Evaluation of External Area Modeling
In New York IRM studies and Scope of Work for Next Steps

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Outline/Scope of Presentation

- Background - Policy 5 Requirements
- Guiding principles or objectives
- Review previous recommendation with latest results
- Treatment of EOPs in neighboring Areas
- Review of assigning EA limits on a Control Area basis
- Examination of development of a model for the external Areas that is less complex than the current process

Background -Policy 5 Required Adjustments

- NYSRC Policy 5 Section 3.5.6 External Control Area Load and Capacity Models states:
  - “In addition, an external Control Area’s LOLE assumed in the IRM Study cannot be lower than its own LOLE criterion and its reserve margin can be no higher than the external Control Area’s minimum requirement”
  - “EOPs are not represented in external Control Area capacity models”
- The NYISO has annually had to adjust several of the External Control Areas, per policy 5, to ensure their LOLE is no better than their criteria
- Adjustments to reserve margins*, however, have not been needed frequently or, if at all, in recent history

*See Appendix 1 for 2019 IRM target reserve margins for neighboring CA

EA Modeling Guiding Principles

- The number one guiding principle as per Policy 5 “is to avoid overdependence on the external Control Areas for emergency capacity support” in setting the IRM
- A secondary unwritten guiding principle has been to limit or mitigate significant unexplained changes or variability in the external area modeling from year to year

Last Year's Recommendation for Externals

- For the 2019 IRM, the NYISO recommends that the ICS consider either
  - Keeping the 2018 external area representations to allow for further discussion on this matter, or
  - Updating the external area representations, by scaling load proportional to excess capacity as described in Case 4*
- If considered by ICS, the Case 4 methodology represents a change from past practice without the benefit of the ICS's normal review process
- Regardless of the direction recommended by ICS for the 2019 IRM, the NYISO advises that additional discussion is needed to consider the preferred long term approach used for external Control Area modeling

* See Appendix 2 for Case Definitions

Last Year's Recommendation for Externals (Cont.)

- ICS members decided it was prudent to keep the 2018 external model and study the issue in more detail in 2019
- Option/Case 4 best fits with existing process except that when load is added, it gets added to external area zones that have excess capacity
- Need to examine if adding load by this method is an effective way to influence LOLE
- Cases where the Area is brought to criteria and then EOPs are stripped out were not available and are now reported herein

Case Results (from October 3rd, 2018 ICS presentation)

External Control Area LOLEs and Margin Levels										
Year:	2018 FBC		2019 PBC							
Case:	**2018 FBC (18.2%)**		**Starting Case* (15.0%)**		**Finish Existing - Case 1 (15.6%)**		**Use Mod-MDMW - Case 2 (15.4%)**		**α to Excess Cap - Case 4 (16.4%)**	
Area	Annual LOLE	Reserve Level	Annual LOLE	Reserve Level	Annual LOLE	Reserve Level	Annual LOLE	Reserve Level	Annual LOLE	Reserve Level
_PJM_MA_	0.146	**116.0%**	0.017	**124.6%**	0.467	**115.9%**	0.398	**115.9%**	0.145	**115.2%**
ISONE	0.108	**113.8%**	0.000	**145.4%**	0.135	**117.6%**	0.108	**117.0%**	0.109	**116.5%**
IESO	0.104	**134.0%**	0.000	**143.5%**	0.639	**117.7%**	0.560	**117.7%**	0.551	**117.7%**
_HQ_	0.110	**144.1%**	0.000	**148.0%**	0.103	**138.3%**	0.103	**131.7%**	0.103	**131.7%**
_HQ_(winter)	-	**99.9%**	-	**107.9%**	-	**100.9%**	-	**100.5%**	-	**100.5%**

* The starting case is the parametric PBC with externals replaced, but prior to any Policy 5 adjustments.

EOP Case 3 Results Completed Since 10/3/18 Presentation

External Control Area LOLEs and Margin Levels						
Year:	2019 PBC					
Case:	**Starting Case* (15.0%)**		**EOPs 2nd, α to load - Case 3 (19.5%)**		**EOPs 2nd, α to Excess Cap - Case 5 (21.7%)**	
Area	Annual LOLE	Reserve Level	Annual LOLE	Reserve Level	Annual LOLE	Reserve Level
_PJM_MA_	0.017	**124.6%**	1.712	**111.5%**	1.102	**109.6%**
ISONE	0.000	**145.4%**	0.260	**113.9%**	0.349	**110.7%**
IESO	0.000	**143.5%**	2.821	**110.5%**	1.111	**114.7%**
_HQ_	0.000	**148.0%**	1.118	**134.0%**	1.132	**125.0%**
_HQ_(winter)	-	**107.9%**	-	**97.7%**	-	**97.3%**

* The starting case is the parametric PBC with externals replaced, but prior to any Policy 5 adjustments.

Evaluation of Case 3 & 5 EOP Results

- Current practice is to remove EOPs and the bring Area to LOLE criteria
- In NYSRC consultant's view this effectively replaces the EOP steps with capacity resources
- The result of Case 3 & 5 indicate that removal of the EOPs as step 2 have a significant impact on Area LOLEs and reduce EA significantly
- Key question is what would be an Area's target LOLE without the availability of its EOPs
- Most likely difficult to determine
- A better approach might be not to remove EOPs

Study Scope and Next Steps

- Validate Option/Case 4 by repeating prior 2 years IRM results using this scaling approach
- Run most recent IRM study by not removing EOPs in neighboring Areas
- Begin review of individual control Area EA limits
- Explore development of a simplified models of external Areas and topology if feasible
- Investigate running the isolated case for NYCA much earlier in the study process in order to get an indication of the direction of the EA benefit accruing to the NYCA much earlier in the study process
- Make changes to Policy 5 as required

EA limits on a Control Area basis

- The current EA limit of 3500 MW is reasonable for NYCA as a whole
- Circumstances could change the balance of EA to one where a majority of the 3500 MW could come from a single external Control Area
- Large injections of EA from a single CA may be unrealistic
- Examination of individual control area limits should be undertaken

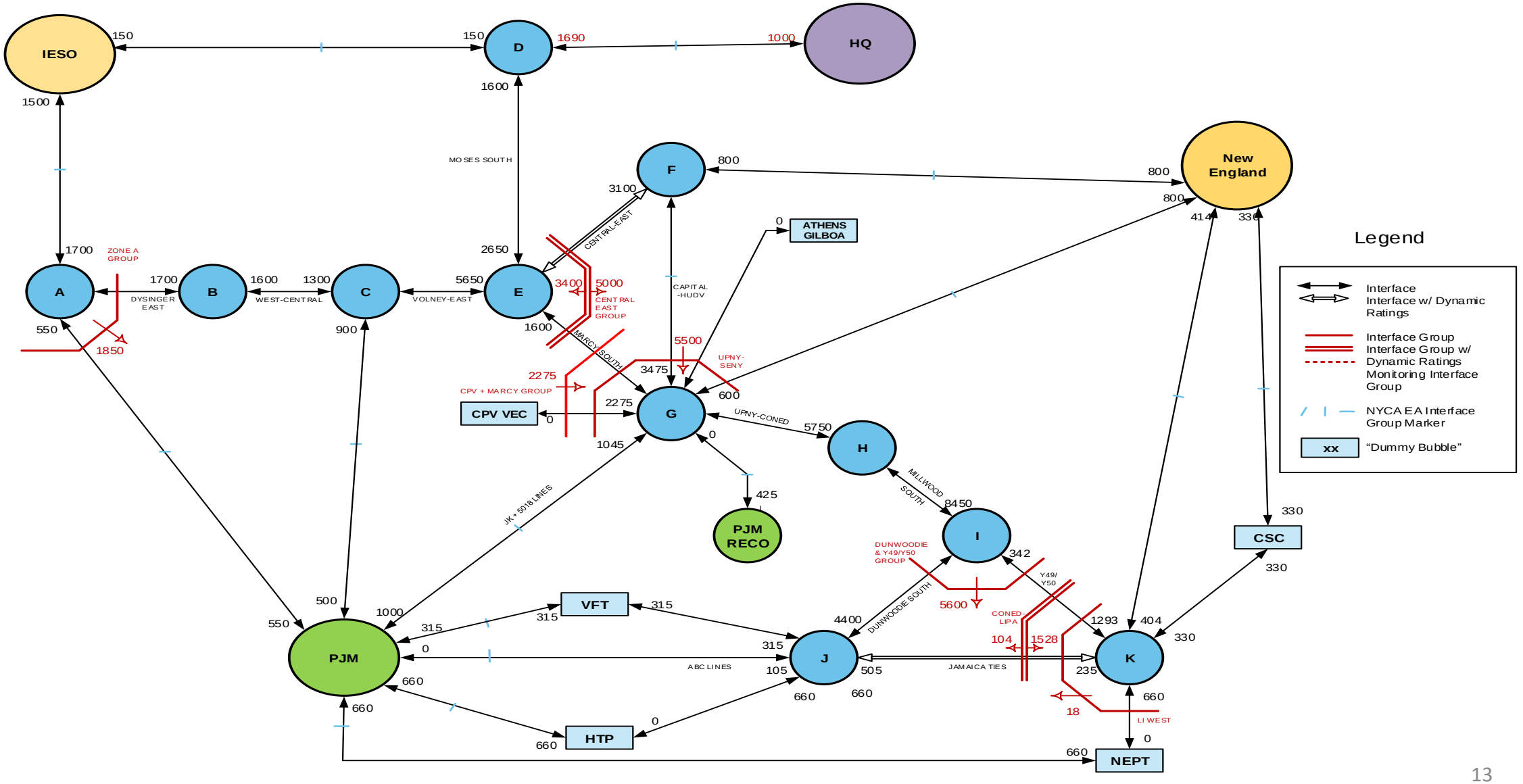
Simplified Topology

- Individual EA limits for external Control Areas could lead to simplified representations for New York's neighboring Areas
- Single generation with no load bubbles should be examined

2020 IRM Topology (Simplified Externals)

EXAMPLE

December 11, 2018



Appendix 1: Target Reserve Margins

Control Area	Published Margin	Source
New England*	17.6%	**ISO_NE ICR, LSR, & Capacity Requirement values…, Jan/16**
PJM Interconnect	15.9%	**2017 PJM Reserve Requirement Study, 10/12/17**
Ontario	17.7%	**Ontario RM Requirements for 2018-2020, 12/21/17**
Quebec	N/A	

*New England will publish an update to this Margin in the next few weeks.

Appendix 2: Definition of Study Cases

- Case 1 - Load scaled proportional to existing load to meet the LOLE criterion and adjust reserve margins if needed to be no higher than the published minimum requirement *
- Case 2 - Same approach as the above case. However, this analysis uses the mod-mdmw table to add loads. The mod-mdmw table is necessary to adjust multiple load shapes; which will be needed for the cases below
- Case 3 - Change the order of adjustment steps. Load scaled proportional to existing load to meet the LOLE criterion first, then remove EOPS, lastly adjust reserve margins if needed to be no higher than the published minimum requirement.
- Case 4 - Load scaled proportional to excess capacity in each zone to the meet the LOLE criterion and adjust reserve margins, if needed, to be no higher than the published minimum requirement *
- Case 5 - Change the order of adjustment steps and use excess capacity to scale. Load scaled proportional to excess capacity in each zone to meet the LOLE criterion first, then remove EOPs, lastly adjust reserve margins if needed to be no higher than the published minimum requirement

*EOPs are removed first