2018/2019 NYSRC RELIABILITY RULE A.2 REQUIREMENTS R1, R2, R3 COMPLIANCE SUBMITTAL

COVERING THE NEW YORK CONTROL AREA
For the 2018–2019 Capability Year

Presented to the
Reliability Compliance Monitoring Subcommittee of the
New York State Reliability Council

April 5th, 2018

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2018 Locational Capacity Requirements Study

LOCATIONAL MINIMUM INSTALLED CAPACITY REQUIREMENTS STUDY

Covering the New York Control Area For the 2018–2019 Capability Year

NYISO Operating Committee

January 18, 2018

I. Recommendation

This report documents a study conducted by the New York Independent System Operator ("NYISO") to determine Locational Minimum Installed Capacity Requirements ("LCRs") for the Localities of New York City (Load Zone J), Long Island (Load Zone K), and the G-J Locality (Load Zones G, H, I, and J) for the 2018–2019 Capability Year beginning May 1, 2018.

Currently for the 2017–2018 Capability Year, the New York City ("NYC") LCR is 81.5% of the NYC forecast peak load and the Long Island ("LI") LCR is 103.5% of the Long Island forecast peak load. The G-J Locality requirement is currently 91.5% of the G-J forecast peak load.

The New York State Reliability Council ("NYSRC") approved the 2018–2019 Installed Reserve Margin ("IRM") at 18.2% on December 8, 2017. The NYISO then determined the LCRs taking into consideration changes that have occurred since the NYSRC approved the IRM base case. The changes include the completion of the final 2018 ICAP/LCR load forecast, the announced retirement of the Binghamton Power Plant, and the ICAP Ineligible Forced Outage ("IIFO") of the Ravenswood GT 9 Generator.

Based on the NYSRC IRM base case for the 2018–2019 Capability Year and the changes identified above, the NYISO's calculations result in decreasing the currently effective LCR of 81.5% of the forecast peak load for the New York City Locality to **80.5%**. The NYISO's calculations also result in keeping the currently effective LCR of **103.5%** of the forecast peak load for the Long Island Locality. Lastly, the NYISO's calculations result in increasing the currently effective LCR of 91.5% for the G-J Locality to **94.5%**.

II. Updating LCR Values

As its starting point, the NYISO LCR study utilized the New York Control Area ("NYCA") IRM study directed by the NYSRC. The IRM study information is available on the NYSRC web site.[1] The final 2018 IRM Study base case maintains the Loss of Load Expectation ("LOLE") criterion at not more than 0.1 days/year with a statewide reserve margin of 18.2% and corresponding preliminary locational requirements of 80.7% and 103.2% for NYC and LI, respectively.

The NYISO follows the Locational Capacity Requirement Calculation Process to develop the LCRs for Zone J, Zone K, and the G-J Locality.[2] Pursuant to that procedure the NYISO adjusted the

1 http://www.nysrc.org/NYSRC_NYCA_ICR_Reports.html
2 http://www.nyiso.com/public/markets_operations/market_data/icap/index.jsp

final IRM Study base case to reflect the final 2018 ICAP/LCR load forecast. This forecast updated the October 2017 load forecast used in the IRM study. The forecast NYCA system peak has an increase of 75 MW while Zones J and K together have a net 31 MW decrease in forecast peak. The G-J Locality has a net increase of 28 MW. These changes in the peak load forecast, which are shown in the table below, have only a small impact on the final LCR values when compared to the IRM Study results.

Area	Final 2018 IRM Study Load Forecast (MW) (10/2017)	Final 2018 ICAP/LCR Load Forecast (MW) (12/2017)	Change (MW)
Zone J (NYC)	11,541	11,539	-2
Zone K (LI)	5,445	5,416	-29
The G-J Locality	15,890	15,918	+28
NYCA	32,868	32,943	+75

The other additional adjustment the NYISO has made to the final IRM Study base case is removal of the Binghamton Power Plant based on its announced retirement, and the ICAP Ineligible Forced Outage ("IIFO") of the Ravenswood GT 9 Generator, since the completion of the IRM study. Because these two generators are in upstate New York (Binghamton Power Plant of 43.7 MW in Zone C), or very small in capacity in downstate New York (Ravenswood GT 9 Generator of 16.3 MW in Zone J), the deactivation of both generation resources also has very limited influence on the final LCR values when compared to the IRM Study results.

III. Changes from Previous (1/13/2017) LCR report

The results of the 2018 LCR Study indicate that the Long Island Locality's 2018 LCR remains unchanged from its 2017 LCR of 103.5%. However, the New York City's 2018 LCR value calculation results in 80.5% which is one percentage point lower than its 2017 LCR of 81.5%. The main drivers for this decrease in NYC LCR can be summarized as follows.

- The 2018 ICAP peak load forecast for Zone J is 11,539 MW, which is significantly reduced from its 2017 ICAP peak load forecast of 11,670 MW.
- New large generating units CPV Valley added in Zone G can provide additional capacity resources and also improve transfer capability into NYC.

It is noteworthy to point out that the 2018 LCR for the G-J Locality was determined to be

94.5%, which is an increase of three percentage points from its 2017 LCR of 91.5%. The primary reason for this result is that, under the current LCR methodology, the addition of the CPV Valley unit with 680 MW of capacity in Zone G modifies the relative levels of megawatts in each Locality. Under the current "Unified Methodology" this changes the relationship of shifting megawatts out of the Localities. A numerical example of this effect was illustrated to the Installed Capacity Working Group on February 15, 2017.[3] The installed capacity requirement increases roughly by 480 MW, which is less than the 680 MW of capacity added to the locality.

IV. Summary of Study

The calculations made in this study, and its supporting analysis, utilize the NYISO process for setting the LCRs. With the NYSRC-approved statewide IRM of 18.2%, the NYISO's LCR study examined the effects of the final 2018 ICAP/LCR load forecast and the changes of generator deactivations to determine the final LCRs for the three Localities.

Based on the NYSRC's final IRM base case for the 2018–2019 Capability Year and inclusion of ICAP load forecast updates and resource changes identified, the LOLE criterion of 0.1 days/year is met with an LCR of **80.5%** for the New York City Locality, an LCR of **103.5%** for the Long Island Locality, and an LCR of **94.5%** for the G-J Locality.

3 http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_icapwg/meeting_materials/2017-02-15/ICAPWG_2-15-17_AlternativeMethodsforLCRs_v13.pdf.

Section II
Additional Information to Satisfy Reliability Rule A.2 Requirements R1, R2, R3

The NYSRC Reliability Rule A.2 has the following requirements:

"**R1.** *LSEs* shall be required to procure sufficient *resource capacity* for the entire *NYISO* defined *obligation procurement period* so as to meet the statewide *IRM* requirement determined from A.1. Further, this *LSE capacity* obligation shall be distributed so as to meet *locational ICAP requirements*, considering the *availability* and capability of the *NYS Transmission System* to maintain A(R1) *reliability* requirements."

"**R2.** *ICAP* from *resources* external to the *NYCA* for satisfying a portion of *LSE ICAP* requirements must be demonstrated to be available and deliverable to the *NYCA* borders. *ICAP* from *resources* external to the *NYCA* shall be permitted to the extent A.1 *reliability* requirements are satisfied."

"**R3.** The *NYISO* shall prepare a report for the next *Capability Period* showing (1) *LSE IRM* and *ICAP* requirements so as to meet the statewide *IRM* requirement, (2) *LSE locational ICAP requirements* for applicable *NYCA zones*, such as New York City and Long Island, and (3) the allowable amount of *LSE ICAP* requirements that may be located externally to the *NYCA*. The report shall include the procedures, factors, and assumptions utilized by the *NYISO* to determine these *LSE ICAP* requirements. The *NYISO* Installed Capacity Manual shall include procedures to establish *LSE ICAP* requirements."

The following compliance measure serves to fulfill the NYSRC Reliability Rule A.2 requirements R1, R2, R3. This measure states that:

"**M1.** The *NYISO* conducted an annual analysis to establish *LSE* and locational *installed capacity* (ICAP) requirements for the next *Capability Year*. The analysis was based on NYCA ICAP requirements established by the *NYSRC* and utilizes models and assumptions consistent with those used by the *NYSRC* for its ICAP requirement study. A report was prepared in accordance with R3, which addresses the results of the study, models utilized, study procedures and assumptions, and other study considerations. The report demonstrates that the *LSE* and *locational ICAP requirements* established by the *NYISO* and the allowable amount of LSE ICAP that may be located externally to the NYCA meets *NYSRC* Reliability Rules, in accordance with R1 and R2, respectively."

In addition, the "Compliance Documentation Requirements" column of the appendix to the NYSRC "scorecard"[1] states that:

> "A NYISO Locational Capacity Requirement (LCR) Report, covering the 2018-19 Capability Year, shall be provided. The NYISO shall also provide the allowable amount of LSE ICAP requirements that may be located externally to the NYCA, and how this was calculated. An appropriate NYISO staff person shall be available at the RCMS meeting to discuss the compliance submission, including the status of future LCR methodology changes."

A. Approval of Locational Capacity Requirements

On January 18th, 2018, the NYISO Operating Committee (OC) voted to approve Locational Capacity Requirements (LCRs) of 80.5% of the forecast peak load for the New York City Locality and 103.5% of the forecast peak load for the Long Island Locality. The OC also approved an LCR of 94.5% of the forecast peak load for the G-J Locality. This approval was based on the Locational Installed Capacity Requirements Study in Section I.

B. Identification of Zones Requiring LCRs

Table 1 shows the installed capacities, loads, and transfer capabilities for the NYCA zones depicted in the MARS model for this study. As can be seen in Table 1, the two individual zones that have low ratios of "capacity plus import capability to peak load" (column 5) are Load Zone J (New York City) and Load Zone K (Long Island). These zones have the potential to impact the NYCA LOLE most significantly. Thus, in order to maintain compliance with the NYSRC/NPCC LOLE criteria while maintaining the NYSRC statewide base case IRM requirement, these two zones must maintain a minimum level of locational ICAP.

In addition to the two zones identified above, there is a third Locality: the G-J Locality which includes Load Zones G, H, I, and J. It was established in 2014 in compliance with the NYISO's tariff which contains the rules under which the NYISO creates new Localities. The G-J Locality is located on the southeast side of the Upstate New York to Southeast New York (UPNY/SENY) interface which is a constrained portion of the New York State bulk transmission system during high load conditions. The import limits into the G-J Locality are more limiting than the zonal interface limits within the G-J Locality. As a result, Table 1 shows that although each of the Load Zones G, H, and I theoretically have a large import capability, the constraints into the G-J Locality actually result in a smaller import capability than the sum of all its individual zones. Due to this influence, the G-J Locality has a low ratio in column 5 of Table 1 and reinforces the need to maintain a minimum LCR from a reliability perspective.

[1] The NYISO and the NYSRC create a matrix that outlines the due dates for many of the reliability rules compliance documents. This "scorecard" is the "New York State Reliability Council 2018 Reliability Compliance Program".

Table 1
Year 2018
Installed Capacities, Loads, and Transfer Capability in the MARS model

(1) Zone	(2) Capacity[2]	(3) Peak Load[3]	(4) Import Capability[4]	(5) Ratio (2+4)/(3)
A	4,027	2,952	4,249	2.8
B	814	2,084	3,300	2.0
C	6,792	2,912	4,199	3.8
D	3,058	639	3,590	10.4
E	1,072	1,363	11,700	9.4
F	4,533	2,390	5,899	4.4
G	3,724	2,257	8,119	5.2
H	2,099	682	7,749	14.4
I	25	1,473	10,449	7.1
J	10,274	11,539	5,220	1.3
K	6,137	5,416	1,932	1.5
G-J Locality	16,121	15,918	6,539	1.4

C. Comparison of Forecast Loads and Resources

The NYISO has forecast a NYCA peak load of 32,943 MW for the 2018–2019 Capability Year. The 18.2% statewide Installed Reserve Margin adopted by the NYSRC and the 32,943 MW peak load forecast produced an ICAP requirement for the NYCA of 38,939 MW.

The forecast peak load, existing capacity (based on CRIS adjusted summer DMNC testing) and proposed resources, and the current locational ICAP requirements for New York City, Long Island, and the G-J Locality produce the statistics as shown in Table 2.

Table 2 indicates that the statewide ICAP requirement for the New York Control Area (NYCA) and the Locational Capacity Requirements for New York City, Long Island, and the G-J Locality can be met with expected ICAP resources in 2018–2019 Capability Year.

[2] These data are based on the "2017 Load & Capacity Data" Report's (Gold Book) summer capacity with changes identified in the 2018 IRM and LCR study reports including unit additions, retirements, reratings, UDRs, SCRs and net imports.
[3] The zonal peaks when combined with the hourly load shape in MARS model yield a system peak of 32,943 MW.
[4] As a matter of convenience for this table, import capability does not include any ties with potential UDRs modeled on them. That capability is already included in the data of column 2.

Table 2
2018–2019 Capability Year
Forecast peak load, Installed Capacity, and Locational Capacity Requirements (LCRs)

Locality	Peak Load (MW)	ICAP LCR (% of peak load)	ICAP LCR (MW)	Existing Capacity (MW) [5]	Expected ICAP (MW) [6]
New York City	11,539	80.5	9,289	9,632	10,183
Long Island	5,416	103.5	5,606	5,285	6,039
G-J Locality	15,918	94.5	15,043	14,764	16,075
NYCA	32,943	118.2	38,939[7]	38,806	42,123

D. Locational Capacity Requirements References and Procedures

This section shows the LCR references and procedures and where those documents exist.

The *NYISO Market Administration and Control Area Services Tariff* provides the rules governing the NYISO markets. Capacity obligations for LSEs are contained in Section 5.11 and Locational Capacity Requirements are defined in Section 5.11.4. The *NYISO Market Administration and Control Area Services Tariff* is available on the NYISO Web site at the following URL:
http://www.nyiso.com/public/markets_operations/documents/tariffviewer/index.jsp

The NYISO ICAP Manual goes into more detail. Section 3 of the manual addresses LSE requirements in procuring capacity to meet the NYSRC's annually set Installed Reserve Margin. Section 3.6.2, titled "Minimum Unforced Capacity Requirements for LSEs Serving Loads in a Locality", outlines the derivation of LSE locational Capacity Requirements. The ICAP Manual is available on the NYISO Web site at the following URL:
http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp

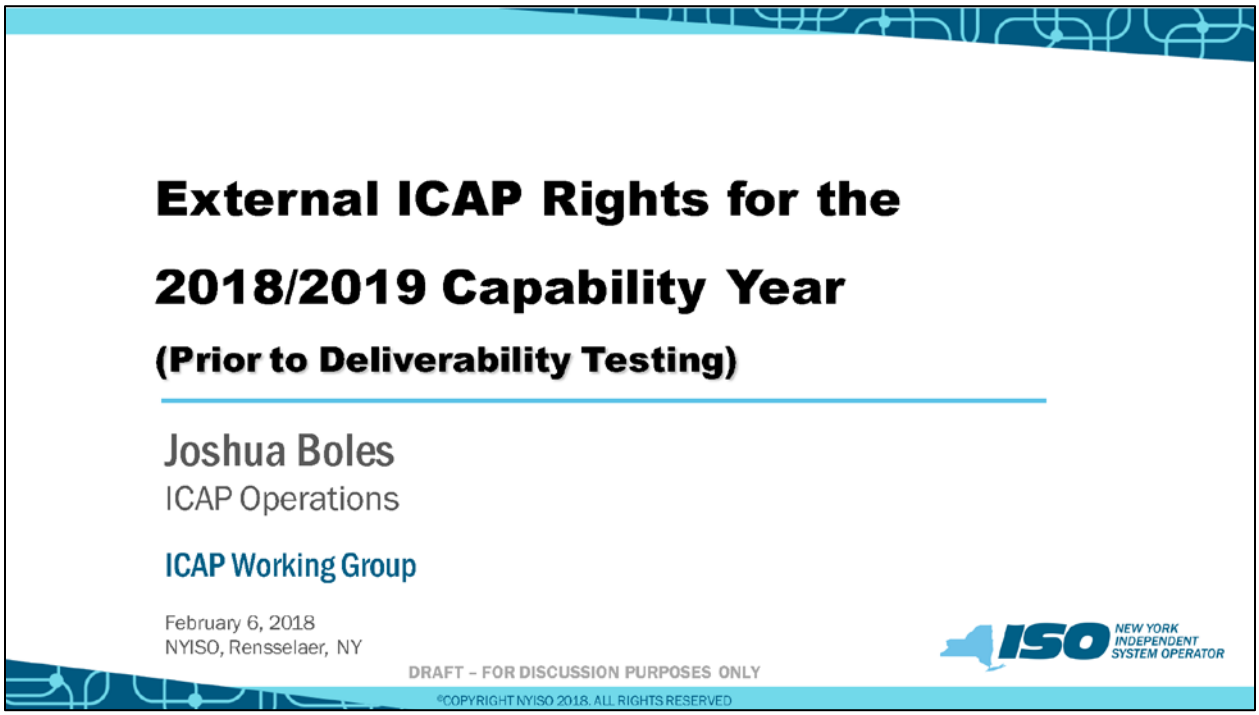
NYSRC IRM Policy 5-12 and the latest IRM study report indicate that there is an inverse relationship between IRM values and Locational Capacity Requirement values. The policy then prescribes the use of a balance point using the "tan 45" methodology. Prior to the NYISO's Locational Capacity Requirement analysis, the NYSRC determines "preliminary" LCRs for Zone J (New York City) and Zone K (Long Island) in conjunction with the IRM calculation process. The NYISO uses the final IRM established by the NYSRC as the starting point of the LCR study.

A full description of the Locational Capacity Requirement Calculation Process is available on the NYISO's website at the following URL:
http://www.nyiso.com/public/markets_operations/market_data/icap/index.jsp

[5] This is the sum of CRIS adjusted DMNC summer values for each unit based on the 2017 summer tested capacity.
[6] This is the existing capacity plus expected unit additions, retirements, reratings, UDRs, SCRs and net imports to the best information as of March 26th, 2018.
[7] This is the statewide Installed Capacity Requirement, expressed in terms of MW of ICAP.

Section III
2018/2019 External ICAP Allowances

A. Presentation to ICAP Working Group on February 6th, 2018



Objective

- To determine the amount of import capacity allowed from neighboring Control Areas (CAs) (Sec 4.9.6 ICAP Manual)
- MARS simulations were performed on the LCR MARS database to determine capacity imports allowed without violating the LOLE criterion

Ties Excluded

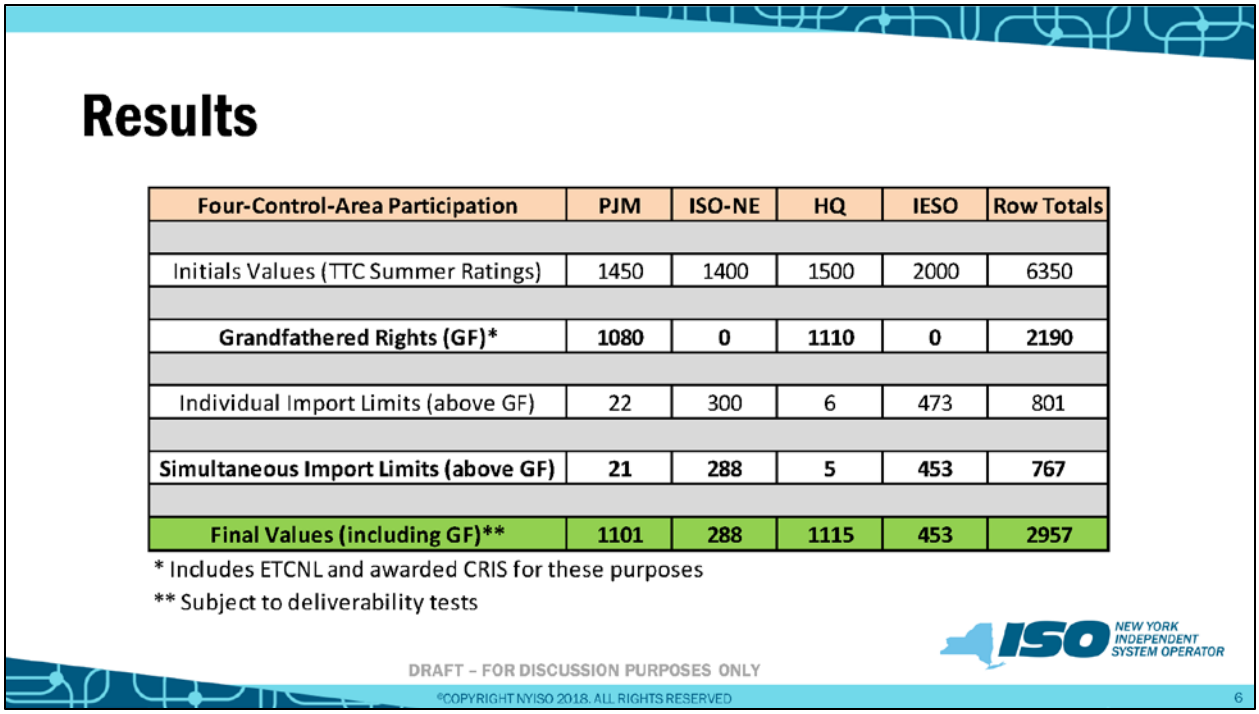
- Interface facilities having UDRs
- Controllable lines from PJM into NY
- The NUSCO 1385 (NNC) line

Methodology

- Initial MARS Database: 2018/2019 final IRM database as updated for the LCR study
- Model Grandfathered imports consistent with the IRM study
- Determine imports for each Control Area individually by increasing imports on each CA's ties until the LOLE levels in the base case are met

Methodology – continued

- Perform simultaneous runs by increasing the ICAP imports based on the individual limits (beyond the Grandfathered imports) until the LOLE levels in the base case are met
- These ICAP imports, when added to the Grandfathered imports, determine the total simultaneous import limits before deliverability



Results

Four-Control-Area Participation	PJM	ISO-NE	HQ	IESO	Row Totals
Initials Values (TTC Summer Ratings)	1450	1400	1500	2000	6350
Grandfathered Rights (GF)*	**1080**	**0**	**1110**	**0**	**2190**
Individual Import Limits (above GF)	22	300	6	473	801
Simultaneous Import Limits (above GF)	**21**	**288**	**5**	**453**	**767**
Final Values (including GF)**	**1101**	**288**	**1115**	**453**	**2957**

* Includes ETCNL and awarded CRIS for these purposes

** Subject to deliverability tests

B. Deliverability Tests on Capacity Imports

Once the Import Rights are determined, from a resource adequacy perspective, they are subjected to deliverability tests. These tests determine how much external area ICAP is deliverable to the New York system. The results of deliverability tests show that the external area ICAP of maximum Import Rights from resource adequacy calculation is fully deliverable to the New York Control Area (NYCA) for the 2018–2019 Capability Year.