

Agenda Item 5.0

PSPC Meeting 271

January 14, 2010

Assumptions for the Tie Benefit Study of Year 2013/14

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PSPC Meeting

Outline

- Study Scope
- High Level Description
 - Use GE MARS
 - “At Criteria”
 - Modeling Inter-Area transmission constraints only
- Study Assumptions
 - Interconnected Systems
 - Four areas modeled
 - Reserving sharing among areas, implement EOP after interconnection assistance
 - Aggregate subareas and EOP steps
 - Neighboring and New England Areas
 - For neighboring areas : using latest data available
 - For New England area: consistent with the assumptions used for 2013/14 FCA ICR calculation, but only grandfather imports are modeled
 - Interconnection Diagram

Study Scope

- To calculate Tie Benefit values from neighboring Control Areas to New England for the year 2013/14 according to Section 12.9 of Market Rule 1
 - Total Tie Benefits available to New England
 - Tie Benefits associated with each neighboring Control Area

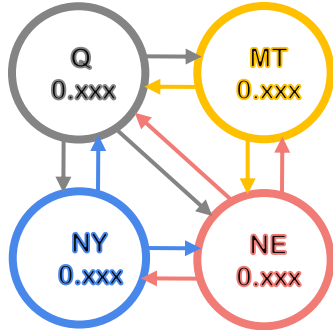
High Level Description of the Process

- Calculate Tie Benefit values through probabilistic method
 - Using multi-area probabilistic simulation model, GE MARS
- Evaluate under “At Criterion” conditions for all interconnected Areas
 - All Areas are brought to 0.1 days/year simultaneously while interconnected to each other.
- Inter-Area transmission constraints are modeled, while internal constraints within each Area are eliminated by adding resources where needed
- Calculate the Tie Benefit contributions of each neighboring Areas in a consistent manner.
 - If the sum of the tie benefits from the individual neighboring Areas is not equal to the total amount of tie benefits, then each of the neighboring Area’s tie benefits will be adjusted based on the ratio of the individual Area tie benefit to the sum of the tie benefits.

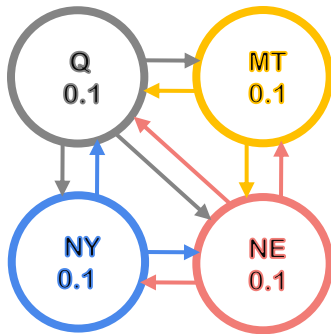
Study Methodology

– Calculation of Total Tie Benefits, TB_{Total}

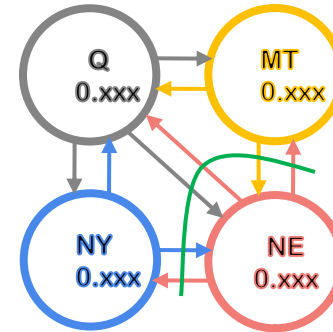
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



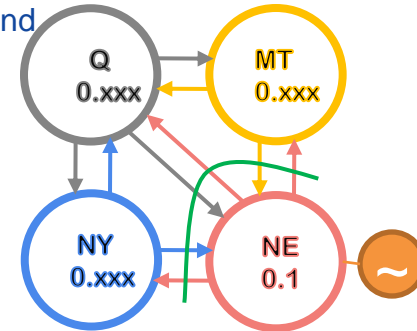
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



Step 3: Reduce the total transfer capabilities of the interconnections from neighboring Areas to allow for only firm capacity import, and calculate the New England risk index ($LOLE_{NE-w/oNY\&HQ\&MT}$). $LOLE_{NE-w/oNY\&HQ\&MT} > 0.1$ days/year.



Step 4: Bring New England Control Area's risk index, $LOLE_{NE-w/oNY\&HQ\&MT}$, back to the 0.1 days/year, by adding unforced resources to New England.

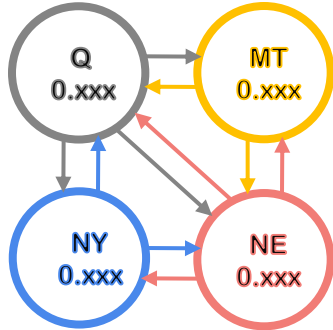


Step 5: The total tie benefits from neighboring Areas, TB_{Total} equals to the amount of resources added to New England in the Step 4.

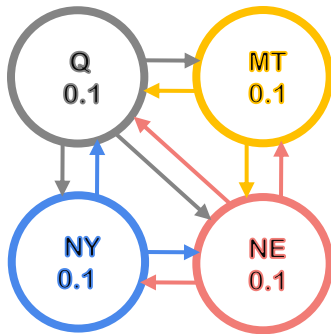
Study Methodology

– Calculation of New York Tie Benefit, TB_{Tie_NY}

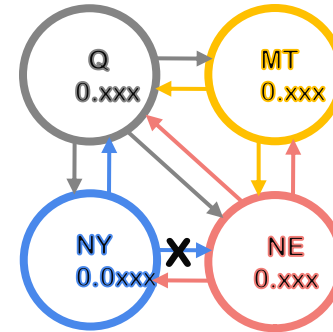
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



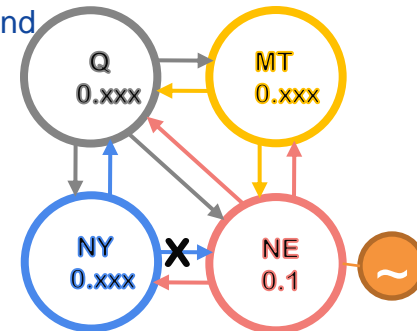
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



Step 3: Reduce the transfer capabilities of the interconnections (All AC lines and Cross Sound Cable) from New York to New England to allow for only Firm capacity import, and calculate the New England risk index ($LOLE_{NE-w/oNY}$). $LOLE_{NE-w/oNY} > 0.1$ days/year.



Step 4: Bring New England Control Area's risk index, $LOLE_{NE-w/oNY}$, back to the 0.1 days/year, by adding unforced resources to New England.

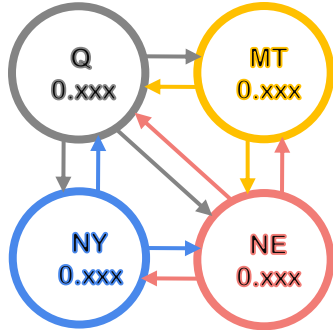


Step 5: The tie benefit contribution of the interconnections from New York to New England (TB_{Tie_NY}) equals to the amount of resources added to New England in the Step 4.

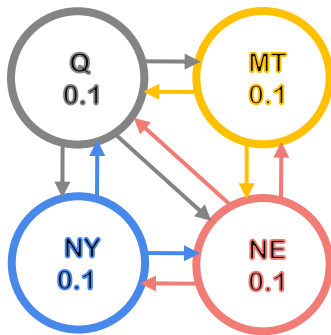
Study Methodology

– Calculation of Maritimes Tie Benefit, TB_{Tie_MT}

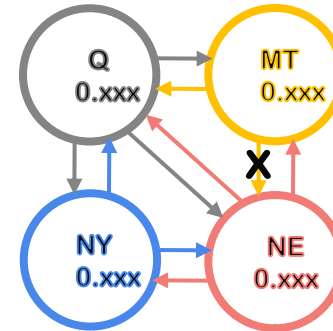
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



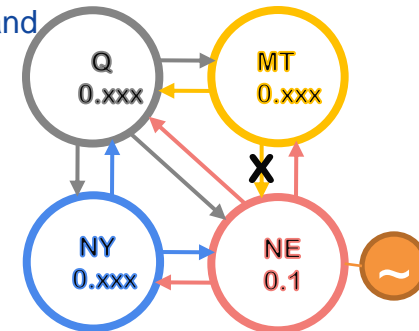
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



Step 3: Reduce the transfer capabilities of the interconnections from Maritimes to New England to allow for only Firm capacity import, and calculate the New England risk index ($LOLE_{NE-w/oMT}$). $LOLE_{NE-w/oMT} > 0.1$ days/year.



Step 4: Bring New England Control Area's risk index, $LOLE_{NE-w/oMT}$, back to the 0.1 days/year, by adding unforced resources to New England.

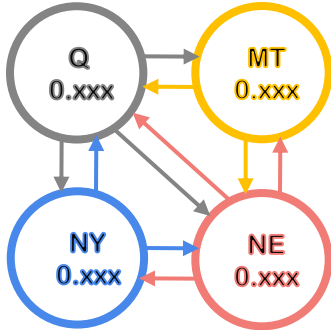


Step 5: The tie benefit contribution of the interconnections from Maritimes to New England (TB_{Tie_MT}) equals to the amount of resources added to New England in Step 4.

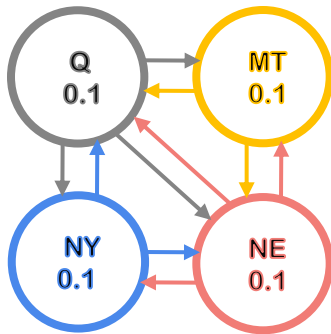
Study Methodology

– Calculation of Quebec Tie Benefit, TB_{Tie_Q}

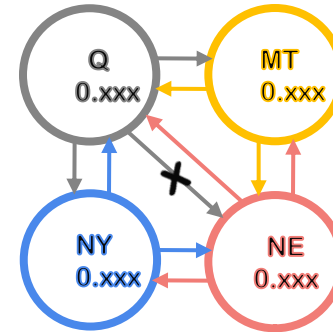
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



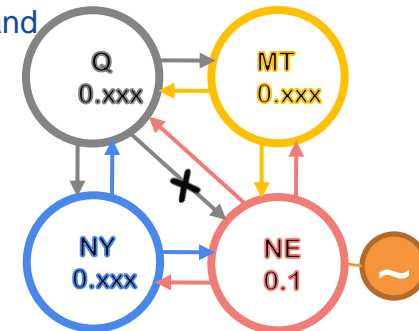
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



Step 3: Reduce the transfer capabilities of the interconnections from Quebec to New England to allow for only Firm capacity import, and calculate the New England risk index ($LOLE_{NE-w/oQ}$). $LOLE_{NE-w/oQ} > 0.1$ days/year.



Step 4: Bring New England Control Area's risk index, $LOLE_{NE-w/oQ}$, back to the 0.1 days/year, by adding unforced resources to New England.



Step 5: The tie benefit contribution of the interconnections from Quebec to New England (TB_{Tie_Q}) equals to the amount of resources added to New England in the Step 4.

Study Assumptions

– Interconnected Systems

- Areas modeled: New England, New York, Maritimes and Quebec
- Interconnection topology between systems and modeling techniques are consistent with NPCC studies
 - Reserve sharing among Areas
 - Assumed load relief from Emergency Operating Procedures (EOP) of each Area implemented after interconnection assistance
- Simplification to speed up calculation process without sacrificing calculation accuracy:
 - Subareas in each system are aggregated to as few subareas as possible
 - Assumed load relief EOP are aggregated to as few steps as possible

Study Assumptions

– Neighboring Areas

- Maritimes
 - MARS database received in February, 2009
- Quebec
 - MARS database received in February, 2009
 - Load forecast per latest Hydro-Québec Strategic Plan 2009-2013 (August 2009)
- New York
 - MARS database received in January 2010
 - Other assumptions are based on NYISO's 2009 Gold Book (Version 2 - Released August 2009)
 - Future additions and retirements
 - Load forecast

Study Assumptions

– New England

- Consistent with the assumptions used for 2013/14 FCA ICR calculation, except:
 - Only grandfather imports are modeled.
 - VJO import to reflect delist bids
 - 194 MW through Highgate
 - 20 MW through derby line
 - 39 MW through HQ phase II
 - Real-Time Emergency Generator demand resources are derated based on their availability factors, and modeled as EOP resources.

Study Assumptions

– Interconnection Diagram

