Capacity Accreditation: Consumer Impact Analysis

Updated with Assumptions for the 2022 RNA Policy Case Model Year 2030

NYISO

ICAPWG/MIWG

November 8, 2022

Reposted: November 9, 2022

Agenda

- Background
- Capacity Accreditation Objectives
- Consumer Impact Analysis Evaluation Areas
- Cost Impact Methodology and Assumptions
- Cost Impacts
- Other Impacts
- Appendix

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Background

Background

- The Commission in its May 10th, 2022 Order accepted the NYISO's proposal, filed with overwhelming support of its stakeholders, to reform its Buyer Side Mitigation (BSM) to address new resources that are required to satisfy the goals specified in the Climate Leadership and Community Protection Act (CLCPA) and to establish a new framework of capacity accreditation for all resource types in the NYISO's ICAP Market.
- The NYISO is currently working on Phase 2 of this project to develop the implementation details, technical specifications, and procedures associated with establishing Capacity Accreditation Resource Classes and calculating the applicable locational Capacity Accreditation Factors (CAFs) for each class of resources

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Reason for Updated CIA

- In response to stakeholder requests at the 10/19/2022 ICAPWG, an updated CIA has been conducted using the load forecasts, supply mix assumptions, IRM, LCRs, and CAFs for the 2022 RNA Policy Case Model Year 2030
- Due to a higher penetration of renewables in the RNA Policy Case, the updated CIA results in higher consumer savings compared to the CIA presented at the 10/19/2022 ICAPWG
  - The CIA presented at the 10/19/2022 ICAPWG utilized the load forecasts, supply mix assumptions, IRM, LCRs, and CAFs for the 2022 RNA Base Case Model Year 2030
  - The methodology, assumptions, and results for the Cost Impacts of the CIA presented at the 10/19/2022 ICAPWG are included in the Appendix

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Capacity Accreditation Objectives

Phase 2 Capacity Accreditation Objectives

- Select technique for calculating CAFs
  - Utilizing GE MARS, the NYISO is evaluating Effective Load-Carrying Capability (ELCC) and Marginal Reliability Improvement (MRI) techniques for calculating CAFs of Capacity Accreditation Resource Classes
- Develop CAF implementation procedures
- Develop process for establishing Capacity Accreditation Resource Classes
- Conduct sensitivity analyses to calculate CAFs under possible future system conditions
  - The ELCC and/or MRI technique to be used in calculating CAFs in the sensitivity analyses
- Develop procedural steps for assigning ICAP Suppliers to Capacity Accreditation Resource Classes
- Develop a process to annually assess the Peak Load Window
- Address other necessary conforming procedural changes required for administering the ICAP Market
- Identify and prioritize future projects to enhance the capacity accreditation process

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Consumer Impact Analysis Evaluation Areas

Consumer Impact Analysis (IA) Evaluation Areas

- Present the potential impact on all four evaluation areas

RELIABILITY	COST IMPACT/ MARKET EFFICIENCIES
ENVIRONMENT/ NEW TECHNOLOGY	TRANSPARENCY

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Cost Impact Methodology and Assumptions

Consumer Impact Methodology and Assumptions

- **The NYISO compared the capacity market procurement costs of using:**
  - The existing market approach of applying derating factors to generating resources; and
  - The Marginal Reliability Improvement (MRI) technique for developing CAFs of Capacity Accreditation Resource Classes
- **The analysis focuses on impacts for a 2030 resource mix that achieves the NY clean energy policy goals**
- **The analysis provides other information such as utilized capacity accreditation values in the Appendix**

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Consumer Impact Methodology and Assumptions

- **Assumptions**
  - The NYISO utilized the 2030 resource mix from the 2022 RNA Policy Case Model Year 2030 in all cases
    - Impacts were analyzed with the as found system modeled for the 2022 RNA Policy Case Model Year 2030 and with the 3-year average historic level of excess
  - Analysis was based on the load forecast, supply mix assumptions, and re-optimized IRM and LCRs for the 2022 RNA Policy Case Model Year 2030[1]
    - NYCA IRM: 162.4%
    - G-J LCR: 111.9%
    - J LCR: 119.5%
    - K LCR: 138.4%

[1]Details regarding the load forecast and supply mix assumptions can be found in the 2022 RNA Draft Report and Appendices presented at the 10/03/2022 ESPWG

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Consumer Impact Methodology and Assumptions

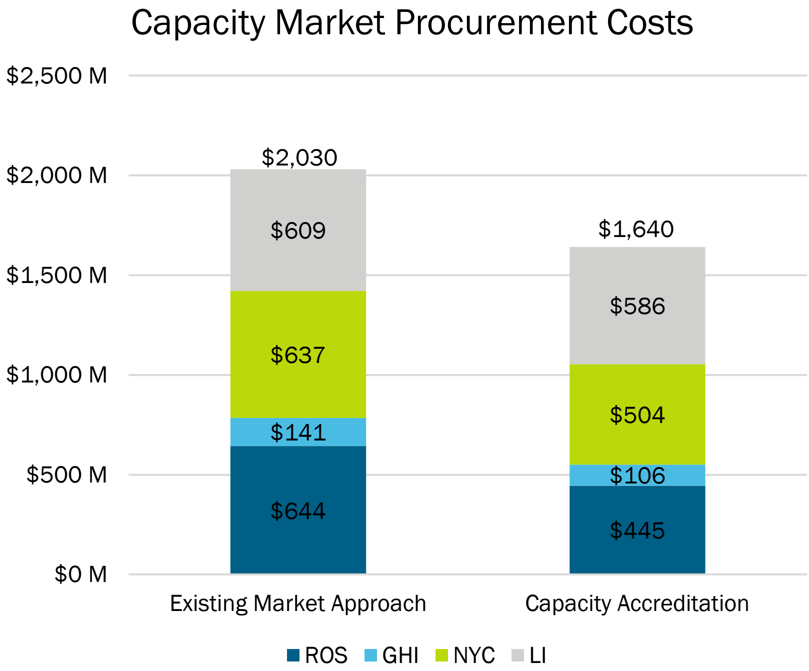
- **Assumptions**
  - Capacity values comparing the existing market approach and the MRI technique were utilized[2]
    - The existing market approach used today's effective Derating Factor calculations, Duration Adjustment Factors, and Peak Load Window weightings
      - The existing market approach will no longer be effective starting May 1st, 2024, with the implementation of the Capacity Accreditation project
    - MRI values were derived from the GE Analysis for Improving Capacity Accreditation
    - For more information on how MRI values are calculated, please see the March 31st, 2022, GE presentation

[2] Capacity values for both the existing market approach and capacity accreditation approach are provided in the Appendix

Cost Impacts

Cost Impacts – As Found System

- **Compared to the existing market approach:**
  - Capacity accreditation cost savings[1]: $390 million



[1]The estimated cost savings reflect lower ICAP Market procurement costs. Changes in costs outside the ICAP Market were not evaluated

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Clearing Quantities – As Found System

- **Compared to the existing market approach:**
  - Capacity accreditation results in 5,001 MW less UCAP procured in NYCA in the summer and 3,777 MW less UCAP procured in the winter

Comp	ICAP	Summer UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	50,721	39,813	14,834	10,609	5,186
Capacity Accreditation		34,812	13,452	9,602	4,962
Delta		-5,001	-1,382	-1,007	-224

Comp	ICAP	Winter UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	51,517	38,581	14,308	10,001	5,101
Capacity Accreditation		34,804	12,787	8,759	5,230
Delta		-3,777	-1,521	-1,242	128

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System Derating Factors – As Found System

- **Compared to the existing market approach:**
  - Capacity accreditation has a 9.86% higher summer NYCA system derating factor
  - Capacity accreditation has a 7.33% higher winter NYCA system derating factor

Comp	Summer System Derating Factors			
	NYCA	G-J	NYC	LI
Existing Market Approach	25.76%	23.03%	27.71%	24.16%
Capacity Accreditation	35.62%	30.31%	34.77%	27.95%
Delta	9.86%	7.28%	7.06%	3.79%

Comp	Winter System Derating Factors			
	NYCA	G-J	NYC	LI
Existing Market Approach	27.86%	22.57%	27.03%	29.27%
Capacity Accreditation	35.19%	30.67%	36.24%	27.24%
Delta	7.33%	8.10%	9.22%	-2.03%

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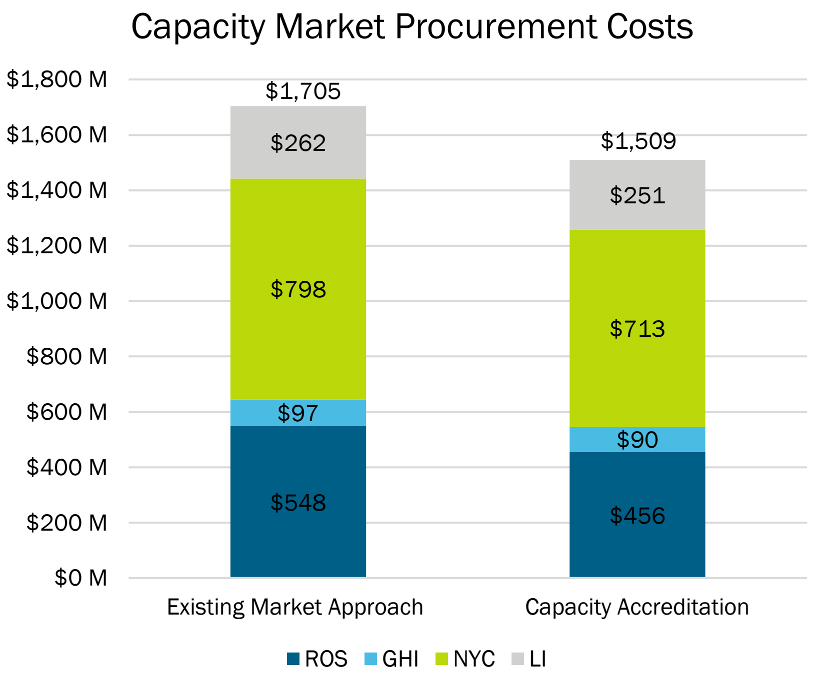
Cost Impacts – Historic Level of Excess

- The level of excess in the as found system modeled for the 2022 RNA Policy Case Model Year 2030 is higher in select localities than the historic level of excess that has cleared in the ICAP market
- Adjusting the 2022 RNA Policy Case Model Year 2030 system to the historic level of excess results in reduced cost savings due to a tighter market
  - Historic Level of Excess Cost Savings[1]: $195 million



[1]The estimated cost savings reflect lower ICAP Market procurement costs. Changes in costs outside the ICAP Market were not evaluated

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Clearing Quantities and System Derating Factors– Historic Level of Excess

- **At the historic level of excess:**
  - Capacity accreditation results in 5,232 MW less UCAP procured in NYCA in the summer and 4,013 MW less UCAP procured in the winter compared to the existing market approach
- **The system derating factors at the historic level of excess are assumed to be the same as the system derating factors at the as found level of excess**
  - The system derating factors at the as found level of excess are presented on slide 16

Comp	ICAP	Summer UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	50,721	39,385	13,440	9,810	5,462
Capacity Accreditation		34,153	12,169	8,852	5,188
Delta		-5,232	-1,271	-958	-273

Comp	ICAP	Winter UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	51,517	39,473	13,794	10,251	5,386
Capacity Accreditation		35,459	12,351	8,956	5,541
Delta		-4,013	-1,443	-1,295	154

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Other Impacts

Reliability Impacts

- By more accurately valuing each resource's contribution to reliability, capacity accreditation ensures an efficient and well functioning ICAP Market that supports reliability and the achievement of public policy goals
- Capacity accreditation also provides signals to attract and retain the most efficient resources in New York

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Environmental Impacts

- The use of capacity accreditation also results in the most economically efficient resources needed to reduce carbon emissions and help guide future state and LSE procurement decisions to achieve the CLCPA

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Impacts on Transparency

- The capacity accreditation approach is critical in informing efficient public and private investment decisions by properly signaling which resources are best suited to support grid reliability

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Questions?

Appendix

Assumptions for Updated CIA - 2022 RNA Policy Case Model Year 2030

Assumed CAFs for CIA

- **The MRI values for the 100 MW step size of the re-optimized 2022 RNA Policy Case Model Year 2030 were used as the CAFs for this analysis[1]**
  - The MRI values using the NYCA-average shape were used for all performance-based resources (*i.e.*, biomass, LCROR, onshore wind, and solar), except offshore wind
    - Offshore wind was modeled with area specific simulated shapes
  - The MRI values from the dynamic model were used for ELRs and large hydro
  - The nuclear and thermal CAFs were assumed to be 100% for this analysis
  - The MRIs from the below zones were used for the respective capacity regions
    - ROS: Zone F
    - GHI: Zone G
    - J: Zone J
    - K: Zone K

	CAFs			
	Annual			
	ROS	GHI	J	K
Nuclear	100%			
Thermal	100%	100%	100%	100%
Biomass	70%			
LCROR	37%	36%		
Onshore wind	18%			
Offshore wind			33%	46%
Solar	8%	6%	24%	7%
4h ELR	38%	41%	27%	63%
SCR[2]	38%	41%	27%	63%
Large Hydro	94%			

[1]All MRI results for the re-optimized 2022 RNA Policy Case Model Year 2030 were presented at the 10/27/2022 ICAPWG

[2]SCRs receive the 4h ELR CAF as proposed at the 07/28/2022 ICAPWG

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Average Capacity Values for CIA

- **Under the existing market approach, the historic average derating factors were applied by resource type to the 2022 RNA Policy Case Model Year 2030 supply mix[1]**
  - On the next slide, the average capacity values for the existing market approach equal 1 minus the average derating factor by resource type and capacity region
- **Under the capacity accreditation approach, the Installed Capacity of availability-based resources (e.g., nuclear, thermal, large hydro, ELRs, and SCRs) was translated to UCAP using the CAFs and average derating factors, consistent with the proposed capacity accreditation market design**
  - On the next slide, the average capacity values for the capacity accreditation approach reflect the CAFs for performance-based resources and the CAFs times 1 minus the average derating factor for availability-based resource classes

[1]The analysis used the NERC 5-year class average EFORd for nuclear and large hydro due market participant confidentiality concerns. For the 4hr ELR class (excluding SCRs), the NERC 5-year class average EFORd for pumped storage was used in conjunction with the 4-hour Duration Adjustment Factor. Additionally, the same average capacity values for offshore wind from the Consumer Impact Analysis for the Comprehensive Mitigation Review Proposal, presented at the 11/02/2021 ICAPWG meeting, were used for this analysis

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Average Capacity Values for CIA

	Existing Market Approach								Capacity Accreditation							
	Summer				Winter				Summer				Winter			
	ROS	GHI	J	K	ROS	GHI	J	K	ROS	GHI	J	K	ROS	GHI	J	K
Nuclear[1]	97.8%				97.8%				99.6%				99.0%			
Thermal	95.2%	93.7%	96.8%	94.2%	96.0%	92.8%	97.2%	92.9%	95.2%	93.7%	96.8%	94.2%	96.0%	92.8%	97.2%	92.9%
Biomass	66.9%				71.9%				70.3%				70.3%			
LCROR	43.4%	73.2%			60.4%	47.2%			37.3%	36.3%			37.3%	36.3%		
Onshore wind	16.1%				29.4%				17.9%				17.9%			
Offshore wind			30.5%	30.5%			36.4%	36.4%			32.8%	46.4%			32.8%	46.4%
Solar	46.0%	46.0%	46.0%	46.0%	2.0%	2.0%	2.0%	2.0%	7.9%	6.1%	24.1%	6.6%	7.9%	6.1%	24.1%	6.6%
4h ELR	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	35.9%	38.9%	25.8%	59.7%	35.9%	38.9%	25.8%	59.7%
SCR	86.5%	83.2%	87.5%	85.2%	83.4%	83.7%	87.2%	72.8%	36.3%	39.2%	26.0%	60.2%	36.3%	39.2%	26.0%	60.2%
Large Hydro[1]	95.5%				95.5%				92.0%	93.2%	94.3%	94.3%	92.4%	88.0%	94.3%	94.3%

[1]The analysis used 1 minus the NERC 5-year class average EFORd for nuclear and large hydro due market participant confidentiality concerns

CIA Presented at the 10/19/2022 ICAPWG - 2022 RNA Base Case Model Year 2030

Cost Impact Methodology and Assumptions – 10/19

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Consumer Impact Methodology and Assumptions – 10/19

- **The NYISO compared the capacity market procurement costs of using:**
  - The existing market approach of applying derating factors to generating resources; and
  - The Marginal Reliability Improvement (MRI) technique for developing CAFs of Capacity Accreditation Resource Classes
- **The analysis focuses on impacts for a 2030 resource mix**
- **The analysis provides other information such as utilized capacity accreditation values in the Appendix**

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Consumer Impact Methodology and Assumptions – 10/19

- **Assumptions**
  - The NYISO utilized the 2030 resource mix from the 2022 RNA Base Case Model Year 2030 in all cases
    - Impacts were analyzed with the as found system modeled for the 2022 RNA Base Case Model Year 2030 and with the 3-year average historic level of excess
  - Analysis was based on the load forecast, IRM, LCRs, and supply mix assumptions for the 2022 RNA Base Case Model Year 2030[1]
    - NYCA IRM: 125.5%
    - G-J LCR: 80.6%
    - J LCR: 80.7%
    - K LCR: 109.2%
      - Note: As discussed at 10/19/2022 presentation on Capacity Accreditation, the IRM/LCRs for this case are being reoptimized. However, as all cases use the same set of requirements, the magnitude and direction of Costs Impacts should be approximately the same under the reoptimized requirements

[1]Details regarding the load forecast and supply mix assumptions can be found in the 2022 RNA Draft Report and Appendices presented at the 10/03/2022 ESPWG

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Consumer Impact Methodology and Assumptions – 10/19

- **Assumptions**
  - As shown on the following slides, capacity values comparing the existing market approach and the MRI technique were utilized
    - The existing market approach used today's effective Derating Factor calculations, Duration Adjustment Factors, and Peak Load Window weightings
      - The existing market approach will no longer be effective starting May 1st, 2024, with the implementation of the Capacity Accreditation project
    - MRI values were derived from the GE Analysis for Improving Capacity Accreditation
    - For more information on how MRI values are calculated, please see the March 31st, 2022, GE presentation

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Assumed CAFs for CIA - 10/19

- **The MRI values for the 100 MW step size of the at-criteria 2022 RNA Base Case Model Year 2030 were used as the CAFs for this analysis[1]**
  - The MRI values using the NYCA-average shape were used for all performance-based resources (*i.e.*, biomass, LCROR, onshore wind, and solar), except offshore wind
    - Offshore wind was modeled with area specific simulated shapes
  - The MRI values from the dynamic model were used for ELRs and large hydro
  - The nuclear and thermal CAFs were assumed to be 100% for this analysis
  - The MRIs from the below zones were used for the respective capacity regions
    - ROS: Zone F
    - GHI: Zone G
    - J: Zone J
    - K: Zone K

	CAFs			
	Annual			
	ROS	GHI	J	K
Nuclear	100%			
Thermal	100%	100%	100%	100%
Biomass	68%			
LCROR	38%	37%		
Onshore wind	22%			
Offshore wind			49%	41%
Solar	13%	12%	17%	12%
4h ELR	72%	73%	77%	80%
SCR[2]	72%	73%	77%	80%
Large Hydro	99%			

[1]All MRI results for the at-criteria 2022 RNA Base Case Model Year 2030 were presented at the 09/30/2022 ICAPWG
[2]SCRs receive the 4h ELR CAF as proposed at the 07/28/2022 ICAPWG

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Average Capacity Values for CIA - 10/19

- **Under the existing market approach, the historic average derating factors were applied by resource type to the 2022 RNA Base Case Model Year 2030 supply mix[1]**
  - On the next slide, the average capacity values for the existing market approach equal 1 minus the average derating factor by resource type and capacity region
- **Under the capacity accreditation approach, the Installed Capacity of availability-based resources (e.g., nuclear, thermal, large hydro, ELRs, and SCRs) was translated to UCAP using the CAFs and average derating factors, consistent with the proposed capacity accreditation market design**
  - On the next slide, the average capacity values for the capacity accreditation approach reflect the CAFs for performance-based resources and the CAFs times 1 minus the average derating factor for availability-based resource classes

[1]The analysis used the NERC 5-year class average EFORd for nuclear and large hydro due market participant confidentiality concerns. For the 4hr ELR class (excluding SCRs), the NERC 5-year class average EFORd for pumped storage was used in conjunction with the 4-hour Duration Adjustment Factor. Additionally, the same average capacity values for offshore wind from the Consumer Impact Analysis for the Comprehensive Mitigation Review Proposal, presented at the 11/02/2021 ICAPWG meeting, were used for this analysis

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Average Capacity Values for CIA - 10/19

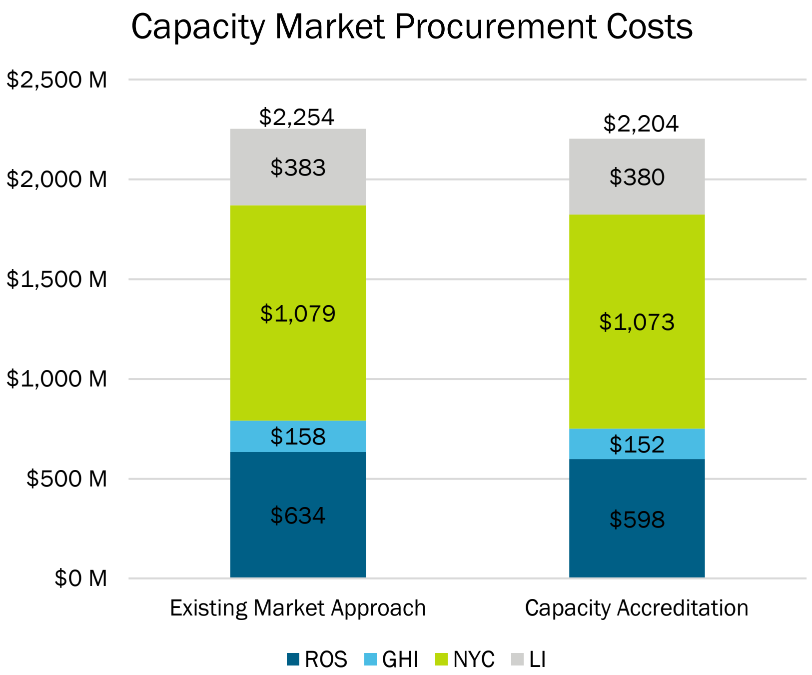
	Existing Market Approach								Capacity Accreditation							
	Summer				Winter				Summer				Winter			
	ROS	GHI	J	K	ROS	GHI	J	K	ROS	GHI	J	K	ROS	GHI	J	K
Nuclear[1]	97.8%				97.8%				97.8%				97.8%			
Thermal	95.2%	93.7%	96.8%	94.2%	96.0%	92.8%	97.2%	92.9%	95.2%	93.7%	96.8%	94.2%	96.0%	92.8%	97.2%	92.9%
Biomass	66.9%				71.9%				68.1%				68.1%			
LCROR	43.4%	73.2%			60.4%	47.2%			37.8%	36.9%			37.8%	36.9%		
Onshore wind	16.1%				29.4%				21.8%				21.8%			
Offshore wind			30.5%	30.5%			36.4%	36.4%			48.5%	41.3%			48.5%	41.3%
Solar	46.0%	46.0%	46.0%	46.0%	2.0%	2.0%	2.0%	2.0%	13.0%	11.7%	17.2%	11.7%	13.0%	11.7%	17.2%	11.7%
4h ELR	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	84.8%	67.9%	69.2%	72.4%	75.2%	67.9%	69.2%	72.4%	75.2%
SCR	86.5%	83.2%	87.5%	85.2%	83.4%	83.7%	87.2%	72.8%	69.3%	67.8%	74.7%	75.6%	66.8%	68.3%	74.5%	64.5%
Large Hydro[1]	95.5%				95.5%				94.9%				94.9%			

[1]The analysis used 1 minus the NERC 5-year class average EFORd for nuclear and large hydro due market participant confidentiality concerns

Cost Impacts – 10/19

Cost Impacts – As Found System - 10/19

- **Compared to the existing market approach:**
  - Capacity accreditation cost savings: $50 million



Clearing Quantities – As Found System - 10/19

- **Compared to the existing market approach:**
  – Capacity accreditation results in 706 MW less UCAP procured in NYCA in the summer and 576 MW less UCAP procured in the winter

Comp	ICAP	Summer UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	40,205	37,197	14,317	9,826	5,455
Capacity Accreditation		36,491	14,179	9,775	5,447
Delta		-706	-138	-52	-7

Comp	ICAP	Winter UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	41,682	37,785	14,046	9,795	5,780
Capacity Accreditation		37,209	14,017	9,768	5,790
Delta		-576	-29	-27	10

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System Derating Factors – As Found System - 10/19

- **Compared to the existing market approach:**
  - Capacity accreditation has a 1.76% higher summer NYCA system derating factor
  - Capacity accreditation has a 1.38% higher winter NYCA system derating factor

Comp	Summer System Derating Factors			
	NYCA	G-J	NYC	LI
Existing Market Approach	12.85%	4.79%	3.16%	8.07%
Capacity Accreditation	14.60%	5.73%	3.68%	8.21%
Delta	1.76%	0.93%	0.53%	0.14%

Comp	Winter System Derating Factors			
	NYCA	G-J	NYC	LI
Existing Market Approach	12.74%	5.52%	3.02%	9.39%
Capacity Accreditation	14.12%	5.71%	3.29%	9.21%
Delta	1.38%	0.19%	0.27%	-0.18%

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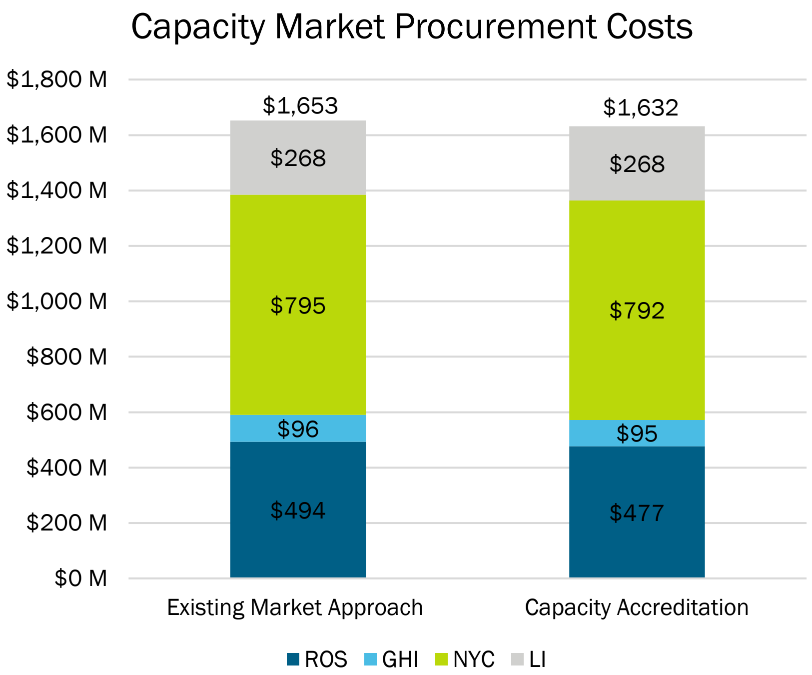
Cost Impacts – Historic Level of Excess - 10/19

- The level of excess in the as found system modeled for the 2022 RNA Base Case Model Year 2030 is higher in select localities than the historic level of excess that has cleared in the ICAP market
- Adjusting the 2022 RNA Base Case Model Year 2030 system to the historic level of excess results in reduced cost savings due to a tighter market
  - Historic Level of Excess Cost Savings: $21 million



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Clearing Quantities and System Derating Factors– Historic Level of Excess - 10/19

- **At the historic level of excess:**
  - Capacity accreditation results in 751 MW less UCAP procured in NYCA in the summer and 609 MW less UCAP procured in the winter compared to the existing market approach
- **The system derating factors at the historic level of excess are assumed to be the same as the system derating factors at the as found level of excess**
  - The system derating factors at the as found level of excess are presented on slide 16

Comp	ICAP	Summer UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	40,205	37,226	13,435	9,797	5,558
Capacity Accreditation		36,475	13,303	9,744	5,549
Delta		-751	-132	-53	-9

Comp	ICAP	Winter UCAP			
		NYCA	G-J	NYC	LI
Existing Market Approach	41,682	38,439	13,602	10,156	5,793
Capacity Accreditation		37,830	13,574	10,127	5,805
Delta		-609	-28	-28	12

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Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- 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

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