

Load Serving Entity Capacity Obligations

Determining the amount of Capacity to Procure

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Intermediate ICAP Course

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Remote Learning

SME Bio

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Dylan Zhang is the Manager of ICAP Market Operations Administration for the NYISO, responsible for New York's \$2.5 billion wholesale capacity market. Dylan and his team work collaboratively with market participants and other NYISO departments in administering NYISO's capacity market in an effort to maintain the reliability of the bulk power system by procuring sufficient capacity to meet the requirements through an efficient wholesale market. Having joined the NYISO in 2017, Dylan has market operations experience in both the energy and capacity markets. Dylan has worked on multiple NYISO market initiatives including improvements to the Coordinated Transaction Scheduling (CTS) Imputed Price formation, and implementation of Energy Storage Resources project.

Dylan holds a B.S. in Economics from the University at Albany and M.S. in Applied Economics at Johns Hopkins University.

Topics for Discussion:

- New York Control Area (NYCA) Installed Capacity Requirement
- Transmission District (TD) Capacity Requirements
- Locational Minimum Installed Capacity Requirement for a Locality
- Individual LSEs Unforced Capacity requirements
- Convert a Transmission District ICAP requirement to UCAP
- Understand LSEs Spot excess capacity purchase obligation

Topic 1:

New York Control Area (NYCA)

Installed Capacity Requirement

Capacity Requirements Review

NYCA

ICAP & UCAP Capacity Requirements

Locational

ICAP & UCAP Capacity Requirements

Transmission District

ICAP & UCAP Capacity Requirements

Load Serving Entity

ICAP & UCAP Capacity Requirements

Capacity Requirements and Obligation to Procure

- Requirements are set annually for each Capability Year
 - NYCA Capacity requirements
 - Transmission District Capacity requirements
 - Locational Capacity requirements
- UCAP requirements
 - Total UCAP requirements are determined each Capability Period
 - Individual LSE UCAP requirements determined monthly

Topic 2:

Transmission District (TD) Capacity Requirements

Capacity Requirements Overview

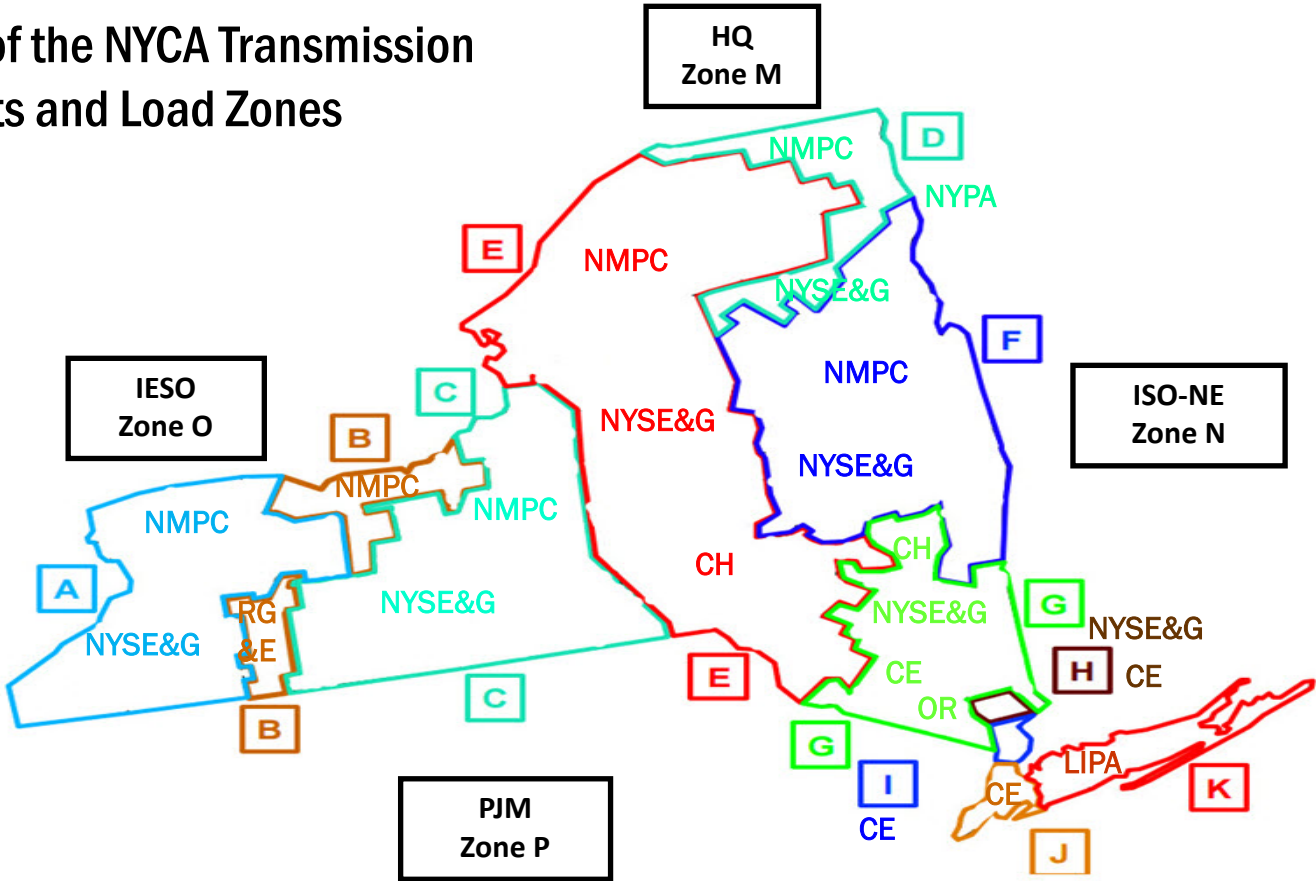
Maps of the NYCA Transmission Districts and Load Zones

NYCA Load Zones

- A- West
- B- Genesee
- C- Central
- D- North
- E- Mohawk Valley
- F- Capital
- G- Hudson Valley
- H- Millwood
- I- Dunwoodie
- J- NYC
- K- Long Island

Transmission Districts

- CE - Consolidated Edison Co. of NY
- CH - Central Hudson Gas & Electric
- LIPA - Long island Power Authority
- NMPC - Niagara Mohawk Power Corp.
- NYSE&G - New York State Electric & Gas Corp.
- OR - Orange & Rockland Utilities
- NYPA - New York Power Authority
- RG&E - Rochester Gas & Electric Corp.



Transmission District (TD) Capacity

$$\text{TD ICAP Requirement} = \text{TD Forecasted Peak Load} \times (1 + \text{NYCA IRM})$$

- **TD Minimum ICAP Requirement Example for Con Edison**
 - Con Edison of NY Forecasted Peak Load: 12,816.7 MW
 - NYCA IRM: 20.7%
= $12,816.7 \times (1 + 0.207) = 15,469.8 \text{ MW}$

(Summer 2021 values)

TD Minimum UCAP Requirement

- Based on the annual NYCA Forecasted Peak Load and the individual TD Forecasted Peak Load
- TD Min UCAP used to calculate LSE Minimum UCAP Requirement

$$\text{TD Min UCAP Requirement} = \text{NYCA Min UCAP Requirement} \times \frac{\text{TD Forecasted Coincident Peak Load}}{\text{Sum of Forecasted Coincident Peak Loads for all TDs}}$$

*Refer to Section 3.3 of the ICAP Manual

TD Minimum UCAP Requirement

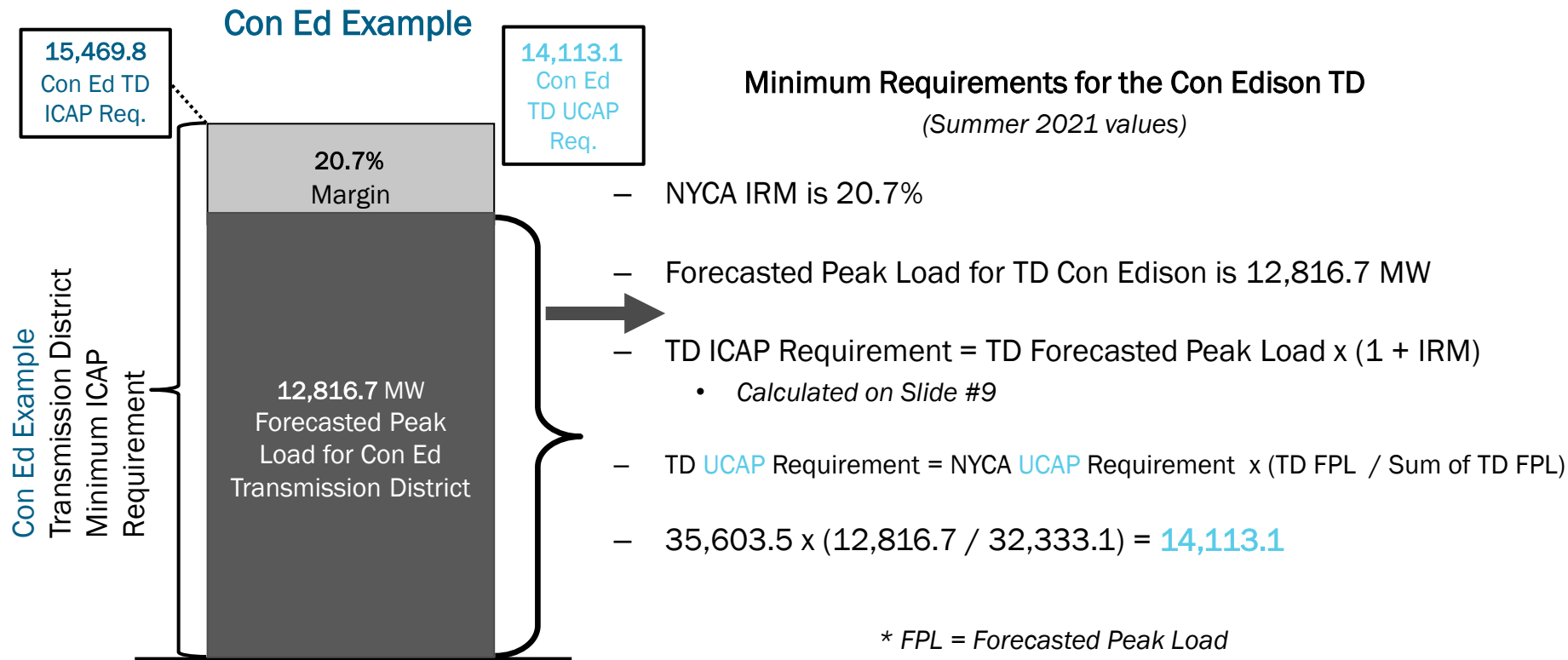
$$\text{TD Min UCAP Requirement} = \text{NYCA Min UCAP Requirement} \times \frac{\text{TD Forecasted Coincident Peak Load}}{\text{Sum of Forecasted Coincident Peak Loads for all TDs}}$$

Con Ed Values - Summer 2021


Con Ed Forecasted Peak Load	12,816.7 MW
NYCA Min UCAP Requirement	35,603.5 MW
Sum of Forecasted Coincident Peak Loads for All TDs	32,333.1 MW
$35,603.5 \times (12,816.7 / 32,333.1) = \underline{14,113.1}$	

*Refer to Section 3.3 of the ICAP Manual

TD Minimum ICAP and UCAP Requirements



ICAP and UCAP Values



Installed Capacity
View ICAP and UCAP Calculations

Auction ▾ Mitigation ▾ Load Forecast ▾ Calendar ▾ Rights ▾ Upload/Download

Season: Summer 2021 ▾
Month: May/2021 ▾
Display

Publish Data

Effective Month	Publish Date	Published By
May/2021	06-Apr-2021 03:48 PM	NYISO

Locational Calculations

Location	Forecasted Peak Load MW	Requirement %	Derating Factor %	ICAP MW Requirement	UCAP MW Requirement	UCAP Effective %
G-J Locality	15,411.3	87.5868%	3.61%	13,498.3	13,011.0	84.43%
LI	5,248.6	102.9000%	4.91%	5,400.8	5,135.6	97.85%
NYC	11,199.0	80.3000%	2.69%	8,992.8	8,750.9	78.14%
NYCA	32,333.1	120.7000%	8.77%	39,026.1	35,603.5	110.11%

Transmission District Loads NYCA

Transmission Owner	Forecasted Peak Load MW	ICAP MW Requirement	UCAP MW Requirement
Metering Authority - Central Hudson Gas and Electr	1,104.5	1,333.1	1,216.2
Metering Authority - Consolidated Edison of NY	12,816.7	15,469.8	14,113.1
Metering Authority - Long Island Power Authority	5,279.7	6,372.6	5,813.7
Metering Authority - New York Power Authority	420.8	507.9	463.4
Metering Authority - New York State Electric & Gas	3,244.8	3,916.5	3,573.0
Metering Authority - Niagara Mohawk	6,793.0	8,199.2	7,480.1
Metering Authority - Orange and Rockland Utilities	1,108.4	1,337.8	1,220.5
Metering Authority - Rochester Gas and Electric	1,565.2	1,889.2	1,723.5
Total	32,333.1	39,026.1	35,603.5

Topic 3:

Locational Minimum Installed Capacity Requirement for a Locality

Load Serving Entity (LSE) Obligation to Procure

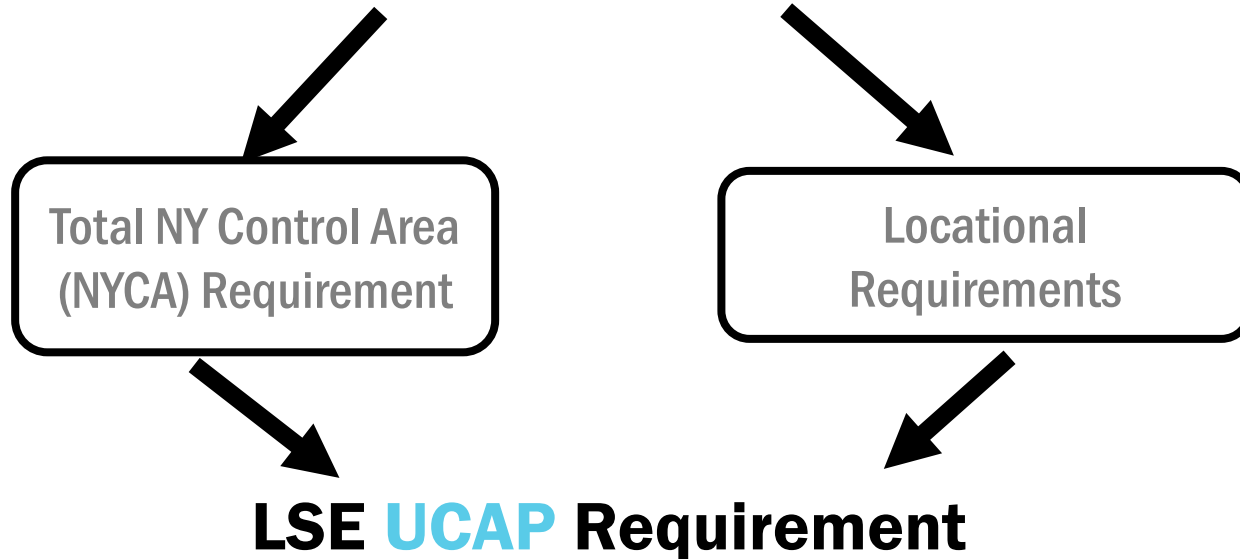
- How much must be procured?
 - All LSEs are required to purchase a portion to satisfy the NYCA UCAP requirement
 - LSEs with Load in a Locality also have a requirement to purchase a portion to satisfy the Locational UCAP requirement
 - (G-J Locality, LI and NYC)
 - Purchase obligation is adjusted for Locality Exchange MW and Spot excess purchase obligations

LSE Obligation to Procure - Minimum Requirements

- Each LSE is required to obtain a certain amount of MW of UCAP to satisfy the NYCA Minimum UCAP Requirement
- Based on the contribution of the sum of the LSE's customers to the forecasted TD coincident peak Load calculated each Capability Period
 - For customer switching, the LSE's contribution could change from month to month

LSE Obligation to Procure

TD Minimum Installed Capacity Requirement



LSE Obligation to Procure

LSEs are required to procure the Minimum **UCAP** Requirement

- Why UCAP and not ICAP?
 - Adjust requirement for historical availability of supply, incorporating derating factors

LSE Obligation to Procure

LSEs are required to procure the Minimum **UCAP** Requirement

■ How much?

- Calculated by NYISO based on TO LSE load share data
- Based on TD ICAP Requirement and accounts for supply derating factors
- NYCA and Locational (G-J Locality, LI and NYC) UCAP requirements are calculated each month

Topic 4:

Individual LSEs Unforced Capacity Requirements

LSE Obligation to Procure

Locational Minimum Requirements

- **Locational Minimum Installed Capacity Requirement (“LCR”)**
 - Established for G-J Locality, NYC & LI
- **Can change each Capability Year due to, for example**
 - Locational Load forecast
 - Generating units’ derating factors
 - Performance factor changes of Special Case Resources
 - System changes due to transmission capability
- **Locational Minimum ICAP Requirement (MW) = Locality Forecasted Peak Load x Locality Requirement %**

Capacity Requirement Percentages

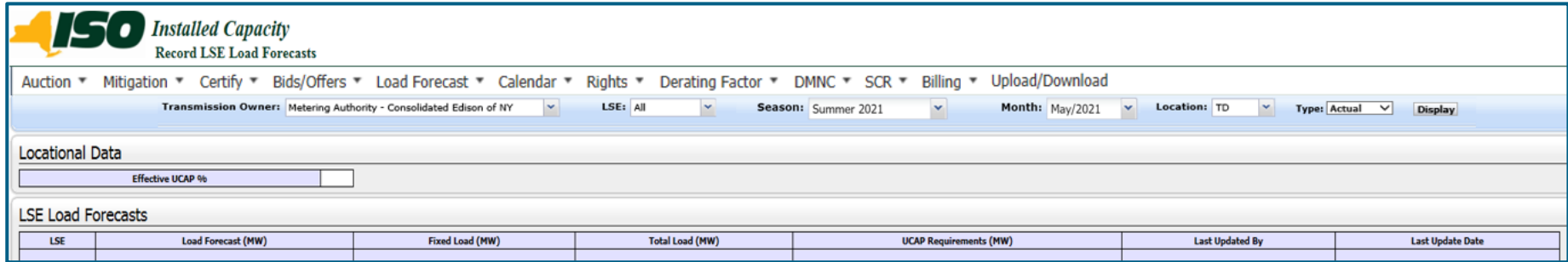
2021/2022 Capability Year (May 1, 2021 – April 30, 2022)

NYCA	120.7% [based on IRM*]
G-J Locality Requirement	87.6% [LCR**]
Zone K (LI) Requirement	102.9% [LCR**]
Zone J (NYC) Requirement	80.3% [LCR**]

**Note: The NYCA requirements are established by the NYISO, based on the IRM which is set by NYSRC, and accepted by FERC and NYPSC*

***Note: Locality requirements are established by NYISO and approved by the NYISO Operating Committee*

LSE ICAP and UCAP Values

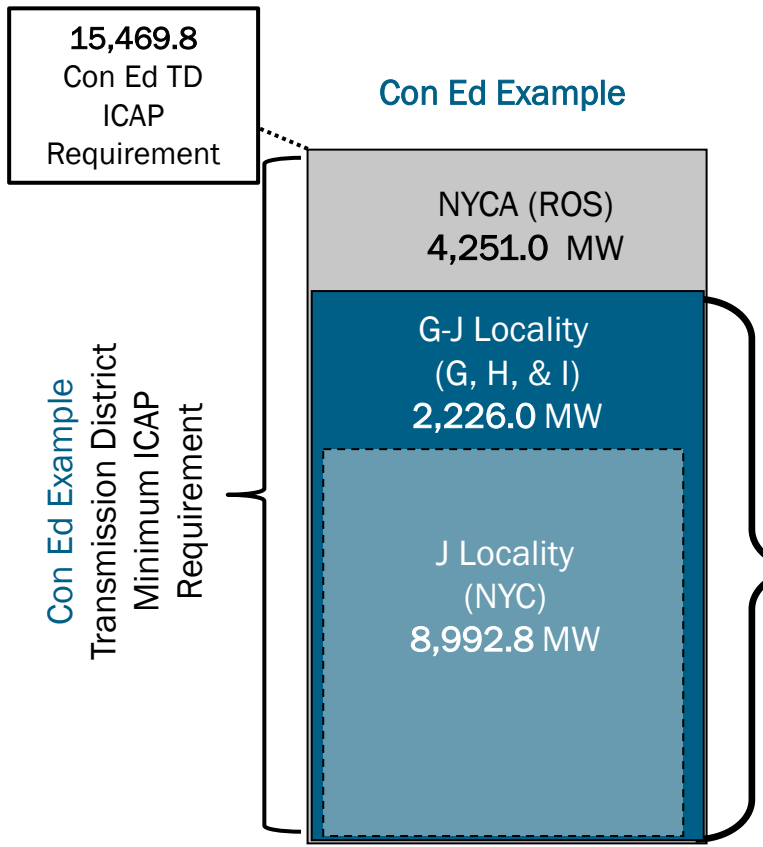


The screenshot shows the 'ISO Installed Capacity Record LSE Load Forecasts' interface. It includes a navigation menu with options like Auction, Mitigation, Certify, Bids/Offers, Load Forecast, Calendar, Rights, Derating Factor, DMNC, SCR, Billing, and Upload/Download. Below the menu are several filters: Transmission Owner (Metering Authority - Consolidated Edison of NY), LSE (All), Season (Summer 2021), Month (May/2021), Location (TD), and Type (Actual). There is also a 'Display' button. Below the filters is a section for 'Locational Data' with an 'Effective UCAP %' input field. At the bottom is a table titled 'LSE Load Forecasts' with the following columns: LSE, Load Forecast (MW), Fixed Load (MW), Total Load (MW), UCAP Requirements (MW), Last Updated By, and Last Update Date.

- LSE Load Forecast in selected ‘Location:’ + Fixed Load = Total Load (ICAP)
- LSE Total Load is then converted to LSE UCAP Requirements
 - ICAP AMS screens described in the ICAP Automated Market System User’s Guide, available online

Example: Locational Minimum ICAP Requirement

(Summer 2021 values)



For Con Ed's portion only:

- Con Ed's TD ICAP Requirement = **15,469.8**
- Calculated on Slide #12

	Forecasted Peak Load (FPL)	Requirement
Con Ed TD NYCA	12,816.7	120.7%
Con Ed TD G-J	12,808.8	87.6%
Con Ed TD NYC	11,199.0	80.3%

- NYC Locational ICAP Requirement is 80.3% of NYC FPL:
 $11,199.0 \times 80.3\% = 8,992.8 \text{ MW}$
- G-J Locational ICAP Requirement is 87.6% of G-J Locality FPL:
 $12,808.8 \times 87.6\% = 11,218.8 \text{ MW}$
- Remaining G-J Locational Requirement after meeting the NYC requirement can be purchased in G, H & I:
 $11,218.8 - 8,992.8 = 2,226.0 \text{ MW}$
- Remaining NYCA requirement can be purchased in G, H, I, J, or ROS:
 $15,469.8 - 11,218.8 = 4,251.0 \text{ MW}$

Topic 5: Converting Transmission District ICAP requirement to UCAP

Locational Min UCAP = (Locational Min ICAP – LEM) x (1-Avg. Derating Factor)

[Note: In ICAP AMS, Avg. Derating Factor is shown as Derating Factor %]

LSE Obligation to Procure

Locational Minimum UCAP Requirements

- ICAP requirement is translated to UCAP value

Locational Minimum **UCAP** =

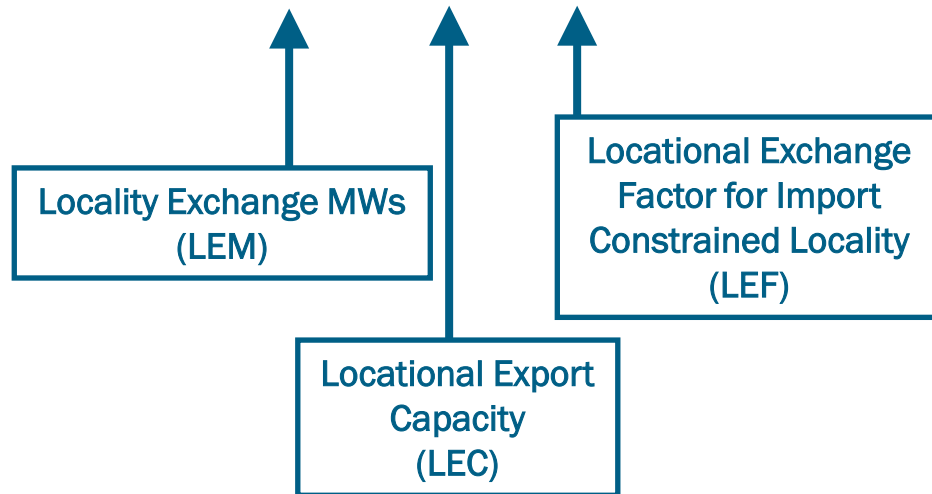
(Locational Min ICAP – Locality Exchange MWs) x (1 - Avg. Derating Factor)

[Note: in ICAP AMS, Avg. Derating Factor is shown as Derating Factor %]

- LSE monthly UCAP requirement may change due to Locational Exports

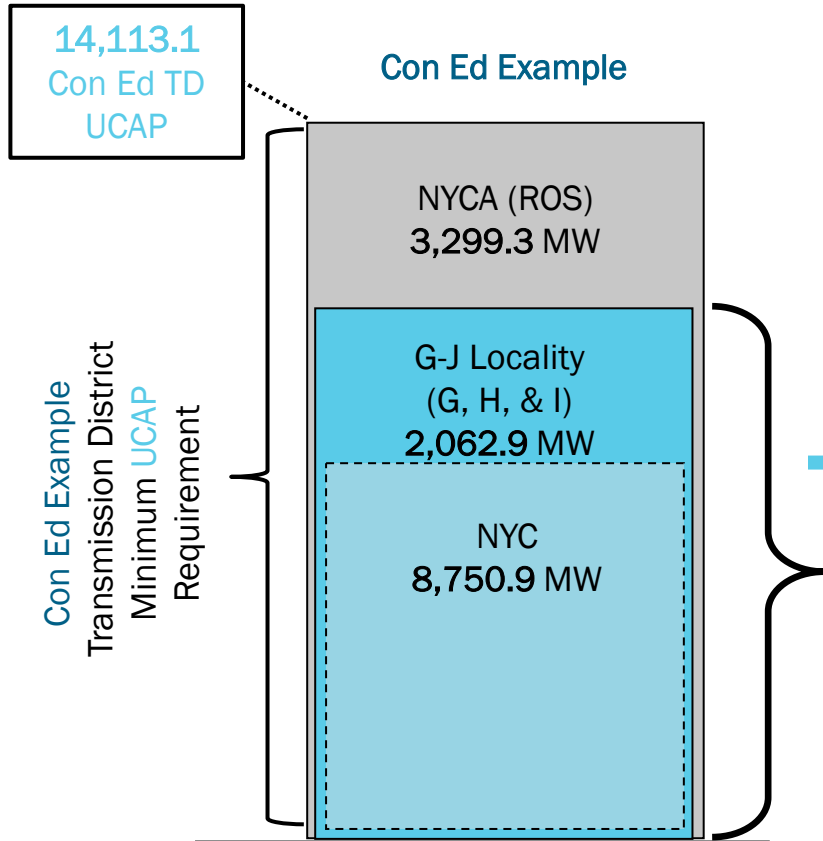
Locality Exchange MW (LEM)

$$\text{LEM} = \text{LEC} \times \text{LEF}$$



- LEFs for a Capability Year are posted at <https://www.nyiso.com/installed-capacity-market> in the Announcements folder under Information and Announcements

Example: Locational Minimum UCAP Requirement



(Summer 2021 values)

For Con Ed's portion only:

- Con Ed's TD UCAP Requirement = **14,113.1** MW
 - Calculated on Slide #13

(Locational Min ICAP – LEM) x (1 – Avg. Derating Factor)

- NYC Locational UCAP Requirement is:

$$11,199.0 \times (1 - 2.69\%) = 8,750.9 \text{ MW}$$
- G-J Locational UCAP Requirement is:

$$11,218.8 \times (1 - 3.61\%) = 10,813.8 \text{ MW}$$
- Remaining G-J Locational UCAP Requirement after meeting the NYC UCAP Requirement can be purchased in G, H, & I:

$$10,813.8 - 8,750.9 = 2,062.9 \text{ MW}$$
- Remaining NYCA UCAP Requirement after meeting the G-J Locational UCAP Requirement can be purchased in G, H, I, J, or ROS:

$$14,113.1 - 10,813.8 = 3,299.3 \text{ MW}$$

LSE Obligation Formula

Minimum Total **UCAP** Requirement =

Forecast Peak Load x (1 + IRM)

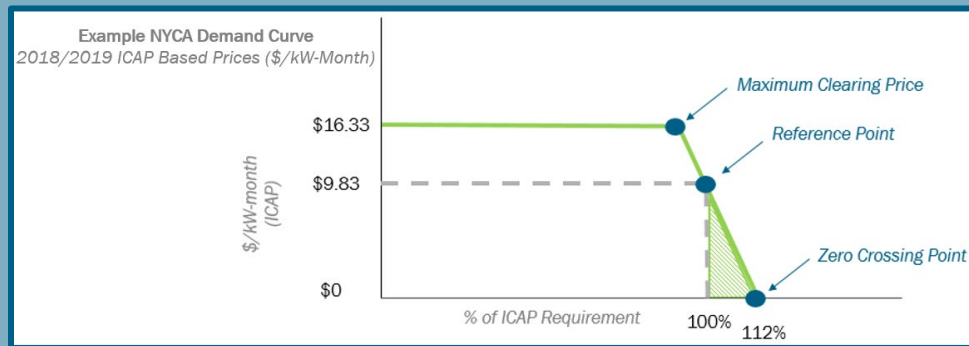
NYCA Minimum ICAP Requirement x (1 - NYCA Derating Factor)

Minimum Locational **UCAP** Requirement =

Forecast Peak Load x Loc. Req.

(Minimum Locational ICAP Requirement - Locational Exchange MWs) x
(1 - Locational Derating Factor)

Topic 6: Understand LSEs Spot excess capacity purchase obligation



LSE Additional Purchase Obligation

- **Purchasing Spot Excess Capacity**
 - **Spot excess = MW offered above 100% Minimum UCAP Requirement and at a price under the Demand Curve in the ICAP Spot Market Auction**
 - **Increases reliability by valuing additional MW and lowers the total cost of the auction to LSEs**
 - **Spot excess can flow from nested locations to nesting locations**
 - e.g., Spot excess purchases for NYCA can be from J, G-J, K, or ROS
 - **Spot excess may be used to both:**
 - **Decrease LSE deficiencies in a nesting location and;**
 - **As additional UCAP offered under the Demand Curve in a nesting location**
 - **Other modules will cover the Demand Curve and ICAP Spot Market Auction in more detail**
 - **NYISO Administered ICAP Market Auctions and Demand Curve**

LSE Additional Purchase Obligation

■ Purchasing Excess Capacity

- Determining amount of excess to be purchased in the ICAP Spot Market Auction and the LSE additional purchase obligation:

Step 1	Identify total amount of UCAP that cleared above the required amount, and deficiency awards by location
Step 2	Calculate portion attributed to an LSE for each location = Individual LSE Requirement / Total Locational Requirement
Step 3	Calculate excess to be allocated to each LSE = Portion attributed to the LSE (by location) x Excess awards (by location)

LSE Obligation to Procure: Review

- LSEs are required to procure their portion of the Transmission District Minimum UCAP requirement
- NYISO calculates LSE minimum UCAP requirement based on TO load share data
- LSE UCAP requirement adjusted monthly for any customer switching, based on TO data and for Locality Exchange MW
- For LSEs serving load in G-J Locality, LI or NYC a specified amount of their UCAP Requirement must be purchased within the LSE's respective Locality, plus a NYCA portion
- All LSEs are obligated to purchase excess capacity that falls under the Demand Curve

Additional Resources

- **NYISO Market Administration and Control Area Services Tariff**
- **ICAP Manual**
- **Automated Market System (ICAP AMS) User Guide**