LOCATIONAL INSTALLED CAPACITY REQUIREMENTS STUDY

COVERING THE NEW YORK CONTROL AREA
For the 2005 – 2006 Capability Year

As Approved by the Operating Committee
February 17, 2005
Revised March 23, 2005 (editorial)

This revision reflects a typo error on the graph labeled 'Locational ICAP Requirements versus Statewide Reserve Margin' under the section labeled "Study Results and Findings". The graph showed the NYC locational requirement at 87.8% at a statewide Specified Reserve Margin level of 15.9%. The correct value is 83.1%. This correction also effects observation number 3 under the same section. It would read "…while the New York City zone was ~~approached 88%~~ slightly over 83%."

Locational Installed Capacity Requirements Study

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 2005 - 2006 Capability Year beginning May 1, 2005. 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 2004 – 2005 Capability Year. The Long Island locational ICAP requirement is ninety-nine percent (99%) of the Long Island forecast peak load for the 2004 – 2005 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.

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 2005 – 2006 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 2005 – 2006 Capability Year.

3) Under the NYSRC base case initial assumptions for the 2005 – 2006 Capability Year, the current locational capacity requirement of 99% of the peak load for the Long Island load zone and 80% for New York City load zone are sufficient to ensure that resource adequacy criteria will be met or exceeded for the forecasted peak loads for the upcoming capability year. Therefore, based on the analysis conducted herein and the assumptions underlying the base case IRM study as well as the locational analysis, the NYISO recommends that the locational capacity requirements currently in effect be retained.

4) The requirements outlined above are based on the operation of the cross sound HVDC 330 MW cable as an interface tie, 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 2005 – 2006 Capability Year.

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 NYSRC[1]. This study was approved by the NYSRC Executive Committee on 12/10/04, and is available on the NYSRC web site at www.nysrc.org.

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 since the completion of the IRM study. This year, the only change was to incorporate the final 2005 zonal peak load forecast for the NYCA.

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

[1] NYSRC Report titled, "New York Control Area Installed Capacity Requirements for the Period May 2005 Through April 2006", December 10, 2004.

Year 2005 Table-1

Installed Capacities, Loads, and Transfer Capability in the MARS model

(1) Zone	(2) Capacity[2]	(3) Load[3]	(4) Import Capability	(5) (2)/(3)	(6) (2+4)/(3)
A	5066	2625	4000	1.93	3.45
B	964	1800	3900	0.54	2.70
C	6621	2982	4870	2.22	3.85
D	1440	946	3500	1.52	5.22
E	886	1266	10770	0.70	9.21
F	3882	2182	5650	1.78	4.37
G	3501	2157	8920	1.62	5.76
H	2079	1551[4]	7600	1.34	6.24
I	3	1402	10980	0.00	7.83
J	9887	11315	5120	0.87	1.33
K	5318	5231	2136	1.02	1.42

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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[5] and the forecasted peak loads for the localities. Locality requirements are calculated by replacing the IRM base case determined peak loads with the peak loads at their forecasted values for the localities and adjusting loads in rest-of-state (ROS) to maintain the base case IRM. Capacity is then shifted from the localities to ROS until the point at which continued shifting of capacity would result in the LOLE criteria being violated.

Based on the sensitivity cases conducted for the 2005 - 2006 Capability Year IRM study, several issues were identified for future investigation. They included an increasing spread between the "free flowing" or unconstrained (i.e., no transmission constraints) IRM sensitivity case results and the base case results, cases indicating that locational capacity had a significant impact on the statewide IRM requirement, and cases with specific generators removed or added in ROS. The sensitivity cases implied that the statewide IRM requirement was impacted by the location of resources. In addition, the

[2] This is the "2004 Load & Capacity Data" Report's (Gold Book) Summer Capacity of 38,110 less 303 MW of firm sales plus 1,840 MW of net additional (those that had been added since the Gold Book plus the IRM proposed units) resources identified in the NYSRC IRM Study.

[3] This load forecast differs slightly (in zones A-I) than the final forecast. It shows those peaks needed to arrive at the system forecast peak while using the 2002 hourly loads (as established in the IRM study).

[4] The August 14, 2003 blackout caused an anomaly in this reading. The actual 2005 forecast for this zone is 803 MW.

[5] The IRM study approved by the NYSRC Executive Committee resulted in a base case IRM of 17.6%. The base case peak load solution resulted in capacity to load ratio of 99% of the peak load for Long Island and 83% for New York City. The peak load solution is the peak load that results by scaling the initial loads on an equal percentage basis in all zones until minimum resource adequacy criteria of an LOLE of 0.1 days/year are achieved for the assumptions studied.

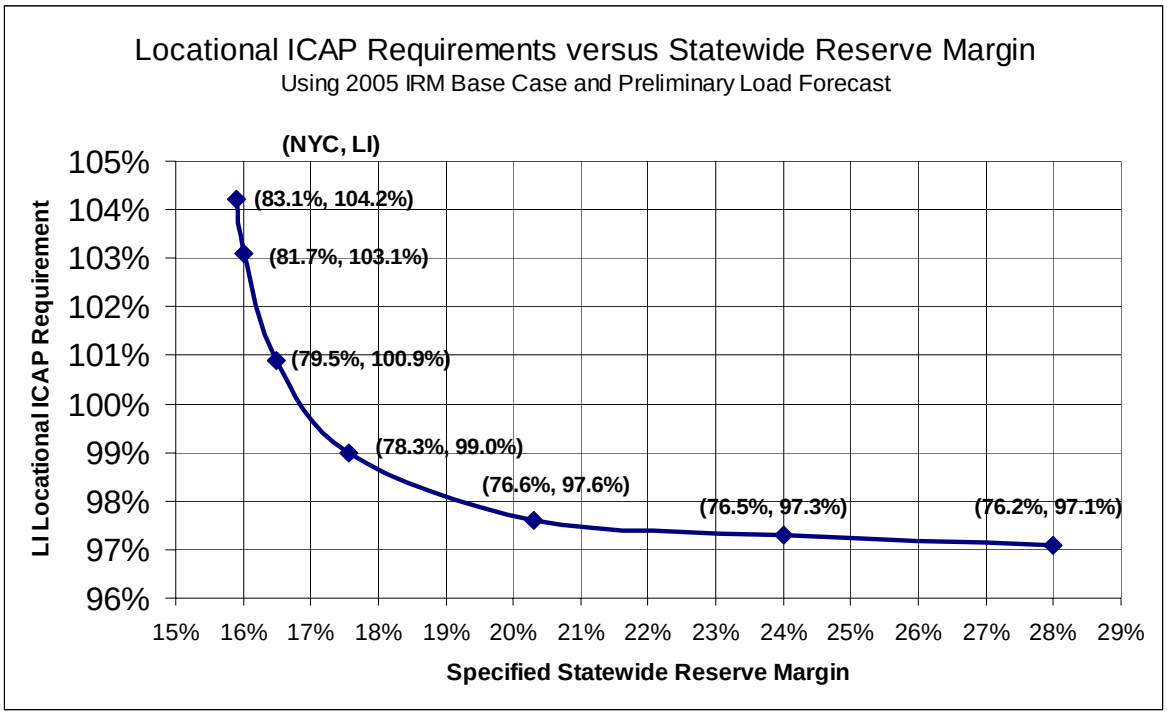
locational analysis for the base case IRM resulted in a capacity to load ratio that differed from the resultant capacity to load ratio for the New York City zone in the statewide IRM study.

As a result of these issues, it was decided to incorporate into the locational capacity requirements analysis for this year, an evaluation of locational capacity at multiple specified statewide reserve margins. The purpose of this additional analysis was to determine how various levels of locality capacity influence the statewide reserve margins and factor that consideration into the process of formulating a locational capacity requirements recommendation.

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. Therefore, the NYISO believes that these constraints have been fully considered.

STUDY RESULTS AND FINDINGS

For the reasons stated above, locational capacity analysis was conducted for multiple levels of statewide reserve margin. Because of lead-time requirements, the analysis was conducted with a preliminary forecast with the base case point validated when the final ICAP forecast became available. The following graph summarizes that analysis for the Long Island and New York City zones.



Note: All points on this graph satisfy LOLE criteria of 0.1 days per year. They are determined by applying the locational capacity analysis methodology – i.e., as pointed out in footnote #4, the IRM is arrived at by adding load in all NYCA zones. The above analysis is conducted by fixing the localities at their forecast peak loads.

The following observations can be made based on the analysis conducted:

1. The current locational capacity requirements for the Long Island and the New York City load zones are sufficient to ensure that resource adequacy criteria are met for the forecasted peak loads for the 2005 – 2006 capability year.

2. At the statewide reserve margin base case requirement of 17.6%, the calculation of a locational requirement (using a preliminary load forecast) for the Long Island zone resulted in a requirement of 99% while the New York City zone result was 78.3%. The New York City zone load to capacity ratio that resulted from the base case statewide IRM solution of 17.6% was 83% and 99% for Long Island.

3. At the "free flowing" or unconstrained statewide IRM of approximately 15.9%, the Long Island zone calculated locational requirement was slightly over 104%

while the New York City zone was slightly over 83%. These results are defined as the free flowing or unconstrained locational capacity equivalent – i.e., the free flowing equivalent.

4. Transmission constraints into the 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.

Results of conducting the single point analysis at 17.6% reserve margin and a final load forecast yield 98.9% Long Island and 78.1% New York City capacity to load ratios. This result is slightly less than the preliminary analysis results of 99% for Long Island and 78.3% for New York City because the final load forecast was slightly lower than the preliminary forecast.

In setting the locational requirements, the NYISO considered several uncertainties that would put upward pressure on locational requirements. These include proposed locality units not materializing, units not achieving their planned output and/or not meeting their projected forced outage rates. This last one is of particular concern since the NYSRC uses class averages in its IRM study, while other Control Areas use immature rates for newer units. In addition to the above uncertainties, upstate retirements could put upward pressure on locational requirements (by lowering reserve margin levels).

In light of these uncertainties, the NYISO recommends the currently applicable locational requirements remain in place for the 2005-2006 capability year.

STATEWIDE AND LOCATIONAL ICAP REQUIREMENTS

The NYISO has forecasted a NYCA peak load of 31,962 MW for the 2005–2006 Capability Year. The 18% statewide Installed Reserve Margin adopted by the NYSRC and the 31,962 MW peak produces an ICAP requirement for the NYCA of 37,715 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 2005 Table-2
Forecast peak load, installed capacity, special case resources (SCR's) and locational ICAP requirements (LCR).

Locality	Peak Load	ICAP LCR (%of Peak load)	ICAP LCR (in MW's)	Existing ICAP*	Proposed New Capacity**	Expected SCR's***
New York City	11,315	80	9,052	8,936	788	158
Long Island	5,231	99	5,179	5,169	160	90
NYCA	31,962	118	37,715	37,142	1698	897

*As measured by summer 2004 DMNC testing (not including SCR's and less 303 MW Firm Sales)

**As modeled in the NYSRC IRM Study and currently untested (have not yet provided DMNC test data)

***As modeled in the NYSRC IRM Study (with 92% availability- shown as derated)

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.