

New Load Shapes and MARS Planning Models Testing

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Background

- Load Shapes MARS Modeling Background
- Testing Results
- Appendix 1: Load/Event Analysis



MARS Planning Models Load Shapes Background



Context

- The 2002, 2006, and 2007 actual load hourly MW shapes have been used to shape forecasted energy and peaks into an 8,760 hourly MW shape
 - For use in the Installed Reserve Margin (IRM) and Reliability Planning resource adequacy studies using GE MARS
- The 2002, 2006, and 2007 shapes will become less representative of current load conditions and patterns
 - This is especially true as more behind the meter (BTM) generation, such as solar, is added in the state



MARS Planning Models and Current Load Shapes

- Historical 8,760 hourly MW shapes are used in the 7 MARS load levels (bins):
 - 2006 for load level (bin) 1
 - 2002 for load level (bin) 2
 - 2007 for load levels (bin) 3 through 7
- Bin 4 (2007 shape) is the expected shape *i.e.*, closest to the Gold Book baseline forecast
- MARS: energy and peaks are scaled to match Gold Book forecasts. Also, LFU is applied hourly, for all hours
- The same historic reference years are used for the external areas



Current MARS Load Bins Probabilities and LFU Multipliers

Final Recommendations									
Bin	Bin Probability	A-E	F&G	H&I	J	к	NYCA (Winter)		
1	0.0062	114.78%	115.85%	112.55%	109.95%	115.63%	111.01%		
2	0.0606	110.01%	110.53%	108.40%	106.49%	110.73%	106.89%		
3	0.2417	105.06%	105.01%	103.36%	102.33%	105.30%	103.25%		
4	0.3830	100.00%	99.36%	97.68%	97.67%	100.00%	100.00%		
5	0.2417	94.88%	93.61%	91.50%	92.58%	92.96%	97.05%		
6	0.0606	89.73%	87.77%	84.89%	87.13%	84.32%	94.34%		
7	0.0062	84.63%	81.88%	77.98%	81.38%	76.60%	91.85%		

- Used for the 2021 IRM Study and the 2021 Planning Databases
- <u>Source:</u>

https://www.nyiso.com/documents/20142 /21707507/04%20LFU_IRM_2022.pdf



DFA Load Shape Recommendations

- The Demand Forecasting and Analysis (DFA) Team has analyzed recent load shapes under the auspices of the LFU Phase 2 Study in order to make a recommendation for use in the IRM and Reliability Planning (*e.g.*, RNA, CRP, STAR) studies.
- Based on these detailed analyses, the recommendation is to use the 2013, 2017, and 2018 load shapes
 - o Reference: see separate DFA presentation posted for this meeting
- Recommendations:
 - Load Bins 1 and 2: 2013
 - Load Bins 3 and 4: 2018
 - Load Bins 5 to 7: 2017
 - Where possible, in conjunction with current or proposed modeling methods, DFA recommends using load shapes adjusted for changing BTM solar penetrations
 - Note: The BTM solar has been modeled as 5 years of 8,760 hourly historical production MW data for several past planning studies, and below is a summary of the modeling technique



BTM Solar Modeling Method for the MARS Planning Models

• Supply side:

- Five years of 8,760 hourly MW profiles based on sampled inverter data
- The MARS random shape mechanism is used: one 8,760 hourly shape (of five) is randomly picked for each replication year
 - Similar with the past planning modeling and aligns with the method used for wind, utility solar, landfill gas, and run-of-river facilities

Load side:

- Gross load forecasts will be used for the 2022 RNA, as provided by the DFA group
 - In the past we calculated an average 8,760h MW shape based on the 5 years of historical production data to determine gross load forecast values



Planning Databases Testing Results

• The following slides provide the results when using the 2021 Planning MARS databases



NYCA LOLE Summary Results

 A summary of the NYCA LOLE (days/year) results when using the new load shapes for both the NYCA and the external areas, and when adjusting the external areas to be between 0.10 and 0.15 d/y LOLE, per the standard study practice:

2021 Planning MARS Cases	Study Year 2022 (y1)	Study Year 2026 (y5)	Study Year 2031 (y10)
Base	0.014	0.046	0.069
(2002, 2006, 2007 shapes)			
Recommendation	0.03	0.052	0.063
(2013,2017,2018 shapes)			

• Observations:

- NYCA LOLE trends up in earlier study years
 - While the 2013 shape is steeper (dropping off faster, which is less conservative) at the NYCA level, it is more conservative for Zones A and B, driving the higher LOLE in earlier study years
- NYCA LOLE for the outer study years is also driven by Zone J (DEC Peaker Rule, etc.). Similar to the NYCA, Zone J has a relatively steep 2013 load shape



Questions?



Appendix 1: 2021 Planning MARS Models Load/Event Analysis



Current Shapes



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MARS Current Load Shapes: Study Year 2031



2021 Q3/Q4 STAR Model for Study Year 2031



New York ISO

MARS Current Load Shapes: Study Year 2031



2021 Q3/Q4 STAR Model for Study Year 2031



DFA Recommended Shapes



MARS DFA Recommended Load Shapes: Study Year 2031



2021 Q3/Q4 STAR Model for Study Year 2031



MARS DFA Recommended Load Shapes: Study Year 2031



2021 Q3/Q4 STAR Model for Study Year 2031



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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

