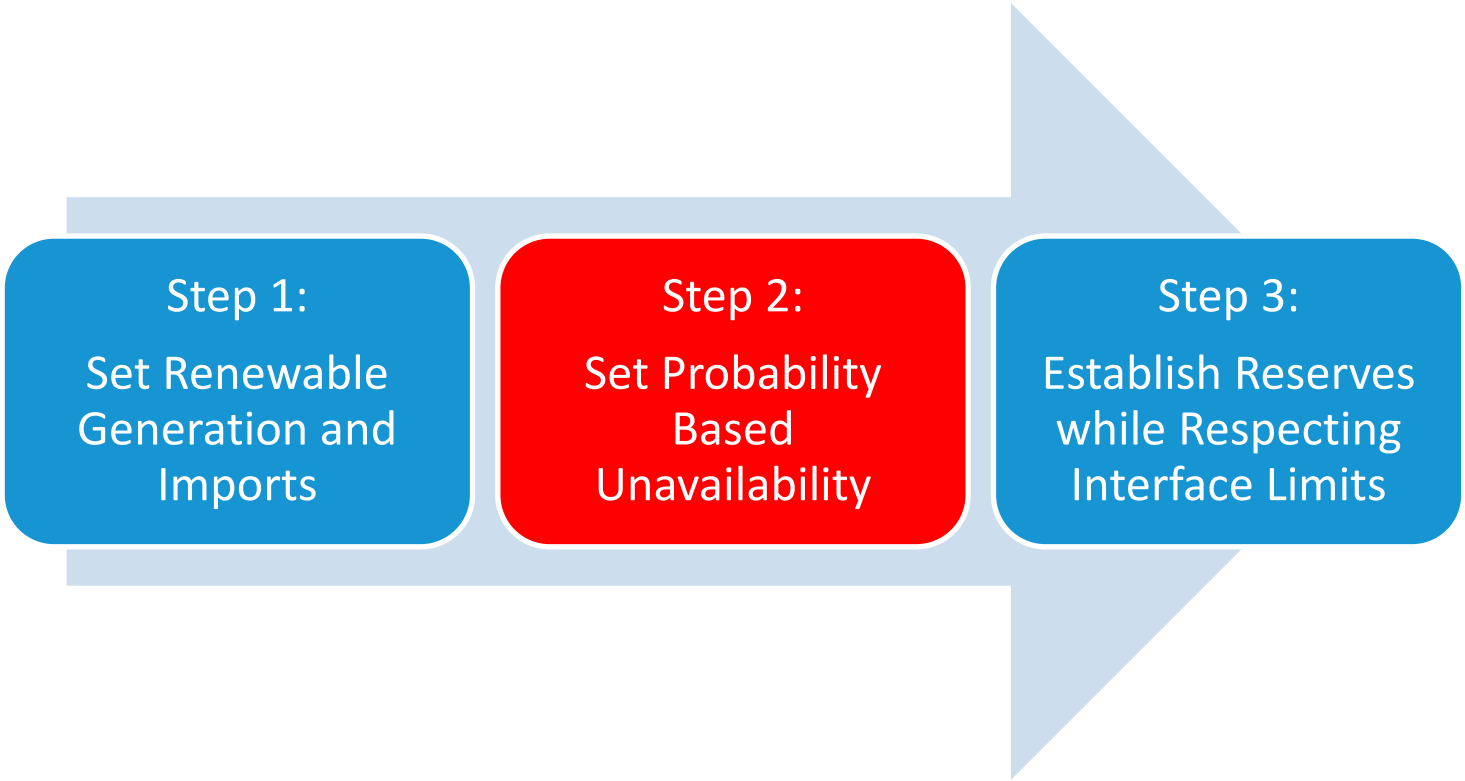


Step 1 -Set Renewable Generation and Imports

- Renewable generation in New England including the ME study area is dispatched based on historical availability
- The table below specifies the ranges of imports from external areas that are proposed for the Needs Assessment

Inter-area Interface	Dispatch Range (MW)
New Brunswick to New England tie (NB-NE)	0 and 700
New York to New England AC ties (NY-NE)	0 and 1400
Cross Sound Cable HVDC From Long Island to New England (CSC)	0
Phase II HVDC from Quebec to New England (Phase II)	950
Highgate HVDC From Quebec to New England (Highgate)	200

Steps to Setup the Needs Assessment Dispatches



Step 2 – Set Probability Based Unavailability

Type of Group	Group of Generators	Max MW Unavailable at 90/10 Peak Load
Study Area (Largest Generator – Yarmouth #4 – 620 MW)	ME Generators	620
Study Area + Adjacent Area	ME+NH Generators	885
Receiving End of System Stress	Eastern New England	1,554

* East-West interface is used to define the boundary between Eastern New England and Western New England

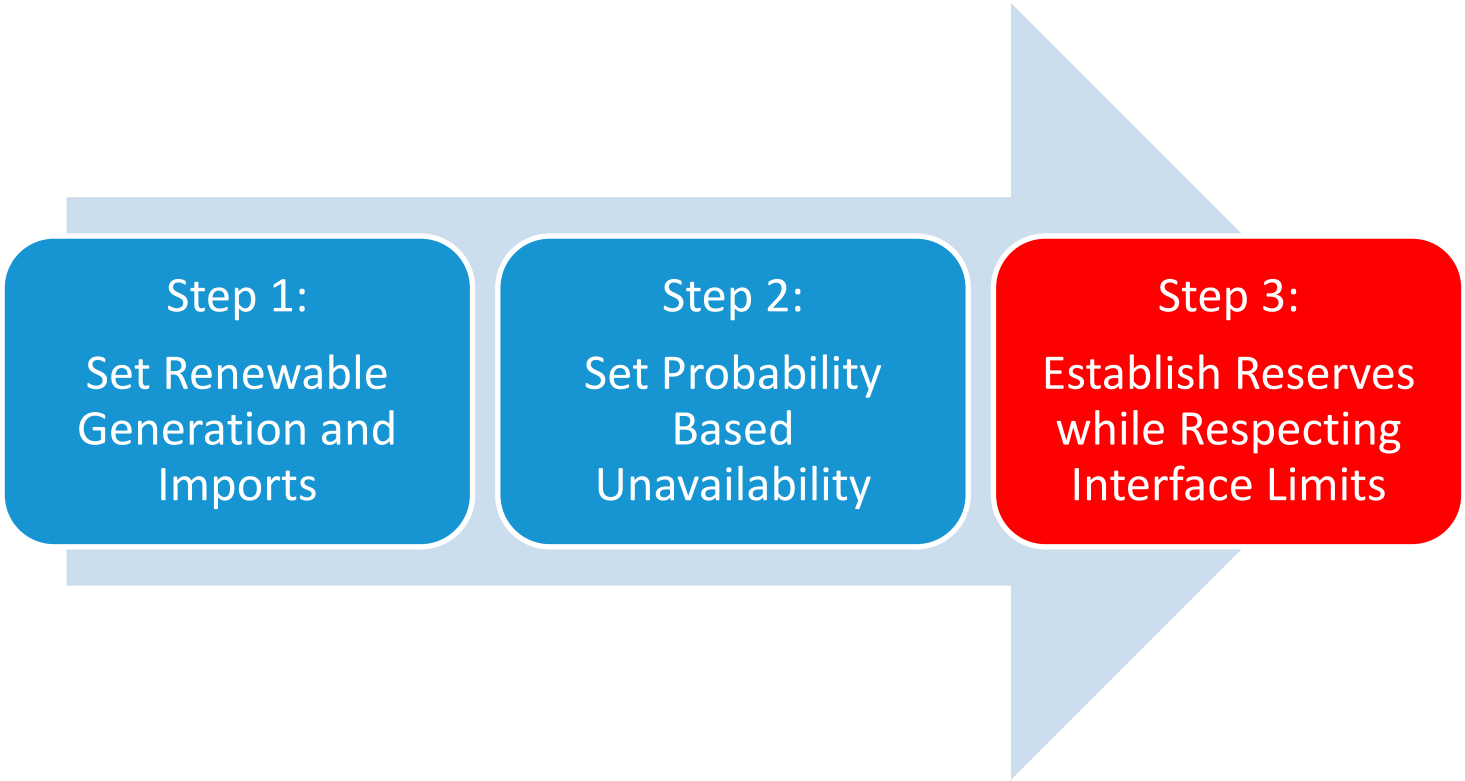
Step 2 – Set Dispatches

- The non-renewable generators unavailable per dispatch at 90/10 peak load are shown in the table below
- Dispatches that end in A and B have different stress on NB-NE interface
  - Dispatches with NB-NE=700 MW in A (example Dispatch D1A)
  - Dispatches with NB-NE=0 MW in B (example Dispatch D1B)

90/10									
D1A	D1B	D2A	D2B	D3A	D3B	D4A	D4B	D5A	D5B
Yarmouth #4	Yarmouth #4	Westbrook	Westbrook	MIS	MIS	RPA	RPA	Bucksport G3, G5	Bucksport G3, G5
Schiller #6, Jet	Schiller #6, Jet	Indeck GT5, GT6	Sappi Somerset G2	Newpage Cogen	AEI Livermore	Yarmouth #3	Yarmouth #3	Verso Cogen #1	Verso Cogen #1
Mystic #7	Mystic #7	PERC	Schiller #6, Jet	Mystic #7	SEA Stratton	Bucksport G4	Bucksport G4	Verso Jay C	Verso Jay C
ANP Blackstone #1	ANP Blackstone #1	Schiller #6, Jet	Mystic #7	ANP Blackstone #1	Mystic #7	Eco ME	Schiller #6, Jet	Yarmouth #1, #2	Yarmouth #1, #2
		Mystic #7	ANP Blackstone #1	Dartmouth Power	ANP Blackstone #1	Sappi Westbrook 9	Mystic #7	Casco Bay	Casco Bay
		ANP Blackstone #1	SEMASS G2		Dartmouth Power	Cape G5	ANP Blackstone #1	Schiller #6, Jet	Schiller #4
					SEMASS G2	Schiller #6, Jet	Dartmouth Power	Merrimack #1, CT #10	Newington G1
						Mystic #7	SEMASS G2	Whitelake Jet	Mystic #7
						ANP Blackstone #1		Bridgewater	Dighton Power
						SEMASS G2		Hemphill Power	
								Alexandria Gen	
								Tamworth Gen	
								Lost Nation Jet	
								Bethlehem	
								Whitefield	
								Mystic #7	
								ANP Blackstone #1	
								Pawtucket Power	

Legend	
	Generators Unavailable in Study Area
	Generators Unavailable in Adjacent Area
	Generators Unavailable in Receiving End

Steps to Setup the Needs Assessment Dispatches



Step 3 - Establish Reserves

- In this step, the reserves are established while respecting the interface limits
- The priority order for reserve establishment is as follows:
  - Priority 1 – Study area and Receiving End Weekly Hydro units
  - Priority 2 – Receiving End non-renewable generators and pumped hydro units
  - Priority 3 – Sending End non-renewable generators
- The reserves will be established following the priority order noted above

Step 3 - Establish Reserves

- For the ME Study Area one interface stress considered (West to East)
  - The proposed generation dispatches in Maine and New Hampshire, and transfers across the NB-NE interface, result in north to south power flows
  - More power is pulled down the eastern part of the system with Eastern New England as the Receiving End due to establishing unavailable and reserve units in southeastern New England
- For the stress with Eastern New England as the Receiving End, the total of 1200 MW of reserves are established as follows
  - Priority 1 Reserves – There are 489 MW weekly hydro units on the Receiving End
  - Priority 2 Reserves – There are 711 MW non-renewable generators on the Receiving End
  - Priority 3 Reserves – Since priority 1 and priority 2 reserves cover the total 1200 MW reserve requirement, there is no need to consider any Sending End non-renewable generators in the total reserves established

Step 3 – Establish Reserves

- The table below shows the amount of reserves available to be turned on after the first contingency in the N-1-1 analysis

Dispatch	NB-NE (MW)	Receiving End	Priority 1 Reserves		Priority 2 Reserves	Priority 3 Reserves	Total (MW)
			Weekly Hydro Receiving End (MW)	Weekly Hydro Sending End (MW)	Non-Renewable Generators Receiving End (MW)	Non-Renewable Generators Sending End (MW)	
D1A	700	Eastern	489	0	711	0	1200
D1B	0	Eastern	489	0	711	0	1200
D2A	700	Eastern	489	0	711	0	1200
D2B	0	Eastern	489	0	711	0	1200
D3A	700	Eastern	489	0	711	0	1200
D3B	0	Eastern	489	0	711	0	1200
D4A	700	Eastern	489	0	711	0	1200
D4B	0	Eastern	489	0	711	0	1200
D5B	700	Eastern	489	0	711	0	1200

List of non-Renewable generator reserves in Receiving End greater than 20 MW:

- Canal #3 – 340 MW
- West Medway Jet #1-#3 – 117 MW
- TA Watson #1 – 54 MW
- Waters River #1, #2 – 46 MW
- Farmington #1-#3 – 31 MW

Step 3 - Respect Interface Limits

- The final step is to check if the establishment of reserves on the Receiving End results in the violation of any key interfaces in the vicinity of the study area or the Receiving End of the stress
- All interfaces are within their limits and the reserves are considered acceptable

Interface Name	Limit (MW)	90/10 Range (MW)
Orrington South	1325	70 to 1251
ME-NH	1900	245 to 1217
NNE Scobie + 394	3450	1625 to 2531
West - East	2200	1249 to 1937
North-South	2725	824 to 1626

SUMMARY OF PEAK LOAD DISPATCHES

Summary of Peak Load Dispatches - MWs Unavailable and Transfer Levels

Dispatch	MW Unavailable in Study Area and Adjacent Area (Maximum MW^)		MW Unavailable in Receiving End (Maximum MW^)	External Interfaces Targets# (Maximum Transfer Capability in MW)			Additional Interfaces (Maximum Transfer Capability in MW)				
	ME 90/10 (620)	ME +NH 90/10 (885)	Eastern 90/10 (1,554)	NY-NE (1,400)	NB-NE (700)	Phase II (1,400)	Orrington S (1,325)	ME-NH (1,900)	NNE Scobie+394 (3,450)	West-East (2,200)	N-S (2,725)
D1A	620	689	1,527	0	700	950	1,251	910	2,308	1,270	1,548
D1B	620	689	1,527	1,400	0	950	561	245	1,706	1,920	886
D2A	616	685	1,523	0	700	950	1,190	920	2,323	1,262	1,557
D2B	610	679	1,545	1,400	0	950	561	251	1,719	1,937	900
D3A	610	610	1,531	0	700	950	761	938	2,370	1,249	1,626
D3B	587	587	1,536	1,400	0	950	70	280	1,777	1,916	987
D4A	595	664	1,530	0	700	950	1,091	949	2,344	1,257	1,586
D4B	529	598	1,547	1,400	0	950	401	338	1,796	1,922	979
D5A	306	655	1,550	0	700	950	1,153	1,217	2,531	1,271	1,599
D5B	306	774	1,535	1,400	0	950	463	553	1,625	1,907	824

^ Maximum MW is the Maximum unavailable MW of non-renewable generators based on probabilistic methods

Actual interface transfers may vary slightly from the targets due to power flow mismatches

Summary of Peak Load Dispatches - Dispatch Data

- For each dispatch, the following slides summarize the:
  - Stress
  - Relationship between the study area, adjacent area and Receiving End of system stress,
  - Total amount of generation (MW) unavailable in each area,
  - Relevant generators turned off in each area, and
  - Information on reserves

Summary of Peak Load Dispatches – Dispatch D1A at 90/10 Peak Load

- NB – NE = 700 MW

Study Area = ME

Actual Gen Unavailable in ME = 620 MW

Largest Gen Unavailable in ME
- Yarmouth #4 – 620 MW

Relevant Generators Unavailable
- **Yarmouth #4 – 620 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 69 MW

Generators Unavailable
- **Schiller #6 – 51 MW**
- **Schiller Jet - 18 MW**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 838 MW

Generators Unavailable
- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**

Total Reserves = 1200 MW, which includes:
- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D1B at 90/10 Peak Load

- NB – NE = 0 MW

Study Area = ME

Actual Gen Unavailable in ME = 620 MW

Largest Gen Unavailable in ME
- Yarmouth #4 – 620 MW

Relevant Generators Unavailable
- **Yarmouth #4 – 620 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 69 MW

Generators Unavailable
- **Schiller #6 – 51 MW**
- **Schiller Jet - 18 MW**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 838 MW

Generators Unavailable
- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**

Total Reserves = 1200 MW, which includes:
- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D2A at 90/10 Peak Load

- NB – NE = 700 MW

Study Area = ME

Actual Gen Unavailable in ME = 616 MW

Relevant Generators Unavailable
- **Westbrook – 544 MW**
- **Indeck GT5, GT6 – 47 MW**
- **PERC – 25 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 69 MW

Generators Unavailable
- **Schiller #6 – 51 MW**
- **Schiller Jet - 18 MW**

Receiving End of System Stress = Eastern New England

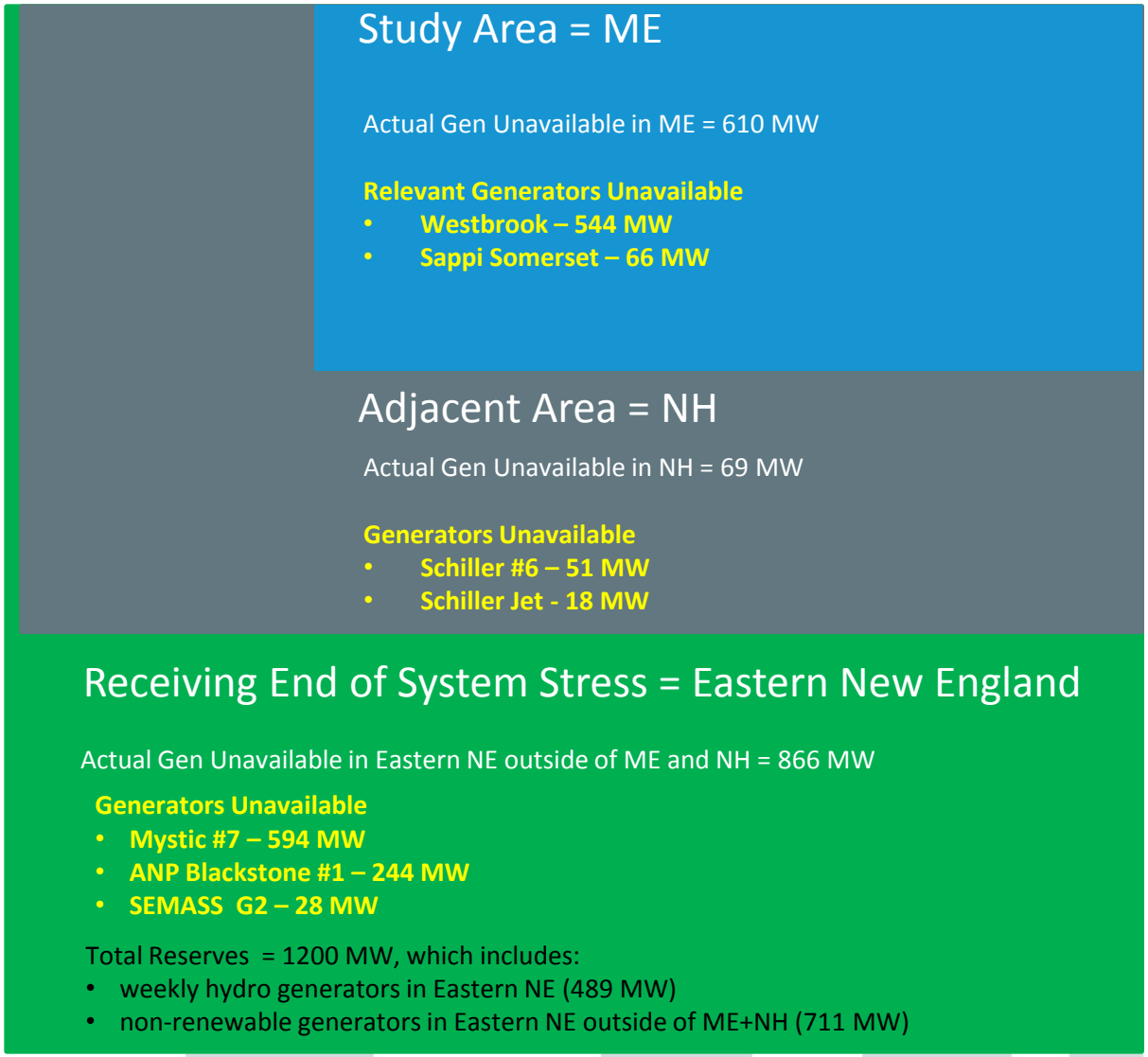
Actual Gen Unavailable in Eastern NE outside of ME and NH = 838 MW

Generators Unavailable
- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**

Total Reserves = 1200 MW, which includes:
- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D2B at 90/10 Peak Load

- NB – NE = 0 MW



Summary of Peak Load Dispatches – Dispatch D3A at 90/10 Peak Load

- NB – NE = 700 MW

Study Area = ME

Actual Gen Unavailable in ME = 610 MW

Relevant Generators Unavailable
- **Maine Independence Station – 500 MW**
- **Newpage Cogen – 110 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 0 MW

Generators Unavailable
- **none**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 921 MW

Generators Unavailable
- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**
- **Dartmouth Power – 83 MW**

Total Reserves = 1200 MW, which includes:
- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D3B at 90/10 Peak Load

- NB – NE = 0 MW

Study Area = ME

Actual Gen Unavailable in ME = 587 MW

Relevant Generators Unavailable

- **Maine Independence Station – 500 MW**
- **SEA Stratton – 49 MW**
- **AEI Livermore – 38 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 0 MW

Generators Unavailable

- **none**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 949 MW

Generators Unavailable

- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**
- **Dartmouth Power – 83 MW**
- **SEMASS G2 – 28 MW**

Total Reserves = 1200 MW, which includes:

- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D4A at 90/10 Peak Load

- NB – NE = 700 MW

Study Area = ME

Actual Gen Unavailable in ME = 595 MW

Relevant Generators Unavailable

- **Rumford Power Authority – 251 MW**
- **Bucksport G4 – 161 MW**
- **Yarmouth #3 – 117 MW**
- **Sappi Westbrook 9 – 39 MW**
- **Cape G5 – 16 MW**
- **Eco ME – 11 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 69 MW

Generators Unavailable

- **Schiller #6 – 51 MW**
- **Schiller Jet - 18 MW**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 866 MW

Generators Unavailable

- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**
- **SEMASS G2 – 28 MW**

Total Reserves = 1200 MW, which includes:

- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D4B at 90/10 Peak Load

- NB – NE = 0 MW

Study Area = ME

Actual Gen Unavailable in ME = 529 MW

Relevant Generators Unavailable

- **Rumford Power Authority – 251 MW**
- **Bucksport G4 – 161 MW**
- **Yarmouth #3 – 117 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 69 MW

Generators Unavailable

- **Schiller #6 – 51 MW**
- **Schiller Jet - 18 MW**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 949 MW

Generators Unavailable

- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**
- **Dartmouth Power – 83 MW**
- **SEMASS G2 – 28 MW**

Total Reserves = 1200 MW, which includes:

- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D5A at 90/10 Peak Load

- NB – NE = 700 MW

Adjacent Area = NH

Actual Gen Unavailable in NH = 349 MW

Generators Unavailable

- **Schiller #6, Jet – 69 MW**
- **Merrimack #1, CT #10 – 145 MW**
- **Tamworth Gen – 22 MW**
- **Hemphill Power – 20 MW**
- **Alexandria Gen – 17 MW**
- **Whitelake Jet – 17 MW**
- **Whitefield – 16 MW**
- **Bethlehem – 15 MW**
- **Bridgewater – 14 MW**
- **Lost Nation Jet – 14 MW**

Study Area = ME

Actual Gen Unavailable in ME = 306 MW

Relevant Generators Unavailable

- **Yarmouth #1, #2 – 106 MW**
- **Bucksport G3, G5 – 99 MW**
- **Verso Cogen #1 – 44 MW**
- **Verso Jay C – 40 MW**
- **Casco Bay – 17 MW**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 895 MW

Generators Unavailable

- **Mystic #7 – 594 MW**
- **ANP Blackstone #1 – 244 MW**
- **Pawtucket Power – 57 MW**

Total Reserves = 1200 MW, which includes:

- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

Summary of Peak Load Dispatches – Dispatch D5B at 90/10 Peak Load

- NB – NE = 0 MW

Study Area = ME

Actual Gen Unavailable in ME = 306 MW

Relevant Generators Unavailable

- **Yarmouth #1, #2 – 106 MW**
- **Bucksport G3, G5 – 99 MW**
- **Verso Cogen #1 – 44 MW**
- **Verso Jay C – 40 MW**
- **Casco Bay – 17 MW**

Adjacent Area = NH

Actual Gen Unavailable in NH = 468 MW

Generators Unavailable

- **Newington G1 – 417 MW**
- **Schiller #4 – 51 MW**

Receiving End of System Stress = Eastern New England

Actual Gen Unavailable in Eastern NE outside of ME and NH = 761 MW

Generators Unavailable

- **Mystic #7 – 594 MW**
- **Dighton Power – 167 MW**

Total Reserves = 1200 MW, which includes:

- weekly hydro generators in Eastern NE (489 MW)
- non-renewable generators in Eastern NE outside of ME+NH (711 MW)

MINIMUM LOAD ASSUMPTIONS AND DISPATCHES

Minimum Load Assumptions

- Majority of Maine generators OOS
- All major New Hampshire generators OOS
- All NH, Maine and Boston reactors online
- All pumped hydro generators OOS
- Low transfers across interfaces
- All transmission capacitors OOS

Minimum Load Dispatch

- Two dispatches are considered
  - NB-NE= 700 MW
  - NB-NE= 0 MW
- All NH and ME generators connected to 345 kV system OOS

SHORT CIRCUIT ASSUMPTIONS

Short Circuit Basecase Assumptions

- The short circuit basecase used for the ME Needs Assessment is based on the expected topology in the 2022 compliance steady state base case
  - No significant project is expected in the 2022-2027 timeframe, and hence the 2022 case was considered acceptable
- The 2022 case includes the impact of all PPA approved generators and ETUs (including resources without an obligation through the FCM)
  - The resources with an approved PPA that do not have an obligation through the FCM cannot be relied upon to resolve a reliability need (and are therefore not considered in steady state),
  - However, they do contribute to the available short circuit current as they may be in service as part of the energy dispatch of the system.
- All generators in the short circuit model will be considered online for this study

STUDY METHODOLOGY

Study Methodology

- Steady state thermal and voltage analysis will be performed, for N-0 (all-facilities-in), N-1 (all-facilities-in, first contingency), and N-1-1 (facility-out, first contingency) for the described set of generation dispatches and inter-regional stresses
  - Up to 1,200 MW generation re-dispatch will be allowed between the first and second contingency
  - If any needs are identified in the summer peak cases:
    - an analysis will be completed to indicate whether the needs are time sensitive or not
    - a critical load level (CLL) analysis will be completed
- Short circuit analysis will evaluate the breaker duties at all substations in the study area

SCHEDULE/NEXT STEPS

Schedule/Next Steps

- Please submit comments on the materials in this presentation to pacmatters@iso-ne.com by Sunday, December 3rd
- Proponents of state sponsored RFPs shall notify the ISO in writing via pacmatters@iso-ne.com by Sunday, December 3rd
- Post the draft ME 2027 Needs Assessment Scope of Work report and intermediate study files – December 2017
- Complete the ME 2027 Needs Assessment and present to PAC – Q1 2018, and post draft report – Q2 2018

Questions