Installed Capacity (ICAP) Market

Kelly Stegmann
Senior Market Trainer, Market Training, NYISO

New York Market Orientation Course (NYMOC)
November 13-16, 2023
Remote Learning
ICAP Market Module Objectives

- Define Installed Capacity
- Describe the benefits of the ICAP Market
- Identify the NY Control Area and Transmission District Capacity Requirements
- Explain the reason for Locational requirements
- Explain the difference between ICAP and UCAP
ICAP Market Module Objectives – Cont’d

- Identify the process for determining the amount of capacity available
- Explain the factors that determine the amount of capacity suppliers are able to offer
- Describe the Load obligations of an LSE
- Distinguish between the three different ICAP Auctions
- Calculate the settlement for an auction award
ICAP Roadmap

Benefits
- Ensures resource adequacy
- Resources recover a portion of fixed costs
- Provides market signal for investment

Market Mechanics
- Amount of Capacity Required
- Amount of Capacity Available
- Amount of Capacity to Offer
- Amount of Capacity to Procure

Auxiliary Processes & Activities
- Capacity Auctions
- Spot Market Auction
- Demand Curve
- Settlements
- Responsibilities
- Sanctions
ICAP Market Benefits

Benefits

- Ensures resource adequacy
- Resources recover a portion of fixed costs
- Provides market signal for investment
Benefits of the ICAP Market:

- Ensures resource adequacy
  - Do we have enough?
    - Supply is sufficient to meet load
    - Adhere to reliability standard
Benefits of the ICAP Market

- Recover portion of fixed costs

Variable Costs vs. Fixed Costs

Energy Market
(Market Clearing Prices - LBMPs)

Portion from ICAP Market
(Auction Clearing Prices)
Benefits of the ICAP Market:

- Market signal for investment
  - Potential Investors:
    - Is it worth building a new plant?
    - Where should I build a new plant?
    - Do I have the technology to build a plant that is competitive?
ICAP Market Mechanics

Benefits
- Ensures resource adequacy
- Resources recover a portion of fixed costs
- Provides market signal for investment

Market Mechanics
- Amount of Capacity Required
- Amount of Capacity Available
- Amount of Capacity to Offer
- Amount of Capacity to Procure
ICAP Market Mechanics

NYISO

Load Serving Entities

Auxiliary Processes & Activities

ICAP Suppliers
## ICAP vs UCAP

<table>
<thead>
<tr>
<th>ICAP</th>
<th>UCAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Capacity describes the <strong>market</strong> as opposed to the product.</td>
<td>The measure by which Installed Capacity Suppliers will be rated, in accordance with formulae set forth in the NYISO Procedures, to <strong>quantify the extent of their contribution to satisfy the NYCA Minimum Installed Capacity Requirement</strong>, and which will be used to measure the portion of that NYCA Minimum Installed Capacity Requirement for which each LSE is responsible.</td>
</tr>
</tbody>
</table>
Amount of Capacity Required

- How much do we need?
Amount of Capacity Required

- NYCA Minimum Installed Capacity Requirement
  - Ensures resource adequacy
    - Supply is sufficient to meet load
    - Meets Reliability Standards
  - Calculated by NYISO each Capability Year
  - Expressed as a MW value

NYCA Minimum ICAP Requirement = Forecasted NYCA Peak Load x (1 + IRM)
NYCA Minimum Installed Capacity Requirement

- Forecast Peak Load
  - Last year’s NYCA coincident peak load, adjusted for:
    - Weather
    - Changes in Load Growth
    - Load reductions provided by Demand Side Resources

NYCA Minimum ICAP Requirement = Forecasted NYCA Peak Load x (1 + IRM)
NYCA Minimum Installed Capacity Requirement

NYCA Minimum ICAP Requirement = Forecasted NYCA Peak Load x (1 + IRM)

- **Installed Reserve Margin (IRM)**
  - Capacity above firm system load required to provide for equipment outages (both forced and scheduled) and transmission capability limitations.
  - Established annually by the NYS Reliability Council (NYSRC) for the upcoming Capability Year
  - Based on the Northeast Power Coordinating Council (NPCC) Standard for Resource Adequacy
    - “...the probability (or risk) of disconnecting any firm load due to resource deficiencies shall be, on average, not more than once in ten years.”

- **IRM for 2021 Capability Year is 20.7%**
  - 2020: 18.9%
  - 2019: 17.0%
NYCA and Locational Requirements

- Minimum Locational Installed Capacity Requirements also established
NYCA Minimum Unforced Capacity Requirement

- ICAP requirement converted to UCAP value
  - Accounts for historic availability of units
- Calculated by NYISO each Capability Period
- Expressed as a MW value
- Minimum Local Capacity Requirements also established

NYCA Minimum UCAP Requirement = Min ICAP x (1 – Avg. Derating Factor)
NYCA Minimum Unforced Capacity Requirement

- Derating factors by location
  - Average Unavailability
  - Weighted Average of all NYCA Derating Factors
  - Recalculated each Capability Period

<table>
<thead>
<tr>
<th>Location</th>
<th>Winter 2019-2020</th>
<th>Summer 2020</th>
<th>Winter 2020-2021</th>
<th>Summer 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-J Locality</td>
<td>5.26%</td>
<td>4.18%</td>
<td>2.85%</td>
<td>3.61%</td>
</tr>
<tr>
<td>Long Island</td>
<td>7.96%</td>
<td>6.91%</td>
<td>5.91%</td>
<td>4.91%</td>
</tr>
<tr>
<td>New York City</td>
<td>4.42%</td>
<td>3.51%</td>
<td>2.70%</td>
<td>2.69%</td>
</tr>
<tr>
<td>NYCA</td>
<td>8.00%</td>
<td>8.30%</td>
<td>6.61%</td>
<td>8.77%</td>
</tr>
</tbody>
</table>
# ICAP and UCAP Values

## Locational Calculations

<table>
<thead>
<tr>
<th>Location</th>
<th>Forecasted Peak Load MW</th>
<th>Requirement %</th>
<th>Derating Factor %</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
<th>UCAP Effective %</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-J Locality</td>
<td>15,411.3</td>
<td>87.586%</td>
<td>3.61%</td>
<td>13,496.3</td>
<td>13,011.0</td>
<td>84.42%</td>
</tr>
<tr>
<td>LI</td>
<td>5,248.6</td>
<td>102.900%</td>
<td>4.91%</td>
<td>5,400.8</td>
<td>5,135.6</td>
<td>97.85%</td>
</tr>
<tr>
<td>NYC</td>
<td>11,199.0</td>
<td>98.990%</td>
<td>2.69%</td>
<td>8,992.8</td>
<td>8,750.9</td>
<td>78.14%</td>
</tr>
<tr>
<td>NYCA</td>
<td>32,333.1</td>
<td>120.700%</td>
<td>8.77%</td>
<td>39,026.1</td>
<td>35,603.5</td>
<td>110.11%</td>
</tr>
</tbody>
</table>

## Transmission District Loads NYCA

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metering Authority - Central Hudson Gas and Electr</td>
<td>Metering Authority - Central Hudson Gas and Electr</td>
<td>1,104.5</td>
<td>1,333.1</td>
<td>1,216.2</td>
</tr>
<tr>
<td>Metering Authority - Consolidated Edison of NY</td>
<td>Metering Authority - Consolidated Edison of NY</td>
<td>12,816.7</td>
<td>15,469.8</td>
<td>14,113.1</td>
</tr>
<tr>
<td>Metering Authority - Long Island Power Authority</td>
<td>Metering Authority - Long Island Power Authority</td>
<td>5,279.7</td>
<td>6,372.6</td>
<td>5,813.7</td>
</tr>
<tr>
<td>Metering Authority - New York Power Authority</td>
<td>Metering Authority - New York Power Authority</td>
<td>420.8</td>
<td>507.9</td>
<td>463.4</td>
</tr>
<tr>
<td>Metering Authority - New York State Electric &amp; Gas</td>
<td>Metering Authority - New York State Electric &amp; Gas</td>
<td>3,244.8</td>
<td>3,916.5</td>
<td>3,573.0</td>
</tr>
<tr>
<td>Metering Authority - Niagara Mohawk</td>
<td>Metering Authority - Niagara Mohawk</td>
<td>6,793.0</td>
<td>8,199.2</td>
<td>7,490.1</td>
</tr>
<tr>
<td>Metering Authority - Orange and Rockland Utilities</td>
<td>Metering Authority - Orange and Rockland Utilities</td>
<td>1,108.4</td>
<td>1,337.8</td>
<td>1,220.5</td>
</tr>
<tr>
<td>Metering Authority - Rochester Gas and Electric</td>
<td>Metering Authority - Rochester Gas and Electric</td>
<td>1,565.2</td>
<td>1,889.2</td>
<td>1,753.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td>32,333.1</td>
<td>39,026.1</td>
<td>35,603.5</td>
</tr>
</tbody>
</table>
## ICAP and UCAP Values

### Locational Requirements

### Transmission District Loads G-J Locality

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Authority - Central Hudson Gas and Elect</td>
<td>1,112.5</td>
<td>674.4</td>
<td>629.3</td>
</tr>
<tr>
<td>Metropolitan Authority - Consolidated Edison of NY</td>
<td>12,908.8</td>
<td>1,218.8</td>
<td>15,813.4</td>
</tr>
<tr>
<td>Metropolitan Authority - New York State Electric &amp; Gas</td>
<td>882.2</td>
<td>249.1</td>
<td>1,031.3</td>
</tr>
<tr>
<td>Metropolitan Authority - Orange and Rockland Utilities</td>
<td>1,011.7</td>
<td>469.0</td>
<td>609.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,911.2</strong></td>
<td><strong>1,473.3</strong></td>
<td><strong>17,513.8</strong></td>
</tr>
</tbody>
</table>

### Transmission District Loads LI

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Authority - Long Island Power Authority</td>
<td>5,248.6</td>
<td>5,408.8</td>
<td>5,135.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,248.6</strong></td>
<td><strong>5,408.8</strong></td>
<td><strong>5,135.4</strong></td>
</tr>
</tbody>
</table>

### Transmission District Loads NYC

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Authority - Consolidated Edison of NY</td>
<td>11,195.0</td>
<td>6,992.8</td>
<td>8,750.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,195.0</strong></td>
<td><strong>6,992.8</strong></td>
<td><strong>8,750.9</strong></td>
</tr>
</tbody>
</table>
Transmission District (TD) Capacity

TD ICAP Requirement = TD Forecasted Peak Load x (1 + 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

\[
\text{TD Min UCAP Requirement} = \frac{\text{NYCA Min UCAP Requirement} \times \sum \text{TD Forecasted Coincident Peak Loads for all TDs}}{\text{TD Forecasted Coincident Peak Load}}
\]

*Refer to Section 3.3 of the ICAP Manual*
Minimum Requirements for the Con Edison TD

(Summer 2021 values)

- NYCA IRM is 20.7%

- Forecasted Peak Load for TD Con Edison is 12,816.7 MW

- TD ICAP Requirement = TD Forecasted Peak Load x (1 + IRM)
  - *Calculated on Slide #12*

- TD UCAP Requirement = NYCA UCAP Requirement x (TD FPL / Sum of TD FPL)

- 35,603.5 x (12,816.7 / 32,333.1) = 14,113.1

*FPL = Forecasted Peak Load*
## ICAP and UCAP Values

### Installed Capacity

**View ICAP and UCAP Calculations**

- **Season:** Summer 2021
- **Month:** May 2021

#### Publish Data

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

#### Locational Calculations

<table>
<thead>
<tr>
<th>Location</th>
<th>Forecasted Peak Load MW</th>
<th>Requirement %</th>
<th>Derating Factor %</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
<th>UCAP Effective %</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-1 Locality</td>
<td>15,411.3</td>
<td>87.9868%</td>
<td>5.61%</td>
<td>13,498.3</td>
<td>13,011.0</td>
<td>84.43%</td>
</tr>
<tr>
<td>LI</td>
<td>5,248.6</td>
<td>102.9000%</td>
<td>4.91%</td>
<td>5,400.8</td>
<td>5,135.6</td>
<td>97.85%</td>
</tr>
<tr>
<td>NYC</td>
<td>11,199.0</td>
<td>80.3000%</td>
<td>2.69%</td>
<td>8,992.8</td>
<td>8,750.9</td>
<td>78.14%</td>
</tr>
<tr>
<td>NYCA</td>
<td>32,333.1</td>
<td>120.7000%</td>
<td>6.77%</td>
<td>39,026.1</td>
<td>35,603.5</td>
<td>110.11%</td>
</tr>
</tbody>
</table>

### Transmission District Loads NYCA

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metering Authority - Central Hudson Gas and Electr</td>
<td>1,108.4</td>
<td>1,337.8</td>
<td>1,220.5</td>
</tr>
<tr>
<td>Metering Authority - Consolidated Edison of NY</td>
<td>12,016.7</td>
<td>15,406.0</td>
<td>14,113.1</td>
</tr>
<tr>
<td>Metering Authority - Long Island Power Authority</td>
<td>3,244.8</td>
<td>3,916.5</td>
<td>3,573.0</td>
</tr>
<tr>
<td>Metering Authority - New York Power Authority</td>
<td>6,793.0</td>
<td>8,199.2</td>
<td>7,460.1</td>
</tr>
<tr>
<td>Metering Authority - New York State Electric &amp; Gas</td>
<td>1,565.2</td>
<td>1,889.2</td>
<td>1,723.5</td>
</tr>
<tr>
<td>Metering Authority - Niagara Mohawk</td>
<td>6,793.0</td>
<td>8,199.2</td>
<td>7,460.1</td>
</tr>
<tr>
<td>Metering Authority - Orange and Rockland Utilities</td>
<td>1,108.4</td>
<td>1,337.8</td>
<td>1,220.5</td>
</tr>
<tr>
<td>Metering Authority - Rochester Gas and Electric</td>
<td>1,108.4</td>
<td>1,337.8</td>
<td>1,220.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32,333.1</strong></td>
<td><strong>39,026.1</strong></td>
<td><strong>35,603.5</strong></td>
</tr>
</tbody>
</table>
Amount of Capacity Available

-How much do we have?
Determine the Amount of Capacity Available

- Suppliers provide data to demonstrate their capability to produce a certain number of MW (Resource Capability)
- Seasonal effects are taken into consideration
- Resource Capability determined by one of the following
  - DMNC / DMGC Test
  - Performance Test
  - Resource Nameplate
  - Actual Production Data
Determine the Amount of Capacity Available

- **Dependable Maximum Net Capability (DMNC) Test**
  - Demonstrates a generator’s ability to generate power
  - Tested every Capability Period
  - Must coordinate test with NYISO
  - Different rules for different classes of generator
  - Value determines ICAP value for the Capability Period*

- **Dependable Maximum Gross Capability (DMGC) Test**
  - Applicable to Behind-the-Meter Net Generation Resources
  - The same procedures that apply to DMNC also apply to DMGC
  - Refer to ICAP Manual Section 4.2
Capability Periods and Test Periods

- Winter Capability Period: November 1st - April 15th
- Summer Capability Period: May 1st - August 15th
- Winter Test Period: November 1st - April 15th
- Summer Test Period: June 1st - September 15th

Exceptions to these test periods are Special Case Resources
Out of period testing permitted for specific conditions - see ICAP Manual
How often must a DMNC test be conducted?

a) annually
b) weekly
c) monthly
d) every Capability Period
Let’s Review

When can a DMNC test be conducted for the summer capability period?

a) April 15th – Sept 15th

b) May 1st – Aug 31st

c) June 1st – Sept 15th

d) June 1st – Oct 31st
Amount of Capacity Suppliers are Qualified to Offer

-How much can be sold?
Determining UCAP

- The four key components in determining UCAP are:
  - Maximum Demonstrated Output
  - Deliverability Limit
  - Duration Adjustment Factor
  - Historic Availability
Maximum Demonstrated Output

- Amount of capacity available
  - Dependable Maximum Net Capability (DMNC) Test
  - Dependable Maximum Gross Capability (DMGC) Test
Deliverability Limit

- Demonstrated output adjusted to account for deliverability
  - Capacity Resource Interconnection Service (CRIS)
    - Class Year Deliverability Studies are conducted to determine the amount of capacity that resources can deliver to any point in its Capacity Region
      - Applicable to new resources or existing resources that request to increase their CRIS
      - CRIS Value or “CRIS CAP”
      - Enables a resource to participate in the NYISO Installed Capacity market to the extent of its deliverable capacity
      - *Note: “Capacity Region” has a different meaning than “Locality.”
Available ICAP

- Available ICAP for Internal Resources

Available ICAP = Min (CRIS Cap*, DMNC)

*CRIS Caps different for Summer and Winter Capability Period
Adjusted ICAP

- **Adjusted ICAP**: The amount of ICAP a Resource has available, taking into account its applicable Duration Adjustment Factor

\[
\text{Adjusted ICAP} = \text{ICAP} \times \text{Duration Adjustment Factor}
\]

\[
\text{ICAP} = \text{Min (CRIS, DMNC)}
\]
Duration Adjustment Factor

- **Duration Adjustment Factor:** The value of Installed Capacity, expressed as a percentage, for a Resource
  - Each Energy Duration Limitation has a corresponding Duration Adjustment Factor
  - The Duration Adjustment Factor is a component of Adjusted ICAP, UCAP, and therefore capacity payment for the resource

<table>
<thead>
<tr>
<th>Energy Duration Limitation (hours)</th>
<th>Less than 1000 MW</th>
<th>1000 MW and greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>45</td>
<td>37.5</td>
</tr>
<tr>
<td>4</td>
<td>90</td>
<td>75</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Adjusted ICAP

- **Adjusted ICAP**: The amount of ICAP a Resource has available, taking into account its applicable Duration Adjustment Factor.

\[
\text{Adjusted ICAP} = \text{ICAP} \times \text{Duration Adjustment Factor}
\]

\[
\text{ICAP} = \min\left(\text{CRIS}, \text{DMNC}\right)
\]

\[
\text{UCAP} = \text{Adjusted ICAP} \times (1 - \text{Derating Factor})
\]
Historic Availability

- Availability is based on Derating Factors that are a function of one or more of the following factors:
  - Forced Outages
  - Forced Derates
  - Actual Performance
# Historic Availability

## Derating Factors

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Derating Factor</th>
<th>ICAP Manual Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Generator, Energy Limited Resource (ELR), Capacity Limited Resource (CLR)</td>
<td>Equivalent Demand Forced Outage Rate (EFORd)</td>
<td>Section 4.5, Section 4.4.4</td>
</tr>
<tr>
<td>Special Case Resources (SCR)</td>
<td>Historical Performance Factor</td>
<td>Section 4.12</td>
</tr>
<tr>
<td>Intermittent Power Resources (IPR) (Wind, Solar, Landfill Gas)</td>
<td>Actual Performance “Production Factor”</td>
<td>Section 4.5.1, Attach J Section 3.4</td>
</tr>
<tr>
<td>Limited Control Run-of-River Hydro</td>
<td>Actual Production Data</td>
<td>Section 4.5</td>
</tr>
<tr>
<td>Energy Storage Resources (ESR)</td>
<td>Average Unavailability Factor</td>
<td>Attach J Section 3.7</td>
</tr>
<tr>
<td>Co-located Storage Resources</td>
<td>Derating Factor for each individual resource type (IPR and ESR), adjusted for Derating Factor for shared Point of Injection (POI)</td>
<td>Attach J Section 3.8</td>
</tr>
</tbody>
</table>
Historic Availability

**EFORd**

- **Equivalent Demand Forced Outage Rate**
  - Calculated from Generating Availability Data System (GADS)
    - Year-to-Date Data Submitted to NYISO Monthly
    - Forced Outages and Forced Derates
      - Dispatched and unable to respond
      - Unplanned event
Historic Availability

Derates and Outages

**Forced Derate**

*EFORD* = .05

- Available all the time but at a reduced output

**Forced Outage**

*EFORD* = .05

- Available at full output but for less than 100% of the time
Availability-Based Resources

- Summer UCAP Calculation

NYISO will use an average of two 6-month EFORD/UOL calculations to establish a Summer ICAP to UCAP derating factor (Avg EFORD, AEFORD_{summer})
Availability-Based Resources

- Winter UCAP Calculation

NYISO will use an average of two 6-month EFORd/UOL calculations to establish a Winter ICAP to UCAP derating factor (Avg EFORd, AEFORd<sub>winter</sub>)

<table>
<thead>
<tr>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>02</td>
<td>02</td>
</tr>
<tr>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td>04</td>
<td>04</td>
</tr>
<tr>
<td>05</td>
<td>05</td>
</tr>
<tr>
<td>06</td>
<td>06</td>
</tr>
<tr>
<td>07</td>
<td>07</td>
</tr>
<tr>
<td>08</td>
<td>08</td>
</tr>
<tr>
<td>09</td>
<td>09</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

...6 month EFORd/UOL

6 month EFORd/UOL

6 month EFORd/UOL
A generator may sell Capacity equal to its adjusted ICAP multiplied by its historic availability.

UCAP = Adjusted ICAP x (1 – Derating Factor)

- **Capacity to Offer**
- **Available ICAP:**
  - Deliverability Limit
  - Maximum Demonstrated Output
- **Duration Adjustment Factor**
- **Historic Availability**

*This formula is for Internal Generators that are not BTM:NG*
# Unforced Capacity (UCAP)

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>How UCAP is Calculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generators, System Resources and ELRs</td>
<td>Based on Equivalent Demand Forced Outage Rate (EFORd)</td>
</tr>
<tr>
<td>Special Case Resources (SCR)</td>
<td>Based on their Average Coincident Load and use Performance Factor instead of EFORd</td>
</tr>
<tr>
<td>Control Area System Resource</td>
<td>Based on Control Area Resource and Load (CARL) Data</td>
</tr>
<tr>
<td>Intermittent Power Resources (Wind, Solar, Landfill Gas)</td>
<td>Based on the amount the intermittent can provide during system peak Load hours, as determined per ISO Procedures</td>
</tr>
<tr>
<td>Limited Run-of-River Hydro Resource</td>
<td>Determined separately for Winter and Summer Capability Periods as rolling average of the hourly net Energy provided by each resource during the 20 highest NYCA integrated real-time load hours in each of the five previous Summer or Winter Capability Periods</td>
</tr>
<tr>
<td>Energy Storage Resources</td>
<td>Based upon time-weighted UOL availability evaluated against the ICAP sold</td>
</tr>
<tr>
<td>Co-located Storage Resources</td>
<td>Based on existing methods for each resource type, with adjustments for shared Point of Injection (POI) availability</td>
</tr>
</tbody>
</table>
Let’s Review

If a resource has a Derating Factor of .05, what is its historic availability?

a) 5%  
b) 10%  
c) 50%  
d) 95%
Let’s Review

What is the maximum capacity that a unit can sell given that it has a DMNC of 200 MW, deliverable CRIS CAP of 190 MW, a duration adjustment factor of 100%, and a historic availability of 0.95?

a) 100 MW
b) 180.5 MW
c) 190 MW
d) 200 MW
Capacity Resources
Capacity Resources

- **Generators**
  - Within NYCA
  - Outside NYCA

- **Special Case Resources (SCRs)**
  - Within NYCA

- **External Capacity Resources**

- **Unforced Capacity Deliverability Rights (UDRs)**

- **External-to-ROS Deliverability Rights (EDRs)**
Special Case Resources

- Load reductions achieved through interruptible / curtailable loads or loads able to operate a qualified behind-the-meter Local Generator to remove load off the grid
- Each SCR is enrolled by Responsible Interface Party (RIP)

\[
\text{SCR UCAP} = \text{SCR ICAP} \times \text{Applicable Performance Factor}
\]

Pledged Amount \times (1 + \text{Transmission Loss Factor})

**Refer to Section 4.12 of ICAP Manual**
External Capacity Resources

- **External CRIS Rights: (ECRs)**
  - One time opportunity to convert Grandfathered Rights were to External CRIS Rights or awarded through the Class Year process
  - Contract or Non-Contract Commitment
  - Consequences for not supplying

- Capacity associated with Existing Transmission Capacity for Native Load ("ETCNL")

- Capacity associated with Unforced Capacity Deliverability Rights (UDRs)

- Import Rights
  - First Come First Served: Subject to Import Limits

*External Installed Capacity Supplier requirements listed in ICAP Manual, Section 4.9*
External Capacity Resources: Import Limits

- Import Limits are set to determine the amount of capacity that can be imported into NYCA using the “First Come First Served” Process
- Limit is established after considering External CRIS Rights and ETCNL
  - Established by NYISO
  - Based on reliability studies
  - Determined annually
  - Available Import Rights are based on Import Limits
    - Calculated for each month of upcoming Capability Period

*Import Limits: ICAP Manual, Section 4.9.6
## External Capacity Resources: Import Limits

Maximum provided by resources outside NYCA
(Excluding Resources Using UDRs, EDRs, ETCNL, and External CRIS Rights)

### 2021-2022 Capability Year

<table>
<thead>
<tr>
<th>Amount of External ICAP Permitted to be Allocated for NYCA Interfaces</th>
<th>Total (MW)</th>
<th>Grandfathered (MW) and Cap. Year External CRIS (MW)</th>
<th>Remaining (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM</td>
<td>1229</td>
<td>38</td>
<td>1191</td>
</tr>
<tr>
<td>ISO-NE</td>
<td>241</td>
<td>0</td>
<td>241</td>
</tr>
<tr>
<td>Ontario</td>
<td>42</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>Quebec via Chateauguay</td>
<td>1119</td>
<td>1110 (Apr-Nov) 239 (Dec-Feb) 259 (Mar)</td>
<td>9 (Apr-Nov) 880 (Dec-Feb) 860 (Mar)</td>
</tr>
<tr>
<td>Quebec via Cedars</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total NYCA Interfaces</td>
<td>2631</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***Neighboring Control Area rules must provide that the resource will not be recalled or curtailed to satisfy the Control Areas own load.***
Unforced Capacity Deliverability Rights (UDRs) & External-to-ROS Deliverability Rights (EDRs)

- Rights associated with a specific transmission interface in a Locality (UDR) or in “Rest of State” (EDR)
  - Either from an External Control Area or a non-constrained region in NYCA
- Allows remote capacity external to the area to be treated as if it were physically located in the Locality/Rest of State zone
- Only associated with Scheduled Lines
- UDRs approved based on CRIS requested and received in relation to transfer capability
# Unforced Capacity Deliverability Rights (UDRs)

<table>
<thead>
<tr>
<th>Current UDRs Awarded</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cross Sound Cable (CSC)</strong></td>
<td>330 MW</td>
</tr>
<tr>
<td>New England to Long Island, Zone K</td>
<td></td>
</tr>
<tr>
<td><strong>Neptune Cable</strong></td>
<td>660 MW</td>
</tr>
<tr>
<td>PJM to Long Island, Zone K</td>
<td></td>
</tr>
<tr>
<td><strong>Linden VFT</strong></td>
<td>315 MW</td>
</tr>
<tr>
<td>PJM to New York City, Zone J</td>
<td></td>
</tr>
<tr>
<td><strong>Hudson Transmission Project (HTP)</strong></td>
<td>660 MW</td>
</tr>
<tr>
<td>PJM to New York City, Zone J</td>
<td></td>
</tr>
</tbody>
</table>

*ICAP Manual – Section 4.9.6*
# External-to-ROS Deliverability Rights (EDRs)

<table>
<thead>
<tr>
<th>Current EDRs Awarded</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedars</td>
<td></td>
</tr>
<tr>
<td>HQ to Rest-of-State (ROS), Zone D</td>
<td>80 MW</td>
</tr>
</tbody>
</table>

*ICAP Manual – Section 4.9.6*
UCAP for UDR

- The UDR Rightsholder/ICAP Supplier designates which generating unit(s) will be used to supply capacity via the UDR.

- Each Rightsholder’s UDRs are further reduced by its share of
  - UDR Losses
  - Generating unit’s Derating Factor using the following UCAP Calculation.
UCAP for UDR Example

- A UDR Line XYZ from NE to LI is configured
- This UDR has Resource A and Resource B

UDR Line Losses: 2.86% (equivalent to 10.3 MW)
UDR Unavailability: 2%

- Resource A: UDR UCAP UDR PTID 345
  \[
  \text{Resource A has } 145.1 \text{ UCAP Available to Offer in LI}
  \]

  \[
  \begin{align*}
  &= (154.0 - 4.4 \text{ MW}) \times (1 - 0.01) \times (1 - 0.02) \\
  &= 149.6 \times 0.99 \times 0.98 = 145.14192 \\
  &\approx 145.1
  \end{align*}
  \]

- Resource B: UDR UCAP UDR PTID 123
  \[
  \begin{align*}
  &= (206.0 - 5.9 \text{ MW}) \times (1 - 0.05) \times (1 - 0.02) \\
  &= 200.1 \times 0.95 \times 0.98 = 186.2931 \approx 186.2
  \end{align*}
  \]

  Resource B has 186.2 UCAP Available to Offer in LI

*Calculation is truncated to one decimal place
Amount of LSE Capacity Obligation to Procure

-How much must be purchased?
LSE Capacity Requirements
Obligation to Procure

- How much must be procured?
  - All LSEs are required to purchase a specific amount of the Total NYCA Capacity Requirement
    - Based on their contribution to the Transmission District’s peak load coincident with the NYCA peak load
  - LSEs may also have Locational Capacity Requirements
    - (G-J Locality, LI and NYC)
LSE Capacity Requirements

- **LSE Minimum ICAP Requirement**
  - Each LSE required to procure a certain percentage of the Total Capacity Requirement
  - The amount that forms the base is calculated each Capability Year and includes:
    - Forecasted Peak Load
    - IRM and Locational Capacity Requirement percentages
    - System changes due to transmission capability
LSE Capacity Requirements

- LSE Minimum **UCAP** Requirement
  - Min **UCAP** calculated separately for each Transmission District in which it serves load
  - NYISO calculates for a Capability Period
  - Each month each LSE must satisfy its minimum **UCAP** requirement
    - May satisfy via self-supply, bilateral transactions or through NYISO administered auctions
    - **UCAP** requirement adjusted monthly for customer switching
LSE Capacity Requirements

- Why ICAP to UCAP?
  - Incorporates Derating Factor
  - Calculated by NYISO every Capability Period
  - Calculated for NYCA and localities
    - For LSEs serving load in G-J Locality, Zone K (LI), or Zone J (NYC), a specified amount of their requirement must be purchased within the LSE’s respective Locality (based on their local load forecast)
Locational Capacity Requirements

- Locational Minimum ICAP Requirements
  - Locational Capacity Requirements (LCRs) established annually for the following Localities:

<table>
<thead>
<tr>
<th>Locality</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-J Locality</td>
<td>87.6% of G-J forecasted peak load</td>
</tr>
<tr>
<td>Zone K (LI) Requirement</td>
<td>102.9% of LI forecasted peak load</td>
</tr>
<tr>
<td>Zone J (NYC) Requirement</td>
<td>80.3% of NYC forecasted peak load</td>
</tr>
</tbody>
</table>

Note: These values are the NYSRC Executive Committee approved IRM and the NYISO approved LCRs for the applicable Capability Year

Locational Minimum ICAP Requirement = Locational Forecasted Peak Load x LCR Percentage

Locational Minimum UCAP Requirement = Locational Minimum ICAP x (1 – Avg. Locational Derating Factor)
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 #40

<table>
<thead>
<tr>
<th>Forecasted Peak Load (FPL)</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Con Ed TD NYCA</td>
<td>12,816.7</td>
</tr>
<tr>
<td>Con Ed TD G-J</td>
<td>12,808.8</td>
</tr>
<tr>
<td>Con Ed TD NYC</td>
<td>11,199.0</td>
</tr>
</tbody>
</table>

- G-J Locational ICAP Requirement is 87.6% of G-J Locality FPL:
  \[
  12,808.8 \times 87.6\% = 11,218.8 \text{ MW}
  \]

- NYC Locational ICAP Requirement is 80.3% of NYC FPL:
  \[
  11,199.0 \times 80.3\% = 8,992.8 \text{ MW}
  \]

- Remaining G-J Locational Requirement after meeting the NYC requirement must be purchased in G, H, I, J:
  \[
  11,218.8 - 8,992.8 = 2,226.0 \text{ MW}
  \]

- Remaining NYCA requirement can be purchased in G, H, I, J, K or ROS:
  \[
  15,469.8 - 11,218.8 = 4,251.0 \text{ MW}
  \]
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 #50

Locational Min ICAP x (1 – Loc. Derating Factor)

- G-J Locational UCAP Requirement is:
  \(11,218.8 \times (1 - 3.61\%) = 10,813.8\) MW

- NYC Locational UCAP Requirement is:
  \(8,992.8 \times (1 - 2.69\%) = 8,750.9\) MW

- Remaining G-J Locational UCAP Requirement after meeting the NYC UCAP Requirement must be purchased in G, H, I, J:
  \(10,813.8 - 8,750.9 = 2,062.9\) MW

- Remaining NYCA UCAP Requirement after meeting the G-J Locational UCAP Requirement can be purchased in G, H, I, J, K, or ROS:
  \(14,113.1 - 10,813.8 = 3,299.3\) MW
# ICAP and UCAP Values
## Locational Requirements

### Transmission District Loads G-J Locality

<table>
<thead>
<tr>
<th>Location</th>
<th>Forecasted Peak Load MW</th>
<th>Requirement %</th>
<th>Derating Factor %</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
<th>UCAP Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-J Locality</td>
<td>15,411.3</td>
<td>87.584%</td>
<td>3.61%</td>
<td>13,499.3</td>
<td>13,001.0</td>
<td>84.4%</td>
</tr>
<tr>
<td>LI</td>
<td>5,246.6</td>
<td>103.933%</td>
<td>4.61%</td>
<td>5,405.8</td>
<td>5,135.6</td>
<td>97.1%</td>
</tr>
<tr>
<td>NYC</td>
<td>11,399.0</td>
<td>80.000%</td>
<td>2.69%</td>
<td>6,992.8</td>
<td>6,759.0</td>
<td>78.1%</td>
</tr>
<tr>
<td>NYC-G</td>
<td>23,233.1</td>
<td>130.706%</td>
<td>8.77%</td>
<td>19,035.1</td>
<td>19,035.1</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### Transmission District Loads LI

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
<th>UCAP Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nettco Authority - Central Hudson Gas &amp; Elect</td>
<td>1,112.9</td>
<td>628.4</td>
<td>628.4</td>
<td>100.0%</td>
</tr>
<tr>
<td>Nettco Authority - Consolidated Edison of NY</td>
<td>17,904.0</td>
<td>11,718.8</td>
<td>11,831.4</td>
<td>99.4%</td>
</tr>
<tr>
<td>Nettco Authority - New York State Electric &amp; Gas</td>
<td>388.2</td>
<td>246.1</td>
<td>246.1</td>
<td>100.0%</td>
</tr>
<tr>
<td>Nettco Authority - Orange and Rockland Utilities</td>
<td>1,051.7</td>
<td>689.0</td>
<td>689.0</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15,411.3</td>
<td>13,499.3</td>
<td>13,001.0</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### Transmission District Loads NYC

<table>
<thead>
<tr>
<th>Transmission Owner</th>
<th>Forecasted Peak Load MW</th>
<th>ICAP MW Requirement</th>
<th>UCAP MW Requirement</th>
<th>UCAP Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nettco Authority - Consolidated Edison of NY</td>
<td>11,995.0</td>
<td>6,992.8</td>
<td>6,759.0</td>
<td>99.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,995.0</td>
<td>6,992.8</td>
<td>6,759.0</td>
<td>99.0%</td>
</tr>
</tbody>
</table>
Let’s Review

The Locational Minimum ICAP Requirement for the G-J locality is 92.3% of ________________.

a) NYCA Minimum ICAP Requirement

b) NYCA Forecasted Peak Load

c) G-J Forecasted Peak Load
ICAP Auxiliary Processes & Activities

Benefits
- Ensures resource adequacy
- Resources recover a portion of fixed costs
- Provides market signal for investment

Market Mechanics
- Amount of Capacity Required
- Amount of Capacity Available
- Amount of Capacity to Offer
- Amount of Capacity to Procure

Auxiliary Processes & Activities
- Capacity Auctions
- Spot Market Auction
- Demand Curve
- Settlements
- Responsibilities
- Sanctions
Capacity Auctions
ICAP Market Auctions

- **Capability Period Auction (Strip Auction)**
  - Matches Bids & Offers
  - Sets Market-Clearing Price

- **Monthly Auction**
  - Matches Bids & Offers
  - Sets Market-Clearing Price

- **Spot Market Auction**
  - Deficiency and Excess UCAP
  - Market Clearing Price based on Demand Curve
Capability Period Auction

- A bid in this auction is for the same MW level and price for the entire capability period.
- Auction is run at least 30 days prior to the start of the Capability Period.
- Auction solves for a (6) Month Strip of UCAP at a Single Price/Month.
Monthly Auction

- May buy/sell for any month remaining in the Capability Period
- Auction is run at least 15 days prior to the start of the month

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>✔️</td>
<td></td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>June</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>August</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>September</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>October</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Spot Market Auction

- May sell for upcoming month only
- Must certify all Capacity before Auction
- Auction solves using the Demand Curve
- Auction is run 2 days prior to the start of the month
Spot Market Auction and Demand Curve

- **Demand Curve used to determine a spot market clearing price**
  - Values additional UCAP above Minimum NYCA and Locational requirements
  - Reduces price volatility
  - Provides signal for capacity investment
Spot Market Auction and Demand Curve

- Separate ICAP Demand Curves to determine
  - Total [NYCA] LSE UCAP Obligation
  - NYC Locational component of LSE UCAP Obligation
  - Long Island Locational component of LSE UCAP Obligation
  - G-J Locality component of LSE UCAP Obligation

- Demand Curves are reset every four years and include annual adjustments
Demand Curve Components

- **Reference Point**: Set price point for 100% of minimum requirement
- **Maximum Clearing Price**: Equal to 1.5 times the estimated localized levelized cost of new peaking unit
- **Zero Crossing Point**: Percentage of requirement where price is $0

Example NYCA Demand Curve
2018/2019 ICAP Based Prices ($/kW-Month)
Demand Curve Components

- **Reference Point: Set price point for 100% of minimum requirement**
  - NYCA: $9.83
  - G-J Locality: $16.59
  - NYC: $21.95
  - LI: $15.96

- **Maximum Clearing Price: Equal to 1.5 times the estimated localized levelized cost of new peaking unit**
  - NYCA: $16.33
  - G-J Locality: $22.51
  - NYC: $26.93
  - LI: $25.11

- **Zero Crossing Point: Percentage of requirement where price is $0**
  - NYCA Demand Curve: 112%
  - G-J Locality Demand Curve: 115%
  - LI & NYC Locational Demand Curves: 118%
## ICAP Event Calendar

### Event Schedule

**Monday May 20, 2019**
- **05:00 AM**: IMPORT RIGHTS - MPs may begin Import Rights returns if IDO announced fully allocated
- **06:00 AM**: EXTERNAL TRANSACTIONS - Deadline to submit MES transaction IDs for Import Rights, Exports, and UDRs
- **06:00 AM**: GAWS - Deadline for Suppliers to submit GAWS data for Apr activity
- **06:00 AM**: IMPORT RIGHTS - Deadline for Import Rights returns if ISO announced fully allocated
- **06:00 PM**: IMPORT RIGHTS - ISO posts the remaining available Import Rights

**Wednesday May 22, 2019**
- **05:00 AM**: CERTIFICATION - Deadline for Certification for Links and Suppliers for Jun

**Thursday May 23, 2019**
- **08:00 AM**: SCR - Enrollment Period for auction month of Jul Opens
- **08:00 AM**: SCR - New Aggregation ID Request Period for Jul Opens
- **08:00 AM**: SCR - Period Opens for TOs to import/modify bids for non-provisional resources newly enrolled for auction month of Jul
- **05:00 AM**: LOAD SHIFT - Deadline for TOs to provide daily load shift (customer switching) for May

**Friday May 24, 2019**
- **08:00 AM**: SPOT MARKET AUCTION - Offer period opens for Jun Spot Market Auction
- **11:00 AM**: TRUE UP - Deadline for TOs to provide true-up load shift (actual data) for LSE activity 3 months prior
- **06:00 PM**: IMPORT RIGHTS - Allocated Import Rights w/o NIS transaction IDs entered into Spot MID Auction @ 16:00
Which auction allows market participants to purchase capacity for an entire 6 month period all at once?

a) Capacity Auction

b) Spot Market Auction

c) Monthly Auction

d) Strip Auction
TRUE or FALSE: The purpose of the spot market is to cover any shortfall or deficiency and allows an opportunity to sell excess capacity.

TRUE

FALSE
Let’s Review

The Demand Curve is applicable to which auction(s)?

a) Capability Auction
b) Spot Market Auction
c) Monthly Auction
d) All of the above
Auction Settlements

- **Award amount x Auction Clearing Price**
  - 100 MW x $2.67/kW-month
  - Convert 100 MW to kW: (100 MW x 1,000 kW/MW)
  - 100,000 kW x $2.67/kW = $267,000 for the month

- **Auction Awards appear in following weekly invoice**
  - Monthly amount is prorated by the number of days on the weekly invoice divided by the number of days in the month

- **Bilateral Transactions are settled between parties outside of NYISO**
Activities /Responsibilities

- Submission of GADS Data, monthly
- Certification prior to applicable auction
  - LSE must certify the amount of UCAP it has or has obtained
  - Suppliers certify UCAP has not been sold for use in an External Control Area
  - UDR & EDR holders certify that their capacity is not already accounted for elsewhere
- Secure UCAP
  - Bilateral contract (includes self-supply) or NYISO Auction
- Bid, Schedule, Notify in DAM Energy Market***
Bid, Schedule or Notify

- **ICAP Suppliers must either:**
  - “Bid” [Offer] Energy in the DAM
  - Schedule a Bilateral Transaction
  - OR
  - Notify the NYISO of any outage

- **The total amount of Energy that an ICAP supplier “bids,” schedules or declares unavailable on a given day must equal or exceed the Installed Capacity Equivalent (ICE) amount of UCAP sold**
  - ICE value is a generator’s capacity sold adjusted for availability

\[
\text{ICE} = \frac{\text{UCAP Sold}}{1 - \text{Derating Factor}}
\]

Exceptions to this are outlined in Section 4.8 of the ICAP manual.
Let’s Review

How much must this ICAP supplier Offer, Schedule, or Notify in DAM if:

UCAP Sold = 50 MWs
Derating Factor = .05 (available 95% of the time)

ICE = \( \frac{UCAP \text{ Sold}}{1 - \text{Derating Factor}} \)
Sanctions

- Failure to comply with bidding, scheduling and notification requirements and procedures
- Failure to provide required information
ICAP Market Summary

- Installed Reserve Margin (IRM)
- Minimum ICAP Requirements
  - NYCA
  - Transmission District
  - Locational
- UCAP
  - Transmission District UCAP Requirement
- Individual LSE Minimum UCAP Requirement
ICAP Summary - Supplier Activities

- Submit DMNC data each Capability Period
- Submit monthly GADS data, or equivalent
- Certify prior to ICAP Spot Market Auction
- Offer capacity in auction
- Bid, schedule or notify in Day-Ahead Market, if obligated to do so
ICAP Summary - Load Activities

- Purchase capacity in auction
  - Minimum requirement
  - Locational Requirements
- Certify prior to ICAP Spot Market Auction

Note: TransmissionOwners must submit Adjusted Load data coincident with NYCA peak
ICAP Summary – NYISO Activities

- Review and adjust Demand Curves every 4 years
  - Through the ICAP Working Group
- Provide Minimum ICAP Requirements
- Calculate UCAP
- Conduct Auctions
- Post award data to web
- Settlement mechanism
What is the primary purpose of the ICAP market?

a) Ensure sufficient load exists for NYCA generation

b) Ensure competitive pricing of new generation

c) Facilitate competitive procurement of generator fixed costs

d) Ensure sufficient resources exist to serve load
Let’s Review

TRUE or FALSE: In addition to submitting data to support their actual output, suppliers also required to Bid, Schedule, Notify in the DAM as an ICAP supplier.

TRUE
FALSE
Let’s Review

Which of the following statements are true regarding DMNC tests?

a) Test should be conducted only during test periods

b) An out-of-period test can be conducted with prior NYISO approval

c) In lieu of a test, a generator can submit actual operating data

d) All of the above are true
Let’s Review

What does UCAP represent?

a) Unforced operating parameters

b) The average availability of a given generator

c) Demonstrated output adjusted for deliverability and availability

d) ICAP adjusted for forecasted usage
Installed Capacity
NYISO Website Data
INSTALLED CAPACITY MARKET (ICAP)

The New York Installed Capacity (ICAP) market serves to maintain reliability of the bulk power system by procuring sufficient resource capability to meet expected maximum energy needs plus an Installed Reserve Margin (IRM).

ICAP AUTOMATED MARKET SYSTEM LOGIN
# ICAP Event Calendar

## Event Schedule

<table>
<thead>
<tr>
<th>Event Date</th>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday Jan 22, 2019</td>
<td>05:00 PM</td>
<td>IMPORT RIGHTS - Deadline for Import Rights returns if ISO announces fully allocated</td>
</tr>
<tr>
<td></td>
<td>05:00 PM</td>
<td>IMPORT RIGHTS - External Balloons confirmed for HES transactions 10's received</td>
</tr>
<tr>
<td></td>
<td>05:00 PM</td>
<td>IMPORT RIGHTS - ISO posts the remaining available Import Rights</td>
</tr>
<tr>
<td>Wednesday Jan 23, 2019</td>
<td>05:00 PM</td>
<td>CERTIFICATION - Deadlines for Certification for LSEAs and Suppliers for Feb</td>
</tr>
<tr>
<td></td>
<td>05:00 PM</td>
<td>ROTATION - Default Reference Price</td>
</tr>
<tr>
<td>Thursday Jan 24, 2019</td>
<td>05:00 PM</td>
<td>LDAP SHIFTS - Deadlines for TOs to provide daily load shift (customer switching) for Jun</td>
</tr>
<tr>
<td></td>
<td>05:00 PM</td>
<td>TRUE UP - Deadline for TOs to provide true-up load shift (actual data) for LSE activities 3 months prior</td>
</tr>
<tr>
<td>Friday Jan 25, 2019</td>
<td>08:00 AM</td>
<td>SPOT MARKET AUCTION - Offer posted open for Feb Spot Market Auction</td>
</tr>
<tr>
<td></td>
<td>08:00 AM</td>
<td>IMPORT RIGHTS - Allocated Import Rights w/c HES transactions 10's entered into Feb Spot Market Auction @ 8:00</td>
</tr>
<tr>
<td>Monday Jan 28, 2019</td>
<td>08:00 AM</td>
<td>SPOT MARKET AUCTION - Offer posted close for Feb Spot Market Auction</td>
</tr>
<tr>
<td>Wednesday Jan 30, 2019</td>
<td>08:00 AM</td>
<td>IMPORT RIGHTS - Import Rights First Come First Serve - begin to submit requests</td>
</tr>
<tr>
<td></td>
<td>08:00 AM</td>
<td>CMHC - Deadline to submit CMHC sGts for New Generators to ensure can be used for Mar</td>
</tr>
<tr>
<td></td>
<td>08:00 PM</td>
<td>IMPORT RIGHTS - ISO no longer Import Rights Repeatability of Priority</td>
</tr>
<tr>
<td></td>
<td>08:00 PM</td>
<td>IMPORT RIGHTS - Import Rights First Come First Serve - deadline for requests</td>
</tr>
<tr>
<td></td>
<td>08:00 PM</td>
<td>CMHC/CMHC - Deadline to update CMHC contracts to be used for events/bid notifications for Feb</td>
</tr>
<tr>
<td></td>
<td>08:00 PM</td>
<td>SPOT MARKET AUCTION - ISO posts results of Feb Spot Market Auction</td>
</tr>
<tr>
<td>Thursday Jan 31, 2019</td>
<td>08:00 AM</td>
<td>CMHC - Performance Factors available in DCS for Summer 2019</td>
</tr>
<tr>
<td></td>
<td>08:00 AM</td>
<td>CMHC - ISO may begin to report resources with partial FTSI Sales for Feb, in DCS</td>
</tr>
<tr>
<td></td>
<td>08:00 AM</td>
<td>IMPORT RIGHTS - Deadline for ISO to receive Supporting Documents for Import Rights Requests</td>
</tr>
</tbody>
</table>
Additional Resources

- Tariffs – MST and OATT
- ICAP Manual
- ICAP Automated Market System (AMS) User’s Guide
- Outage Scheduler User’s Guide