

# Tailored Availability Metric

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Emily Conway

Associate Market Design Specialist

**ICAPWG/MIWG**

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# Agenda

- **Background and Recap**
- **Availability-based resources**
- **Wind and solar resources**
- **Next Steps and Schedule**
- **Appendix**

# Background and Recap

# A Grid in Transition – The Plan

- Carbon Pricing
- Comprehensive Mitigation Review
- DER Participation Model
- Energy Storage Participation Model

Aligning Competitive Markets and New York State Clean Energy Objectives



- Enhancing Energy & Shortage Pricing
  - Ancillary Services Shortage Pricing
  - Constraint Specific Transmission Shortage Pricing
  - Enhanced Fast Start Pricing
- Review Energy & Ancillary Services Product Design
  - More Granular Operating Reserves
  - Reserve Enhancements for Constrained Areas
  - Reserves for Resource Flexibility

Valuing Resource & Grid Flexibility



- Enhancements to Resource Adequacy Models
- Revise Resource Capacity Ratings to Reflect Reliability Contribution
  - Expanding Capacity Eligibility
  - Tailored Availability Metric
- Capacity Demand Curve Adjustments

Improving Capacity Market Valuation



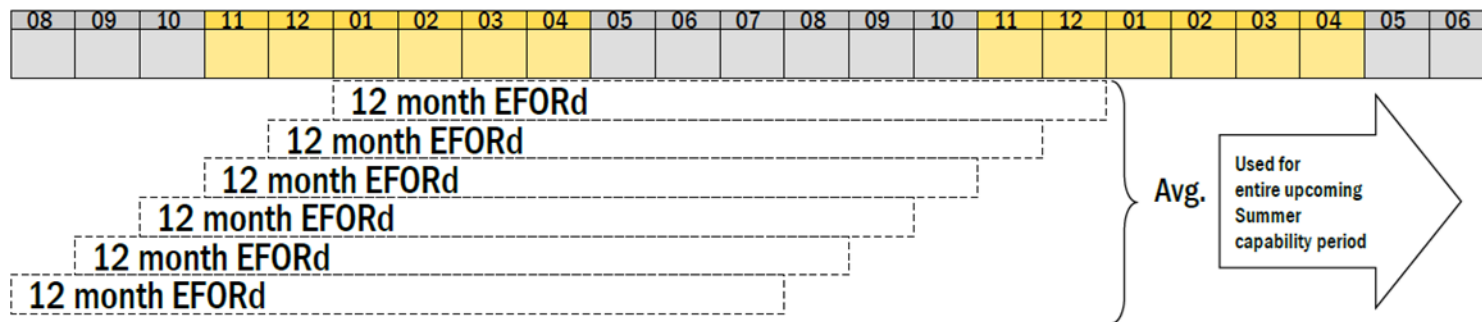
# Recap

- **2020 Deliverable: Q2 Market Design Complete for a 2021 Implementation**
- **2019 Deliverable: Market Design Concept Proposal**
  - For availability-based resources, the NYISO proposed the weightings of peak months in the Market Design Concept Proposal
  - For wind and solar resources, the NYISO proposed a reoccurring study that will result in relative capacity value weightings across the Peak Load Window hours

# Availability-based Resources

# Background

- The current methodology for calculating a Capability Period AEFORd is the average of six consecutive (rolling) 12-month EFORd calculations
  - Under this construct:
    - It is assumed outages are random
    - Winter outages directly effect a Summer AEFORd
    - Respective peak months (June, July, and August) account for 25% of the calculation

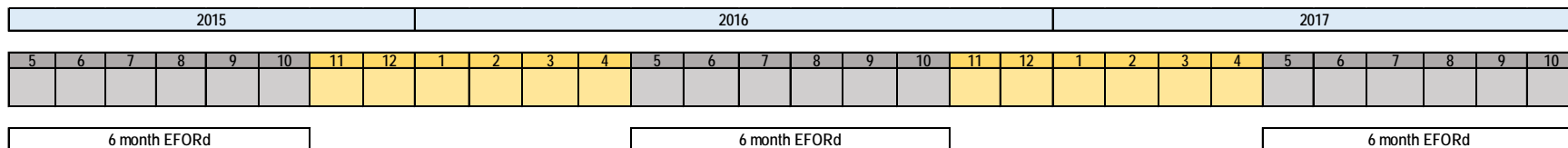


# Proposal

- **At this time, the NYISO is seeking stakeholder feedback on the following proposed changes for resources that use the EFORd or UOL for the derating factor**
- **The NYISO proposes changing the structure of the EFORd to take the average of the previous 3 like-Capability Periods**
  - Under this construct:
    - An 18-month time-frame could mirror the current 17-month time-frame used today
    - Outages directly effect their respective Capability Period (i.e. Winter outages are reflected in the Winter EFORd)
    - Respective peak months account for 50% of the calculation
- **Under this structure, resources would have the incentive to be available in a particular season which will be in sync with market revenues**



# Proposal



- The average of the three 6-month EFORDs shown in the example would be used to calculate the 2018 Summer Capability Period AEFORD

# Analysis

- **Initial analysis calculated the change in the translation factor between the current mechanism used today and the proposed methodology**
  - Translation factor = 1 - Derating Factor (see Appendix)
  - The delta value shows: (the proposed translation factor - the current translation factor)
- **Calculations show there is not a significant change in the AEFORd between the two methodologies**
  - Analysis included 3 peaker gas turbine units, and 1 steam turbine unit
  - GT Unit 3 recorded fairly high EFORDs (more outages) in Summer 2015 and 2016, which is not heavily reflected in the current EFORD used today
- **A similar methodology is used in the IRM set by the Reliability Council, which calculates an EFORD using data from the previous 5 years**

Summer 2018	
Unit Name	Translation Factor Delta
GT Unit 1	0.85
GT Unit 2	0.14
GT Unit 3	-8.33
ST Unit 4	1.45

Winter 2018-19	
Unit Name	Translation Factor Delta
GT Unit 1	3.04
GT Unit 2	0.76
GT Unit 3	-6.44
ST Unit 4	1.33

# Wind and Solar Resources

# Wind and Solar Resources

- **The current performance factor for performance-based Installed Capacity Suppliers is based on actual performance over peak periods**
  - For wind and solar resources, performance factors are calculated based on the current 4-hour window in the respective peak months
    - Summer:
      - HB 14 – HB 17
      - June, July, and August
    - Winter:
      - HB 16 – HB 19
      - December, January, and February
  - Performance factors are calculated by dividing the output performance by the nameplate capacity of the resource

# Wind and Solar Resources

- **As a part of the Market Design Concept Proposal, the NYISO proposed a reoccurring study every 4 years, that would result in hourly capacity value weightings across the Peak Load Window**
  - Weightings would be applied to the respective hourly production data
  - The study would run concurrently with the study for Expanding Capacity Eligibility
  - Each study could reset the top 4 hours within the Peak Load Window and percentages based on the percentages for Expanding Capacity Eligibility
- **Initial analysis shows potential weighting percentages across the Peak Load Window based off of different IRM cases**
  - Tying the percentages to Loss of Load Events reflects the highest needs of the system

# Wind and Solar Resources

- The following cases show the differences in the hourly LOLE percentages of the top 4 hours:

2019 IRM Final Base Case		
HB	8 Hour	6 Hour
12	7%	
13	13%	14%
14	17%	19%
15	19%	21%
16	19%	21%
17	14%	15%
18	9%	10%
19	3%	

Top 4 Hours	68%	76%
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2020 IRM Preliminary Base Case		
HB	8 Hour	6 Hour
12	7%	
13	13%	14%
14	17%	19%
15	19%	21%
16	19%	21%
17	13%	15%
18	9%	10%
19	4%	

Top 4 Hours	68%	76%
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High Renewables (12K) Case		
HB	8 Hour	6 Hour
12	5%	
13	11%	12%
14	16%	18%
15	18%	20%
16	19%	21%
17	16%	18%
18	9%	10%
19	5%	

Top 4 Hours	69%	78%
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- The High Renewables Case runs the 2020 Base Case with an additional 12,000 MW of renewable resources
  - 4,000 MW of solar, 4,000 MW of onshore wind, and 4,000 MW of offshore wind
- The whitepaper that describes the high renewable study can be found here:
  - <http://nysrc.org/PDF/MeetingMaterial/ECMeetingMaterial/EC%20Agenda%20249/4.3%20High%20Renewable%20Resource%20Modeling%20White%20Paper%20v1.1%201-7-2020-Attachment%204.3.pdf>

# Wind and Solar Resources

- **The relative capacity value weightings established will align with the Peak Load Windows proposed in the Expanding Capacity Eligibility project**
  - 6 hour Peak Load Window:
    - Summer: HB 13 – HB 18
    - Winter: HB 16 – HB 21
  - 8 hour Peak Load Window:
    - Summer: HB 12 – HB 19
    - Winter: HB 14 – HB 21
  - The duration of the Peak Load Window is dependent on resources with duration limitations

# Proposal

- **At this time, the NYISO is seeking stakeholder feedback on the following proposed changes for wind and solar resources**
- **For a 6-hour PLW, the top 4 hours will receive a 75% weighting**
  - Weightings of the shoulder 2 hours will be equally weighted at 12.5% each
- **For an 8-hour PLW, the top 4 hours will receive a 70% weighting**
  - Weightings of the shoulder 4 hours are still being evaluated
    - All 4 shoulder hours could be equally weighted at 7.5% each
    - Alternatively, the top 2 shoulder hours could be weighted higher than the bottom 2 shoulder hours



# Proposal

- **Summer and Winter Capability Period months will receive the same set of weightings, within its respective Peak Load Window hours**
  - For the Winter PLW, the top 4 hours could remain consistent with methodology used today, and the top load hours from Expanding Capacity Eligibility (HB 16 – HB 19)
- **Under this construct, wind and solar resources will still have the opportunity to receive 100% performance factors if they perform in all hours of the Peak Load Window**

	Summer Peak Load Window	Winter Peak Load Window
HB	6 Hour	6 Hour
12		
13	12.5%	
14	18.75%	
15	18.75%	
16	18.75%	18.75%
17	18.75%	18.75%
18	12.5%	18.75%
19		18.75%
20		12.5%
21		12.5%
<b>Top 4 Hours</b>	<b>75%</b>	<b>75%</b>

# Next Steps

# Next Steps

- **Based off of the stakeholder feedback received today, the NYISO will continue discussion at a future working group date**
- **Additional analysis for wind and solar will show the percentages of the top 4 hours in the Peak Load Window of additional cases**
  - A 2020 Base Case with 4,000 MW of renewable resources added incrementally will be assessed

# Feedback/Questions?

The NYISO will consider input received during today's Working Group meeting and further input sent in writing to [deckles@nyiso.com](mailto:deckles@nyiso.com) and [econway@nyiso.com](mailto:econway@nyiso.com)

# Appendix

# Recap

- **March 7<sup>th</sup>, 2019: The NYISO discussed expanding the project scope to include all availability-based and performance-based resources**
  - <https://www.nyiso.com/documents/20142/5375692/Tailored%20Availability%20Metric.pdf/92ef1b5d-0ec3-cee5-df69-e2130934ec0e>
- **May 9<sup>th</sup>, 2019: The NYISO presented initial analysis for availability-based resources that use the EFORd**
  - <https://www.nyiso.com/documents/20142/6474763/Tailored%20Availability%20Metric%20050919.pdf/2c86f002-0fe5-b3cb-05d8-f118e4dd392f>
- **July 24<sup>th</sup>, 2019: The NYISO presented the Market Design Concept Proposal for availability-based resources that use the EFORd as their derating factor**
  - <https://www.nyiso.com/documents/20142/7674442/Tailored%20Availability%20Metric.pdf/e28df5c2-6994-ba5c-7ca2-05abeba9daeb>
- **August 23<sup>rd</sup>, 2019: The NYISO began discussion of analysis options for performance-based resources**
  - <https://www.nyiso.com/documents/20142/8040247/tailored%20availability%20metric%20082319.pdf/ada7cacf-97aa-699a-7ead-e1e39b1a51f8>
- **October 18<sup>th</sup>, 2019: The NYISO continued discussion of analysis for performance-based resources**
  - <https://www.nyiso.com/documents/20142/8783504/Tailored%20Availability%20Metric.pdf/7a9c6c65-f218-b685-a2d5-16f491276d29>
- **November 21<sup>st</sup>, 2019: The NYISO presented the Market Design Concept Proposal for performance-based resources**
  - <https://www.nyiso.com/documents/20142/9312827/Tailored%20Availability%20Metric.pdf/c4271e59-b0e0-7c0a-c2f9-15cc91bbb2ef>

# Availability-based Resources

# Background

- **Unforced Capacity (UCAP) is the amount of capacity a Resource is qualified to supply**
  - $UCAP = \text{Minimum ICAP} \times (1 - \text{Derating Factor})$
- **Translation factor *1 - Derating Factor* is used to measure availability of a Resource**
  - Takes into account forced outages and forced deratings



# GT Unit 1

- Summer 2018

Year	EFORd
2015	4.07
2016	24.92
2017	11.38
2018	13.46

Calc. No	EFORd
1	21.20
2	16.47
3	13.24
4	10.55
5	11.36
6	13.05
2018	14.31

Delta
-0.85

- Winter 2018-19

Year	EFORd
2015-16	4.62
2016-17	10.09
2017-18	17.40
2018-19	10.70

Calc. No	EFORd
1	15.05
2	14.78
3	14.36
4	14.31
5	13.74
6	10.23
2018	13.74

Delta
-3.04

# GT Unit 2

- Summer 2018

Year	EFORd
2015	2.26
2016	0.12
2017	2.63
2018	1.67

Calc. No	EFORd
1	1.75
2	1.70
3	1.75
4	1.78
5	1.79
6	2.07
2018	1.81

Delta
-0.14

- Winter 2018-19

Year	EFORd
2015-16	1.87
2016-17	0.64
2017-18	0.11
2018-19	0.87

Calc. No	EFORd
1	2.16
2	1.92
3	1.94
4	1.87
5	1.84
6	0.05
2018	1.63

Delta
-0.76

# GT Unit 3

- Summer 2018

Year	EFORd
2015	22.45
2016	37.36
2017	0.37
2018	20.06

Calc. No	EFORd
1	21.71
2	13.02
3	6.10
4	0.43
5	9.76
6	19.36
2018	11.73

Delta
8.33

- Winter 2018-19

Year	EFORd
2015-16	54.50
2016-17	1.75
2017-18	91.13
2018	49.13

Calc. No	EFORd
1	28.27
2	35.92
3	42.43
4	45.42
5	49.41
6	54.65
2018	42.68

Delta
6.44

# ST Unit 4

- Summer 2018

Year	EFORd
2015	0.42
2016	1.88
2017	5.67
2018	2.66

Calc. No	EFORd
1	4.85
2	4.92
3	5.04
4	3.59
5	3.22
6	3.05
2018	4.11

Delta
-1.45

- Winter 2018-19

Year	EFORd
2015-16	3.03
2016-17	0.00
2017-18	0.61
2018	1.22

Calc. No	EFORd
1	3.03
2	2.92
3	2.99
4	3.06
5	2.96
6	0.29
2018	2.54

Delta
-1.33

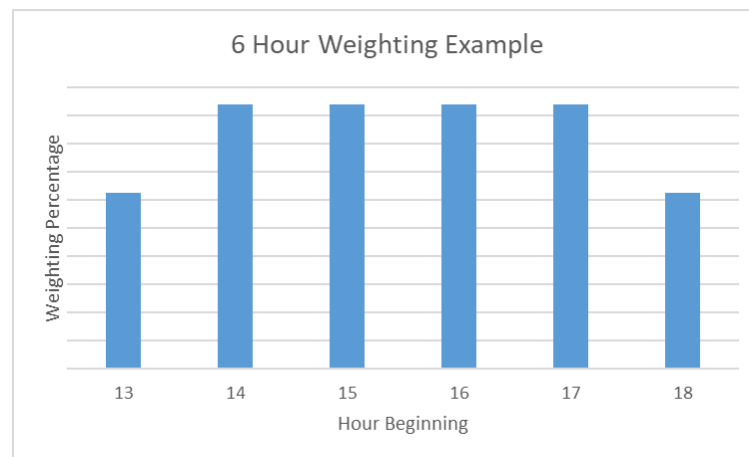
# Wind and Solar Resources

# Proposal for Wind and Solar Resources

- **Based off analysis done thus far, the NYISO is proposing a reoccurring study for wind and solar resources**
  - The study will run concurrently with the Capacity Value Study and will be conducted every 4 years
  - The Capacity Value Study and this study will use a similar base case
    - The base case built on will be from the IRM Study
    - For this base case, additional wind and solar resources could potentially be added to establish relative capacity value weightings for wind and solar resources
- **The proposal would be effective in 2021**
  - An initial study would be conducted in the Market Design Complete stage (Q2 of 2020)

# Proposal for Wind and Solar Resources

- **The relative capacity value weightings will be shaped across the Peak Load Window hours**
  - A subset of Peak Load Window hours will be weighted higher than the remaining shoulder hours
    - Preliminary weightings will be established as a part of the Market Design Complete
- **Summer and Winter Capability Period months will receive the same set of weightings, within its respective Peak Load Window hours**



# Wind and Solar Capacity Factors

Delta of: 6-hour PLW with top 4 hours at 90% vs 75%

Summer Solar	
6-Hour PLW	
Year	90% to 75% Comparison
2012	1.4%
2013	1.4%
2014	1.7%
2015	1.4%
2016	1.6%

1.5%

Summer Wind	
6-Hour PLW	
Year	90% to 75% Comparison
2012	0.2%
2013	0.1%
2014	0.2%
2015	0.2%
2016	0.4%

0.2%

Winter Solar	
6-Hour PLW	
Year	90% to 75% Comparison
2012	0.2%
2013	0.1%
2014	0.2%
2015	0.2%
2016	0.1%

0.1%

Winter Wind	
6-Hour PLW	
Year	90% to 75% Comparison
2012	-0.4%
2013	-0.6%
2014	-0.4%
2015	-0.4%
2016	-0.3%

-0.4%



# Additional Requested Analysis for Special Case Resources

- Material on the following slides was presented on July 30, 2019 from the NYSRC ICS meeting
  - <http://www.nysrc.org/pdf/MeetingMaterial/ICSMeetingMaterial/ICS%20Agenda%20223/AI%204%20-%20SCR%20Performance%20Analysis.pdf>

# Introduction

- **NYISO calculates SCR zonal performance factors for IRM studies based on historical SCR performance. The data set includes:**
  - All event hours, by zone, for each mandatory event from the most recent five years in which a mandatory event was initiated by the NYISO (but not older than summer 2012)
  - All performance test hours accumulated during the above timeframe even when there were no mandatory events
- **The ICS has requested that NYISO investigate the impact using data from only mandatory SCR Events, in lieu of the Event & Test data, would have on the SCR Model Value MWs**

# Overview – Event & Test

## ■ Event:

- Called when Operating Reserves shortages are forecasted or during an actual Operating Reserve shortage
- Events have typically ranged between 4 to 6 hours
  - For IRM Analysis: Performance from all event hours are used
  - For Market Participation: Best 4 consecutive hours are used

## ■ Test:

- Resources must demonstrate their maximum enrolled Declared Value once every Capability Period
- Mandatory 1 hour performance per Capability Period

# Inputs for Analysis

- **Same data set used for calculating SCR Model Values**
  - **Event & Test:**
    - All event hours, by zone, from mandatory events from summer 2012 through summer 2018
      - Range from 20 event hours for Zone A to 64 event hours for Zone J
    - All performance test hours from summer 2012 through summer 2018
      - 13 performance test hours
  - **Event Only:**
    - All event hours, by zone, from mandatory events from summer 2012 through summer 2018
      - Range from 20 event hours for Zone A to 64 event hours for Zone J
    - 13 Performance test hours not included in analysis

# Comparison: Event & Test vs Event Only

SCR Performance for 2020 IRM														
			Event & Test				Event Only				Comparison			
Program	Zone	July 2019 MW	Zonal PF	ACL to CBL Factor	Effective Performance Factor	Model Value MW	Zonal PF	ACL to CBL Factor	Effective Performance Factor	Model Value MW	Zonal PF	ACL to CBL Factor	Effective Performance Factor	Model Value MW
SCR	A-F	629.3	86.8%	94.1%	81.7%	514.2	80.1%	94.3%	75.4%	474.3	-6.74	0.19	-6.34	-39.9
SCR	G-I	125.5	75.6%	85.1%	64.3%	80.7	65.5%	84.3%	55.2%	69.3	-10.11	-0.81	-9.07	-11.4
SCR	J	478.9	69.1%	75.3%	52.0%	249.0	64.7%	76.8%	49.6%	237.7	-4.44	1.48	-2.36	-11.3
SCR	K	48.2	71.8%	82.3%	59.1%	28.5	65.6%	85.0%	55.7%	26.9	-6.23	2.69	-3.38	-1.6
<b>Total</b>		1281.9				872.4				808.2				-64.2
						68.2%				63.0%				-5.0%

5.0% decrease in Effective Performance Factor when using Event data only, versus Event & Test data

# Observations from Comparison

## ■ Zonal Performance Factor:

- Using Event data only to measure performance decreases the Zonal Performance Factor in all zones (ranging from -4.44 in J to -10.11 in G-I) compared to current Event & Test methodology

## ■ ACL to CBL Translation Factor:

- Using Event data only had a minimal impact (ranging from a decrease of 0.81 in G-I to an increase of 2.69 in K) on Translation Factor
- In general, the Translation Factor slightly increased, with the exception of zones G-I, where there was a slight decrease

## ■ Effective Performance Factor

- Using Event only data to measure performance decreases the Effective Performance Factor by 5% compared to current Event & Test methodology

<http://www.nysrc.org/pdf/MeetingMaterial/ICSMaterial/ICS%20Agenda%202023/AI%204%20-%20SCR%20Performance%20Analysis.pdf>

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- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

