

NYSRC Installed Capacity Subcommittee (ICS)

ICAP / UCAP Translation Report

Report Proposal to Supplement the Annual IRM Study

Steven Jeremko – NYSEG-RGE

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Background:

The Installed Capacity (ICAP) Market in New York is based on the obligation placed on LSEs to procure ICAP to meet their minimum requirements. These minimum requirements are determined by each LSE's forecasted contribution to seasonal peak load, plus an additional amount to cover an Installed Reserve Margin (IRM). The amount of capacity that each supplying resource is qualified to provide to the New York Control Area (NYCA) is determined by an Unforced Capacity (UCAP) methodology.

In New York, ICAP represents generating capacity that is physically on the ground and has a defined value that is determined by a valid Dependable Maximum Net Capability (DMNC), test or other approved evaluation method.

- Example: Generator A has a nameplate value of 100 MW and undergoes a DMNC test which reveals that this unit can only produce 95 MWs. For ICAP purposes, the NYISO will therefore rate this unit at 95 MW (ICAP).

However, the ICAP market actually trades UCAP, which represents the amount of ICAP that is likely to be available for dispatch at any given time. UCAP is the percentage of ICAP available after discounting that unit's forced outage rate. A rolling 12-month average of the monthly forced outage rate is used to determine the amount of ICAP that can be sold in units of UCAP.

- Example: Generator A's 12-month forced outage rate is 10%. Therefore, this unit's 95 MW ICAP is further discounted by 10%. Generator A is thereby allowed to sell 85.5 MW (95 MW ICAP * (1-10%)) of UCAP in the next monthly ICAP auction. This value may vary on a monthly basis.

The Annual IRM Study is a comprehensive and highly regarded technical analysis that explains and justifies the development of the IRM, expressed as a percentage of the forecasted peak load. For the 2010 IRM Study, the final calculated IRM was 17.9%, an increase of 1.7% over the 2009 IRM Study result of 16.2%.

The Locational Capacity Requirements (LCRs) also changed over this period. The 2010 Basecase LCRs were 79.6% and 104.9% for New York City (NYC) and Long Island (LI), respectively. These values also represent a change from the 2009 IRM Study, with LCRs of 80% for NYC and 97.5% for LI.

Problem:

The representation of IRM in terms of percentage does not necessarily capture the full impact of changes in IRM when expressed as megawatts (MWs). The IRM is applied to peak load forecasts to develop the ICAP requirements. In turn, ICAP is then translated to UCAP by applying the appropriate derating factors.

With so many variables at play, an approximate 10% increase in IRM percentage (as seen this year, 16.2% to 17.9%) may not necessarily translate to a 10% increase in ICAP or UCAP. Since the IRM study contains so many simultaneously moving components, many factors can easily alter the results.

As the IRM Study reaches its conclusive result, several questions arise that all market participants and other and interested parties ultimately want and should know that goes directly to the bottom line:

- *How does a change in the statewide IRM affect us? How does IRM affect overall NYCA capacity requirements?*
- *How much do changes in peak load forecast and forced outage rates affect the reserve requirements in each Transmission Zone?*
- *What amounts of UCAP must we procure?*
- *What steps must we take in our capacity procurement programs to ensure that we meet reliability requirements?*
- *How does this affect our near-term and long-range planning?*

The current IRM Study does not address the capacity requirements (MWs) in terms of ICAP or UCAP. In this regard, the percentage IRM can be a rather abstract concept to many market participants.

Proposal:

A new "ICAP / UCAP Translation Report" could be jointly developed by the NYISO and the NYSRC-ICS to supplement the current Annual IRM Study. This report would utilize existing historic data with newly-developed IRM information to illustrate capacity trends and project ICAP / UCAP requirements for the upcoming capability year. Report should include:

- Conversion of IRM and LCR information into the ICAP requirement (MWs)
- An estimated "Derating Factor %" used to calculate an initial (best guess) UCAP requirement.
- ICAP / UCAP projections for the Locational Areas (NYCA, NYC and LI) plus each of the eight Transmission Zones (CHGE, Con Edison, LIPA, NYPA, NYSEG, NGrid, O&R and RGE)
- Tabular information with graphs to depict: 1) Peak Load Forecast, 2) ICAP requirements, 3) UCAP requirements, 4) IRM (Approved for NYCA) and 5) LCRs (for NYC and LI).

The time resources expected and required to develop this report are minimal; most of this information is publicly available and already offered on the NYISO website.

Development / Implementation:

Historic data is compiled from information already posted on the NYISO o Historic Data:

[NYISO website](#) → [Market Data](#) → [ICAP](#) → [ICAP Data & Information](#) → [View ICAP & UCAP Calculations](#)

The screen capture from the NYISO website shows ICAP / UCAP Calculations for the Summer 2009 period.

The screenshot displays the NYISO website interface for 'Installed Capacity' calculations. The header includes the NYISO logo and the text 'View ICAP and UCAP Calculations'. Navigation tabs for 'Auction', 'Mitigation', 'Load Forecast', and 'Calendar' are visible. A 'Season' dropdown menu is set to 'Summer 2009' with a 'Display' button. Below this, a 'Post Data' section shows the posting date as '19-Mar-2009 03:30 PM' and the user as 'Mariann Wilczek'. The 'Locational Calculations' table provides a summary of peak loads, requirements, and derating factors for LI, NYC, and NYCA. The 'Transmission District Loads' table breaks down these requirements by district, including Metering Authority - Central Hudson Gas and Electric, Consolidated Edison of NY, Long Island Power Authority, New York Power Authority, New York State Electric & Gas, Niagara Mohawk, Orange and Rockland Utilities, and Rochester Gas and Electric, along with a total row.

Location	Forecasted Peak Load	Requirement %	Derating Factor %	ICAP MW Requirement	UCAP MW Requirement	UCAP Effective %
LI	5,474.0	97.50%	11.03%	5,337.2	4,748.5	86.75%
NYC	12,050.0	80.00%	8.14%	9,640.0	8,855.3	73.49%
NYCA	33,930.2	116.50%	8.01%	39,528.7	36,362.4	107.17%

Transmission District	Forecasted Peak Load	ICAP MW Requirement	UCAP MW Requirement
Metering Authority - Central Hudson Gas and Electric	1,196.3	1,393.7	1,282.1
Metering Authority - Consolidated Edison of NY	14,043.0	16,360.1	15,049.6
Metering Authority - Long Island Power Authority	5,431.7	6,327.9	5,821.1
Metering Authority - New York Power Authority	587.2	684.1	629.3
Metering Authority - New York State Electric & Gas	3,111.8	3,625.3	3,334.9
Metering Authority - Niagara Mohawk	6,728.4	7,838.6	7,210.7
Metering Authority - Orange and Rockland Utilities	1,179.5	1,374.1	1,264.0
Metering Authority - Rochester Gas and Electric	1,652.3	1,924.9	1,770.7
Total	33,930.2	39,528.7	36,362.4

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As of January 2010, the earliest period available on the NYISO website is from Summer 2006. The latest information is for Winter 2009-2010.

This information is updated by the NYISO by March for the Summer period and again in September for the Winter period. Since the Derating Factor is not yet available for 2010, this parameter has to be estimated.

Summaries were then compiled using available information.

Locational Capacity Areas (LCAs):

Adapting the format from the NYISO data, values for the LCAs including the NYCA, NYC and LI are compiled as follows:

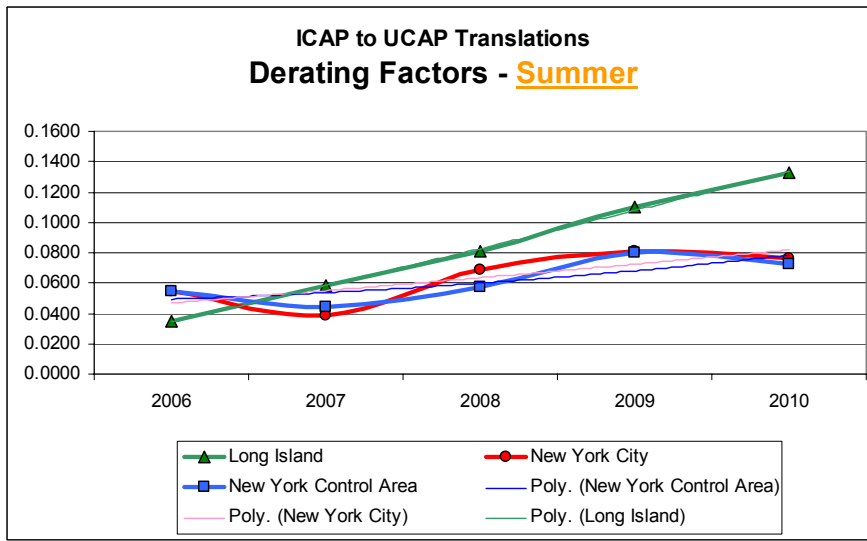
Locational Capacity Areas

Location		Forecasted Peak Load	Requirement %	Derating Factor %	ICAP MW Requirement	UCAP MW Requirement	UCAP Effective %
NYISO Data					5,294.5	5,110.3	95.55%
2006 S	LI	5,348.0	99.0%	0.0348	5,294.5	5,110.3	95.56%
2006 S	NYC	11,627.8	80.0%	0.0542	9,302.2	8,798.1	75.66%
2006 S	NYCA	33,294.5	118.0%	0.0543	39,287.5	37,154.2	111.59%
2006 W	LI	5,348.0	99.0%	0.0420	5,294.5	5,072.2	94.84%
2006 W	NYC	11,627.8	80.0%	0.0506	9,302.2	8,831.5	75.95%
2006 W	NYCA	33,294.5	118.0%	0.0501	39,287.5	37,319.2	112.09%
2007 S	LI	5,421.8	99.0%	0.0580	5,367.6	5,056.3	93.26%
2007 S	NYC	11,780.0	80.0%	0.0388	9,424.0	9,058.3	76.90%
2007 S	NYCA	33,447.4	116.5%	0.0446	38,966.2	37,228.3	111.30%
2007 W	LI	5,421.8	99.0%	0.0736	5,367.6	4,972.5	91.71%
2007 W	NYC	11,780.0	80.0%	0.0587	9,424.0	8,870.8	75.30%
2007 W	NYCA	33,447.4	116.5%	0.0551	38,966.2	36,819.2	110.08%
2008 S	LI	5,423.8	94.0%	0.0811	5,098.4	4,684.9	86.38%
2008 S	NYC	11,963.7	80.0%	0.0690	9,571.0	8,910.6	74.48%
2008 S	NYCA	33,808.5	115.0%	0.0578	38,879.8	36,632.5	108.35%
2008 W	LI	5,423.8	94.0%	0.1044	5,098.4	4,566.1	84.19%
2008 W	NYC	11,963.7	80.0%	0.0593	9,571.0	9,003.4	75.26%
2008 W	NYCA	33,808.5	115.0%	0.0614	38,879.8	36,492.6	107.94%
2009 S	LI	5,474.0	97.5%	0.1103	5,337.2	4,748.5	86.75%
2009 S	NYC	12,050.0	80.0%	0.0814	9,640.0	8,855.3	73.49%
2009 S	NYCA	33,930.2	116.5%	0.0801	39,528.7	36,362.4	107.17%
2009 W	LI	5,474.0	97.5%	0.1222	5,337.2	4,685.0	85.59%
2009 W	NYC	12,050.0	80.0%	0.1129	9,640.0	8,551.6	70.97%
2009 W	NYCA	33,930.2	116.5%	0.0947	39,528.7	35,785.3	105.47%
2010 S							
2010 S							
2010 S							
2010 W							
2010 W							
2010 W							

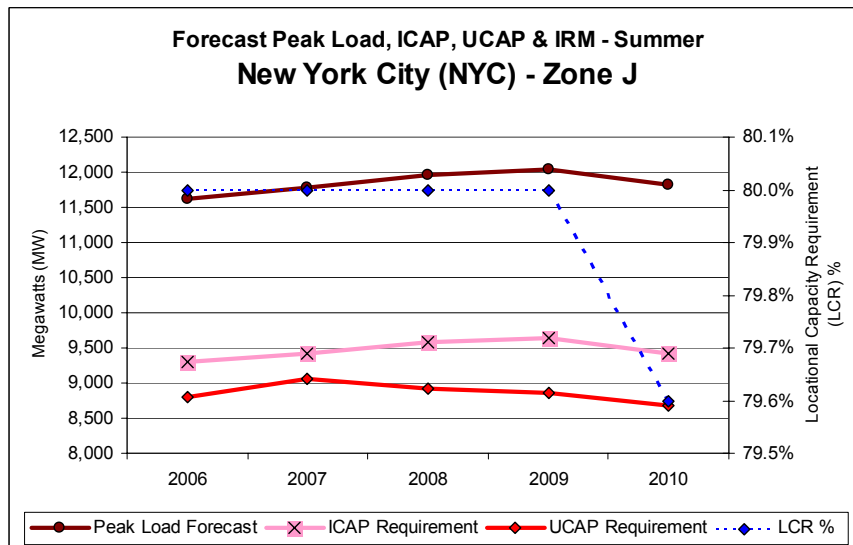
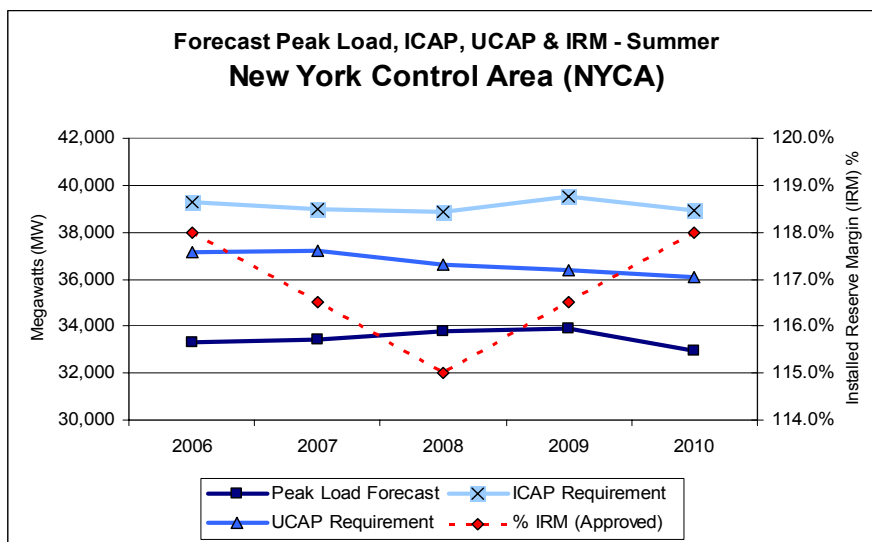
The 2010 information has to be projected using estimated Derating Factors. A simple trending analysis (using Excel's "TREND" function) was performed on the change in deratings to estimate the 2010 values. Summer 2010 is shown below:

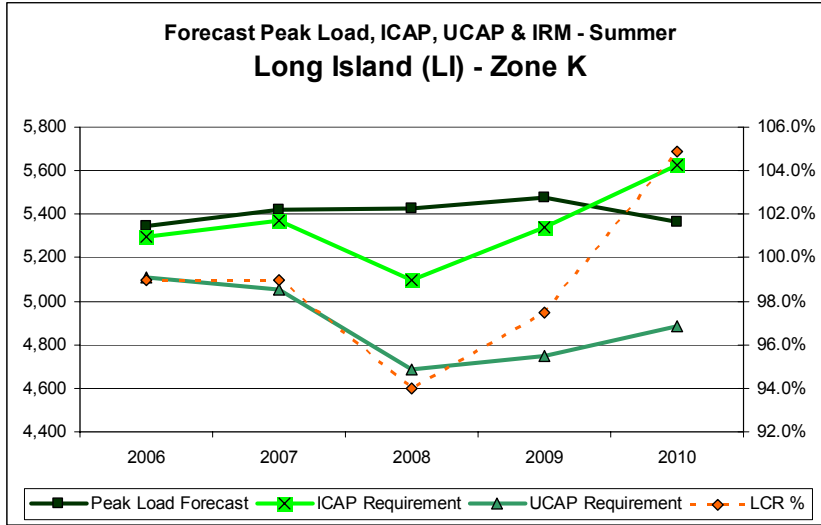
Sorted by Area & Period								
Location	Forecasted Peak Load	Requirement %	Derating Factor %	ICAP MW Requirement	UCAP MW Requirement	UCAP Effective %	Derating Deltas	
SUMMER								
Long Island								
2006 S	LI	5,348.0	99.0%	0.0348	5,294.5	5,110.3	95.55%	
2007 S	LI	5,421.8	99.0%	0.0580	5,367.6	5,056.3	93.26%	0.0232
2008 S	LI	5,423.8	94.0%	0.0811	5,098.4	4,684.9	86.38%	0.0231
2009 S	LI	5,474.0	97.5%	0.1103	5,337.2	4,748.5	86.75%	0.0292
2010 S	LI	5,365.0	104.9%	0.1325	5,627.9	4,882.4	91.00%	0.022167
New York City								
2006 S	NYC	11,627.8	80.0%	0.0542	9,302.2	8,798.1	75.66%	
2007 S	NYC	11,780.0	80.0%	0.0388	9,424.0	9,058.3	76.90%	-0.0154
2008 S	NYC	11,963.7	80.0%	0.0690	9,571.0	8,910.6	74.48%	0.0302
2009 S	NYC	12,050.0	80.0%	0.0814	9,640.0	8,855.3	73.49%	0.0124
2010 S	NYC	11,822.0	79.6%	0.0766	9,410.3	8,689.8	73.51%	-0.0048
New York Control Area								
2006 S	NYCA	33,294.5	118.0%	0.0543	39,287.5	37,154.2	111.59%	
2007 S	NYCA	33,447.4	116.5%	0.0446	38,966.2	37,228.3	111.30%	-0.0097
2008 S	NYCA	33,808.5	115.0%	0.0578	38,879.8	36,632.5	108.35%	0.0132
2009 S	NYCA	33,930.2	116.5%	0.0801	39,528.7	36,362.4	107.17%	0.0223
2010 S	NYCA	32,976.0	118.0%	0.0727	38,911.7	36,082.8	109.42%	-0.0074

The following graph was then developed to examine how well the trending analysis works:



This information was then compiled into the following LCA graphs. Note that the NYCA graph shows the IRM while the NYC and LI graphs include the LCRs. :





Transmission Zones:

Transmission Zone data was also obtained from the "ICAP / UCAP Translations" data. Information for 2010 was provided from the NYISO in the following table:

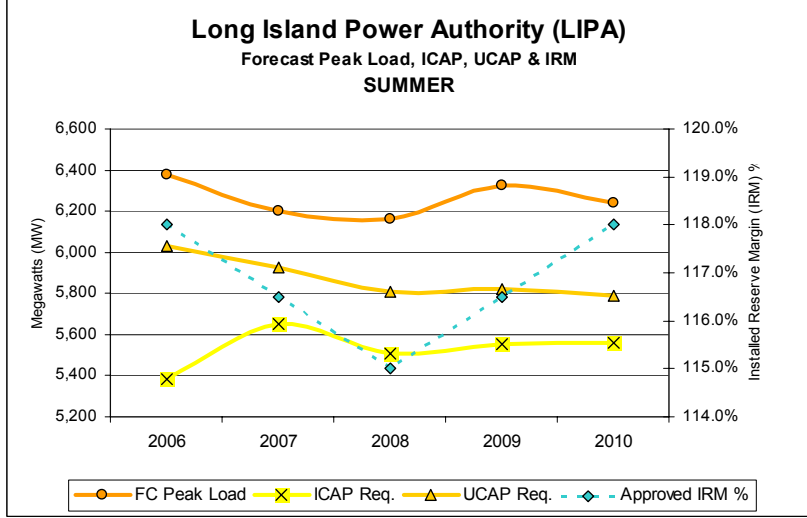
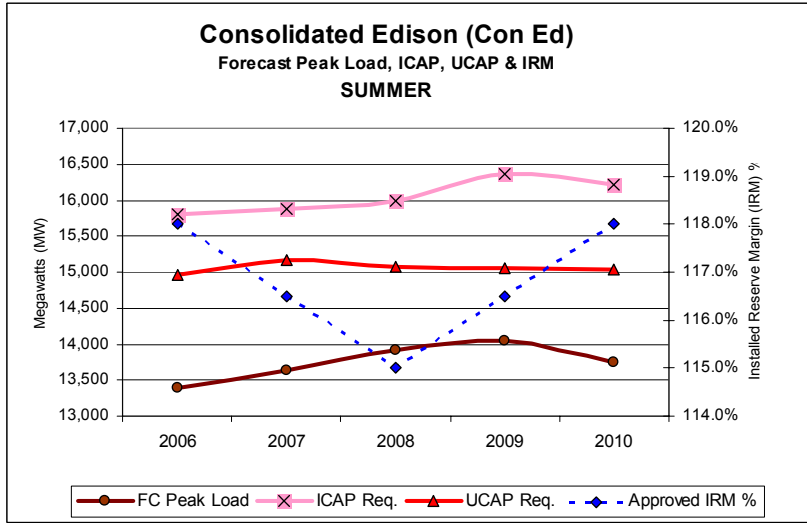
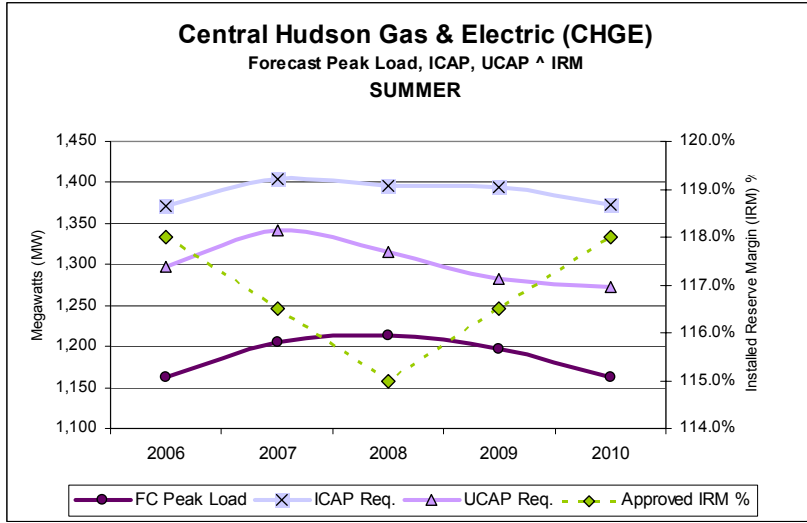
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Transmission District	2009 Actual MW	Weather Adjustment	2009 Adjusted MW	Loss Reallocation	2009 Weather Adjusted MW	Regional Load Growth Factors	2010 Installed Reserve Margin Forecast
Central Hudson	1,084	80	1,164	-1	1,163	1.0000	1,163
Con Ed	11,962	1,613	13,575	157	13,732	1.0010	13,746
LIPA	5,063	189	5,252	37	5,289	1.0000	5,289
NGrid	6,813	-15	6,798	-184	6,614	1.0050	6,647
NYPA	312	-4	308	5	313	1.0202	319
NYSEG	3,044	76	3,120	-18	3,102	0.9970	3,093
O&R	1,017	69	1,086	9	1,095	1.0030	1,098
RG&E	1,549	77	1,626	-5	1,621	1.0000	1,621
Grand Total	30,844	2,085	32,929	0	32,929	1.0014	32,976

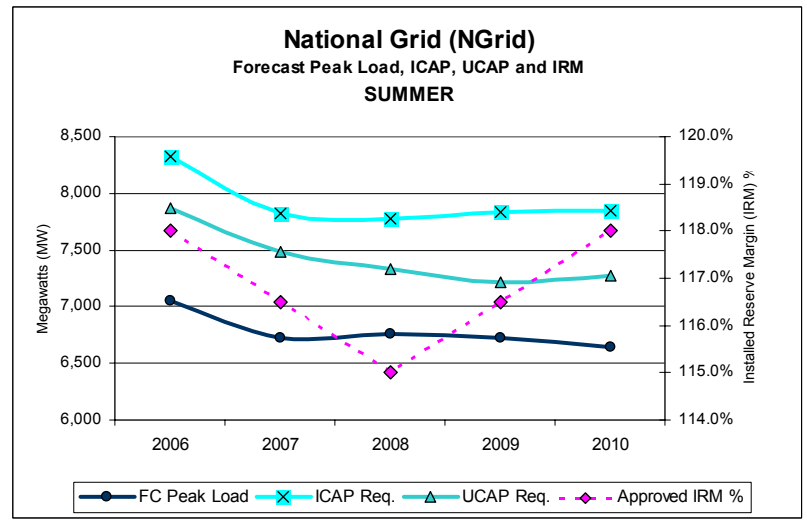
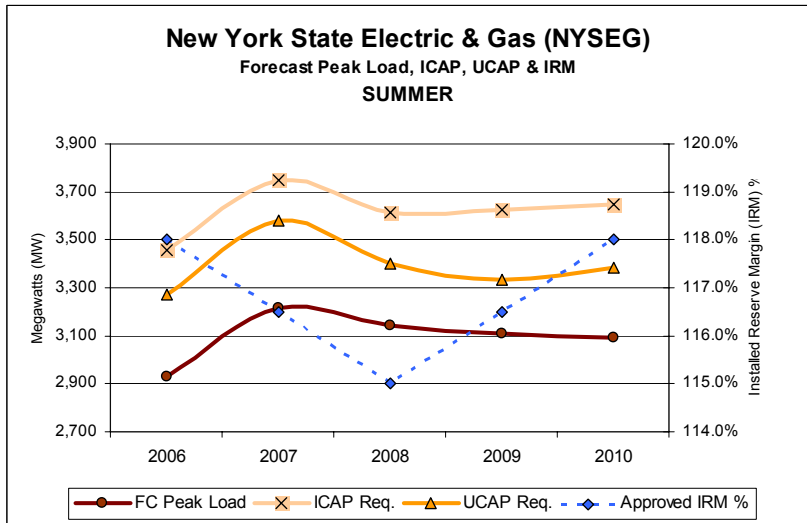
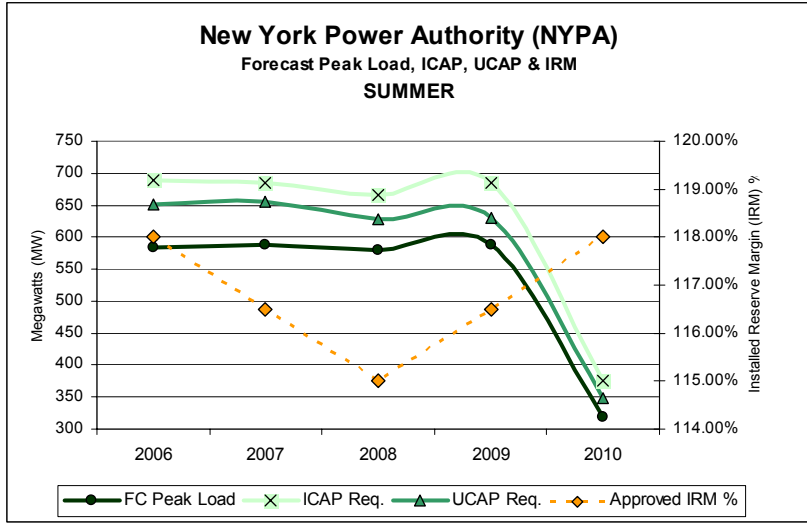
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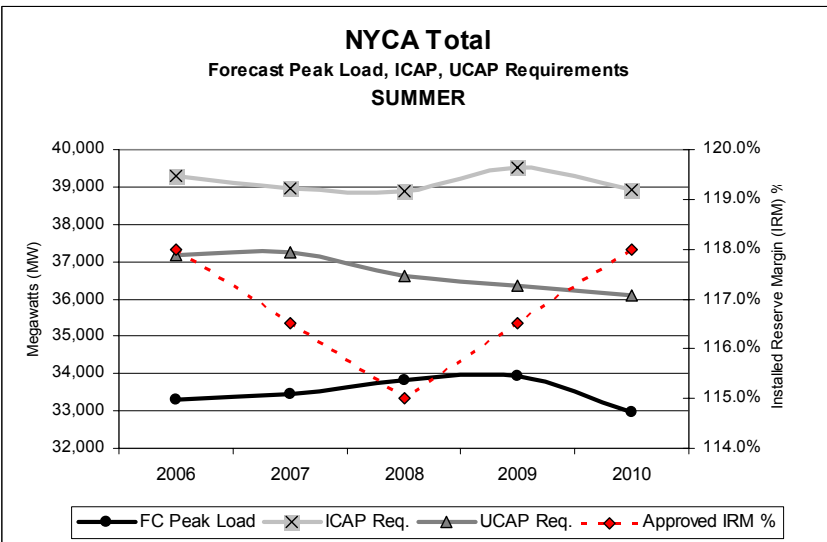
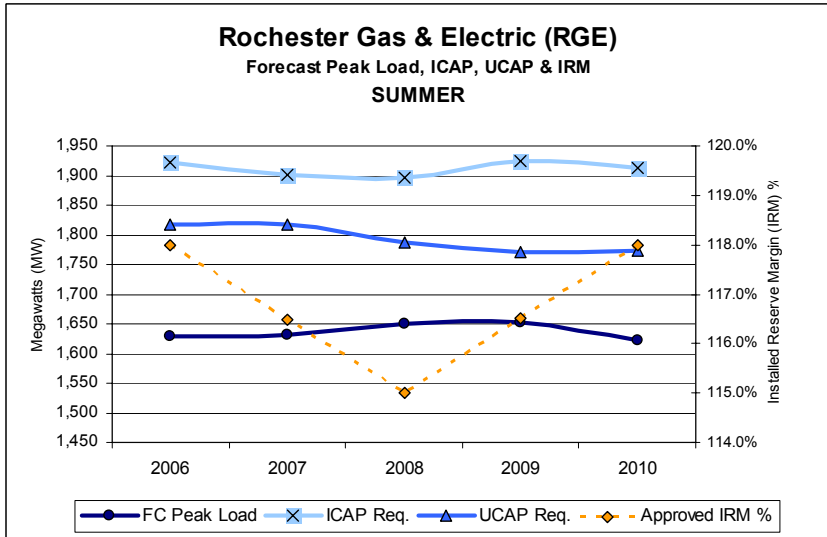
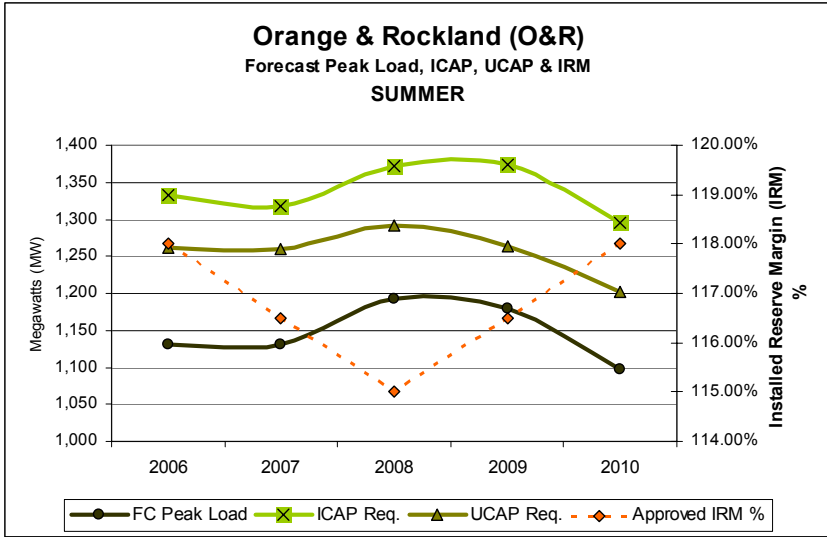
Sorted by Transmission Zone & Period

Transmission District		Forecasted Peak Load	ICAP MW Requirement	UCAP MW Requirement	ICAP % of Peak Load	UCAP % of Peak Load
SUMMER						
Central Hudson Gas & Electric (CHGE)						
2006 S	Central Hudson Gas and Electric	1,162.5	1,371.7	1,297.3	118.00%	111.60%
2007 S	Central Hudson Gas and Electric	1,205.0	1,403.8	1,341.2	116.50%	111.30%
2008 S	Central Hudson Gas and Electric	1,214.1	1,396.2	1,315.5	115.00%	108.35%
2009 S	Central Hudson Gas and Electric	1,196.3	1,393.7	1,282.1	116.50%	107.17%
2010 S	Central Hudson Gas and Electric	1,163.0	1,372.3	1,272.6	118.00%	109.42%
Consolidated Edison of NY (Con Edison)						
2006 S	Consolidated Edison of NY	13,400.0	15,812.0	14,953.4	118.00%	111.59%
2007 S	Consolidated Edison of NY	13,633.6	15,883.1	15,174.7	116.50%	111.30%
2008 S	Consolidated Edison of NY	13,911.1	15,997.8	15,073.1	115.00%	108.35%
2009 S	Consolidated Edison of NY	14,043.0	16,360.1	15,049.6	116.50%	107.17%
2010 S	Consolidated Edison of NY	13,746.0	16,220.3	15,041.1	118.00%	109.42%
Long Island Power Authority (LIPA)						
2006 S	Long Island Power Authority	5,406.2	6,379.3	6,032.9	118.00%	111.59%
2007 S	Long Island Power Authority	5,321.8	6,199.9	5,923.4	116.50%	111.30%
2008 S	Long Island Power Authority	5,358.9	6,162.7	5,806.5	115.00%	108.35%
2009 S	Long Island Power Authority	5,431.7	6,327.9	5,821.1	116.50%	107.17%
2010 S	Long Island Power Authority	5,289.0	6,241.0	5,787.3	118.00%	109.42%
New York Power Authority (NYPA)						
2006 S	New York Power Authority	584.2	689.4	651.9	118.01%	111.59%
2007 S	New York Power Authority	588.2	685.3	654.7	116.51%	111.31%
2008 S	New York Power Authority	579.1	666.0	627.5	115.01%	108.36%
2009 S	New York Power Authority	587.2	684.1	629.3	116.50%	107.17%
2010 S	New York Power Authority	319.0	376.4	349.1	118.00%	109.42%
New York State Electric & Gas (NYSEG)						
2006 S	New York State Electric & Gas	2,931.5	3,459.2	3,271.3	118.00%	111.59%
2007 S	New York State Electric & Gas	3,216.9	3,747.7	3,580.5	116.50%	111.30%
2008 S	New York State Electric & Gas	3,141.1	3,612.3	3,403.5	115.00%	108.35%
2009 S	New York State Electric & Gas	3,111.8	3,625.3	3,334.9	116.50%	107.17%
2010 S	New York State Electric & Gas	3,093.0	3,649.7	3,384.4	118.00%	109.42%
National Grid (NGrid)						
2006 S	National Grid (NGrid)	7,051.6	8,320.9	7,869.1	118.00%	111.59%
2007 S	National Grid (NGrid)	6,718.6	7,827.2	7,478.1	116.50%	111.30%
2008 S	National Grid (NGrid)	6,762.5	7,776.9	7,327.3	115.00%	108.35%
2009 S	National Grid (NGrid)	6,728.4	7,838.6	7,210.7	116.50%	107.17%
2010 S	National Grid (NGrid)	6,647.0	7,843.5	7,273.2	118.00%	109.42%
Orange & Rockland Utilities (O&R)						
2006 S	Orange and Rockland Utilities	1,130.0	1,333.4	1,261.0	118.00%	111.59%
2007 S	Orange and Rockland Utilities	1,131.5	1,318.2	1,259.4	116.50%	111.30%
2008 S	Orange and Rockland Utilities	1,192.3	1,371.1	1,291.9	115.00%	108.35%
2009 S	Orange and Rockland Utilities	1,179.5	1,374.1	1,264.0	116.50%	107.16%
2010 S	Orange and Rockland Utilities	1,098.0	1,295.6	1,201.4	118.00%	109.42%
Rochester Gas & Electric						
2006 S	Rochester Gas and Electric	1,628.5	1,921.6	1,817.3	118.00%	111.59%
2007 S	Rochester Gas and Electric	1,631.8	1,901.0	1,816.3	116.50%	111.31%
2008 S	Rochester Gas and Electric	1,649.4	1,896.8	1,787.2	115.00%	108.35%
2009 S	Rochester Gas and Electric	1,652.3	1,924.9	1,770.7	116.50%	107.17%
2010 S	Rochester Gas and Electric	1,621.0	1,912.8	1,773.7	118.00%	109.42%
NYCA Total						
2006 S	Total	33,294.5	39,287.5	37,154.2	118.00%	111.59%
2007 S	Total	33,447.4	38,966.2	37,228.3	116.50%	111.30%
2008 S	Total	33,808.5	38,879.8	36,632.5	115.00%	108.35%
2009 S	Total	33,930.2	39,528.7	36,362.4	116.50%	107.17%
2010 S	Total	32,976.0	38,911.7	36,082.8	118.00%	109.42%

Then, develop graphs for each Transmission Zone:







Upstate vs. Downstate
Forecast Peak Load, ICAP, UCAP & IRM
SUMMER

