



Forward Capacity Auction 11 Zonal Development: Scope of Work

Planning Advisory Committee

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Topics

- Capacity Zone Formation Methodology
- Forward Capacity Auction 11 (FCA-11, Capacity Commitment Period 2020-2021) Zone Formation
- Transfer Limit Summary
- External Interfaces



Background

- In November 2015, in preparation for the Capacity Zone formation process for FCA-11, the Planning Advisory Committee conducted a comprehensive discussion of the zone formation process and the expected direction of zone preparations for FCA-11
- 4 Presentation made at November PAC relative to capacity market
 - Historical Development [link to presentation](#)
 - Current Process [link to presentation](#)
 - Review of Determination for FCA 10 [link to presentation](#)
 - New England Power System in 2020 [link to presentation](#)



METHODOLOGY FOR MODELING CAPACITY ZONES IN FCM

Developing Zonal Boundaries for the FCM

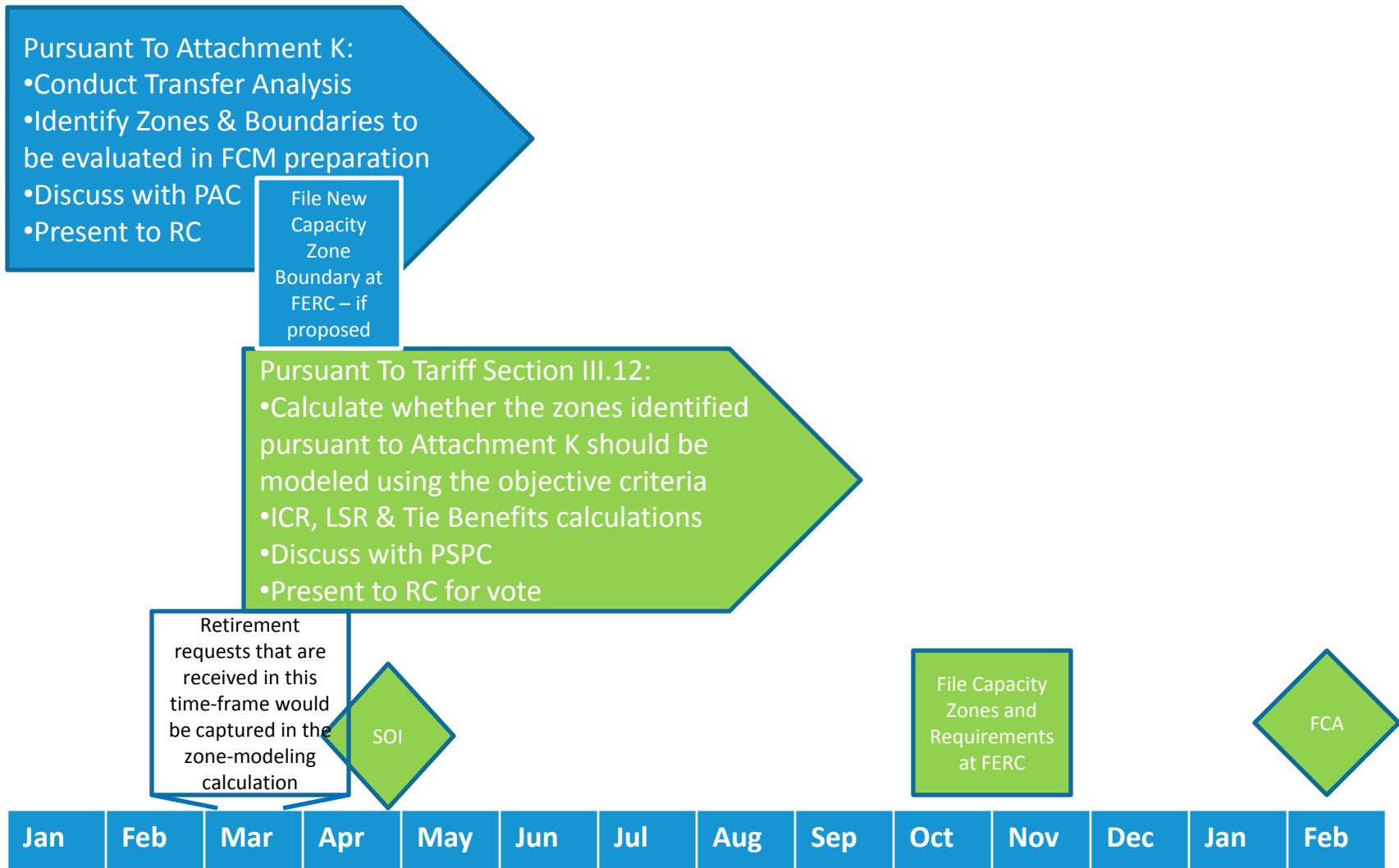
- Included in Attachment K of the Open Access Transmission Tariff:
 - Annual Assessment of Transmission Transfer Capability
 - Each year, the ISO shall issue the results of the annual assessment of transmission transfer capability, conducted pursuant to applicable NERC, NPCC and ISO New England standards and criteria and the identification of potential future transmission system weaknesses and limiting facilities that could impact the transmission system's ability to reliably transfer energy in the planning horizon.
 - Each annual assessment will identify those portions of the New England system, along with the associated interface boundaries, that should be considered in the assessment of Capacity Zones to be modeled in the Forward Capacity Market pursuant to ISO Tariff Section III.12.



Zone Formation: A Two Step Process

Step ONE	Step TWO
<p>Identify the potential zonal boundaries and associated transfer limits to be tested for modeling in the FCM</p>	<p>Use objective criteria to determine whether or not the zone should be modeled for the Capacity Commitment Period</p>
	<p>Import-constrained zone Trigger to model the zone is based on the quantity of surplus resources in the zone above the zonal requirement</p> <p>Export-constrained zone: Trigger to model the zone is based on the quantity of existing and proposed new resources compared with the maximum capacity capability in the zone</p> <p>Zones that are neither import- or export-constrained are collapsed into the rest-of-pool zone</p>

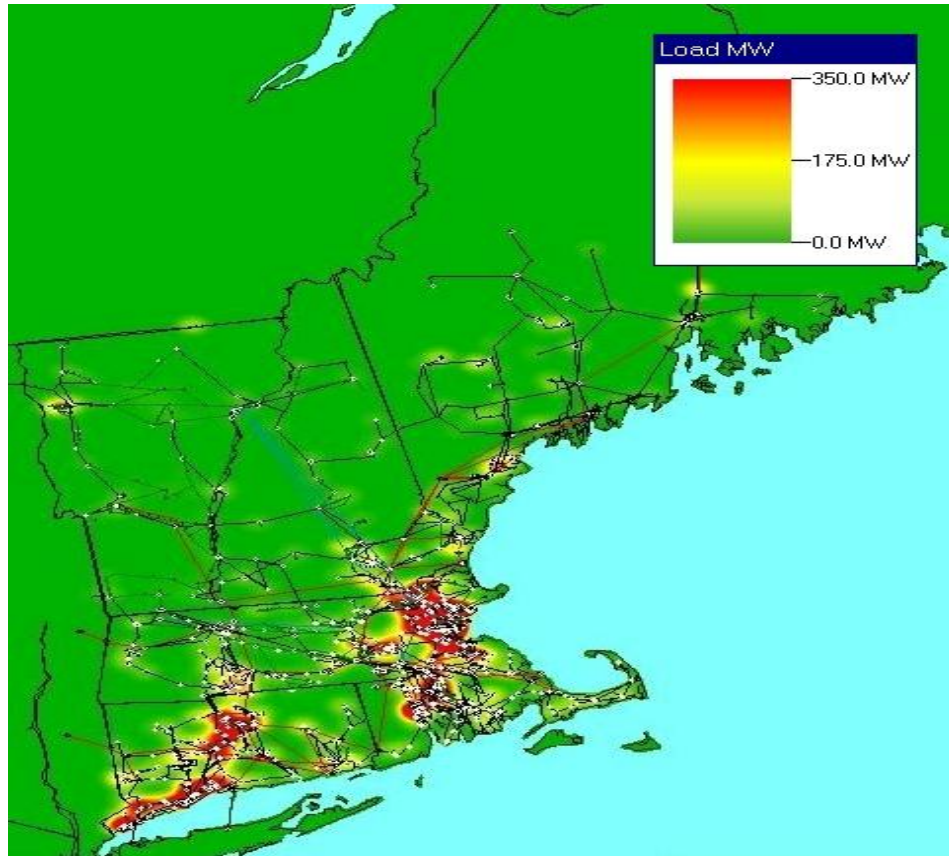
Zonal Modeling Timeline



**This illustration reflects potential timeline change proposals associated with the Retirement Reforms project.*

FCA-11 CAPACITY ZONE FORMATION

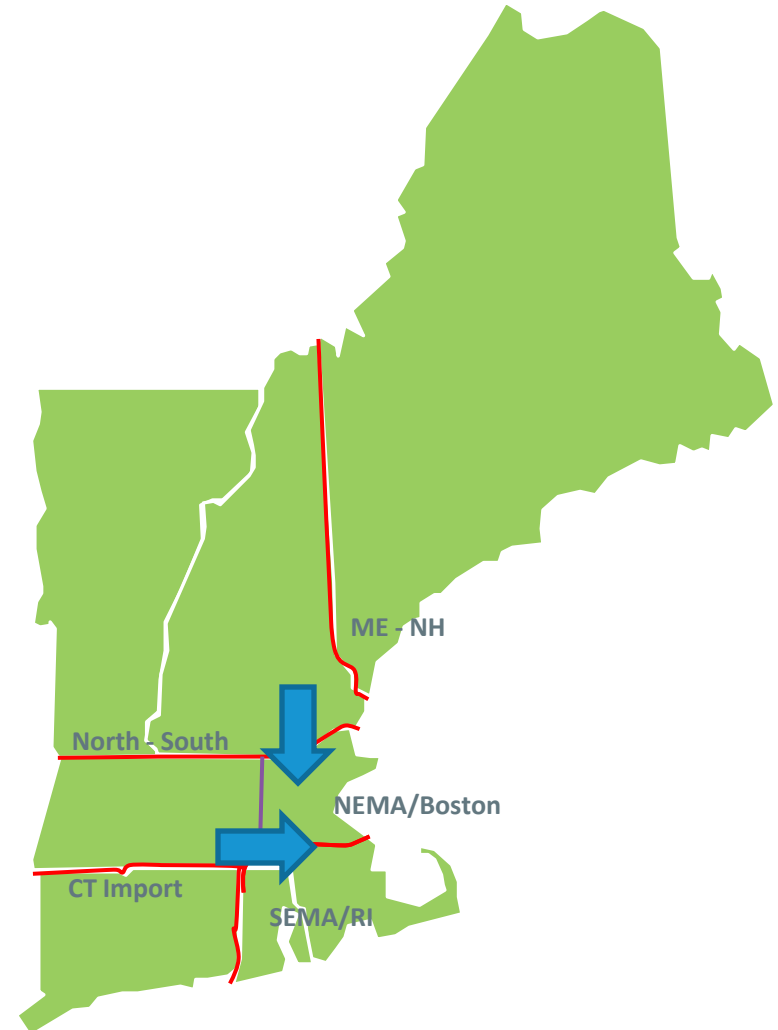
Load Distribution Within New England



Representative Summer Peak - New England Load Density

Primary Intraregional Constraints – 2020

- Simultaneous North-South and West-East constraints that affect both SEMA/RI and NEMA/Boston

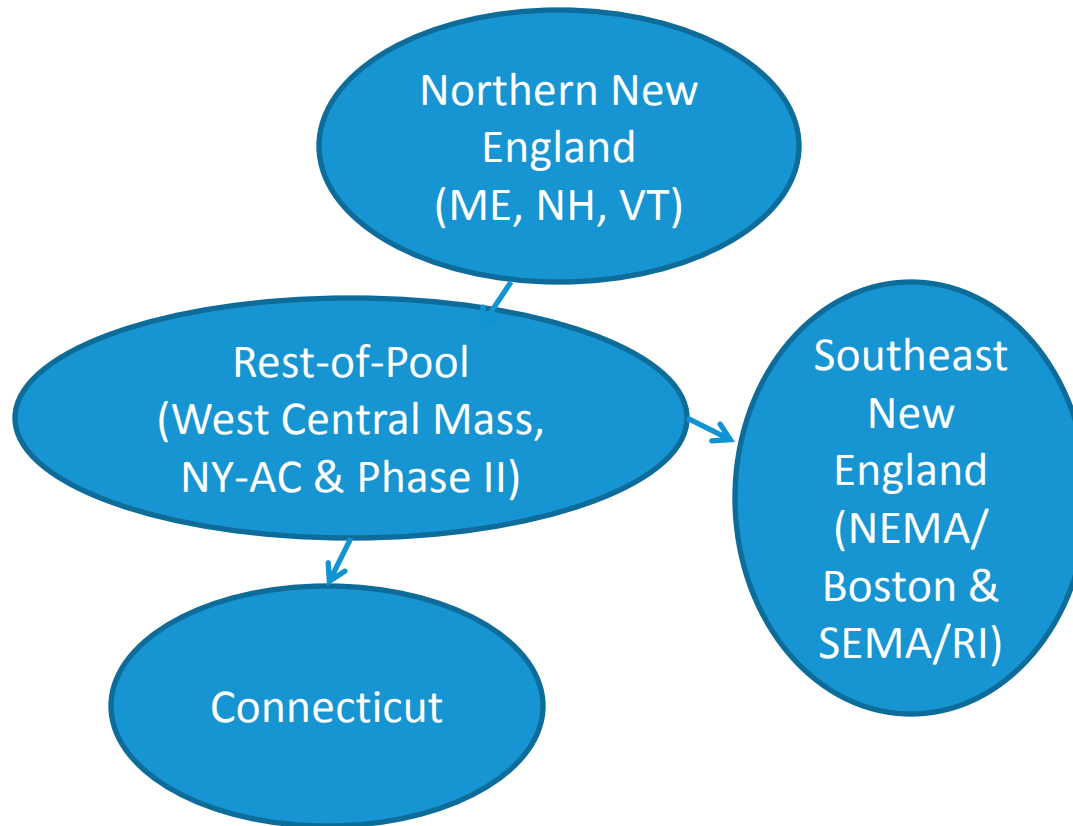


Potential Zonal Boundaries

- On May 29, 2015 FERC approved the use of the following two potential Capacity Zone boundaries (these boundaries were considered in preparation for FCA-10)
 - The North-South Interface was approved to be used in the evaluation of a potential “Northern New England” export-constrained Capacity Zone (comprising the combined Vermont, New Hampshire and Maine Load Zones)
 - The combined NEMA/Boston and SEMA/RI interfaces were approved to be used in the evaluation of a potential “Southeast New England” import-constrained Capacity Zone (comprising the combined NEMA/Boston, SEMA and Rhode Island Load Zones)



Expected Potential Zonal Construct for FCA-11



Note that zones are modeled in the FCA only if the objective criteria in Market Rule 1, Section 12 is triggered

North-South Interface: Transfer Capability

- After the inclusion of the Greater Boston upgrades, the observed thermal and (currently identified) NNE-Scobie + 394 stability limit simultaneously bind at the following level of North-South transfer:

North-South Transfer Capability (N-1)

2,675 MW



Northern New England-Scobie + 394

- The stability limit for the NNE-Scobie + 394 interface is based on the system response for significant faults in Southern New England
 - NPCC A-10 (Bulk Power System testing) and Extreme Contingency faults
- The Greater Boston upgrades may result in an improved system response for these faults
 - Allowing the NNE-Scobie + 394 and North-South limits to be increased
- Significant stability analysis will be required
 - Updated stability analysis is hoped to be completed in time for FCA-11



TRANSFER LIMIT SUMMARY

Potential Changes to RSP15 Base Internal Interface Limits

Single-Value, Summer Peak,¹ Non-Firm, Transmission Interface Limits for Use in Subarea Transportation Models

Interface	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Orrington South Export	1325	1325	1325	1325	1325	1325	1325	1325	1325	1325
Surowiec South	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Maine-New Hampshire	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Northern New England-Scobie + 394	3100	3100	3100	3100	3100	3100	3100	3100	3100	3100
North-South	2100	2100	2100	2675 ^a	2675	2675	2675	2675	2675	2675
East-West	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
West-East	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
Boston Import (N-1)	4850	4850	4850	5700 ^a	5700	5700	5700	5700	5700	5700
Boston Import (N-1-1)	4175	4175	4175	4600 ^a	4600	4600	4600	4600	4600	4600
SEMA/RI Export	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
SEMA/RI Import (N-1)	-	-	1280 ^b	1280 ^b	1280	1280	1280	1280	1280	1280
SEMA/RI Import (N-1-1)	-	-	720 ^b	720 ^b	720	720	720	720	720	720
Southeast New England Import (N-1)	-	-	-	5700 ^a	5700	5700	5700	5700	5700	5700
Southeast New England Import (N-1-1)	-	-	-	4600 ^a	4600	4600	4600	4600	4600	4600
Connecticut Import (N-1)	2950	2950	2950	2950	2950	2950	2950	2950	2950	2950
Connecticut Import (N-1-1)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
SW Connecticut Import (N-1)	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200
SW Connecticut Import (N-1-1)	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300

These values may be updated for FCA-11 based on updated Stability analysis of the NNE-Scobie transfer limit after the Greater Boston upgrades. Any interaction between these updates and the Boston import capabilities and the Southeast New England import capabilities will also be reviewed.

Notes are discussed on the following pages

Base Internal Interface Limits, continued ...

- Limits are for the summer period, except where noted to be winter
 - The limits may not include possible simultaneous impacts, and should not be considered as “firm” (the bases for these limits are subject to more detailed review in the future)
 - For the years within the FCM horizon (CCP 2020-21 and sooner), only accepted certified transmission projects are included when identifying transfer limits
 - Accepted certified transmission projects presented to the Reliability Committee at their January 20, 2016 meeting
 - For the years beyond the FCM horizon (June 1, 2021 and later), proposed plan approved transmission upgrades are included according to their expected in-service dates

Base Internal Interface Limits, continued ...

- Relevant in-service dates
 - Greater Boston Upgrades
 - The certification of this project to be in service by June 2019 has been accepted by ISO New England
- In response to the Brayton Point retirement, the following Rhode Island area facilities are now planned to be upgraded (and are certified to be in service by the start of CCP-9)
 - The V148N 115 kV line from Woonsocket to Washington
 - West Farnum 345/115 kV autotransformer (already in service)
 - Kent County 345/115 kV autotransformer (already in service)



EXTERNAL INTERFACES

External Import Capability Determinations

For Use in FCM (Tariff Section III.12.9.2.4)

- The import capability of all external interconnections with New England will be determined using studies of system conditions expected during the Capacity Commitment Period:
 - Forecast 90/10 peak load
 - Existing Generating Capacity Resources at their CNR Capability
 - Existing Demand Resources reflecting their Capacity Supply Obligation
 - Stressed Transfers
- The system will be modeled in a manner that reflects the design of the interconnection
 - If an interconnection and its supporting system upgrades were designed to provide incremental capacity into the New England Control Area, simulations will assume imports up to the level that the interconnection was designed to support
 - If the interconnection was not designed to be comparably integrated, simulations will determine the amount of power that can be delivered into New England over the interconnection



Analysis of the Delivery of Capacity

- To analyze the potential for the delivery of capacity over an existing external interface into New England:
 - For the study year and load level:
 - Turn on New England Existing Generating Capacity Resources to their Capacity Network Resource Capability (CNRC)
 - Turn on Existing Demand Resources
 - Identify how much can be transferred into New England over the existing interface before reaching a constraint
- To analyze the potential to qualify new capacity within New England (overlapping impacts of new internal resources):
 - For the study year and load level:
 - Turn on Existing Generating Capacity Resources to their CNRC
 - Turn on Existing Demand Resources
 - Increase imports to their limit or until an interface constrains
 - Identify if there is any remaining headroom to qualify new internal capacity

FCA-11 Transmission Upgrade Certifications

- Not all of the components of the Greater Hartford/Central Connecticut and Southwest Connecticut projects were included in the Network Model for FCA-11
- When the certifications of these projects are accepted for inclusion in the FCM Network Model, the Cross Sound Cable capacity import capability will be re-evaluated
 - There is no change in this interface transfer capabilities for FCA-11



RSP15 External Interface Import Capability

Single-Value, Summer Peak,¹ Non-Firm, Transmission Interface Limits for Use in Subarea Transportation Models

Interface	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
New Brunswick-New England (energy import capability) ²	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
New Brunswick-New England (capacity import capability)	700	700	700	700	700	700	700	700	700	700
HQ-New England (Highgate) (energy import capability) ³	217	217	217	217	217	217	217	217	217	217
HQ-New England (Highgate) (capacity import capability)	200	200	200	200	200	200	200	200	200	200
HQ-New England (Phase II) (energy import capability) ⁴	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
HQ-New England (Phase II) (capacity import capability)	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
Cross-Sound Cable (CSC) (energy import capability) ⁵	330	330	330	330	330	330	330	330	330	330
Cross-Sound Cable (CSC) (capacity import capability)	0	0	0	0	0	0	0	0	0	0
New York-New England (energy transfer capability) ⁶	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
New York-New England (capacity transfer capability)	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400

These values may be updated based on updated transfer analysis after the Southwest Connecticut upgrades

Notes are discussed on the following pages



External Interface Import Capability, continued ...

1. Limits are for the summer period
 - The limits may not include possible simultaneous impacts, and should not be considered as “firm” (the bases for these limits are subject to more detailed review in the future)
2. The electrical limit of the New Brunswick-New England (NB-NE) Tie is 1,000 MW
 - When adjusted for the ability to deliver capacity to the greater New England Control area, the NB-NE transfer capability is 700 MW
 - This is because of downstream constraints; in particular Orrington South
3. The capability for the Highgate facility is listed at the New England AC side of the Highgate terminal



External Interface Import Capability, continued ...

4. The Hydro-Quebec Phase II interconnection is a DC tie with equipment ratings of 2,000 MW. Due to the need to protect for the loss of this line at full import level in the PJM and NY Control Areas' systems, ISO-NE has assumed its transfer capability for capacity and reliability calculation purposes to be 1,400 MW
 - This assumption is based on the results of loss-of-source analyses conducted by PJM and NY
5. Import capability on the Cross Sound Cable (CSC) is dependent on the level of local generation
6. New York interface limits
 - These are without CSC and with the Northport Norwalk Cable at 0 MW flow
 - Simultaneously importing into NE and SWCT or CT can lower the NY-NE capability (very rough decrease = 200 MW)



Next Steps

- Complete transfer analysis
 - Northern New England-Scobie
 - Cross Sound Cable Import
- Present final potential Capacity Zone boundary construct for FCA-11
 - March 2016 Planning Advisory Committee
 - March 2016 Reliability Committee

Questions

