

# Reliability Challenges in Meeting CLCPA Requirements

New York State Reliability Council

Mayer Sasson, Chair of the Executive Committee

Stephen Whitley, Unaffiliated Member

Roger Clayton, Unaffiliated Member

Climate Action Council  
Reliability Planning Speaker Session

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# New York State Reliability Council

## Introduction: Mayer Sasson

- Maintaining reliability is critical now and in the transition to meeting CLCPA requirements
- NYSRC is a FERC-approved entity responsible for the promulgation of reliability standards for New York, which are mandatory requirements for the NYISO
- The NYSRC establishes the annual Installed Reserve Margin (“IRM”)
  - The IRM sets the minimum installed capacity margin above the estimated peak load to meet the NPCC requirement that the probability of shedding load is not greater than one day in ten years
  - The NYSRC conducts a complex probabilistic analysis of generation and transmission resources, and demand response, to determine the IRM
- Our key message to the CAC today is:

**With the intermittency of renewables and the electrification of the economy, substantial clean energy and dispatchable resources, some with yet to be developed technology, over and above the capacity of all existing fossil resources that will be replaced, will be required to maintain reliability in the transition to meeting CLCPA requirements**

# Operating the System Reliably

## Stephen Whitley

- Operators today fully utilize all available dispatchable and non-energy limited resources in New York
- Control Centers and their responsibilities:
  1. Operating with substantial energy limited resources is extremely difficult
  2. Demand and generation are balanced every six seconds
  3. If out of balance, the system could become unstable and collapse
  4. Operators are continually giving instructions to generation resources to increase or decrease generation or to reroute transmission flows as necessary to maintain reliability
  5. The availability and dispatchability of different types of reserves is critically important
  6. Need to maintain thermal, voltage, stability, and frequency requirements
  7. Fuel redundancy is critical during peak load and resource shortages
  8. Blackstart resources are needed to re-energize the system after a blackout without assistance from the grid
- Planning the system over the next ten years is required to identify the need for new transmission and generation resources to meet reliability standards
- Rigorous interconnection process to ensure new generation and transmission resources interconnect reliably – from concept, to infrastructure siting, permitting, engineering, procurement, construction and placing into service, can take 3 to 10 years depending on the type of resources

# Operating the Future System Reliably

- As the percentage of renewable resources increases, the way we plan and operate the system must evolve, which was designed for the current mix in generation resources
- Limited fuel diversity and over-dependence on energy limited resources is a risk to reliability
- Recent events (cold snaps, rolling blackouts in California, load shedding for days in Texas) provide a caution to what we might face in the future

**Operators will need additional dispatchable and sustainable energy resources to manage the substantially different system in order to maintain reliability**

# Installed Reserve Margin (IRM)

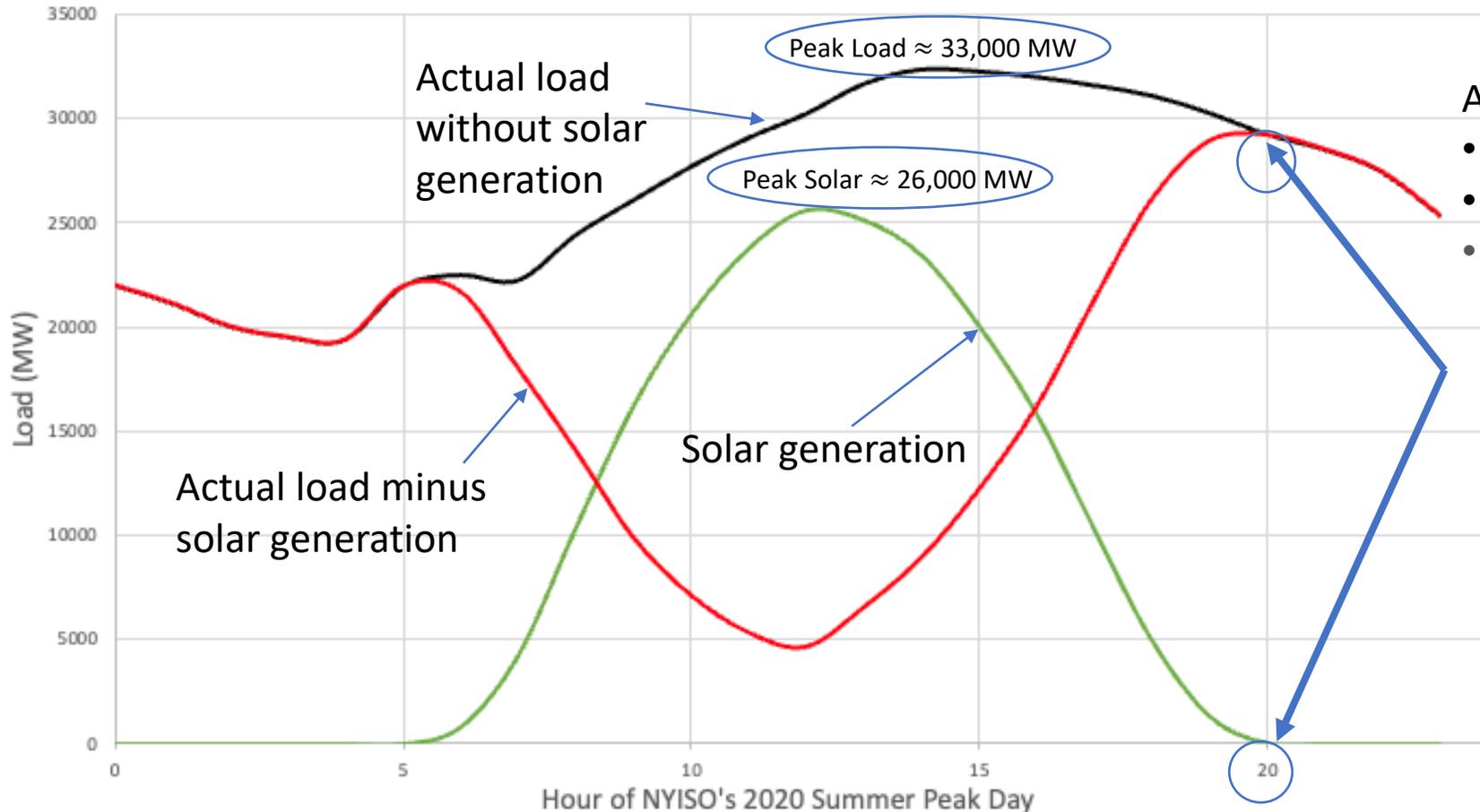
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# Future Challenges Presented by Significant Increases in Renewable Clean Energy Resources

Roger Clayton

# Solar Impact on Resource Adequacy

Load vs Solar Generation (MW)



At ~ 8:00 pm

- Net Load  $\approx$  29,000 MW
- Solar Generation  $\approx$  0 MW
- Therefore, at a minimum:
  - Need  $\approx$  29,000 MW of current resources to reliably serve load
  - Can only retire  $\approx$  4,000 MW (33,000 – 29,000)
  - Total resources  $\approx$  55,000 MW (26,000 + 29,000)
  - Total reserve requirement  $\approx$  22,000 MW (55,000 – 33,000)
  - Current reserve requirement  $\approx$  6,600 MW

**For this case, the addition of 26,000 MW of new solar generation raises the reserve requirement to  $\approx$  22,000 MW & allows the retirement of only 4,000 MW of current resources**

# NYS DPS/NYSERDA “Initial Report on the New York Power Grid Study Appendix E, Zero Emissions Electric Grid in New York by 2040 Study” 1/19/2021

**Table 4-1 New York Annual Installed Capacity Supply Mix (in Megawatts)**

	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Thermal	24,447	23,458	24,113	17,269
Nuclear	3,381	3,381	3,381	3,381
Hydro	4,663	4,663	4,663	4,663
Onshore Wind	3,932	6,230	6,736	12,804
Offshore Wind	1,826	6,000	9,000	9,837
Grid Solar	3,099	3,808	6,426	16,759
Energy Storage	1,542	3,000	5,154	15,515
Other Renew	416	416	416	416
NYC Tx	1,250	1,250	1,250	1,250
BTM Solar (AC)	4,839	5,323	5,856	6,443
<b>Totals (MW)</b>	<b>49,395</b>	<b>57,529</b>	<b>66,995</b>	<b>88,337</b>

## 2040 Resources & Load – Initial Scenario

- Total resources = 88,337 MW
- Peak load = 38,000 MW
- Therefore:
  - **Total reserves  $\approx$  50,000 MW to reliably serve load**
  - **Current reserve requirement is  $\approx$  6,600 MW**

**The study shows a 2040 reserve requirement of  $\approx$  50,000 MW in order to meet the CLCPA 2040 goals and the NYSRC Resource Adequacy Reliability Criterion**

# Observations

- Analyses presented herein plus other studies have indicated a need for significant new clean energy resources in New York in order to meet CLCPA requirements and NYSRC reliability criteria
- New resources plus full development of those sites presently identified in New York as suitable for solar or wind development will be required and will increase the New York reserve margin to unprecedented levels from the current  $\approx 20\%$  to over 100% by 2040
- The required new clean energy technologies:
  - Must be emissions free
  - Must be dispatchable
  - Must be fast ramping
  - Must have long-duration storage capability

**The need for sufficient levels of new clean energy resources will steadily increase as the Grid is transformed ... some of these resources rely on technologies that do not currently exist for utility-scale application**

# Concluding Remarks

- We have mentioned some of the challenges we expect to face in planning and operating a grid largely supplied by renewable resources
- We included appendices with a glossary of mentioned entities and terms and notes on NYSRC governance and the speakers
- The NYSRC website contains the IRM reports and the Reliability Rules document

**The NYSRC stands ready to work with the Climate Action Council to enable the State to transition in a safe and reliable manner to meet its CLCPA requirements**

- We look forward to answering any questions you may have on the issues we have discussed

# Appendix

- Glossary
- The Speakers
- NYSRC Governance

# Glossary of Entities

TERM	Definition
NYSRC	New York State Reliability Council
CLCPA	Climate Leadership and Community Protection Act
NYISO	New York Independent System Operator
FERC	Federal Energy Regulatory Council
NERC	North American Electric Reliability Corporation
NPCC	Northeast Power Coordinating Council, Inc.
IRM	Installed Reserve Margin
NYCA	New York Control Area
NYSRC EC	Executive Committee (NYSRC Board)

# Glossary of Electricity Terms

TERM	Definition
Blackstart	Starting a generation resource without assistance from the electric system
Reliability	Performance of the bulk power system within applicable standards while supplying all load without adverse effects: generally assessed in two ways: adequacy and security
Adequacy	Ability of the power system to meet demand considering probability expectations of load and of generation and transmission outages
Security	Ability of the electric system to withstand disturbances such as electrical short circuits or unanticipated loss of system elements in a deterministic manner
Reserves	Amount of generating capacity available in excess of demand
IRM	Installed Reserve Margin, minimum generation resource capacity to meet the requirement that the probability of load disconnection does not exceed one day in ten years
NYCA	New York Control Area, the grid under the control of the NYISO

# NYSRC Governance

- The NYSRC is governed by its Executive Committee (“EC”) which is comprised of a representative of each of the New York electric utilities, Large Consumers, Wholesale Sellers, Municipal Systems and Cooperatives, and four Unaffiliated Members with no affiliation with any entity with interests in the New York Power System, for a total of 13 members
- An affirmative vote of 9 members is required to approve any measure
- The EC meetings are open to the public and regularly attended by representatives of the PSC, NYISO and NPCC.
- The PSC has consistently adopted the reliability standards of the NYSRC as the standards for New York State

# The Speakers

## **Mayer Sasson**

Dr. Sasson has been with Con Edison for more than 30 years working on system and regulatory reliability matters and is the current chair of the of the NYSRC EC. He is also on the board of NPCC. Earlier, he worked for American Electric Power and was on the team that developed the first control center with real-time applications. He is the recipient of various IEEE awards.

## **Stephen Whitley**

Stephen Whitley is currently an Unaffiliated Member of the NYSRC EC. He previously served as the President/CEO of NYISO (2008-2016); COO of ISO New England (2000-2008); various positions at TVA including Director Electric System Operations and VP Transmission (1970-2000). He has served on numerous reliability committees at SERC, NPCC, and SPP.

## **Roger Clayton**

Roger Clayton, is currently an Unaffiliated Member of the NYSRC EC and chair of the Reliability Rules Subcommittee. He has worked for some of the leading consultants in the United States as a technical specialist, as a developer of software tools and methods, and as a manager of professional engineers engaged in power system planning and economic analyses.