



**REVISED LOCATIONAL INSTALLED CAPACITY
REQUIREMENTS STUDY**

**COVERING THE NEW YORK CONTROL AREA
For the 2006 – 2007 Capability Year**

**Operating Committee
March 28, 2006**

Note

This report supersedes a report dated 2/9/06. This version incorporates the correction to a database error that was announced by the NYSRC on 3/15/06

The error occurred in the manner in which the operating reserves were accounted for in the model. The model tracks the number of times locational operating reserves are utilized by placing them in the Emergency Operating Procedure (EOP) steps. The operating reserves are first removed in step 1 and then added back later in as 30 minute and 10 minute reserves. Although the amounts subtracted and added back were equal on a statewide basis, they were not equal on an individual zonal basis. This had the effect of shifting capacity from the downstate zones to the upstate NY zones.

Locational Installed Capacity Requirements Study

I. INTRODUCTION

This report documents an engineering study conducted by the New York Independent System Operator (NYISO) to determine locational installed capacity (ICAP) requirements for the New York Control Area (NYCA) for the 2006 - 2007 Capability Year beginning May 1, 2006. The study had two specific objectives. First, it reviewed NYCA system parameters to determine which zones required locational ICAP requirements. Second, it determined what those locational ICAP requirements would be.

A locational ICAP requirement specifies the minimum amount of installed capacity that must be procured from resources situated specifically within a locality. It considers resources within the locality as well as the transmission import capability to the locality in order to meet the resource adequacy reliability criteria of the New York State Reliability Council (NYSRC) and the Northeast Power Coordinating Council (NPCC). These criteria require that each Control Area's probability (or risk) of disconnecting any firm load due to resource deficiencies shall be, on average, not more than once in ten years. Further, NYISO's Market Administration and Control Area Services Tariff and the NYSRC Reliability Rules require the NYISO to establish locational ICAP requirements.

Currently, the New York City locational ICAP requirement is eighty percent (80%) of the New York City forecast peak load for the 2005 – 2006 Capability Year. The Long Island locational ICAP requirement is ninety-nine percent (99%) of the Long Island forecast peak load for the 2005 – 2006 Capability Year. Each Load-Serving Entity (LSE) serving load within these localities is required to procure installed capacity based on their contribution to the locality's forecast peak load.

Beginning November 1, 2001, the NYISO implemented a revised ICAP market design in the NYCA. The NYISO uses unforced capacity (UCAP) to determine the amount of capacity that a resource is qualified to supply to the NYCA, and to determine the UCAP requirements of LSEs. UCAP is a measure of a resource's available capacity recognizing forced outages. The NYISO calculates an Equivalent Forced Outage Rate under Demand (EFORd) to determine a resource's unavailability due to forced outages. The NYISO continues to establish ICAP requirements based on installed capacity and then translates the ICAP requirement to a UCAP requirement based on a statewide average availability (1.0 – EFORd) of resources. The locational ICAP requirements are translated to locational UCAP requirements based on average availabilities of resources located within the locality.

II. SUMMARY OF STUDY FINDINGS

1) New York City and Long Island are the only two zones within the NYCA which need to have locational ICAP requirements for the 2006 – 2007 Capability Year.

2) Under expected load and resource conditions and an adopted statewide installed reserve margin of 18%, the NYCA will be able to meet the NYSRC/NPCC LOLE criteria of one day in ten years for the 2006 – 2007 Capability Year.

3) Based on the updated NYSRC base case for the 2006 – 2007 Capability Year, the current locational capacity requirement of 99% of the peak load for the Long Island zone and 80% of the peak load for the New York City zone should be maintained.

In general, all else being equal, as the amount of load in the zone relative to the available transfer capacity into the zone and the amount of supply resources in the zone increases, a point is reached where the locational capacity requirement must increase or the transfer capability into the load zone must be increased – i.e., how long can you continue to meet a MW of load growth with 0.8 MW of capacity before you have to increase transfer capacity into a zone or increase the locational resource requirement? This point has not been reached for the New York City load zone while the Long Island zone has increased from its previous low point.

4) The requirements outlined above are based on the operation of the Cross Sound Controllable Line as supplying capacity to the NYCA through Long Island. The Long Island Power Authority has been allocated UDRs at the 330 MW level. When the resources supplying capacity over that tie are unavailable, the model assumes that the tie is available for emergency assistance.

5) Given the current projection of resources, the New York City and Long Island localities will have sufficient installed capacity to meet their locational ICAP requirements for the 2006 – 2007 Capability Year.

III. DATA, MODELS, AND METHODOLOGY

As its starting point, the NYISO locational ICAP requirements study utilized the statewide Installed Reserve Margin (IRM) study conducted by the NYSRC¹. This study was approved by the NYSRC Executive Committee on 1/31/06, and is available on the NYSRC web site at www.nysrc.org. Subsequently, the NYISO identified an error in the MARS database used to conduct the IRM study. On March 15, 2006, the NYSRC and the NYISO notified the Market Participants that this error would be corrected and new LCR-IRM curves would be produced. On March 17, 2006, the Installed Capacity Subcommittee of the NYSRC approved the revised LCR-IRM curves. On March 20, 2006 the Executive Committee of the NYSRC, based on the new LCR-IRM curves, affirmed that the base case point remains at 18% and that the statewide IRM will remain at 18%.

The NYSRC study models the NYCA and neighboring control areas: Hydro Quebec, ISO-NE, PJM and the Province of Ontario systems. The NYSRC database includes data for individual generating units, special case resources, loads and interconnections as well as internal NYCA transmission and load forecast uncertainty. In order for proposed generation to be included, it had to meet the established interconnection criteria of the NYSRC IRM study.

Historical generator availability data was taken from the NYISO's availability database, which collects data in a format similar to the North American Electric Reliability Council-Generator Availability Data System (NERC-GADS). For units without sufficient historical data, unit type NERC class average data is utilized.

The NYISO locational ICAP study starts with the NYSRC IRM study's base case. Updates are then made to reflect material changes that have been made to the system that were not modeled in the IRM study. This year, the following changes were made to reflect actual conditions expected during the capability year:

1. Incorporation of the final ICAP peak load forecast for the NYCA. See Appendix 1 for changes to the load forecast.
2. The Article X stipulation that the existing Poletti unit can only operate, on average, to an annual capacity factor of 30% until its retirement.
3. The announced retirement of the Indeck Illion plant (54 MW) in zone E.

The NYISO locational ICAP requirements study uses the General Electric Multi-Area Reliability Simulation (MARS) model. Table 1 (top of next page) shows 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 zones that have "low capacity plus import capability to expected load" (column 6) ratios are zones J (New York City) and 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

¹ NYSRC Report titled, "New York Control Area Installed Capacity Requirements for the Period May 2006 Through April 2007", January 31, 2006.

criteria while maintaining the NYSRC statewide base case IRM requirement, these two zones must maintain a minimum level of locational ICAP.

Year 2006 Table-1
Installed Capacities, Loads, and Transfer Capability in the MARS model

(1) Zone	(2) Capacity²	(3) Peak Load³	(4) Import Capability	(5) (2)/(3)	(6) (2+4)/(3)
A	5155	2771	4000	1.86	3.30
B	1017	1914	3900	0.53	2.57
C	6680	3080	4770	2.17	3.72
D	1512	1155	3500	1.31	4.34
E	1022	1496	10770	0.68	7.88
F	3924	2193	5650	1.79	4.37
G	3423	2242	8320	1.53	5.24
H	2070	618	7000	3.35	14.68
I	13	1802	10980	0.01	6.10
J	10364	11630	5320	0.89	1.35
K	5767	5348	1731*	1.08	1.08

*The Cross Sound Controllable Line is not counted toward import capability here (since it is used for capacity (UDR) and is included in column 2)

Locational capacity has been defined as the minimum amount of capacity that would be needed to be located in zones identified as localities in order to meet resource adequacy criteria at the base case IRM requirement and the forecasted peak loads for the localities.

In 2005, the NYSRC’s Installed Capacity Subcommittee along with the NYISO staff conducted analysis that determined the relationship between statewide Installed Reserve Margin (IRM) requirements and Locational Capacity Requirements (LCR). The result of that work was to align the methodologies for calculating the statewide IRM and LCRs under what is called the unified methodology. This report and its supporting analysis are based on the unified methodology. Under the unified methodology, capacity is removed from zones west of the Central-East interface that have excess capacity when compared to their forecast peaks until a study point IRM is reached. At this point, capacity is shifted from Zones J and K into the same zones as above until the 0.1 LOLE criterion is violated. For purposes of this analysis, the selection of the base case during the IRM study process determines the study point used here.

² This is the “2005 Load & Capacity Data” Report’s (Gold Book) Summer Capacity with changes shown in appendix 2

³ The zonal peaks when combined with the 2002 hourly load shape yield a system peak of 33, 295 MW.

Finally, the NYISO and its market participants have initiated several processes designed to look at intra and inter zonal transmission constraints. These processes fall under the auspices of the Interconnection Issues Task Force (IITF) and have resulted in a draft report on deliverability. To date, the inter-zonal transmission limits have been accepted and no significant intra-zonal constraints have been identified to the NYISO for the as found system.

IV. STUDY RESULTS AND FINDINGS

The IRM study and its report identified locational requirements for various levels of IRMs along an LCR-IRM curve⁴. It then went on to select a base case point of 118%. For purposes of this analysis, the only point of interest along that curve is that of the 118% point. Based on this point and the changes in conditions expected during the capability year that are discussed in section III above, the following observations can be made:

1. At the statewide reserve margin base case requirement of 18.0%, the calculation of a locational requirement for the Long Island zone resulted in a Locational Capacity Requirement (LCR) of 99.1 % while the New York City zone result was 79.7%. This observation is the result of the updated LCR-IRM curves. Since the IRM study's LCR-IRM curve was revised to include the updates described in this report, this curve is also valid for the establishing the Locational Capacity Requirements.
2. Transmission constraints into a locality become more prevalent as the load is increased in the locality, all-else being equal. Thus, in addition to other factors, the statewide reserve margin required to meet the resource adequacy criteria is highly dependent on the capacity in the locality, the capacity in the ROS, and the transfer capability into the locality, while the determination of the locality requirement is highly dependent on the load forecast for the locality.
3. The reevaluation of the 18% reserve margin base case utilizing LCRs of 80% for New York City and 99% for Long Island meets the LOLE criteria.
4. The previous Locational Installed Capacity Requirements Study, which contained the error involving the distribution of reserves, calculated minimum LCRs of 83% in-City and 106% on Long Island. These calculations met or exceeded the LOLE criteria of 0.10 days per year. Nevertheless, these calculations did not constitute the Minimum Locational Capacity Requirements. Having corrected the error, the LCRs are now 80% in-City and 99% on Long Island, at the 18% Installed Reserve Margin level.

⁴ A full discussion of this curve can be found in the 2006 IRM study report which has been posted on the NYSRC website at '<http://www.nysrc.org/pdf/Doucments/2006-07IRMReportfinal.pdf>'.

The NYISO recommends that the current requirements for New York City and Long Island be maintained at 80% and 99%, respectively for the 2006-2007 capability year.

V. STATEWIDE AND LOCATIONAL ICAP REQUIREMENTS

The NYISO has forecasted a NYCA peak load of 33,295 MW for the 2006–2007 Capability Year. The 18% statewide Installed Reserve Margin adopted by the NYSRC and the 33,295 MW peak produces an ICAP requirement for the NYCA of 39,288 MW.

The forecast peak load, existing (based on revised summer DMNC testing) and proposed resources, and the current locational ICAP requirement for New York City and Long Island produces the following locality statistics:

Year 2006 Table-2
Forecast peak load, Installed Capacity, Special Case Resources (SCRs) and
Locational ICAP Requirements (LCRs).

<u>Locality</u>	<u>Peak Load</u>	<u>ICAP LCR (% of Peak load)</u>	<u>ICAP LCR (in MW's)</u>	<u>Existing ICAP*</u>	<u>Proposed New Capacity</u>	<u>Expected SCRs</u>
New York City	11630	80	9304	9054	1000	262
Long Island	5348	99	5295	5287	330	98
NYCA	33295	118	39288	38169	1473 ⁵	1016

*As measured by summer 2005 DMNC testing (not including SCRs and less 303 MW Firm Sales)

Table-2 above shows that the New York Control Area statewide requirements, New York City's locational requirements, and Long Island's locational requirements can be met with the addition of the proposed units or with expected special case resources.

⁵ This number represents the addition of SCS Astoria (500 MW), the Poletti Expansion (500 MW), Maple Ridge wind farm (198 MW), Cross Sound Controllable Line as UDRs (330 MW), less the Indeck Illion retirement (55 MW).

Appendix 1

Comparison of initial versus final load forecasts

<u>Area</u>	<u>Gold Book Forecast</u>	<u>Final ICAP Forecast</u>
Zone J (NYC)	11,505 MW	11,630 MW
Zone K (LI)	5,320 MW	5,348 MW
NYCA	32,400 MW	33,295 MW

Appendix 2

Capacities in Model by zone

<u>Zone</u>	<u>GOLD BOOK</u>	<u>non- Participation</u>	<u>Sales</u>	<u>IRM Add's</u>	<u>CSCL as UDR</u>	<u>Rets</u>	<u>Total</u>	<u>SCR's</u>	<u>Grand Total</u>
A	5083		-255				4828	327.3	5155
B	950						950	67.2	1017
C	6617	-30					6587	93.3	6680
D	1262		-35	200			1427	85.4	1512
E	871			198		-55	1014	8.0	1022
F	3111			750			3861	62.6	3924
G	3421						3421	2.4	3423
H	2069						2069	0.7	2070
I	3						3	10.0	13
J	8981			1288		-167	10102	262.0	10364
K	5180			160	330		5670	97.3	5767
	37548		-290	2596			39932	1016.07	40948