

Agenda Item 4.1.1

PSPC Meeting 273

March 11, 2010

Tie Benefit Assumptions for 2013/14 Sensitivity Studies

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PSPC Meeting

Westborough, MA

Outline

- Summary of Tie Benefit Results for 2013/14 FCA4
- Response to two questions raised at the February PSPC Meeting
 - Why are the tie benefits for the 2013/14 FAC4 higher than the tie benefits obtained from the simulations for the 2011/12 Capability Year for ARA2?
 - Why is the sum of the simulation results of the individual Control Area contributions lower than the simulation result of the total tie benefits?

Summary of Tie Benefit Results for 2013/14

2013/14 Tie Benefit Study (MW)		
	Calculated	Adjusted
Total	1,700	
New York	190	194
Maritimes	570	584
Quebec	900	922
Sum of NY, MT and HQ	1,660	1,700

Response to Questions Raised by the PSPC

- At the February 2010 PSPC meeting, a question was raised regarding why the tie benefits for the 2013/14 FCA4 are higher than the tie benefits obtained from the simulations for the 2011/12 Capability Year for ARA2
 - Requested ISO to examine the reason for the increase in tie benefits from the 1570 MW value calculated for 2011/12 ARA2 to the 1,700 MW calculated for FCA4
- While many assumptions have changed, ISO focused the review on two areas:
 - Assumed amount of grandfathered capacity imports into NE
 - Assumed amount of NY's load relief from emergency operating procedures (EOP)

Comparison of Existing Qualified Import Capacity and NY EOP Assumptions

Comparison of 2013/14 FCA4 and 2011/12 ARA2 capacity imports (MW)

Import Contract (Interface)	2013/14 FCA4	2011/12 ARA2
NYPA -CMR (NY AC Tie)	68.8	68.8
NYPA -VT (NY AC Tie)	15.3	15.3
VJO- Highgate (Highgate)	194	200
VJO - Phase I/II (Phase I/II)	39	110
Total Import contract	317.1	394.1

Comparison of 2013/14 FCA4 and 2011/12 ARA2 NY EOP Assumption

	2013/14 FCA4	2011/12 ARA2
NY EOP MW (August)	2703	2832

Simulations

- Simulated the 2013/14 Capability Year with the 2011/12 ARA2 assumed capacity imports (all other assumptions remained unchanged)
- Tie benefits reduced by 55 MW with a 77 MW increase in assumed capacity imports
 - More transfer capability for emergency assistance resulted in higher tie benefits
- Simulated the 2013/14 Capability Year with the 2011/12 ARA2 assumed amount of load relief from EOP for NY (all other assumptions remained unchanged)
 - Tie benefits reduced by 40 MW with a 129 MW increase in assumed load relief from EOP for NY
 - Lower load relief from EOP resulted in NY needing less emergency assistance from the interconnections, which translates to more emergency assistance available to NE

Individual Control Area Tie Benefits Contributions

At the February 2010 PSPC meeting, it was also requested that the ISO develop a presentation that explains why the sum of the simulation results of the individual Control Area contributions is lower than the simulation result of the total tie benefits. Some members referred the 2002 method required scaling down of the results.

Note: As shown in Agenda item 4.1.1 slide 12, all individual control area tie benefit contributions calculated for past FCAs have been scaled up. We will compare the current method with the 2002 method because the 2002 method required scaling down.

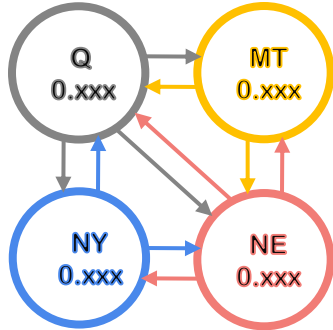
Comparison of the Calculation Methodologies

Modeling	Current Method	2002 Method
Total Tie Benefits	Cut all areas. The total tie benefits are the MWs needed to bring NE back to 0.1 days/year.	Same procedure as the current method
Contribution from Individual Control Areas	Cut only the interconnections of the target area with New England. The tie benefits from the control area are the MWs needed to bring NE back to 0.1 days/year.	Cut all the interconnections except the one(s) with the target control area. The tie benefits from the target control area are the MWs needed to bring NE isolated LOLE back to the new LOLE with the target control area interconnected.

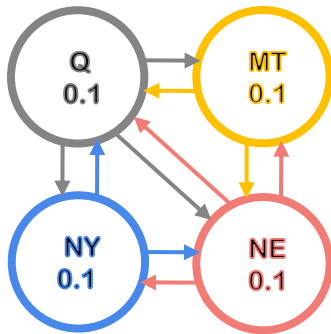
Study Methodology – Same for Current and 2002

– Calculation of Total Tie Benefits, TB_{Total}

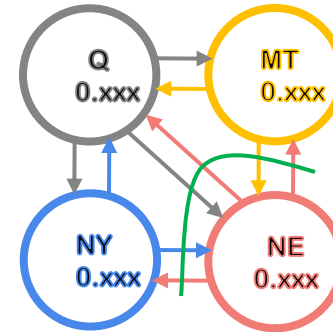
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



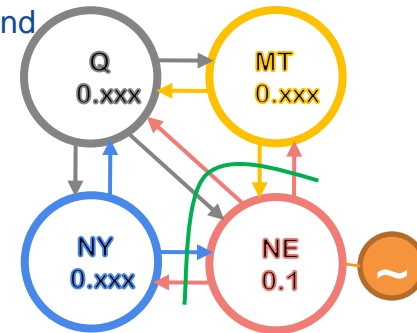
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



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.

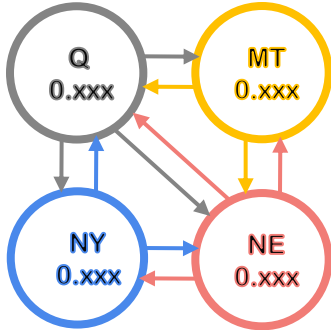


Step 5: The total tie benefits from neighboring Areas, TB_{Total} equals to the amount of resources added to New England in the Step 4.

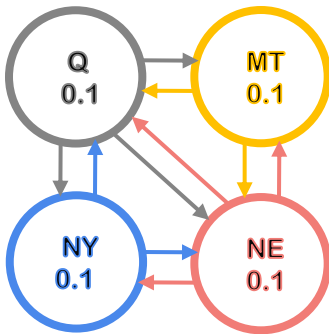
Study Methodology - Current

Calculation of Individual Control Areas – Used New York as Example

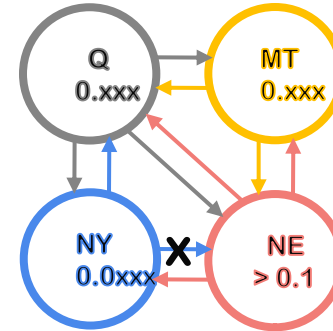
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



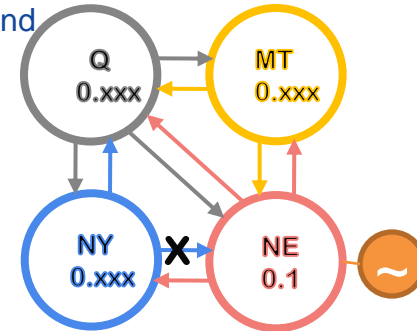
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



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.

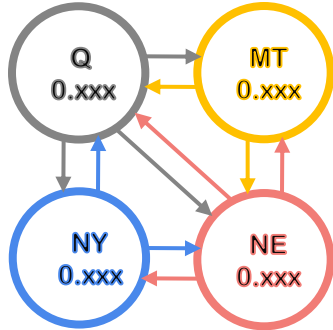


Step 5: The tie benefit contribution of the interconnections from New York to New England (TB_{Tie_NY}) equals to the amount of resources added to New England in the Step 4.

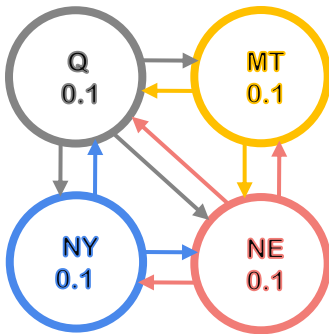
Study Methodology - 2002

Calculation of Individual Control Areas – Used New York as Example

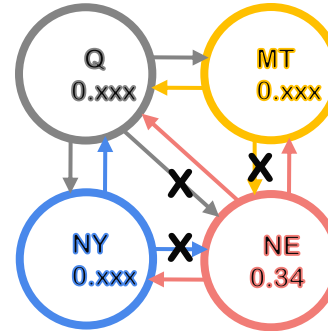
Step 1: Interconnect New England, Quebec, New York and Maritimes systems and calculate each Control Area's risk index ($LOLE_{interconnected}$).



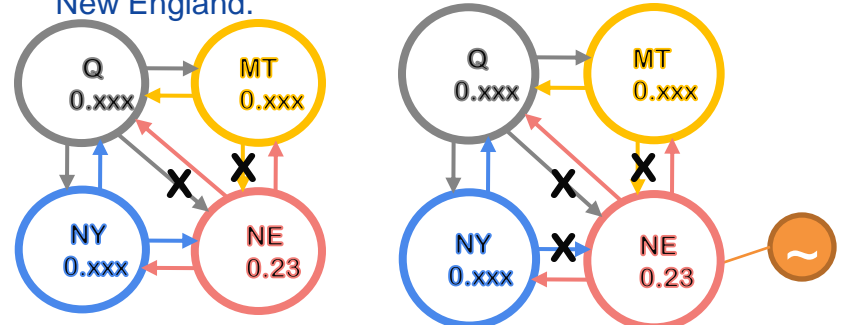
Step 2: Bring each Control Area's risk index to the 0.1 days/year level simultaneously, by adjusting the resources/load in each Control Areas.



Step 3: Determine Isolated NE Area $LOLE_{NE-isolated}$ (e.g. 0.34).



Step 4: Interconnect NY to NE and calculate the New England risk index ($LOLE_{NE-w NY}$) e.g. 0.23 days/year. Bring $LOLE_{NE-isolated}$ in Step 3 to 0.23 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.

Simulation Results of Current and 2002 Methodologies

2013/14 Tie Benefit Study (MW)		
	Current Methodology	2002 Methodology
Total	1,700	1,700
New York	190	515
Maritimes	570	585
Quebec	900	955
Sum of NY, MT and HQ	1,660	2,055

Why the Two Methods Produce Different Results

In the current methodology, when the target Control Area is cut (by limiting the transfer capability of the tie(s) with the target Control area to transfer only the Existing Qualified Import Capacity), a part or all of the emergency capacity may reach NE by way of loop flow because the target Control Area is still interconnected with NE through its neighboring Control Areas. Therefore, the tie benefits simulated represent the emergency capacity that cannot reach NE through loop flow.

In the 2002 methodology, the target Control Area is interconnected to NE while the other Control Areas are not. This method allows the other Control Areas to provide assistance to NE through the target Control Area. Therefore, the tie benefits simulated represent the total emergency capacity available from all the modeled Control Areas but limited by the transmission between the target Control Area and NE. In this methodology, the same emergency capacity could be counted up to three times contributing to the sum of the individual simulations be higher than the total tie benefits.

Comparison of Current and 2002 Methods

(similar slide also shown in July 9, 2009 PSPC meeting)

- There are different ways to calculate the individual interconnection tie benefit contributions. What types of tie benefit does each method capture? Which method is more robust and technically sound?

