Forward Capacity Auction 15 Transmission Transfer Capabilities & Capacity Zone Development

Reliability Committee

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Topics

- Review of interface transfer capabilities
- Proposed Capacity Zone construct for the fifteenth Forward Capacity Auction (FCA 15), which is associated with the 2024-2025 Capacity Commitment Period

FCA 15 – Capacity Zone Development: Steps So Far

- The *Forward Capacity Auction 15 (FCA 15) Capacity Zone Development Preview* was presented at the November 2019 Planning Advisory Committee (PAC) meeting
- *2020 Forward Capacity Market Transmission Certifications* were presented at the January 2020 Reliability Committee
- *Update to the Southeast New England and Boston Import Transfer Capabilities: Capacity Commitment Period 2024-25* was presented at the February 2020 PAC meeting

REVIEW OF INTERFACE TRANSFER CAPABILITIES

Internal Interfaces

FCA 15 Internal Interface Transfer Capabilities

Single-Value, Summer Peak,[a] Non-Firm, Transmission Interface Limits for Use in Subarea Transportation Models										
Interface	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
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	3450	3450	3450	3450	3450	3450	3450	3450	3450	3450
North-South	2725	2725	2725	2725	2725	2725	2725	2725	2725	2725
East-West	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
West-East	2200	2200	2200	3000[e]	3000	3000	3000	3000	3000	3000
Boston Import (N-1)	5400	5700[b]	5700	5700	5150[f]	5150	5150	5150	5150	5150
Boston Import (N-1-1)	4500	4600[b]	4600	4600	4300[f]	4300	4300	4300	4300	4300
SEMA/RI Export	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
SEMA/RI Import (N-1)	1280	1280	1280	1800[e]	1800	1800	1800	1800	1800	1800
SEMA/RI Import (N-1-1)	720	720	720	800[e]	800	800	800	800	800	800
Southeast New England Import (N-1)	5400	5700[b]	5700	5700	5150[f]	5150	5150	5150	5150	5150
Southeast New England Import (N-1-1)	4500	4600[b]	4600	4600	4300[f]	4300	4300	4300	4300	4300
Connecticut Import (N-1)	3400[c]	3400	3400	3400	3400	3400	3400	3400	3400	3400
Connecticut Import (N-1-1)	2200[c]	2200	2200	2200	2200	2200	2200	2200	2200	2200
SW Connecticut Import (N-1)	2500	2800[d]	2800	2800	2800	2800	2800	2800	2800	2800
SW Connecticut Import (N-1-1)	1750	1900[d]	1900	1900	1900	1900	1900	1900	1900	1900

Notes are discussed on the following page

FCA 15 Internal Interface Transfer Capability (Notes)

a) 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”
   - For the years within the FCM horizon (CCP 2024-2025 and sooner), only accepted certified transmission projects are included when identifying transfer limits
   - For the years beyond the FCM horizon (CCP 2025-2026 and later), proposed plan approved transmission upgrades are included according to their expected in-service dates

b) Increase associated with the Greater Boston upgrades, with the Wakefield – Woburn 345 kV line in service (CCP 2021-2022 and later)

c) Increase associated with the Greater Hartford/Central Connecticut upgrades

d) Increase associated with the Southwest Connecticut (SWCT) upgrades

e) Increase associated with the Southeast Massachusetts/Rhode Island (SEMA/RI) Reliability project upgrades

f) Decrease associated with the updated load assumptions, updated Northern New England (NNE)-Scobie transfer capability and retirement of Mystic 7, 8 & 9

EXTERNAL INTERFACES

FCA 15 External Interface Import Capability

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

Interface	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
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

Notes are discussed on the following pages

External Interface Import Capability (Notes)

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 (NB)-New England (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 …

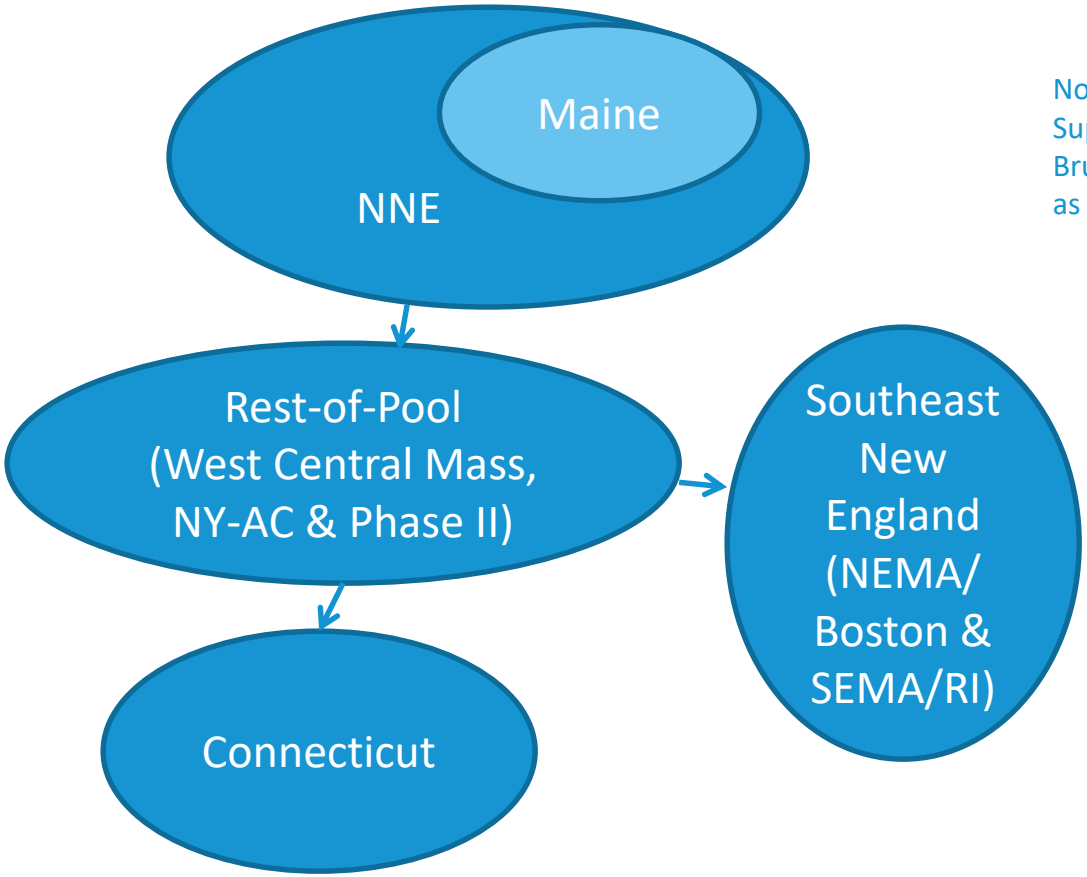
4. The Hydro-Quebec Phase II interconnection is a DC tie with equipment ratings of 2,000 MW. Due to the need to protect for the loss of this line at full import level in the PJM and New York (NY) Control Areas' systems, ISO-NE has assumed its transfer capability for capacity and reliability calculation 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. NY interface limits
   - These are without CSC and with the Northport Norwalk Cable at 0 MW flow
   - Simultaneously importing into NE and SWCT or Connecticut can lower the NY-NE capability (very rough decrease = 200 MW)

PROPOSED POTENTIAL ZONAL CONSTRUCT FOR FCA 15

Proposed Potential Zonal Construct for FCA 15

- For FCA 15, the following potential zones (unchanged from FCA 14) will be evaluated using the Capacity Zone modeling objective criteria triggers in Section III.12.4 of the Tariff
  - Potential export-constrained zones
    - Northern New England ("NNE" - Vermont, New Hampshire & Maine)
    - Maine - nested within NNE
  - Potential import constrained zones
    - Southern New England ("SENE" - Northeast Massachusetts/Boston & Southeast Massachusetts/Rhode Island)
    - Connecticut

Potential Capacity Zone Construct for FCA 15



Note:
Supply from New Brunswick is modeled as connected to Maine

Note that zones are modeled in the FCA only if the objective criteria in Section III.12 of the ISO Tariff is triggered

Interface Transfer Capabilities for Potential Capacity Zone Boundaries

FCA 14 Transfer Capabilities (MW)		FCA 15 Transfer Capabilities (MW)	
SENE Import N-1	5,700	SENE Import N-1	5,150
SENE Import N-1-1	4,600	SENE Import N-1-1	4,300
Connecticut Import N-1	3,400	Connecticut Import N-1	3,400
Connecticut Import N-1-1	2,200	Connecticut Import N-1-1	2,200
North-South (NNE Boundary) N-1	2,725	North-South (NNE Boundary) N-1	2,725
Maine-New Hampshire (Maine Boundary) N-1	1,900	Maine-New Hampshire (Maine Boundary) N-1	1,900

Next Steps

- The potential Capacity Zone boundaries will be tested using the Step 2 objective criteria trigger calculations
  - Results scheduled to be presented at the May 2020 Power Supply Planning Committee
- Zones that trigger the objective criteria will be modeled in FCA 15 and associated reconfiguration auctions
- Whether any of the modeled zones bind in FCA 15 and experience price-separation will be determined during the auction itself

Questions

APPENDIX

Methodology for Modeling Capacity Zones in FCM

Developing Zonal Boundaries for the FCM

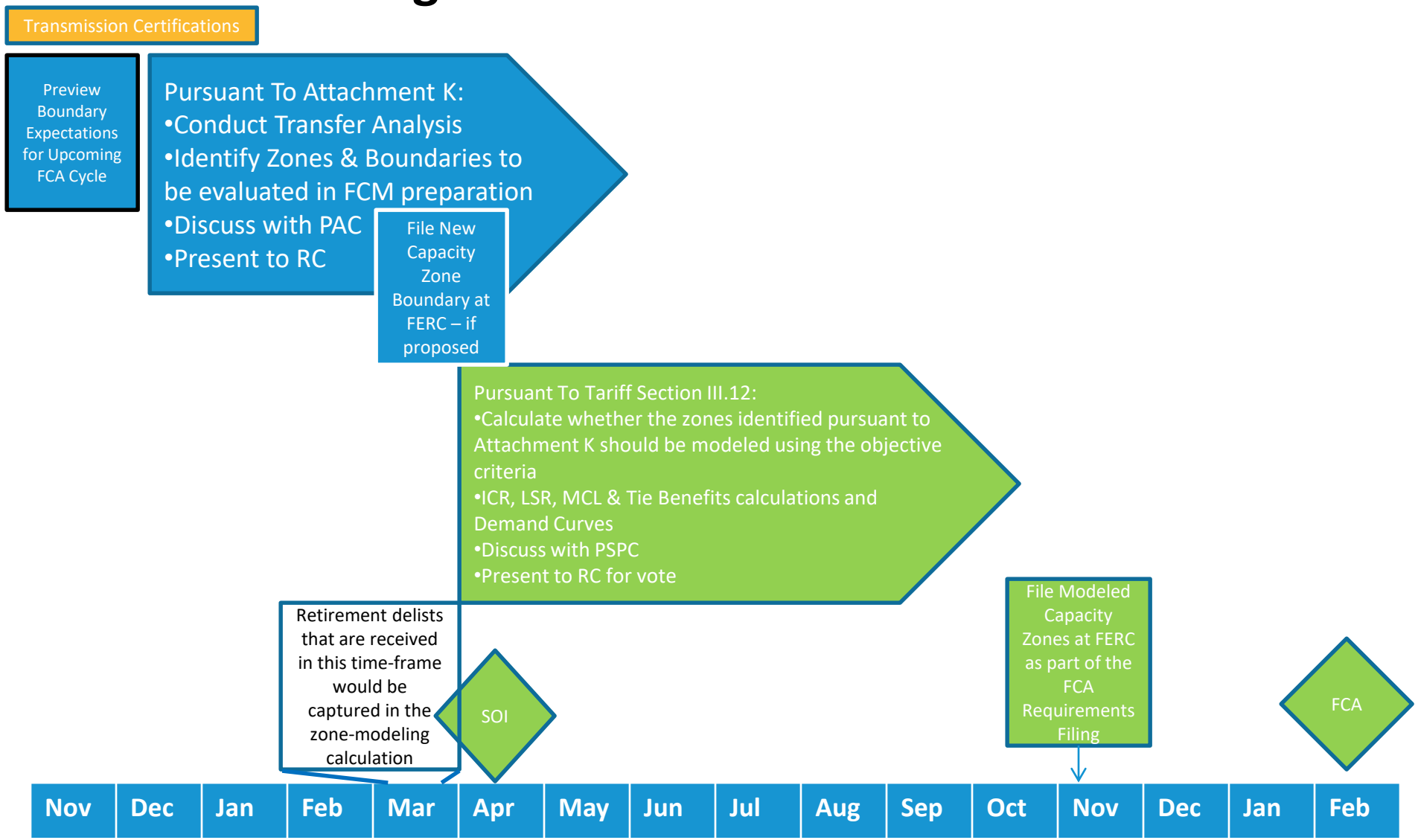
- Included in Attachment K of the Open Access Transmission Tariff:
  - Annual Assessment of Transmission Transfer Capability
    - Each year, the ISO shall issue the results of the annual assessment of transmission transfer capability, conducted pursuant to applicable NERC, NPCC and ISO New England standards 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 Section III.12 of the ISO Tariff.

Zone Formation: A Two Step Process

Step ONE	Step TWO
Identify the potential zonal boundaries and associated transfer limits to be tested for modeling in the FCM	Use objective criteria* to conduct the test determining whether or not the zone meets the trigger to be modeled for the Capacity Commitment Period
	Import-constrained zone Trigger to model the zone is based on the quantity of surplus resources in the zone above the zonal requirement 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 Adjacent load zones that aren't import- or export-constrained are modeled together in the rest-of-pool zone

*Objective criteria are contained in Section III.12.4 of the ISO Tariff

Zonal Modeling Timeline



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