



LOCATIONAL INSTALLED CAPACITY
REQUIREMENTS REVIEW

COVERING THE NEW YORK CONTROL AREA
For the 2007 – 2008 Capability Year

February 16, 2007

Locational Installed Capacity Requirements Review

I. INTRODUCTION

This report documents a review 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 2007 - 2008 Capability Year beginning May 1, 2007. The review had three specific objectives. First, it examined NYCA system parameters to determine which zones required locational ICAP requirements. Second, it verified that the minimum locational ICAP requirements outlined by NYRSC are valid. And third, it validated the maximum allowable external ICAP contracts.

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 2006 – 2007 Capability Year. The Long Island locational ICAP requirement is ninety-nine percent (99%) of the Long Island forecast peak load for the 2006 – 2007 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.

The existing external ICAP import limit is 2,755 MW. This limit is independent of 330 MW of capacity from the Cross Sound Controllable Line (CSCL) and the imports (200MW) from the Cedars plant over the Dennison line into Quebec.

II. SUMMARY OF 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 2007 – 2008 Capability Year.
- 2) Under expected load and resource conditions and an adopted statewide installed reserve margin of 16.5%¹, the NYCA will be able to meet the NYSRC/NPCC LOLE criteria² for the 2007 – 2008 Capability Year.
- 3) Based on the updated NYSRC base case for the 2007 – 2008 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.
- 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.
- 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 2007 – 2008 Capability Year.
- 6) Under the sensitivity where the Neptune 660 MW HVDC line becomes available (due in service in July 2007) and is awarded UDRs, the locational capacity requirements of 80% for NYC and 99% for LI would still be sufficient to meet design criteria.
- 7) The 2,755 MW ICAP import limit is still valid for the 2007-2008 Capability Year. This limit could be expressed as a higher number if the Cedars import amount and/or CSCL contracts are included.
- 8) Separate analysis has indicated that allowing a 350 MW wheel from Quebec through Ontario into NYCA will not affect the Loss of Load Expectation (LOLE) at the IRM base case levels.

¹ The 2007 IRM Study provided for a 16.0% reserve margin to meet to LOLE criteria (see footnote 2). The NYSRC, in establishing the statewide IRM, added 0.5% to account for sensitivities and other factors to arrive at a 16.5% statewide IRM.

²The NYSRC shall establish the IRM requirement for the NYCA such that the probability (or risk) of disconnecting any firm load due to resource deficiencies shall be, on average, not more than once in ten years. Compliance with this criterion shall be evaluated probabilistically, such that the loss of load expectation (LOLE) of disconnecting firm load due to resource deficiencies shall be, on average, no more than 0.1 day per year. This evaluation shall make due allowance for demand uncertainty, scheduled outages and deratings, forced outages and deratings, assistance over interconnections with neighboring control areas, NYS Transmission System emergency transfer capability, and capacity and/or load relief from available operating procedures.

III. DATA, MODELS, AND METHODOLOGY

As its starting point, the NYISO locational ICAP requirements review utilized the statewide Installed Reserve Margin (IRM) study conducted by the NYSRC³. This study was approved by the NYSRC Executive Committee on 1/05/07, and is available on the NYSRC web site at www.nysrc.org.

The NYSRC study models the NYCA and neighboring control areas: 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 external ICAP allowance analysis starts with NYSRC IRM study's base case, which produced a statewide IRM of 16.0% and LCRs for NYC and LI of 80% and 99%, respectively⁴. It then tests each externally modeled Control Area to determine the maximum contractual import limit that can occur without affecting the IRM base case LOLE. This test results in a minimum amount of emergency assistance from each individual Control Area that the IRM base case relies upon for its findings. After these individual tests are performed, a collective or simultaneous test is run, using the above found ratios, to find the maximum contractual activity that can occur without affecting the IRM base case LOLE.

The NYISO locational ICAP review also starts with the NYSRC IRM study's base case. It then examines, as sensitivities, changes that could occur to the system before or during the capability year that could impact results. For this review two sensitivities were considered. The first was to examine the effect of the final ICAP load forecast on the base case results from the IRM study. The second was to determine the effects of the introduction of the Neptune 660 MW HVDC tie between PJM East zone and NY's Long Island zone.

The NYISO locational ICAP requirements review 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

³ NYSRC Report titled, "New York Control Area Installed Capacity Requirements for the Period May 2007 Through April 2008", January 5, 2007.

⁴ IBID.

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.

Table-1
Year 2007

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

<u>(1)</u> Zone	<u>(2)</u> Capacity⁵	<u>(3)</u> Peak Load⁶	<u>(4)</u> Import Capability	<u>(5)</u> (2)/(3)	<u>(6)</u> (2+4)/(3)
A	4923	2837	4000	1.74	3.15
B	1070	2074	3900	0.52	2.40
C	6524	3097	4770	2.11	3.65
D	1472	962	3500	1.53	5.17
E	1090	1384	10770	0.79	8.57
F	3817	2294	5950	1.66	4.26
G	3233	2337	8250*	1.38	4.91
H	2144	629	7000	3.41	14.54
I	16	1519	10980	0.01	7.24
J	10320	11780	5320	0.88	1.33
K	5771	5422	1751**	1.06	1.39

* Does not include import capability from dummy zone AG.

**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.

Beginning in 2005, the NYSRC's Installed Capacity Subcommittee along with the NYISO staff conducted analyses 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 review 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 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.

⁵ This is the "2006 Load & Capacity Data" Report's (Gold Book) Summer Capacity with changes shown in Appendix 2

⁶ The zonal peaks when combined with the 2002 hourly load shape yield a system peak of 33, 447 MW.

Finally, the NYISO and its market participants have initiated several processes designed to look at intra and inter zonal transmission constraints to determine if “bottled generation” exists. To date, the inter-zonal transmission limits have been accepted and no significant intra-zonal constraints indicating “bottled generation” have been identified to the NYISO.

IV. REVIEW OBSERVATIONS

The IRM study and its report identified locational requirements for various levels of IRMs along an LCR-IRM curve⁷. These curves (one for each of two localities) are attached to this review as Appendix 3. It then went on to select a base case point of 116.0%. For purposes of this review, the only point of interest along that curve is that of the 116.0% 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 16.0% and the IRM load forecast that was prepared in October 2006, the calculation of a locational requirement for the Long Island zone resulted in a Locational Capacity Requirement (LCR) of 98.6% while the New York City zone result was 79.5%. This observation is the result of the LCR-IRM curve that was provided in the 2007 IRM study report and is attached as Appendix 3.
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. Sensitivity - At the statewide reserve margin base case requirement of 16.0% and the final ICAP load forecast, the calculation of a locational requirement for the Long Island zone resulted in a Locational Capacity Requirement of 98.6% while the New York City zone result was 79.2%.
4. Sensitivity - At the statewide reserve margin base case requirement of 16.0%, the final ICAP load forecast, and the operation of the Neptune 660 MW HVDC cable (with UDRs assigned), the calculation of a locational requirement for the Long Island zone resulted in a Locational Capacity Requirement of 98.3% while the New York City zone result was 79.0%.

⁷ A full discussion of this curve can be found in the 2007 IRM study report which has been posted on the NYSRC website at 'http://www.nysrc.org/pdf/Reports/2007_08IRMReportFinal011707.pdf'.

Given the IRM base case and the sensitivities presented here, 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 33,447 MW for the 2007–2008 Capability Year. The 16.5% statewide Installed Reserve Margin adopted by the NYSRC and the 33,447 MW peak produces an ICAP requirement for the NYCA of 38,966 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:

Table-2
Year 2007
Forecast peak load, Installed Capacity, Special Case Resources (SCRs) and
Locational ICAP Requirements (LCRs).

Locality	Peak Load	ICAP LCR (% of Peak load)	ICAP LCR (in MW's)	Existing ICAP	Proposed New Capacity	Expected SCRs
New York City	11780	80	9424	10018	0	325
Long Island	5422	99	5368	5610	0	150
NYCA	33447	116.5	38966	39108 ⁸	179 ⁹	1080

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 existing resources.

⁸ Total 2006 summer tested capacity (not yet verified) plus firm purchases of Cedars (200 MW) and Cross Sound Cable (330 MW) less firm sales of NYPA Federal Power contracts (290 MW) and less retirements of Lovett 3 & 5 and Huntley 65 & 66.

⁹ This number represents the addition of Maple Ridge wind farm Phase 2 (100 MW) and Prattsburg Wind Farm (79 MW). Note that the addition of the Neptune cable (660 MW) currently scheduled for service in July is not included in any of the above numbers.

Appendix 1 Comparison of load forecasts

<u>Area</u>	<u>Gold Book Forecast</u>	<u>IRM Forecast</u>	<u>Final ICAP Forecast</u>
Zone J (NYC)	11,800 MW	11,775 MW	11,780 MW
Zone K (LI)	5,549 MW	5,478 MW	5,422 MW
NYCA	33,831 MW	33,544 MW	33,447 MW

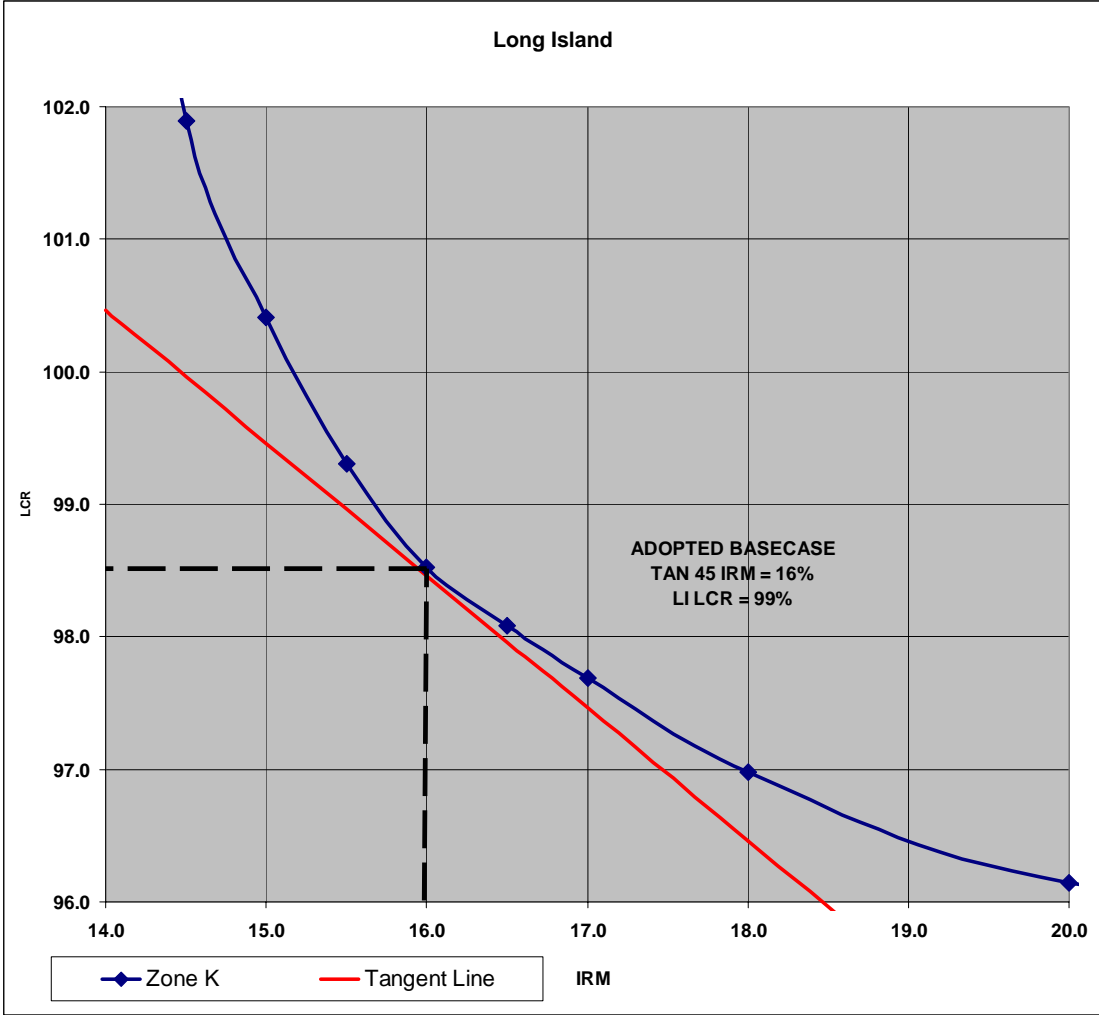
Appendix 2 Capacities in Model by zone

<u>Zone</u>	<u>2006 GOLD BOOK</u>	<u>non- ICAP</u>	<u>Sales</u>	<u>IRM Additions</u>	<u>CSCCL as UDR</u>	<u>IRM Retire- ments</u>	<u>Total</u>	<u>SCR's</u>	<u>Grand Total</u>
A	5051		-255			-165	4631	291.9	4923
B	941			79.9			1020.9	49.3	1070
C	6590	-152.7					6437.3	86.9	6524
D	1241	-18.3	-35	200			1387.7	84.2	1472
E	978			100			1078	11.6	1090
F	3765						3765	52.4	3817
G	3429	11				-223	3217	16.3	3233
H	2143						2143	1.0	2144
I	3						3	12.8	16
J	9525	-9.1		479.7			9995.6	324.6	10320
K	5291				330		5621	149.6	5771
	38957	-169.1	-290	859.6	330	-388	39299.5	1080.7	40380

Appendix 3

Long Island LCRs vs Statewide IRM

From the 2007 IRM Study Report



Appendix 3 – continued

New York City LCRs vs Statewide IRM

From the 2007 IRM Study Report

