New York ISO
Independent System Operator

Winter Constraints Sensitivities - *2024 - 25 IRM*

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Agenda

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- Modeling Methodology
- Winter EA Assumptions
- Results
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- Takeaways
- Next Steps

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Background

- **As supported by the NYSRC and stakeholders, the NYISO is currently researching the impact of winter conditions on gas availability to New York electric power generators**
  - Gas Constraints Whitepaper Scope (2/1/2023 ICS):
    https://www.nysrc.org/wp-content/uploads/2023/05/Gas-Constraints-Whitepaper_Scope_2023.02.01_revised13443.pdf
  - Gas Constraints Whitepaper Update (5/30/2023 ICS):
    https://www.nysrc.org/wp-content/uploads/2023/07/11_ICS_GasConstraintsWhitepaperUpdate_2023.05.30_v415826.pdf
- **The gas constraints whitepaper is on track to be completed in December 2023, so in the interim, the NYSRC supported running sensitivity cases to show the potential impact to reliability when winter capacity is reduced**
  - The reduced winter capacity is representative of potential winter gas constraints and can be used to understand tightening winter conditions

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Modeling Methodology

- **The winter constraints sensitivity cases were built upon the Emergency Operating Procedure ("EOP") sensitivity cases (IRM24 Sensitivities 6a and 6b)**
  - The EOP sensitivity cases are based on the EOP whitepaper recommendations and show the impact of modifying the Emergency Assistance ("EA") from neighboring areas (EA Assumptions presented on next slide)
- **To represent winter constraints, negative units were added to the EOP sensitivity cases for all hours of January, February, and December**
  - The negative units were added to zones F, G, J, and K and two levels of magnitude were reviewed:
    - 3,500MW Reduction to Capacity
    - 7,000MW Reduction to Capacity

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Winter EA Assumptions

- **Sensitivity 6a: EOP Whitepaper Recommendation**

Winter							
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 (1162 MW)						
Total	1,470 MW	2,600 MW	No additional limits (3500 MW)				

- **Sensitivity 6b: EOP Whitepaper Recommendation with EA Further Reduced in Winter**

Winter							
Area	Bin 1	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6	Bin 7
IESO	0 MW		No additional limits (2100 MW)				
ISONE	0 MW				No additional limits (1804 MW)		
PJM	0 MW				No additional limits (1412 MW)		
HQ	0 MW				No additional limits (1162 MW)		
Total	0 MW		No additional limits (3500 MW)				

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Sensitivities Results

Sensitivity Case	Description	Shifting	IRM	IRM Delta	J LCR	K LCR	G - J	EOP Calls	LOLH (hrs/yr)	EUE (MWh/yr)
6a	EOP Whitepaper Recommendation	Tan45	23.043%	-	72.405%	109.524%	84.022%	6.1577	0.36814	227.886
7a-1	6a plus 3,500 MW Winter Constraints	A – K	23.043%	-	72.405%	109.524%	84.022%	6.1956	0.36814	227.886
7a-2	6a plus 7,000 MW Winter Constraints	A – K	23.092%	+0.049%	72.440%	109.574%	84.060%	16.4149	0.36537	224.831

Sensitivity Case	Description	Shifting	IRM	IRM Delta	J LCR	K LCR	G - J	EOP Calls	LOLH (hrs/yr)	EUE (MWh/yr)
6b	6a plus EA Further Reduced in Winter	A – K (Based on 6a)	23.043%	-	72.405%	109.524%	84.023%	6.1575	0.36823	227.895
7b-1	6b plus 3,500 MW Winter Constraints	A – K	23.043%	-	72.405%	109.524%	84.023%	6.1944	0.36824	227.898
7b-2	6b plus 7,000 MW Winter Constraints	A – K	23.783%	+0.740%	72.933%	110.278%	84.591%	14.2097	0.33256	191.207

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Winter Risk – LOLE

Case	6a	7a-1	7a-2
IRM	23.043%	23.043%	23.092%
JAN	-	-	0.001
FEB	-	-	-
MAR	-	-	-
APR	-	-	-
MAY	-	-	-
JUN	0.001	0.001	0.001
JUL	0.078	0.078	0.077
AUG	0.017	0.017	0.016
SEP	0.005	0.005	0.005
OCT	-	-	-
NOV	-	-	-
DEC	-	-	0.001
Total	**0.100**	**0.100**	**0.100**

Seasonal LOLE (%)			
Winter	0%	0%	1%
Summer	100%	100%	99%

Case	6b	7b-1	7b-2
IRM	23.043%	23.043%	23.783%
JAN	-	-	0.010
FEB	-	-	0.001
MAR	-	-	-
APR	-	-	-
MAY	-	-	-
JUN	0.001	0.001	0.001
JUL	0.078	0.078	0.064
AUG	0.017	0.017	0.013
SEP	0.005	0.005	0.004
OCT	-	-	-
NOV	-	-	-
DEC	-	-	0.008
Total	**0.100**	**0.100**	**0.100**

Seasonal LOLE (%)			
Winter	0%	0%	19%
Summer	100%	100%	81%

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Winter Risk – EOP Calls

Case	6a	7a-1	7a-2
IRM	23.043%	23.043%	23.092%
JAN	-	0.017	5.174
FEB	-	0.000	1.205
MAR	-	-	-
APR	-	-	-
MAY	0.000	0.000	0.000
JUN	0.218	0.218	0.215
JUL	2.003	2.003	1.986
AUG	2.615	2.615	2.597
SEP	1.313	1.313	1.305
OCT	0.002	0.002	0.002
NOV	0.000	0.000	0.000
DEC	0.006	0.026	3.930
Total	**6.158**	**6.195**	**16.415**

Seasonal EOP Calls (%)			
Winter	0%	1%	63%
Summer	100%	99%	37%

Case	6b	7b-1	7b-2
IRM	23.043%	23.043%	23.783%
JAN	-	0.017	4.401
FEB	-	0.000	0.927
MAR	-	-	-
APR	-	-	-
MAY	0.000	0.000	0.000
JUN	0.218	0.218	0.176
JUL	2.002	2.002	1.752
AUG	2.615	2.615	2.353
SEP	1.313	1.313	1.200
OCT	0.002	0.002	0.001
NOV	0.000	0.000	0.000
DEC	0.006	0.026	3.399
Total	**6.158**	**6.194**	**14.210**

Seasonal EOP Calls (%)			
Winter	0%	1%	61%
Summer	100%	99%	39%

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Takeaways

- **While reducing winter EA and reflecting winter constraints have little impact on LOLE independently, the severe assumption for winter constraints will increase the winter reliability risk when combined with reduced EA assumptions**
  - Applying 7,000 MW of winter constraints has considerable impact on the IRM/LOLE, particularly in combination with reducing winter EA to zero for higher bin/load levels
  - The number of EOP calls increases substantially when 7,000 MW of winter constraints are applied
    - Increasing EOP calls also increases the runtime for the MARS simulation, which can be mitigated by triggering the gas constraints by bin/load level
- **During the most constrained condition, with 0 MW EA combined with 7000 MW of winter constraints, the resulting IRM is close to the as-found system, meaning there's a limited buffer of capacity in the system beyond the requirement**
- **These sensitivities exhibit that winter reliability is a serious concern that will only grow over time, and it is essential that the NYISO continues to research gas constraints, winter EA, and other winter considerations to ensure the risk is properly accounted for in the IRM study**
  - Further research and improvements to winter modeling are crucial as winter peak loads are forecasted to increase significantly over the coming years

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Next Steps

- **The NYISO continues to make progress on the Gas Constraints Whitepaper**
  - The NYISO aims to develop different load level thresholds for the gas constraints for different LFU bins
  - The NYISO aims to develop different gas constraint magnitudes to be applied for different LFU bins
- **The Gas Constraints Whitepaper will be finalized and published by December 2023 with preliminary modeling recommendations made around the same timeframe**

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Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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Questions?