Adequacy of LSE Unforced Capacity During the 2002 Summer Period
NYSRC Installed Capacity Subcommittee White Paper

Background

At the September 12, 2002 meeting of the New York State Reliability Council (NYSRC) Reliability Compliance Monitoring Subcommittee (RCMS) the NYISO advised RCMS that there may have been insufficient LSE unforced capacity (UCAP) in place to satisfy the statewide installed capacity requirement (ICR), as determined by the NYSRC for the 2002 summer period. If true, the NYISO would have been non-compliant with NYSRC Reliability Rule A-R2 that states that LSEs shall be required to procure sufficient resource capacity so as to meet the statewide ICR.

At the September 13, 2002 NYSRC Executive Committee (EC) meeting the NYISO further described the issue. At the meeting the EC requested the NYSRC Installed Capacity Subcommittee (ICS) further investigate this issue with the following objectives: (1) Develop a clear grasp of the present UCAP methodology, (2) Confirm the accuracy of the ICAP value derived from the certified 2002 summer LSE UCAP, as reported by the NYISO, (3) Review and understand the flaw in the UCAP process that led to the apparent shortfall of required LSE ICAP for meeting the 2002 summer statewide ICR, (4) Establish whether the NYISO was in non-compliance with NYSRC Reliability Rule A-R2 during the 2002 summer period, (5) Comment on a NYISO remedy to correct the flaw in the UCAP process, and (6) Comment on a NYISO plan and schedule to remedy the UCAP process.

This report documents ICS findings on the above stated issue.

Conclusion

NYSRC ICS has concluded that LSE ICAP requirements, as determined by the NYISO Unforced Capacity (UCAP) translation process, resulted in the NYISO failing to require the LSEs to procure sufficient resource capacity during the 2002 summer period required to satisfy NYCA installed capacity requirements, as required by NYSRC Reliability Rule A-R2.

The current method for translating the NYCA Installed Capacity Requirement into a NYCA Unforced Capacity resulted in a shortfall of 1771 MW. Given this shortfall the NYISO was non-compliant with NYSRC Reliability Rule A-R2 during the 2002 summer period. This matter has been referred to the NYSRC RCMS for further compliance review and action in accordance with NYSRC Policy 4 and the NYSRC Compliance Template Manual.

To remedy the non-compliance the NYISO proposed an interim translation methodology that was presented to NYSRC ICS at the September 24, 2002 meeting. ICS acknowledges the interim NYISO proposal addresses *almost the entire* shortfall, however, the methodology falls short of providing an absolute guarantee that no future deficiency could result. While the NYSRC ICS supports the immediate implementation of this interim measure as a means of correcting the bulk of the shortfall, NYSRC ICS does not at this time agree that the methodology corrects all defects associated with the calculation, nor that the methodology can assure full compliance with NYSRC requirements.

The NYSRC ICS commends the NYISO for bringing this matter to the attention of the NYSRC and for working collaboratively with the RC toward resolution.

Discussion

To determine the adequacy of LSE unforced capacity during the 2002 summer period it is useful to review of applicable NYS Reliability Rules.

NYSRC Reliability Rules Addressing Resource Adequacy Requirements

The NYSRC is responsible for establishing the annual statewide installed capacity requirement in order to ensure adequate resource capacity in the New York Control Area. NYSRC Reliability Rules A-R1, A-R2, and A-R3 address resource adequacy requirements in New York State. Rule A-R2 is stated below:

" R2. <u>LSE Capacity Requirements</u>

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-R1. Further, this LSE capacity obligation shall be distributed so as to meet locational ICAP requirements, considering the availability and capacity of the NYS transmission system to maintain A-R1 reliability requirements. "

NYSRC Reliability Rule A-R2 requires LSEs to procure sufficient capacity to meet the statewide installed capacity requirement computed by the NYSRC. The installed reserve margin determined in the " New York Control Area Installed Capacity Requirement For the Period May 2002 – April 2003 " study applicable for the summer 2002 period is 18%.

It is noted NYCA was compliant with NYSRC Reliability Rule A-R1.

Based on the above requirement ICS reviewed the adequacy of LSE unforced capacity during the 2002 summer period starting with a review of the UCAP translation methodology utilized.

(1) NYISO UCAP Methodology Utilized for 2002 Summer Period

Beginning November 1, 2001, the NYISO implemented a new system to value capacity in the New York State market in a manner that considers the forced outage rates of individual units. This system is referred to as "UCAP" which stands for "unforced capacity."

Under the UCAP approach the amount of capacity available to meet reserve requirements is tied to the actual historical performance of generating units. New York State Installed Reserve Margin (IRM) and Locational Capacity requirements, however, are based on installed capacity (ICAP). In order to maintain consistency between the rating of a unit on a UCAP basis, and the statewide and the local reserve margins, the reserve margin must be adjusted to an unforced capacity basis. The NYISO employed the following UCAP translation methodology to determine the NYCA Unforced Capacity Requirement for the 2002 summer period:

<u>NYCA Installed Reserve Margin Requirement as defined by 2002 IRM Study</u>
18%

<u>NYCA Installed Capacity Requirement</u>

Peak Load   x   (1 + IRM)   = ICAP Req.
30,475 MW   x   1.18   = **35,960.5 MW**

<u>10-year outage rate from IRM Study:</u>
9.68% [1]

<u>NYCA Unforced Capacity Equivalent</u>

(1 – IRM outage rate) x ICAP Req. = UCAP Req.
(1 – 0.0968) x 35,960.5 MW = 32,479.5 MW

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[1] Weighted average NYCA equivalent. It is noted the 10-year outage rate from the IRM study may vary slightly from 10-year WEFORd due to calculation methodology. To date no significant difference has been observed between the 10-year outage rate from IRM study and 10-year WEFORd.

(2) ICAP Value derived From the Certified 2002 Summer LSE UCAP

The following calculation determines the ICAP equivalent derived from the certified 2002 summer LSE UCAP procured by the NYISO:

Current approximate 12-month rolling Equivalent Demand Forced Outage Rate
5% [2]

Installed Capacity Equivalent

UCAP ÷ (1 – 12-mos. rolling EFORd avg.) = ICAP Equiv.
32,479.5 MW [3] ÷ (1 – 0.05) = **34,189 MW**

From the above it is clear that while NYSRC Reliability Rules require the procurement of 35,960.5 MW of ICAP the NYISO only procured 34,189 MW of ICAP. The resulting shortfall was a direct result of methodology utilized to translate ICAP requirements into UCAP.

Based on the above calculation ICS agrees with the accuracy of the ICAP value derived from the certified 2002 summer LSE UCAP reported by the NYISO.

(3) Review and understand the flaw in the UCAP process that led to the apparent shortfall of required LSE ICAP for meeting the 2002 summer statewide ICR.

The UCAP translation methodology utilized by the NYISO for the summer 2002 period is deficient in that it understated the requirement when the forced outage rate derived from the NYCA Installed Capacity Requirement study (which was used to determine the UCAP demand) is significantly greater than the forced outage rate which is used to calculate the UCAP supply. The result was a shortfall in procured ICAP. The effect has been quantified in the 2002 summer conditions above. Had both the weighted IRM forced outage rate and the weighted 12–month rolling forced outage rate been virtually identical then no shortfall would have resulted.

To underscore the inadequacy of the existing UCAP translation methodology utilized for the 2002 summer, it is noted that had the NYCA Installed Capacity Requirement study utilized a reduced forced outage rate, the above methodology would have produced an increased UCAP requirement in spite of the improved availability of generating units. This effect is incorrect.

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[2] NYCA WEFORd.
[3] See Appendix or http://www.nyiso.com/markets/icapinfo.html

For example, assuming the 12 month forced outage rate stays the same, and the 10 yr forced outage rate drops to 7%, and IRM result stayed at 18%, the UCAP requirement of 35,960.5 MW becomes 35,960.5 x (1-.07) = 33,443 MW. It is contrary that at the lower forced outage rate of 7%, more UCAP of 33,443 MW is required then at the 9.68% forced outage rate where only 32,479.5 MW is required. In this example, when the 10 year average improves we need to purchase more UCAP, which does not make sense.

Lastly, it is important to note that just because the forced outage rate is currently less than the forced outage rate used in the NYCA Installed Capacity Requirement study does not mean that the overall system risk has been reduced. The system risk will be reduced if the UCAP supplier's short-term performance, which is better than the long term expected performance used to calculate the IRM, can be maintained on a long-term basis. If the short term level of performance can be maintained over the long term, the IRM study and UCAP forced outage rates will come closer. This will result in a reduction in the ICR and IRM requirements and hence lower UCAP requirements – i.e., all else being equal.

(4) Establish whether the NYISO was in non-compliance with NYSRC Reliability Rule A-R2 during the 2002 summer period

Approximate ICAP deficiency
35,960 MW – 34,189 MW = 1,771 MW

Approximate actual Installed Reserve Margin
34,189 MW / 30,475 MW = 1.122 or 12.2%

Approximate UCAP deficiency translated from ICAP
1,771 MW x (1 – 0.05) = 1682.5 MW

As shown above NYSRC Reliability Rules required the procurement of 35,960 MW of ICAP for the 2002 summer period, however the NYISO only procured 34,189 MW of ICAP. This resulted in the NYISO failing to require the LSEs to procure 1771 MW of ICAP during the 2002 summer period needed to satisfy NYCA installed capacity requirements, as required by NYSRC Reliability Rule A-R2. The result of the translation methodology: Inadequate reserve margins of 12.2 % actual, versus 18 % required.

Based on the above it is therefore concluded that NYISO was in non-compliance with NYSRC Reliability Rule A-R2 during the 2002 summer period.

Furthermore, as long as the forced outage rate to determine the UCAP demand is significantly greater than that used to calculate UCAP supply, the NYISO will not procure sufficient ICR or meet the IRM requirement required by the NYSRC reliability rules given the flawed translation methodology.

(5) Comment on a NYISO remedy to correct the flaw in the UCAP process, and (6) Comment on a NYISO plan and schedule to remedy the UCAP process.

To remedy the non-compliance the NYISO proposed an interim translation methodology which was presented to NYSRC ICS at the September 24, 2002 meeting. ICS acknowledges the interim NYISO proposal addresses *almost the entire* shortfall, however, the methodology falls short of providing an absolute guarantee that no future deficiency could result. While the NYSRC ICS supports the immediate implementation of this interim measure as a means of correcting the bulk of the shortfall, NYSRC ICS does not at this time agree that the methodology corrects all defects associated with the calculation, nor that the methodology can assure full compliance with NYSRC requirements. Discussed below is the interim NYISO methodology for correcting the flaw in the UCAP process, along with ICS critique of the methodology:

The NYISO proposal to remedy the UCAP translation process is to adjust both the requirement and the supply by the same amount, the average of the six most recent 12-month performance. What this does is take the 10-year estimated forced outage rate built into the NYSRC IRM study and discounts it by the current 18 month performance, but it also translates the requirement and the supply by the same amount, resulting in the same amount of ICAP being available in the market.

Specifically for each Capability Period, the proposal is to translate the NYCA and Locality ICAP Requirements to UCAP requirements based on the average forced outage rate value of the six (6) most recent rolling 12-month equivalent demand forced outage rates of all NYCA or Locality Resources. This would lock in the amount of UCAP a Resource can supply on a Capability Period basis instead of updating every month and base the amount of UCAP each Resource is eligible to supply on the average of the six (6) most recent rolling 12-month equivalent demand forced outage rates for that Resource (the same six (6) most recent rolling 12-month intervals used to translate the various ICAP Requirements to UCAP requirements).

Average of 6 most recent 12-month rolling Equivalent Demand Forced Outage Rates:
4.98%

New NYCA Unforced Capacity Requirement

(1 – New NYCA outage rate) x ICAP Req. = UCAP Req.
(1 – 0.0498) x 35,960.5 MW = 34,169.7 MW

Additional Unforced Capacity Required

34,169.7 MW - 32,479.5 MW = 1690.2 MW

Fixing each generator's capability at the start of the period eliminates the concern of updating each generator's capability each month.

The concern with this methodology is that it is still possible to end up with slightly more or less ICAP depending on the individual make-up of what is actually procured. If the ICAP that is procured has a lower forced outage rate than the total market average, then there will be a shortfall of ICAP. The NYISO does note expect this shortfall to occur and believes that if it does, it will not be of a material magnitude. Never the less, the NYISO will address any short fall that occurs in the upcoming winter capability period. The NYISO is looking at ways to ensure the UCAP translation guarantees full compliance with NYSRC rules prior to the summer 2003 capability period.

11-24-02

APPENDIX

Statewide and Locational Requirements for ICAP and UCAP Beginning May 1, 2002 Through April 30, 2003

Transmission District	2002 Non-Coincident Peak Load (MW)	TD Share	ICAP Requirement (MW)	Effective ICAP %	NYCA UCAP Requriments	Effective UCAP %
Central Hudson	990	0.032	1,166.3	117.81%	1,053.4	106.40%
Con Edison	12,225	0.400	14,402.0	117.81%	13,007.9	106.40%
LIPA	4,775	0.156	5,625.0	117.81%	5,080.5	106.40%
NYPA	648	0.021	763.4	117.81%	689.5	106.40%
NYSEG	2,606	0.085	3,070.1	117.81%	2,772.9	106.40%
NMPC	6,766	0.222	7,970.9	117.81%	7,199.3	106.40%
Orange and Rockland[1]	945	0.031	1,113.3	117.81%	1,005.5	106.40%
RGE	1,570	0.051	1,849.6	117.81%	1,670.5	106.40%
Total	**30,525**	**1.000**	**35,960.5**		**32,479.5**	

Statewide requirements

NYCA ICAP Requirement set at 118% of 2002 forecast peak

NYCA ICAP Requirement $= 1.18 \times$ **30,475** MW

$=$ **35,960.5** MW

[1] Reduced by 435 MW to account for Rockland Electric Company load moving to PJM.

UCAP Calculation = 30,475 * 118% * (1-NYCA EFOR)

NYCA EFOR	=	9.68%
1-NYCA EFOR	=	90.32%
NYCA UCAP Requirement	= **106.58%** *	**30,475.0** MW
	=	**32,479.5** MW
Deficiency Price for 6 months	=	**$69.20**
Deficiency Price for 1 month	=	**$11.53**

Developed   03/28/02

Locational requirements

NYC ICAP requirement is 80% of peak load
NYC UCAP requirement is the NYC peak load
                * (80% * (1- NYC EFOR))

NYC EFOR =	10.67%
1 - NYC EFOR =	89.33%
NYC Peak Load =	10,665.0
NYC UCAP =	**7,621.6**
NYC Deficiency Price for 6 Mo.	**83.96**
NYC Deficiency Price for 1 Mo.	**13.99**

LI ICAP requirement is 93% of peak load
LI UCAP requirement is the LI peak load *
                (93% * (1- LI EFOR))

LI EFOR =	5.94%
1 - LI EFOR =	94.06%
LI Peak Load =	4,776.0
LI UCAP =	**4,177.8**
LI Deficiency Price for 6 Mo.	**$74.42**
LI Deficiency Price for 1 Mo.	**$12.40**