



2017/2018 NYSRC RELIABILITY RULE A.2
REQUIREMENTS R1, R2, R3 COMPLIANCE
SUBMITTAL

COVERING THE NEW YORK CONTROL AREA
For the 2017–2018 Capability Year

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

April 6th, 2017

Contents

I. 2017 Locational Capacity Requirements Study

A. Report to OC accepted on January 13th, 2017

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

A. Approval of Locational Capacity Requirements

B. Report on the IRM Base Case Alignment

C. Identification of Zones Requiring LCRs

D. Comparison of Forecast Loads and Resources

E. Locational Capacity Requirements References and Procedures

III. 2017/2018 External ICAP Allowances

A. Presentation to ICAP Working Group on January 27th, 2017

B. Deliverability Tests on Capacity Imports

Section I
2017 Locational Capacity Requirements Study



LOCATIONAL MINIMUM INSTALLED CAPACITY
REQUIREMENTS STUDY

COVERING THE NEW YORK BALANCING AUTHORITY AREA
For the 2017 – 2018 Capability Year

NYISO Operating Committee
January 13, 2017

Locational Minimum Installed Capacity Requirements Report

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 2017–2018 Capability Year beginning May 1, 2017.

Currently, for the 2016–2017 Capability Year, the New York City (NYC) LCR is 80.5% of the NYC forecast peak load and the Long Island (LI) LCR is currently 102.5% of the Long Island forecast peak load. The G-J Locality requirement is currently 90.0% of the G-J forecast peak load.

The New York State Reliability Council (NYSRC) approved the 2017–2018 Installed Reserve Margin (IRM) at 18.0% on December 2, 2016. The NYISO then determined the LCRs taking into consideration changes that have occurred since the NYSRC approved the IRM base case. After adjusting the model to use the approved IRM, the only change to the database for this analysis is the final 2017 ICAP load forecast.

The below table shows the difference between the load forecasts used in setting the 2016 LCR values versus the 2017 LCR values.

Area	Final 2016 ICAP/LCR Load Forecast (MW) (12/2015)	Final 2017 ICAP/LCR Load Forecast (MW) (12/2016)	Change (MW)
Zone J (NYC)	11,794	11,670	-124
Zone K (LI)	5,479	5,427	-52
Zones G-J	16,309	16,061	-248
NYCA	33,359	33,178	-181

Based on the NYSRC base case for the 2017–2018 Capability Year and the changes identified above, the NYISO’s calculations result in increasing the currently effective LCR of 80.5% of the forecast peak load for the New York City Locality to **81.5%**. The NYISO’s calculations also result in increasing the currently effective LCR of 102.5% of the forecast peak load for the Long Island Locality to **103.5%**. Lastly, the NYISO’s calculations result in increasing the currently effective LCR of 90.0% for the G-J Locality to **91.5%**.

II. Updating LCR Values

As its starting point, the NYISO LCR study utilized the statewide Installed Reserve Margin (IRM) study directed by the NYSRC. The IRM study is available on the NYSRC web site¹.

¹ www.nysrc.org

The NYISO follows the Locational Capacity Requirement Calculation Process to develop the LCRs for the Zone J, Zone K and the G-J Locality². The only additional adjustment the NYISO has made to the final IRM base case with IRM adjusted to the established 18.0% is the inclusion of the final 2017 ICAP/LCR peak load forecast. This forecast updated the October 2016 peak load forecast used in the IRM study. The NYCA system peak had a decrease of 94 MW while Zones J and K had a net 23 MW decrease. Zones G-J had a net decrease of 12 MW. These changes in the peak forecast used in the LCR study had only a small impact on the final LCR values when compared to the IRM results.

The LCR analysis is an optimization process for the NYCA system to meet the LOLE reliability criteria by setting minimum requirements for each of the defined localities. As the outcome of the process, the NYC, LI, and G-J LCRs increased, with respect to the 2016–2017 LCR values.

Factors identified in the IRM study as the drivers in the change to the IRM were also the drivers in the change in the LCRs from last year’s study. These are:

1. Less assistance available from NY’s neighbors.
2. Higher NY generator EFORds.
3. 146 MW of NYC Generator retirements.

III. Summary of Study

The calculations made in this study, and its supporting analysis, utilize the NYISO process for setting the LCRs. The final 2017 IRM base case maintains the Loss of Load Expectation (LOLE) criterion at not more than 0.1 days/year with a statewide reserve margin of 18.1% and corresponding preliminary locational requirements of 81.6% and 103.5% for NYC and LI, respectively. After adjusting the model to use the NYSRC approved IRM of 18.0%, the NYISO’s LCR study examined the effects of the final 2017 ICAP/LCR peak load forecast to determine the final LCRs for the three localities.

Based on the NYSRC’s final IRM base case for the 2017–2018 Capability Year with IRM adjustment to 18.0% and the NYISO’s final 2017 ICAP/LCR peak forecast, the LOLE criterion of 0.1 days/year is met with an LCR of **81.5%** for the New York City (Zone J) Locality, an LCR of **103.5%** for the Long Island Locality (Zone K), and an LCR of **91.5%** for the G-J Locality.

² http://www.nyiso.com/public/markets_operations/market_data/icap/index.jsp

NYISO – Locational Minimum Installed Capacity Requirements Report Covering the NYCA for the 2017/18 Capability Year.

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”³ states that:

“A NYISO Locational Capacity Requirement (LCR) Report, covering the 2017 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 this information and answer questions, including the status of LCR methodology changes.”

A. Approval of Locational Capacity Requirements

On January 13th, 2017, the NYISO Operating Committee (OC) voted to approve Locational Capacity Requirements (LCRs) of 81.5% 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 91.5% 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. Report on the IRM Base Case Alignment

Report on Adjustments to the 2017 IRM Base Case Database

To Align the Established IRM to the IRM Study Database

(For the 2017 IRM Study)

Introduction

On December 2, 2016, the NYSRC Executive Committee (EC) approved Policy 5-11. This policy is the foundation for the procedure to calculate a technical installed reserve margin for the upcoming capability year. Policy 5-11 was utilized to produce results for the 2017-2018 capability year. Appendix C of that policy provides instruction to the Installed Capacity Subcommittee (ICS) on final database adjustments needed to align the IRM database to the established statewide Installed Reserve Margin (IRM). This aligned database is used, by the NYISO, as a starting point in setting the final LCR values.

³ 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 2017 Reliability Compliance Program”.

This report documents the relationship between the technical IRM result and the established IRM set by the NYSRC to determine the correct course of action to be used to implement Appendix C of the policy. The report also documents the results of that alignment, if warranted.

Description of Process

For IRMs that are established above the technical study report IRM value, the database needs no further alignment and the NYISO will calculate the LCRs based on the established IRM. For established IRMs that are lower than the technical study report IRM value, the database of the base case is adjusted to meet the 0.1 days/year LOLE criterion by adding resources in an Emergency Operating Procedure (EOP) step immediately prior to customer disconnections in all eleven New York zones proportional to the peak load forecast in each zone until 0.1 days/year is achieved at the established IRM value.

The 2017 IRM Base Case Alignment

For the 2017-2018 Capability Year, the NYSRC set the IRM at a value of 18.0% at its December 2, 2016 Executive Committee meeting. The base case technical study results were for an IRM of 18.1%. Given the NYSRC’s adoption of the IRM of 18.0%, an alignment of the technical database was performed to match the 18.0% IRM per NYSRC Policy 5, Appendix C. Specifically, the NYISO removed existing capacity in the MARS model in Zones A, C and D to reflect the approved 18.0% IRM value. When the database was run at the approved IRM level of 18.0%, the resultant LOLE was 0.101 days/year. The next step of the process is to allow the model to use an additional EOP step immediately prior to customer disconnections. In this case, the NYISO added 7 MW of existing capacity to the database, which returned the LOLE to the criterion of 0.1 days/year. Consistent with Policy 5, these adjustments resulted in a database that meets the LOLE criterion at the approved 18.0% IRM with indicative LCRs of 81.6% and 103.5% for Zones J and K, respectively.

Summary of changes per Policy 5-11											
Zone	A	B	C	D	E	F	G	H	I	J	K
18.1% Base Case Zonal LOLE	0.000	0.063	0.000	0.000	0.063	0.000	0.005	0.000	0.077	0.084	0.078
Policy 5-11 MW Added	0.571	0.422	0.600	0.123	0.297	0.500	0.474	0.141	0.313	2.426	1.133
18.0% Base Case Zonal LOLE (Adjusted)	0.000	0.063	0.000	0.000	0.063	0.000	0.005	0.000	0.078	0.083	0.077

C. 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 expected 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 periodically evaluates the need for, and if the prescribed test is satisfied, it creates new Localities. The G-J Locality is located on the constrained 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 meet the 91.5% LCR from a reliability perspective.

Table 1
Year 2017
Installed Capacities, Loads, and Transfer Capability in the MARS model

(1) Zone	(2) Capacity ⁴	(3) Peak Load ⁵	(4) Import Capability ⁶	(5) Ratio (2+4)/(3)
A	4,057	2,691	4,249	3.1
B	834	2,030	3,300	2.0
C	6,728	2,880	4,199	3.8
D	2,983	670	3,590	9.8
E	1,066	1,443	11,700	8.8
F	4,452	2,422	5,899	4.3
G	3,056	2,262	7,979	4.9
H	2,111	687	7,599	14.1
I	25	1,505	10,791	7.2
J	10,541	11,670	5,105	1.3
K	6,093	5,427	1,956	1.5
G-J Locality	15,733	16,061	6,300	1.4

⁴ These data are based on the “2016 Load & Capacity Data” Report’s (Gold Book) summer capacity with changes identified in the 2017 IRM and LCR study reports including unit additions, retirements, re-ratings, UDRs, SCRs and net imports.

⁵ The zonal peaks when combined with the hourly load shape in MARS model yield a system peak of 33,178 MW.

⁶ 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.

D. Comparison of Forecast Loads and Resources

The NYISO has forecast a NYCA peak load of 33,178 MW for the 2017–2018 Capability Year. The 18.0% statewide Installed Reserve Margin adopted by the NYSRC and the 33,178 MW peak load forecast produced an ICAP requirement for the NYCA of 39,150 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 2017–2018 Capability Year.

Table 2
2017–2018 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) ⁷	Expected ICAP (MW) ⁸
New York City	11,670	81.5	9,511	9,582	10,646
Long Island	5,427	103.5	5,617	5,298	6,106
G-J Locality	16,061	91.5	14,696	14,669	15,819
NYCA	33,178	118.0	39,150 ⁹	38,582	41,637

E. 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.

⁷ This is the sum of CRIS adjusted DMNC values for each unit based on the 2016 summer tested capacity.

⁸ This is the existing capacity plus expected unit additions, retirements, re-ratings, UDRs, SCRs and net imports.

⁹ This is the statewide Installed Capacity Requirement, expressed in terms of MW of ICAP.

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

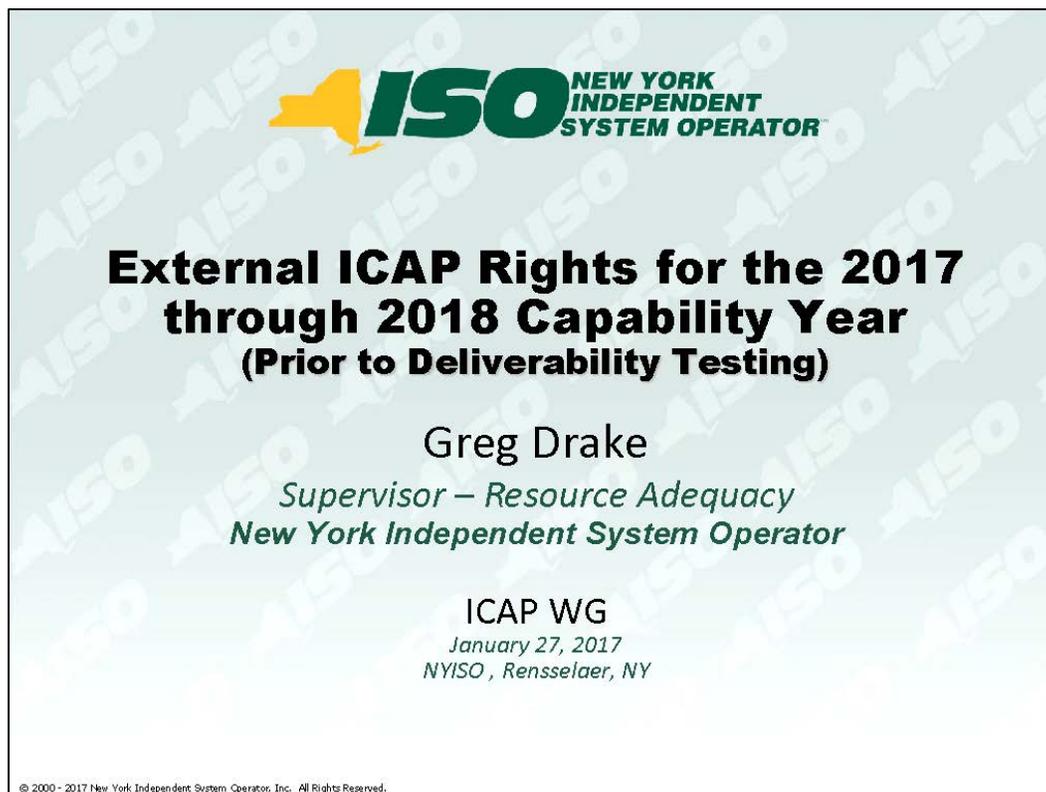
NYSRC IRM Policy 5-11 and the latest IRM study report indicate that there is an inverse relationship between IRM values and Locational Capacity Requirement values. The policy then prescribes the use of a balance point using the “tan 45” methodology. Because the IRM and LCRs are established through a unified methodology, the procedure used to generate the LCR-IRM curve (see Appendix A of NYSRC Policy 5-11) is the same procedure used by the NYISO to determine recommended LCRs for New York City and Long Island.

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

Section III
2017/2018 External ICAP Allowances

A. Presentation to ICAP Working Group on January 27th, 2017



Objective

- ◆ **To determine the maximum amounts of import capacity allowed from neighboring Control Areas (CAs) (Sec 4.9.6 ICAP Manual)**
- ◆ **MARS simulations were performed in accordance with MST 5.12.2.2 to determine the sum of the individual capacity import contributions without violating the LOLE criterion**

© 2000 - 2017 New York Independent System Operator, Inc. All Rights Reserved.

2

Ties Excluded

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

© 2000 - 2017 New York Independent System Operator, Inc. All Rights Reserved.

3

Methodology

- ◆ **Initial MARS Database: 2017-2018 IRM database as updated for the LCR study**
- ◆ **Model Grandfathered imports consistent with the IRM study**
- ◆ **Determine the maximum imports for each Control Area individually by increasing imports on each CA's ties until the LOLE levels in the base case are met**

© 2000 - 2017 New York Independent System Operator, Inc. All Rights Reserved.

4

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**

© 2000 - 2017 New York Independent System Operator, Inc. All Rights Reserved.

5

Methodology Changes

- ◆ There were no changes in the methodology from last year
- ◆ The methodology was performed including IESO participation in capacity imports
- ◆ The assumption used for the IRM, LCR, and this work is that the 2015 Class Year will be complete and 20 MW of additional CRIS coming from Quebec will be awarded

© 2000 - 2017 New York Independent System Operator, Inc. All Rights Reserved.

6

Calculations

	PJM	ISO-NE	Quebec	Ontario	Row Totals
Initial Values (TTC Summer Ratings)	1450	1400	1500	2000	6350
Grandfathered Rights*	1080	0	1110	0	2190
Individual Limits (above GF)	212	1075	18	450	1755
Simultaneous Limits (above GF)	60	306	5	128	500
Final Values	<u>1140</u>	<u>306</u>	<u>1115</u>	<u>128</u>	<u>2689</u>

* Includes ETCNL for these purposes

© 2000 - 2017 New York Independent System Operator, Inc. All Rights Reserved.

7

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 can be fully deliverable to the New York Control Area (NYCA).