



EOP Review Whitepaper

- Preliminary Recommendations

Yvonne Huang
NYISO

EC Meeting

August 11, 2023

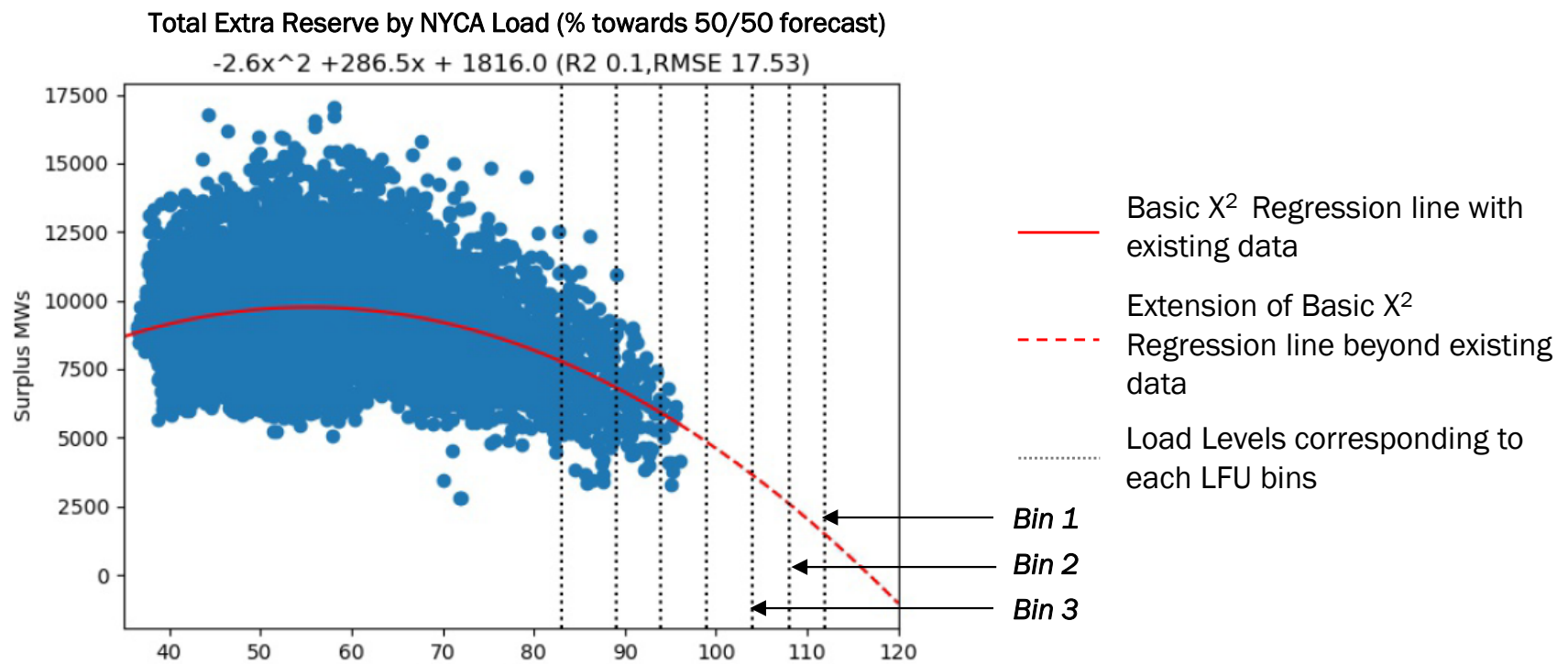
Executive Summary

- **The NYISO recommended the LFU bin- and area-specific topology limitations based on the regression analysis using historical extra reserves data for the summer season.**
 - Such analysis can be repeated when historical data becomes available
 - Utilizing the NPCC Summer Operating Margins would lead to extreme EA assumptions for the IRM study and does not include assessment for PJM
- **The NYISO recommended applying the above summer limitations to the winter season, as no reasonable assumptions were developed using either the historical extra reserve data or the NPCC Winter Operating Margins**
 - A separate sensitivity case with an extreme assumption with 0 MW of EA for winter is also recommended to assess the book-end impact of the EA assumptions
 - The NYISO to continue to explore other methodologies and data to support winter assumptions
- **NYISO's initial recommendation results in about 2% increase on the IRM with minimum impact on the LCRs**

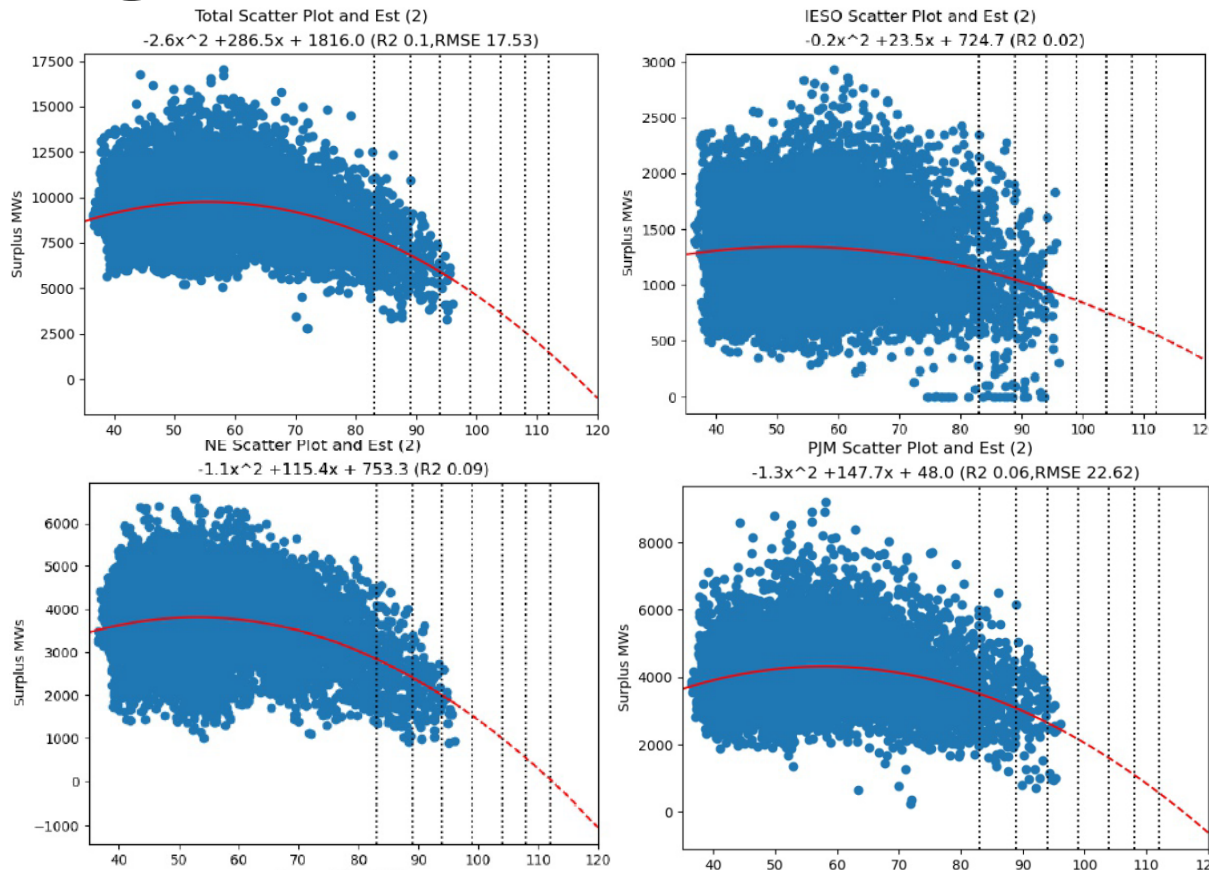
Analysis for Revised EA Assumptions

- **The NYISO conducted regression analysis using historical extra reserves data in the neighboring areas and arrive at LFU bin- and area-specific topology limitations to constraint EA in the IRM model.**
 - The NYISO pulled the hourly extra reserves data for IESO and ISONE and collaborated with PJM to obtain such data for the mid-Atlantic region within the PJM footprint
 - Data for HQ is not available; 280 MW limit (deducting the firm transaction from the topology limit) in the IRM study is assumed in the regression analysis
 - Basic X^2 Regression is established for the summer data; regression is extended to arrive at assumptions for upper LFU bins
- **The NYISO also collected the past 5-year's operating margins for both summer and winter seasons for Ontario, New England and Quebec and reviewed the historical averages and trends. Details in the Appendix**

Total Extra Reserve by NYCA Load (summer)



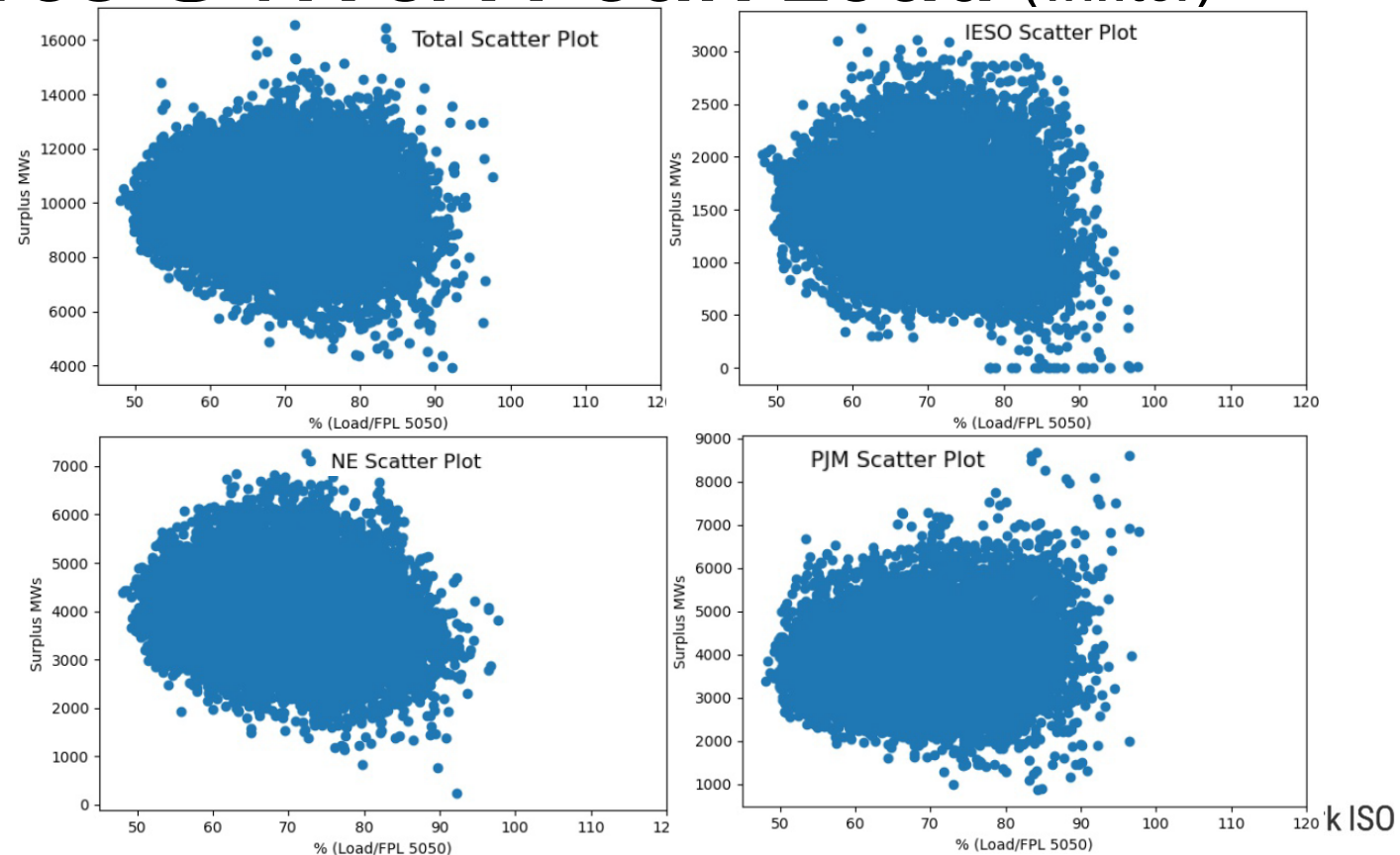
Extra Reserves @ NYCA Peak Load (summer) all regions



- Basic X^2 Regression line with existing data
- - - Extension of Basic X^2 Regression line beyond existing data
- - - - - Load Levels corresponding to each LFU bins

Extra Reserves @ NYCA Peak Load (winter)

- Beyond ~95% of the 50/50 FPL, no historical data is available
- The winter data does not produce meaningful relationship between extra reserves and NYCA load



k ISO

Additional Winter Considerations

- **NYISO recognizes the importance of reliability during winter seasons and therefore developed the strategic plan to improve the resource adequacy modeling to properly reflect winter conditions**
 - The areas of focus include EA assumptions, gas constraints, winter forecast and load shape, and topology limits
- **All of our neighbors have also expressed concerns over the winter seasons**
 - Quebec is a winter peaking system; New England is subject to gas pipeline constraints in winter; PJM had recently announced reliability risks concentrated in winter; Ontario is expected to be winter peaking in early 2030s
- **While the NYISO believes that the support from the neighboring areas is highly limited, historical and current modeling data for the Northeast region does not properly reflect the winter conditions and therefore analysis using these data would not reflect the true conditions of winter**
 - For example, the gas constraints in NYCA and ISONE are not captured in the current NPCC database

Complete Initial Recommendation

Additional Topology Limits for EA

<i>Summer</i>							
Area	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7
IESO	550 MW	660 MW	750 MW	860 MW	No additional limits (1950 MW)		
ISONE	50 MW	540 MW	1,000 MW	1,530 MW	No additional limits (1804 MW)		
PJM	580 MW	1,110 MW	No additional limits (1412 MW)				
HQ	No additional limits (280 MW)						
Total	1,470 MW	2,600 MW	No additional limits (3500 MW)				
<i>Winter</i>							
Area	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7
IESO	550 MW	660 MW	750 MW	860 MW	No additional limits (2100 MW)		
ISONE	50 MW	540 MW	1,000 MW	1,530 MW	No additional limits (1804 MW)		
PJM	580 MW	1,110 MW	No additional limits (1412 MW)				
HQ	No additional limits (858 MW)						
Total	1,470 MW	2,600 MW	No additional limits (3500 MW)				

Impact of the Initial Recommendations

- Implementing the additional topology limits to constrain the EA flow results in ~2% increase in the IRM and ~0.3% decrease on the LCRs

<i>Tan45 Results</i>	<i>IRM</i>	<i>J LCR</i>	<i>K LCR</i>
2023-2024 IRM FBC	19.90	78.20	107.40
2023-2024 IRM FBC + Additional Topology Limits for EA	21.91	77.862	107.065
<i>Delta</i>	2.01	-0.338	-0.335

Process beyond Initial Recommendation

- **For the next two years, repeat the regression analysis with historical extra reserves data for any potential updates to the IRM study assumptions**
 - NYISO proposes to update the IRM assumption if the regression analysis results in ≥ 25 MW change
- **Continue to explore methodologies to develop winter-specific EA assumptions**
- **Leverage regional collaboration and neighboring areas progress with emergency assistance assumptions to review/improve the current methodology beyond 2024**
 - The NYISO participates in the NPCC working group and is supporting the working group effort to improve regional tie-benefits study
 - The NYISO is also in conversation with PJM and ISONE to monitor their progress in revising their adequacy study assumptions for emergency assistance
 - Both jurisdictions have previously communicated the desire to lower the assumptions for external support in the respected resource adequacy study

Next Steps

- **Conduct Tan45 sensitivity case with the initial recommendation on the PBC**
 - Conduct another sensitivity case with proposed initial recommendation + 0 MW EA assumptions for winter
- **If no unintended consequences identified, adopt the recommended EA modeling in FBC**
 - Accepting the Tan45 sensitivity case as the starting point for FBC – September adoption
 - Results of the sensitivity case is scheduled for 8/29 ICS and modeling adoption can be approved at the 9/8 EC meeting
 - Or adding the initial recommendation as a parametric step at the FBC – October adoption
 - The initial recommendation will be reflected in the FBC Assumption Matrix which is scheduled for approval at the 10/4 ICS meeting and 10/13 EC meeting
- **Finalize the EOP Whitepaper Report for ICS review at 10/4 ICS meeting**
 - Extending final report timeline due to resources being prioritized to complete the IRM study

Appendix

- Historical NPCC Operating Margins

NPCC Summer Operating Margins

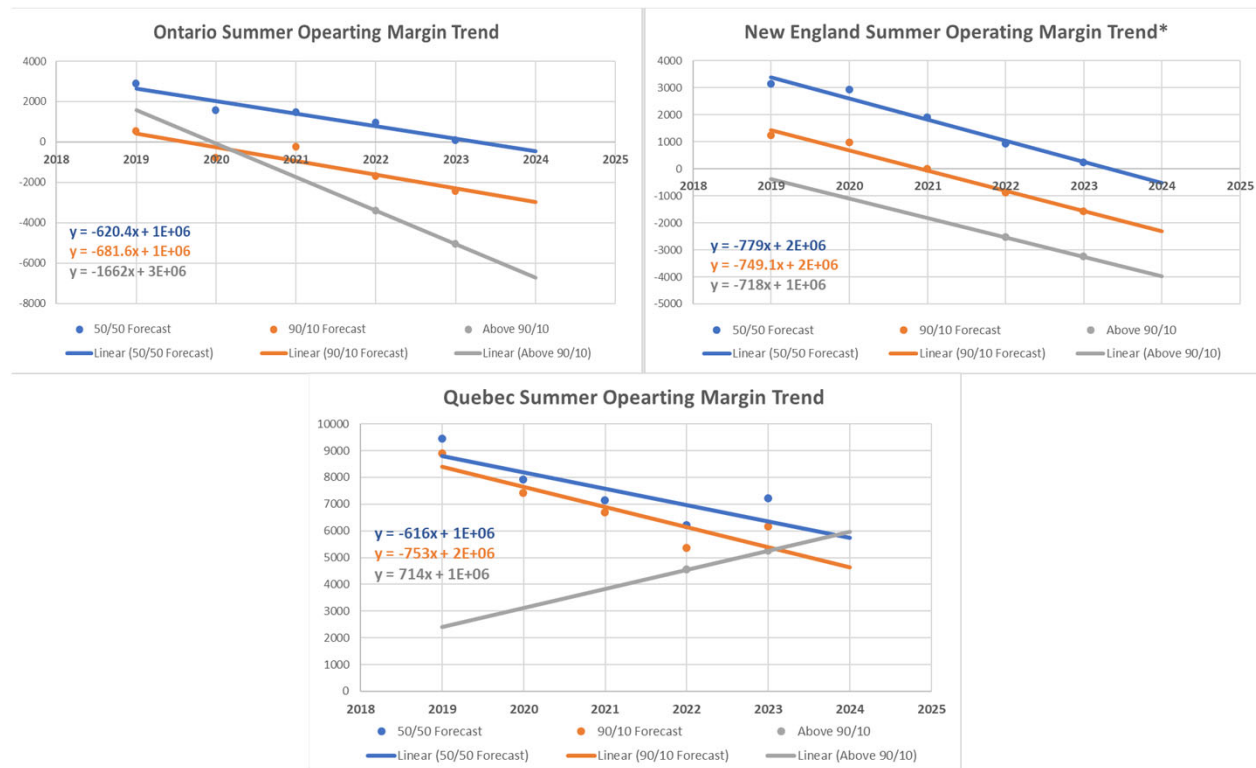
- The table below summarized the summer operating margins from 2019 to 2023
 - Operating margins for Ontario and New England are negative at 90/10 forecast or above
 - Quebec has relatively high operating margins at all forecast levels

Area	Ontario			New England*			Quebec		
	50/50	90/10	> 90/10	50/50	90/10	> 90/10	50/50	90/10	> 90/10
2019	2887	514		3125	1236		9429	8899	
2020	1558	-803		2920	962		7922	7413	
2021	1468	-250		1900	-1		7125	6675	
2022	952	-1715	-3396	918	-889	-2541	6210	5359	4537
2023	88	-2438	-5058	231	-1584	-3259	7202	6161	5251
5-year Average	1390.6	-938.4	-4227.0	1818.8	-55.2	-2900.0	7577.6	6901.4	4894.0

* New England margins are based on capacity obligations. Seasonal capability can have a slight increase on the margins

NPCC Summer Operating Margins Trend

- Linear trend lines have been applied to all the summer operating margins at the three forecast levels
- All areas show downward trends for the summer margins at all forecast levels
 - Except Quebec at the above 90/10 level



* New England margins are based on capacity obligations. Seasonal capability can have a slight increase on the margins



NPCC Winter Operating Margins

- The table below summarized the winter operating margins from 2018 to 2022
 - Significant operating margins are available across all areas at 50/50 and 90/10 forecast levels
 - Only Quebec and New England shows negative margins for 90/10 forecast and above

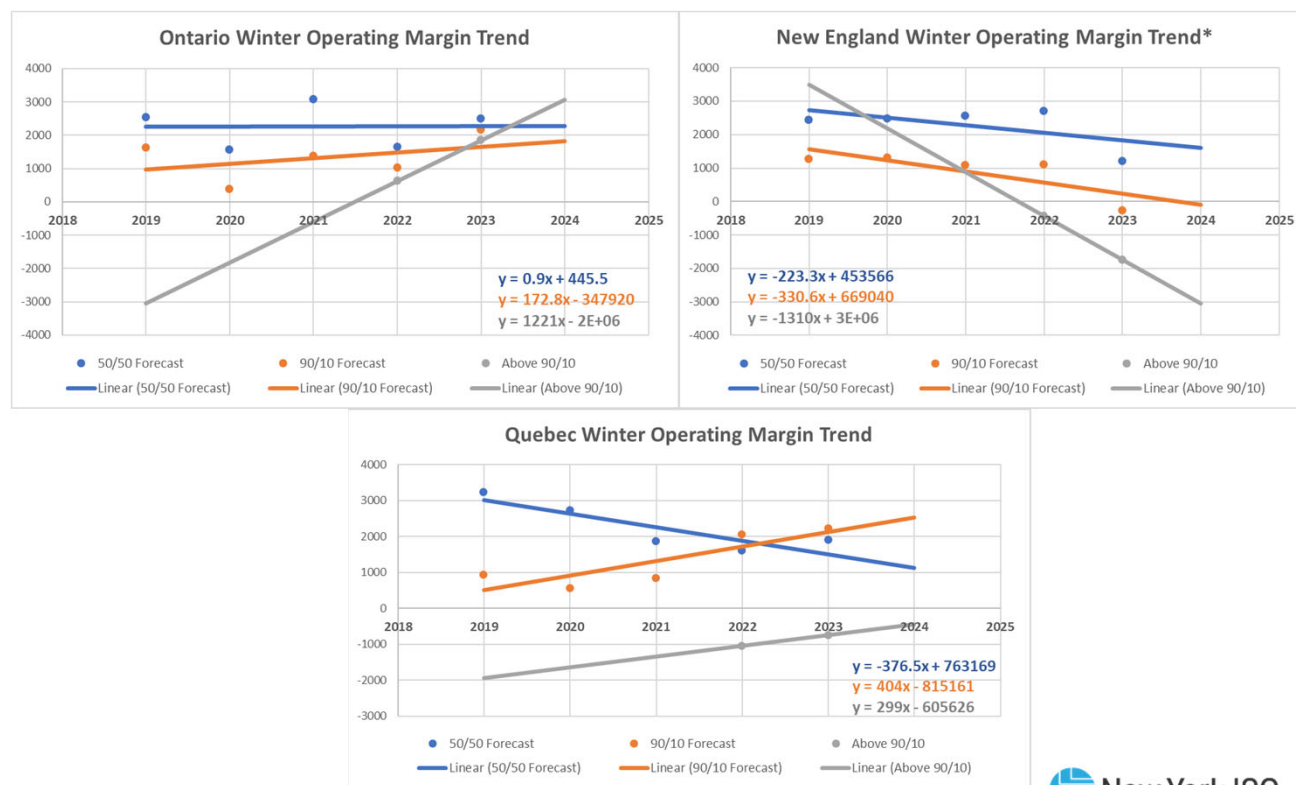
Area	Ontario			New England*			Quebec		
	50/50	90/10	> 90/10	50/50	90/10	> 90/10	50/50	90/10	> 90/10
2018-19	2543	1616		2437	1270		3226	940	
2019-20	1559	386		2477	1313		2720	562	
2020-21	3070	1364		2560	1076		1861	844	
2021-22	1646	1012	621	2704	1109	-436	1603	2054	-1048
2022-23	2504	2167	1842	1207	-281	-1746	1902	2214	-749
5-year Average	2264.4	1309	1231.5	2277	897.4	-1091	2262.4	1322.8	-898.5

* New England margins are based on capacity obligations. Seasonal capability can have a significant increase on the margins



NPCC Winter Operating Margins Trend

- Linear trend lines have been applied to all the summer operating margins at the three forecast levels
- There is no consistent trends observed across all regions and at all forecast levels



* New England margins are based on capacity obligations. Seasonal capability can have a significant increase on the margins



Our Mission & Vision



R n x r t s

J s x z w j u t | j w x ~ x y j r w j a f g m y ~
f s i h t r u j y n { j r f w j y x k t w S j |
^ t w r s f h a j f s j s j w l ~ k z y z w j



[n x r t s

\ t w r s l y t l j y n j w | n y m x y f p j m t a j j w x
y t g z a j y m j h a j f s j x y l r t x y w j a f g a j
j q j h y w l x ~ x y j r r s y m j s f y t s

Questions?