Expanding Application of Peak Hour Forecasts

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Purpose

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Purpose

- The purpose of this presentation is to:

  - Clarify the NYISO's requirements regarding the allocation of the ICAP obligation to Load Serving Entities (LSEs)

  - Discuss coincident and non-coincident peak load

  - Address stakeholder questions regarding tariff language

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Background

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Date	Working Group	Discussion Points and Links to Materials
February 25, 2021	ICAPWG/MIWG	Kick-off presentation discussing the current process: https://www.nyiso.com/documents/20142/19520392/Expanding%20Application%20of%20Peak%20Hour%20Forecasts%202.25.2021%20ICAPWG%20FINAL.pdf/800c1e4b-6169-7e31-3647-ad417a236221
March 25, 2021	ICAPWG/MIWG	Discuss potential analyses: https://www.nyiso.com/documents/20142/20226859/Expanding%20Application%20of%20Peak%20Hour%20Forecasts%203.25.2021%20ICAPWG%20FINAL.pdf/5334cd44-5d5f-06d8-f12e-bd294bbcbee1
May 4, 2021	ICAPWG/MIWG	Discuss load duration analysis https://www.nyiso.com/documents/20142/21189817/Expanding%20Application%20of%20Peak%20Hour%20Forecasts%205.4.2021%20ICAPWG.pdf/5a2115b3-cd4d-b977-b3de-6fd3115b13a9

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Background

- Revisions to the ICAP load forecast or Installed Reserve Margin (IRM) processes are <u>not</u> under consideration as part of this project.

- The NYISO and its stakeholders are considering the use of multiple peak load hours in the Transmission Owner (TO) ICAP obligation allocation to LSEs as part of this project.
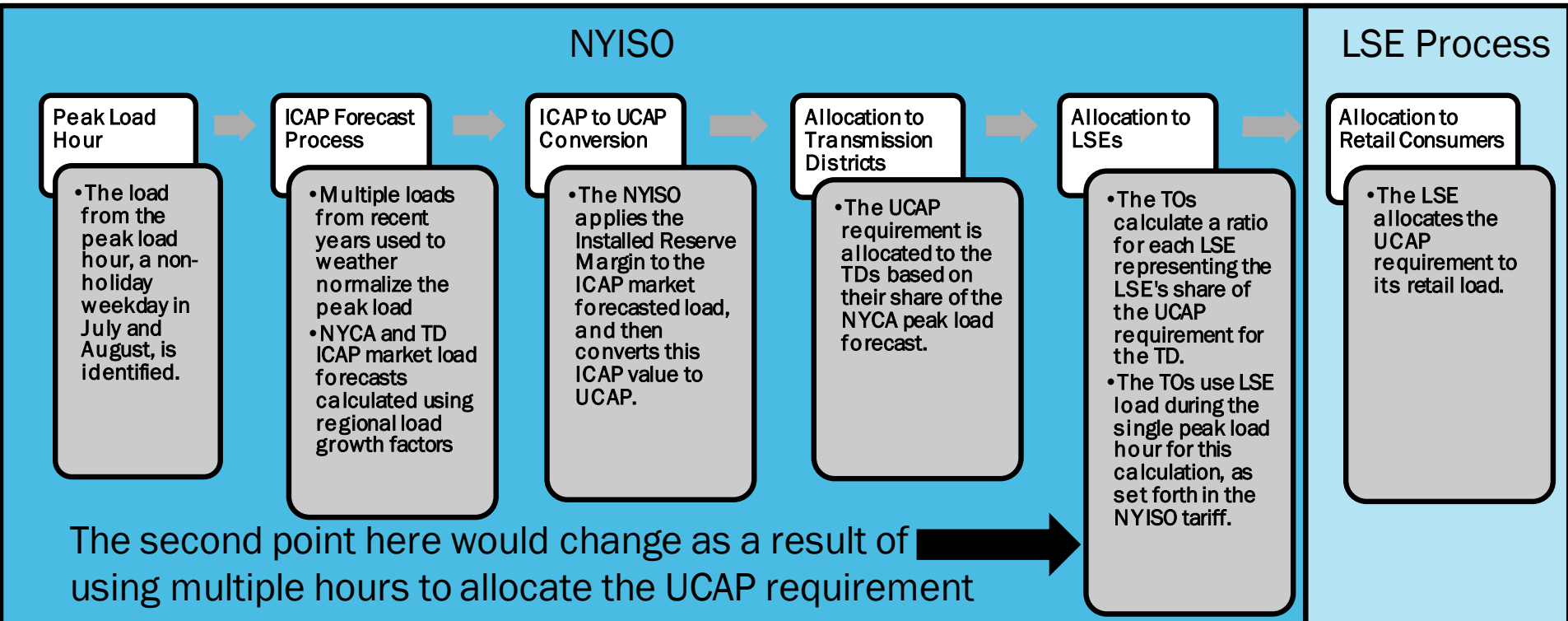
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Initial Recommendation

- The NYISO is still evaluating its initial recommendation to provide data for the top 5 peak load hours, with the identification of these hours to include only non-holiday weekdays in July and August, consistent with design conditions.

  - The NYISO could provide data for the top 5 peak load hours. There is a drop in the load during peak load hours each year after the fifth load hour, as observed in the charts in the appendix.

  - Additionally, this approach may balance concerns that the incentive to reduce load during peak hours will be reduced with the desire to have that incentive apply to more peak load days, as historically up to three unique days are present in the top five load hours.

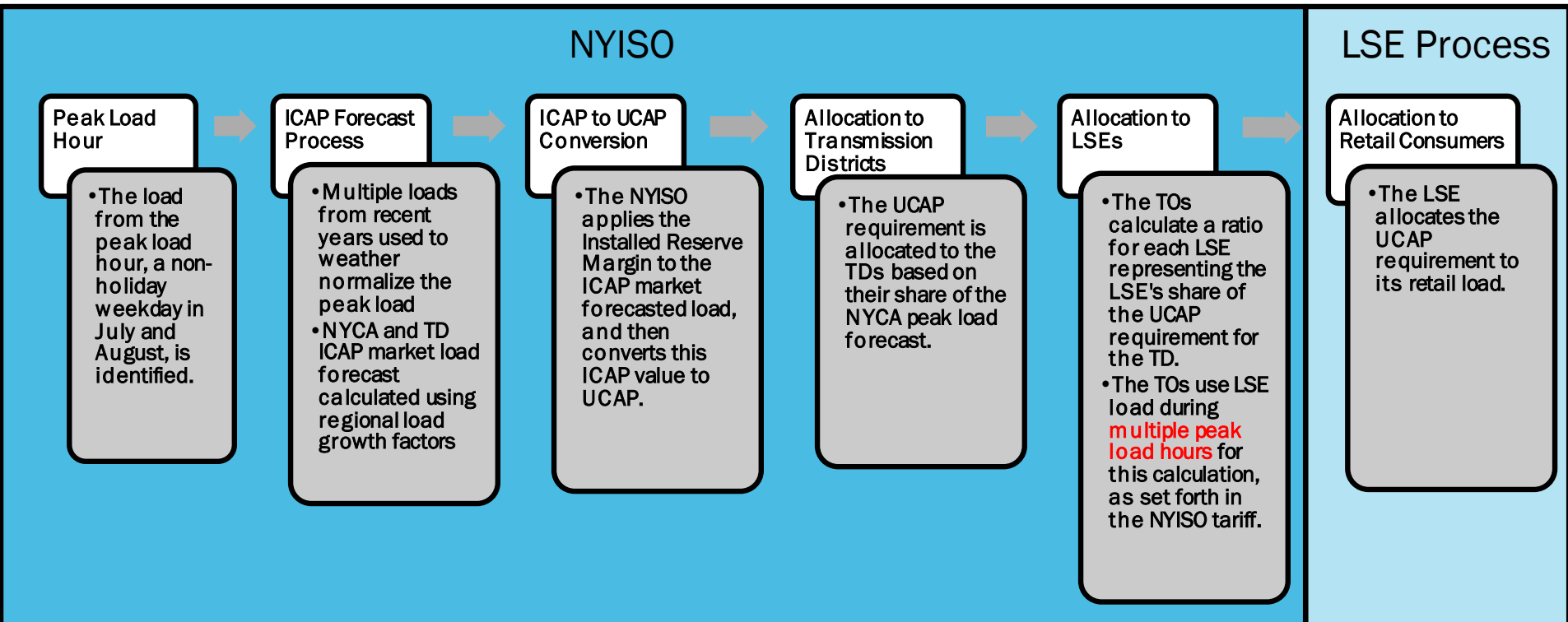New York ISO

Initial Recommendation

- **Actual load data would be used to identify the peak load hours, as opposed to reconstituted load data.**

  - Final Special Case Resource (SCR) load reduction data would not be available in time to be used to identify multiple peak load hours.

  - The load duration curve analysis discussed at the May 4, 2021 ICAPWG has been updated to use actual load data instead of reconstituted load, and has been included as an appendix to this presentation.

  - Actual load data is used today when identifying the peak load hour.

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ICAP Market Requirement Process

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Current Process Flow

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Peak Load Hour
- The load from the peak load hour, a non-holiday weekday in July and August, is identified.

ICAP Forecast Process
- Multiple loads from recent years used to weather normalize the peak load
- NYCA and TD ICAP market load forecasts calculated using regional load growth factors

ICAP to UCAP Conversion
- The NYISO applies the Installed Reserve Margin to the ICAP market forecasted load, and then converts this ICAP value to UCAP.

Allocation to Transmission Districts
- The UCAP requirement is allocated to the TDs based on their share of the NYCA peak load forecast.

Allocation to LSEs
- The TOs calculate a ratio for each LSE representing the LSE's share of the UCAP requirement for the TD.
- The TOs use LSE load during the single peak load hour for this calculation, as set forth in the NYISO tariff.

LSE Process

Allocation to Retail Consumers
- The LSE allocates the UCAP requirement to its retail load.

The second point here would change as a result of using multiple hours to allocate the UCAP requirement

Proposed Process Flow

NYISO

Peak Load Hour
- The load from the peak load hour, a non-holiday weekday in July and August, is identified.

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- The UCAP requirement is allocated to the TDs based on their share of the NYCA peak load forecast.

Allocation to LSEs
- The TOs calculate a ratio for each LSE representing the LSE's share of the UCAP requirement for the TD.
- The TOs use LSE load during **multiple peak load hours** for this calculation, as set forth in the NYISO tariff.

LSE Process

Allocation to Retail Consumers
- The LSE allocates the UCAP requirement to its retail load.

Multiple Daily Peak Loads in the Current NYISO ICAP Forecast Process

- The previous slides show the current and proposed process flow for the establishment and allocation of ICAP market requirements.

- The NYISO's ICAP forecast process already uses multiple peak load hours.
  - The ICAP forecast regression process for weather normalization uses daily peak loads for each weekday in June, July, and August from recent years.

- The NYISO design criterion is based on the single highest load hour.
  - The NYISO's ICAP market forecast process will be unaffected by the identification of multiple hours of peak loads in order for the TOs to allocate ICAP obligations to the LSEs.

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NYCA Coincident Peak Load

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Coincident and Non-Coincident Peak Load

- At the last ICAPWG, the NYISO received feedback that the ICAP market requirement allocation to LSEs should incorporate non-coincident load from the Localities. The NYISO is considering this feedback.

- However, the coincident and non-coincident peak loads have often occurred during similar dates in previous years, as shown in the table below, which considers Load that has not been reconstituted.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Top Peak Load as a % of ICAP Forecast	101.3%	103.5%	97.4%	102.0%	88.5%	92.8%	96.2%	89.5%	96.8%	93.9%
NYCA Coincident Peak	7/6/2010 16:00	7/22/2011 15:00	7/17/2012 16:00	7/19/2013 16:00	9/2/2014 14:00	7/29/2015 16:00	8/11/2016 16:00	7/19/2017 16:00	8/29/2018 16:00	7/20/2019 16:00
G-J Non-Coincident Peak	7/6/2010 16:00	7/22/2011 15:00	7/18/2012 12:00	7/19/2013 16:00	9/2/2014 15:00	7/20/2015 16:00	8/11/2016 16:00	7/20/2017 15:00	9/6/2018 15:00	7/17/2019 15:00
J Non-Coincident Peak	7/6/2010 16:00	7/22/2011 11:00	7/18/2012 14:00	7/19/2013 16:00	9/2/2014 15:00	7/20/2015 17:00	8/11/2016 16:00	7/20/2017 15:00	9/6/2018 16:00	7/17/2019 17:00
K Non-Coincident Peak	7/6/2010 16:00	7/22/2011 15:00	6/21/2012 16:00	7/18/2013 16:00	9/2/2014 15:00	7/20/2015 16:00	8/12/2016 16:00	7/20/2017 15:00	8/29/2018 16:00	7/21/2019 17:00

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Review of Applicable Tariff Language

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Tariff Review

- **The single peak load hour discussed in MST 5.10 and 5.11 is currently used by the Transmission Owners (TOs) to allocate ICAP obligations to the Load Serving Entities (LSEs).**

  - Revised tariff language will be necessary for the TOs to allocate ICAP obligations to the LSEs using multiple peak load hours.

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Tariff Review

- **The NYISO and its stakeholders should consider the following:**
  - Number of peak load hours, or peak load days, used for the allocation
  - Weighting of the peak load hours used by the TOs to construct a single ratio for the allocation to the LSEs
- **Load will continue to be attributed to LSEs based on actual meter data in accordance with TO procedures.**

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Next Steps

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Timeline

- **June/ July ICAPWG**
  - Continue stakeholder discussions

- **July BIC**
  - Present MDCP

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Appendix I: Peak Hour Forecast Process

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Peak Load Date and Hour

- Each September, NYISO identifies the NYCA peak load date and hour for the current capability year (for example, this September 2021, the NYISO will provide this information for the 2021 Capability Year).

  - The locality non-coincident peak load dates and hours are also identified.
  - The TOs report meter data for these peak load hours to the NYISO.
    - The data is submitted to the NYISO in multiple data files, and compiled by the NYISO in a single file.
  - TO load data is then compared to NYISO Decision Support System (DSS) data, to ensure that the actual loads match within a 1% tolerance.

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Net Load vs. Gross Load

- **The peak hour load received from the TOs is net of certain production.**
  - Demand reductions during the peak load hour from all Special Case Resources (SCRs), which are Demand Response (DR) resources participating in the Capacity Market, are added back into the peak hour load.
    - The TOs choose whether their own load reduction programs that do not overlap with SCRs should be added back into the load.
  - Specific municipal generating units that participate in the NYISO Capacity Market are also added back into the load.
  - There is currently no adjustment to add back generation from resources not participating in the wholesale markets.
    - For example, there is no adjustment to the load for rooftop solar outside of the wholesale markets.

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Weather Normalized Load

- **The TOs and the NYISO each weather normalize the peak load hour data.**
  - Models are developed by the NYISO and reviewed by the LFTF to weather normalize the data. Examples from 2020 include:
    - Single year model for the current year
    - Pool model including the current year and selected previous years.
  - The TO weather normalized load data is accepted if either:
    - The TO and NYISO adjusted loads are within 25% of each other, OR
    - The TO and NYISO weather normalized loads are within 1% of each other

Example Data*	NYISO	TO
Peak Hour Load	32,000	32,100
Weather Normalized Load	33,000	33,250
Adjusted Load	1,000	1,150

Must be within 25%

Must be within 1%

- **The ratio of coincident to non-coincident peak load is calculated in order to weather-adjust the peak load for each locality.**

- **A regional load growth factor is applied to the weather adjusted load, and this becomes the forecasted peak load**

*Data in this table is for example purposes only

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ICAP Forecast

- **The forecasted peak load is communicated to the ICAP marketplace.**

- **The forecasted peak load is assigned to each TO.**
  - Each TO then assigns the forecasted peak load MW to each LSE.

- **These assigned peak load values are converted to ICAP MW, and then to UCAP values.**
  - These UCAP values become purchase requirements for each LSE.

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Appendix II: NYISO Selection of the Peak Load Hour

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NYISO Selection of the Peak Load Hour

- Last year, the NYISO pursued revisions to the peak load forecast process.

  - FERC accepted the NYISO's filing on September 18, 2020.

- As a result of these revisions, the peak load hour may only occur on a non-holiday weekday in July and August

  - If the peak load day occurs outside of this time frame, then the next highest load is selected until arriving upon a peak load that occurred during a non-holiday peak day in July and August.

*For additional information, please see the presentation at the following link:
https://www.nyiso.com/documents/20142/13050797/04%20NYCA%20Peak%20Load%20Forecast%20Min%20Unforced%20Capacity%20Requirements%20for%20LSEs.pdf/8fe8d2f2-f4aa-f7a4-cd5c-71d66d225c51

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Weather Normalization and Regional Load Growth Factors (RLGFs)

- **The NYISO and the TOs conduct a regression using load and other data from weekdays in June, July, and August.**
  - The resulting regression formula is then used to adjust the coincident peak load for each Transmission District up or down to arrive at the expected peak load under normal weather conditions (i.e., Adjusted Actual Load).
- **The TOs provide Regional Load Growth Factors (RLGFs), which are then evaluated by the NYISO.**
  - The RLGFs are used to forecast the peak load for next year from the Adjusted Actual Load.

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UCAP Allocation to Transmission Owners

- The NYISO ICAP forecast is a forecast of the peak load for the following year, generated using the weather normalized coincident peak load day (numerous load/weather days are considered in the weather normalization process).
  - The forecasted peak load may occur on any day of the following year.

- This forecasted load is converted to UCAP and assigned to the TOs in each Transmission District (TD) using the following formula and example:[1]

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

TD Forecasted Coincident Peak Load (Con Edison, 2021)	12,816.7
Sum of Forecasted Coincident Peak Loads for all TDs (2021)	32,333.1
NYCA Minimum UCAP Requirement (2021)	35,603.5

$$TD \text{ Minimum UCAP Requirement} = 35,603.5 * \frac{12,816.7}{32,333.1}$$

TD Minimum UCAP Requirement = 14,113.1

[1] For illustrative purposes only. Data sources includes NYISO AMS and the following presentation:
https://www.nyiso.com/documents/20142/17660272/2021_ICAP_V5a.pdf/bcce19c1-2af1-558a-c9b7-c0ea0c3acd8d

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Appendix III: Load Duration Curve Analysis – Actual Load (Not Reconstituted)

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Load Duration Curve Analysis Data

- **The NYISO conducted a load duration curve analysis using previous hourly load data from 2010 to 2019.**
  - This load data was <u>not</u> reconstituted with the estimated Special Case Resource (SCR) response.

- **For each hour, the NYISO calculated the hourly load as a percentage of the ICAP load forecast for the applicable year.**

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Decline from Peak – Load as a Percent of ICAP Forecast

- **In years where the peak load is higher than the ICAP forecast (2010, 2011, 2013), the top peak load hours show a decline around the 5th hour.**

  - These years fall below 100% by roughly the 15th hour.
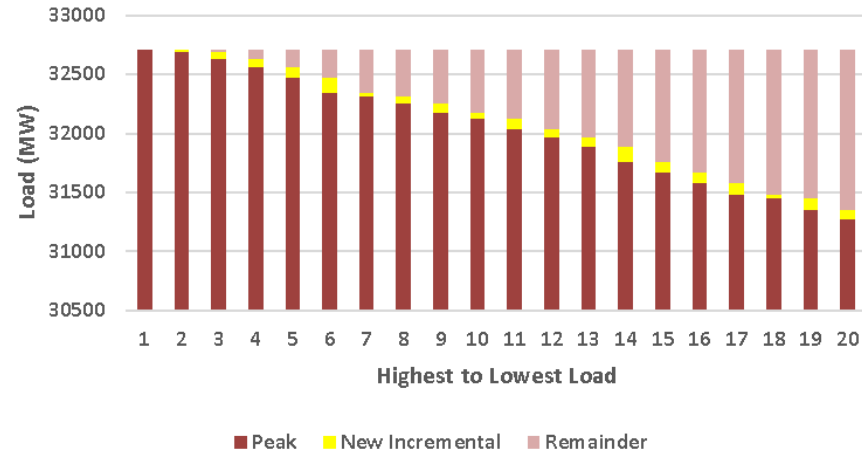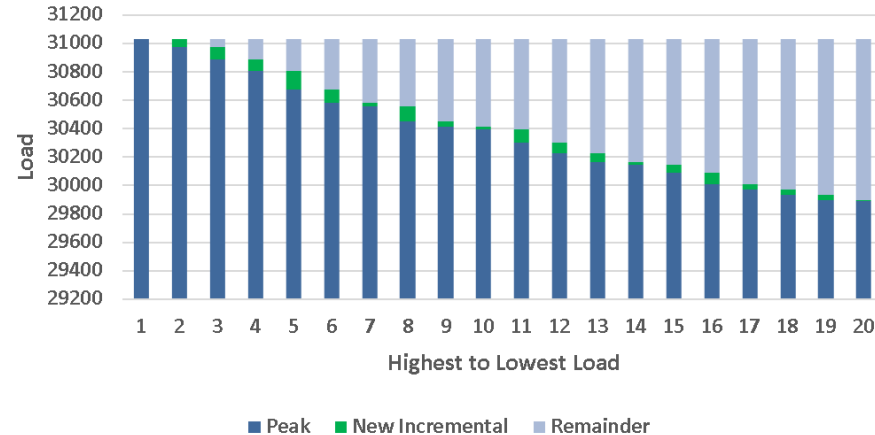

Load as a Percent of ICAP Forecast
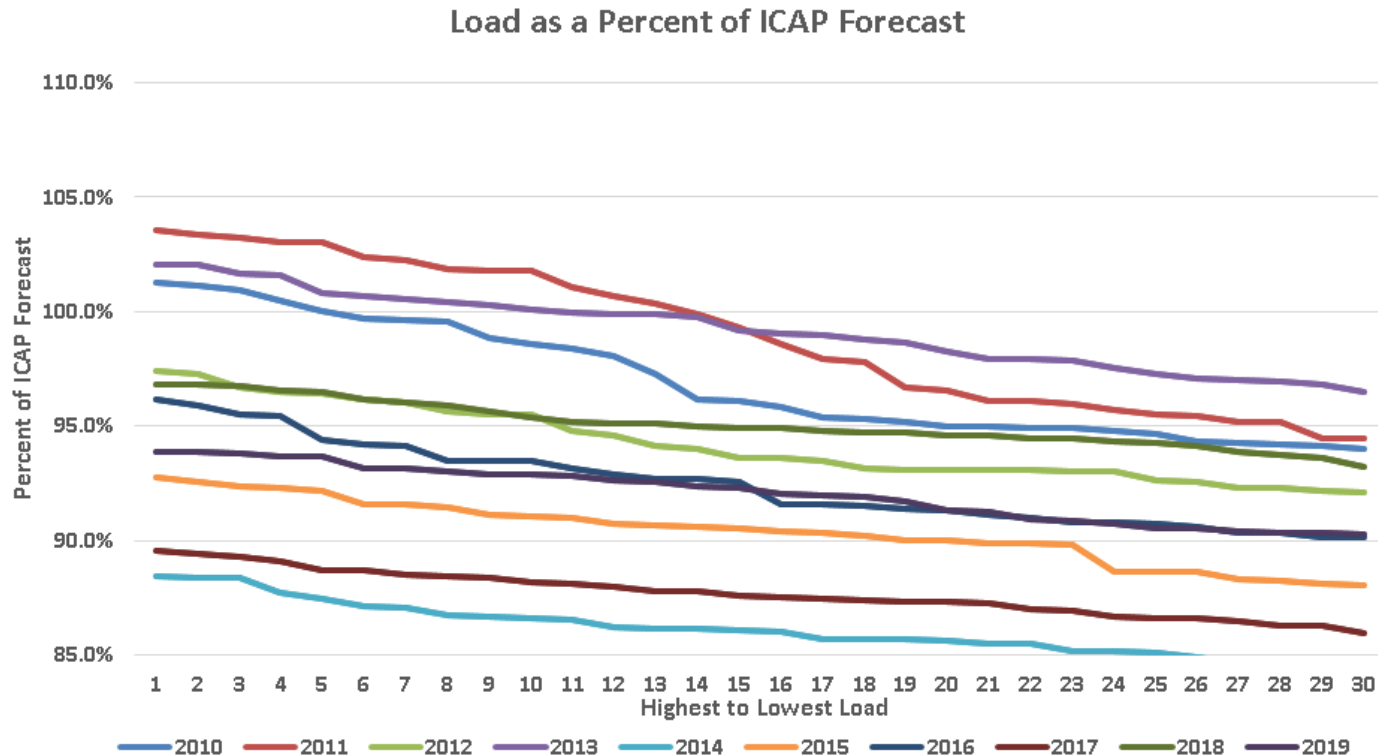
Decline from Peak – MW

- **The charts at right show the decline in the average MW when stepping from the first highest load hour to the 20th highest load hour for warmer and cooler years.***

  - Again, a relatively steep decline is present around the 5th hour.

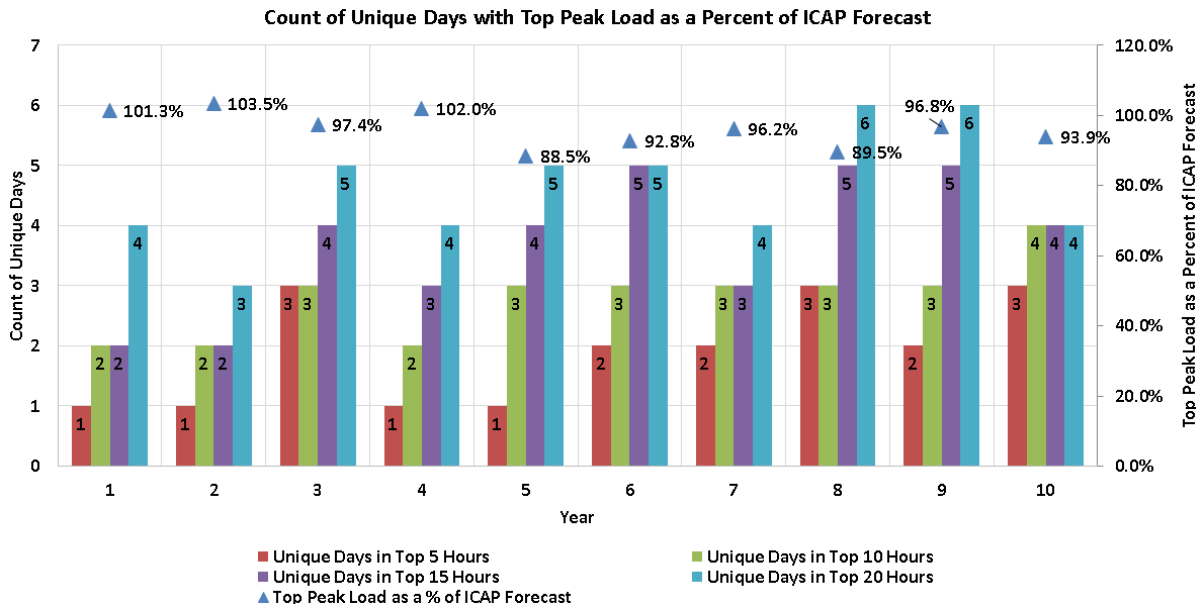| Year	NYCA Peak Day CTHI	Percentile	Above / Below 50th
2010	86.7	88%	A
2011	87.74	95%	A
2012	83.26	37%	B
2013	86.56	87%	A
2014	80.54	6%	B
2015	82.95	32%	B
2016	83.41	39%	B
2017	80.38	5%	B
2018	84.59	60%	A
2019	84.96	66%	A

Average MW Below Peak Load - Warmer Years

Average MW Below Peak Load - Cooler Years

Days in the Top Load Hours

- **The secondary axis shows the top peak load as a percent of ICAP forecast for each analysis year.**
  - The primary axis shows a count of unique days over the top 20 peak load date hours by year.
- **There are at most three unique days in the top five load hours, four unique days in the top 10, five unique days in the top 15, and six unique days in the top 20.**
  - Additionally, the vast majority of peak load hours occur during weekdays.

Count of Unique Days with Top Peak Load as a Percent of ICAP Forecast

Legend:
- Unique Days in Top 5 Hours
- Unique Days in Top 10 Hours
- Unique Days in Top 15 Hours
- Unique Days in Top 20 Hours
- Top Peak Load as a % of ICAP Forecast

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Top Peak Load *Days*

- **The chart at right shows the top peak load *days* as a percent of the ICAP forecast.**
  - The top few peak load days, instead of peak load hours, could be identified by the NYISO.
- **This chart shows a steep decline around the third peak load day.**

Peak Load as a Percent of ICAP Forecast - Top 15 Days
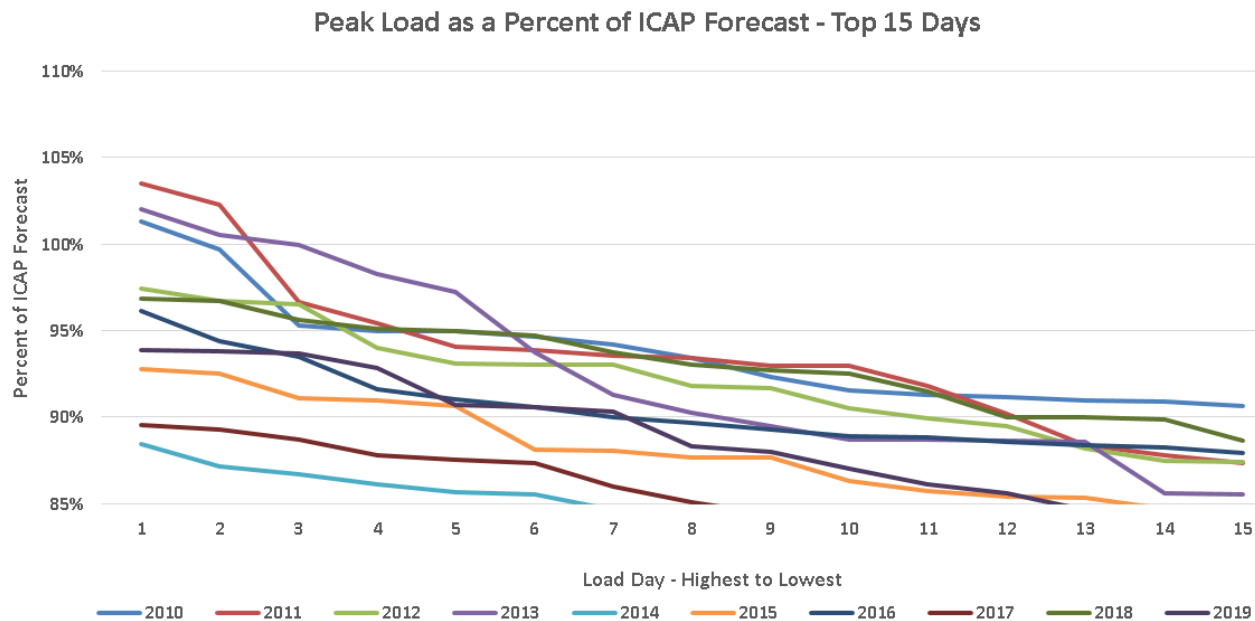
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- Maintaining and enhancing regional reliability

- Operating open, fair and competitive wholesale electricity markets

- Planning the power system for the future

- Providing factual information to policymakers, stakeholders and investors in the power system

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