2016 Reliability Needs Assessment

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Topics

- **The NYISO Reliability Planning Process**
- **Power Trends & Major Study Assumptions**
- **Resource Adequacy Results**
- **Transmission Security Results**
- **Next Steps**

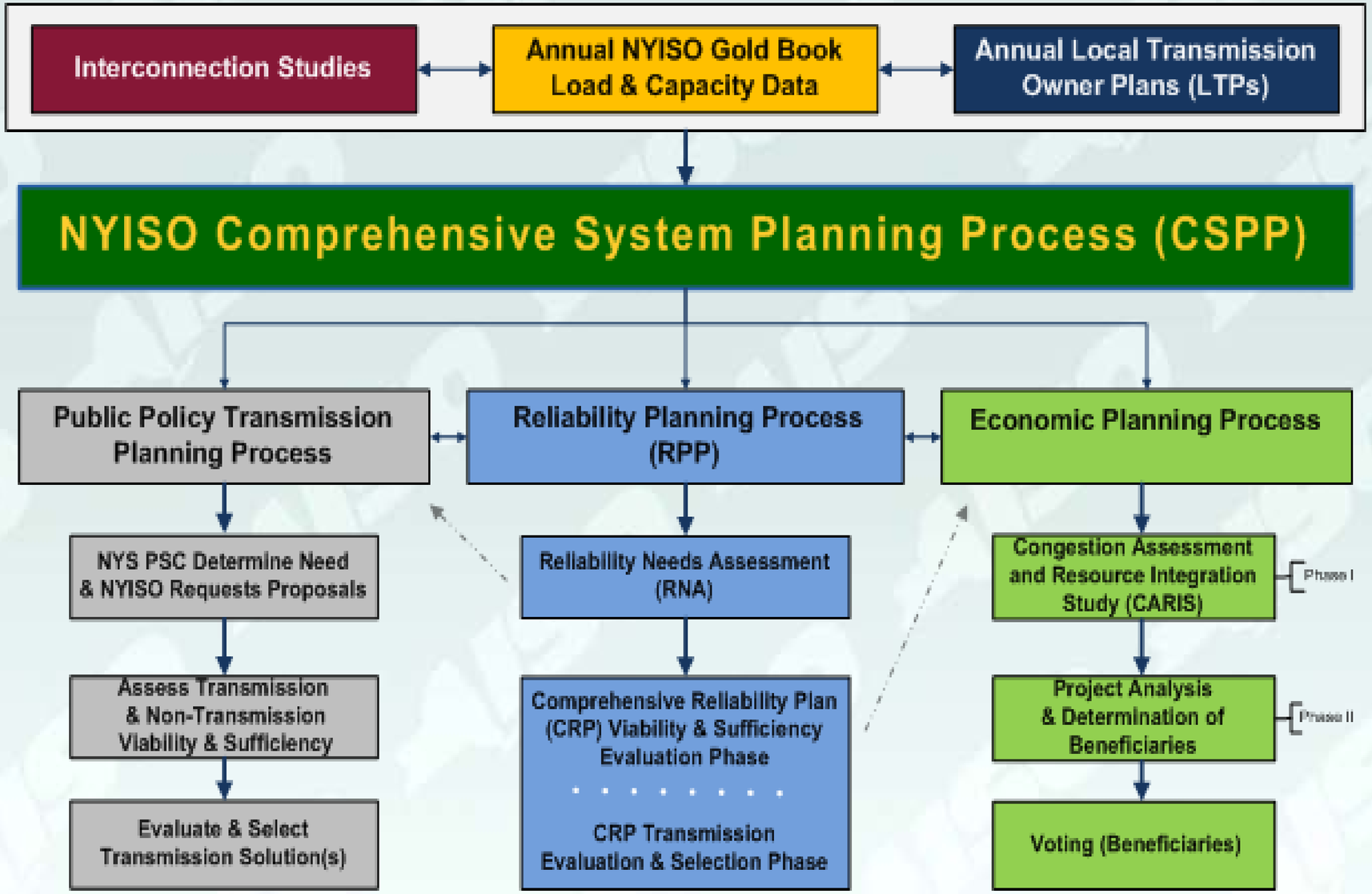
The Value of Planning

“By failing to plan, you are planning to fail.”

Benjamin Franklin

Reliability Planning Process

- **The NYISO Reliability Planning Process (RPP) is a two-year process and an integral part of the NYISO's overall Comprehensive System Planning Process (CSPP).**
- **During the RPP, the NYISO conducts the Reliability Needs Assessment (RNA) followed by the Comprehensive Reliability Plan (CRP).**



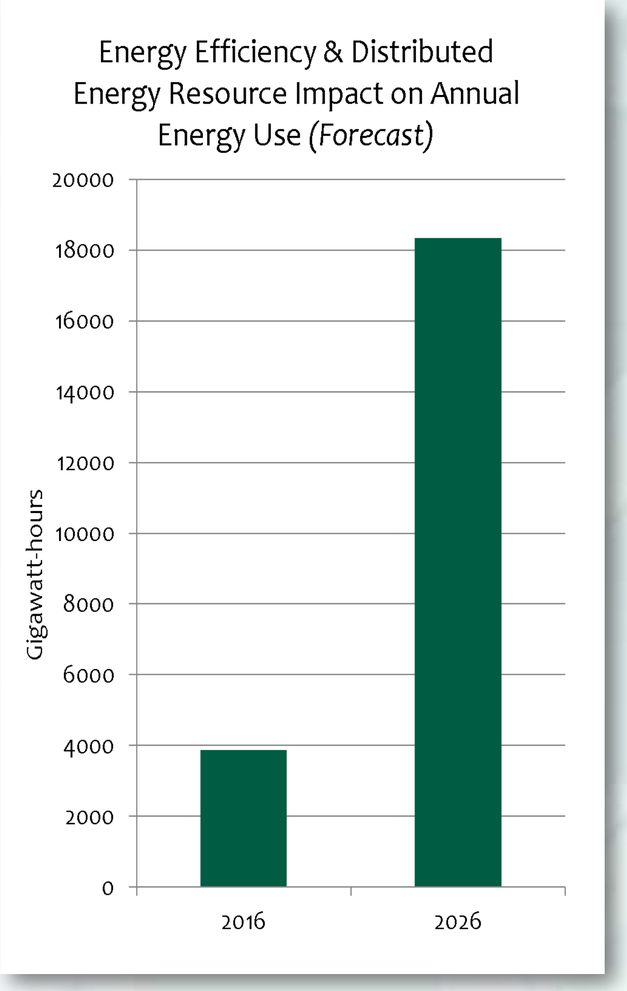
2016 RNA: Process Background

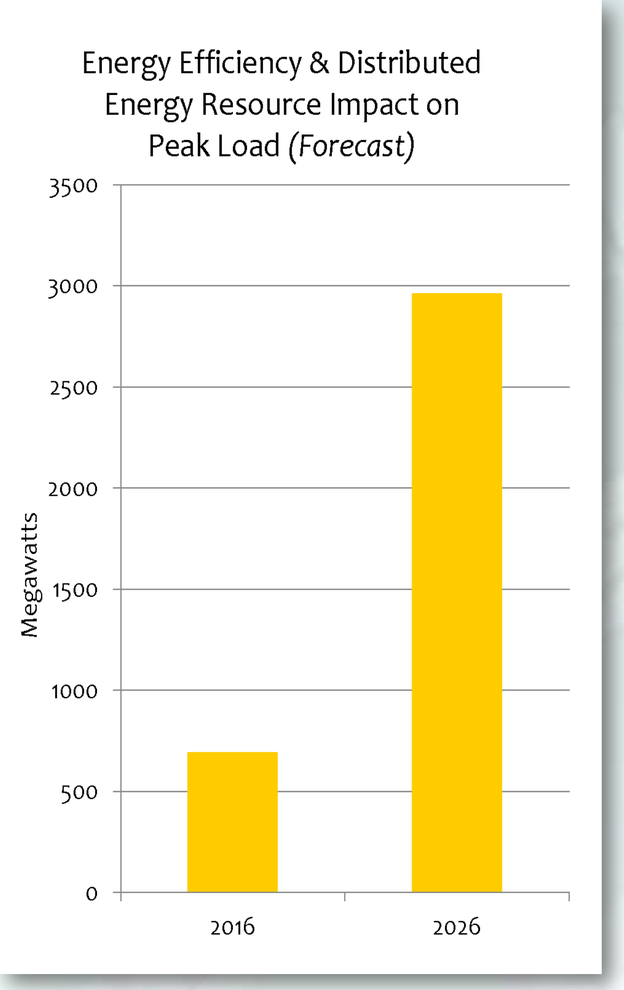
- **The RNA evaluates the <u>adequacy</u> and <u>security</u> of the bulk power system over a ten-year study period *(2017 through 2026 for this RNA),* and identifies Reliability Needs.**
  - ***<u>Resource adequacy</u> is the ability of the electric systems to supply the aggregate electricity demand and energy requirements of the customers at all times, taking into account scheduled and unscheduled outages of system elements.***
  - ***<u>Transmission security</u> is the ability of the power system to withstand disturbances, such as short circuits or unanticipated loss of system elements, and continue to supply and deliver electricity.***

Power Trends
&
Major Study Assumptions

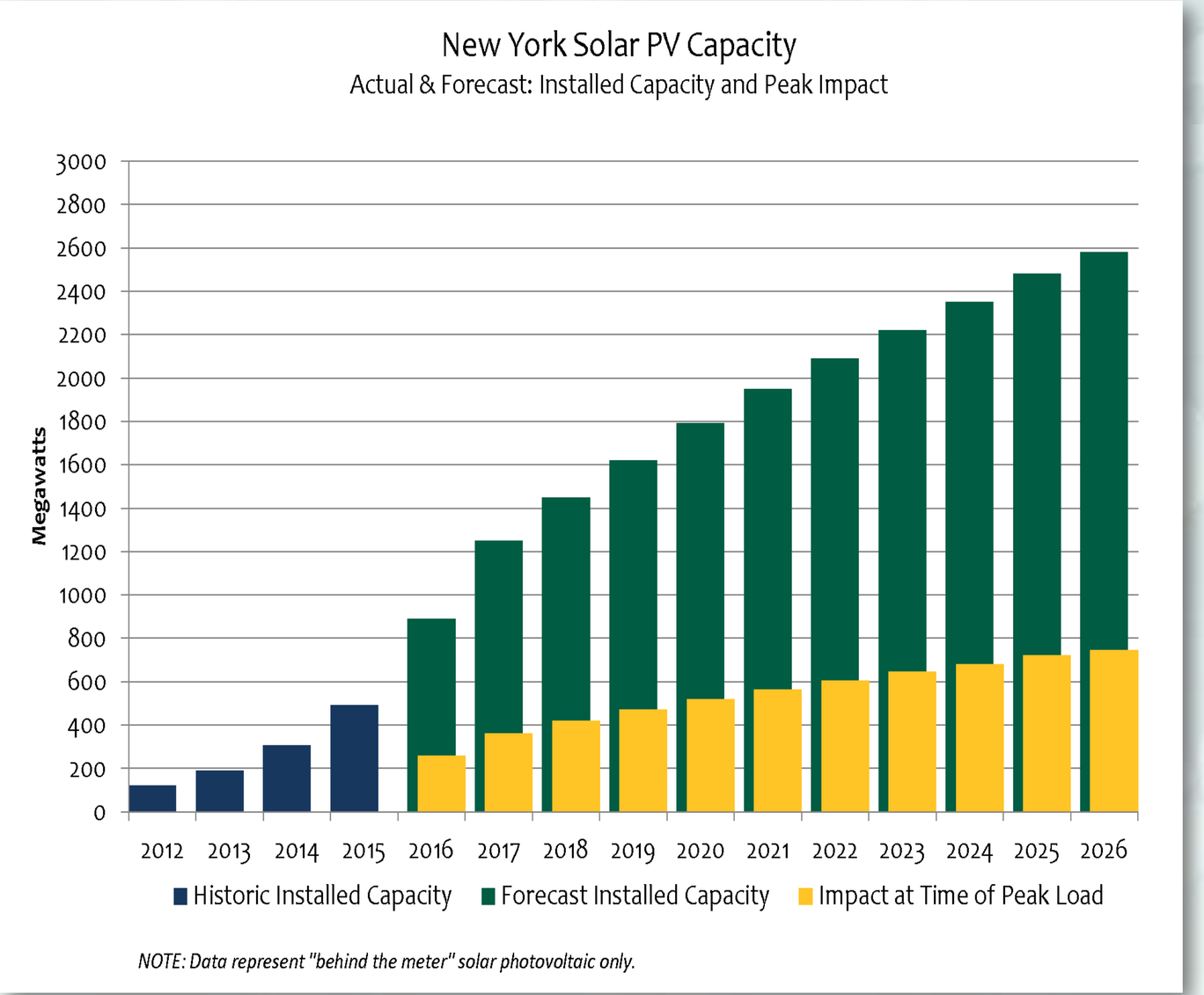
EE & DER Impacts

Impact of Energy Efficiency & Distributed Energy Resources on Bulk Electric System *forecasted to grow four-fold over next decade*





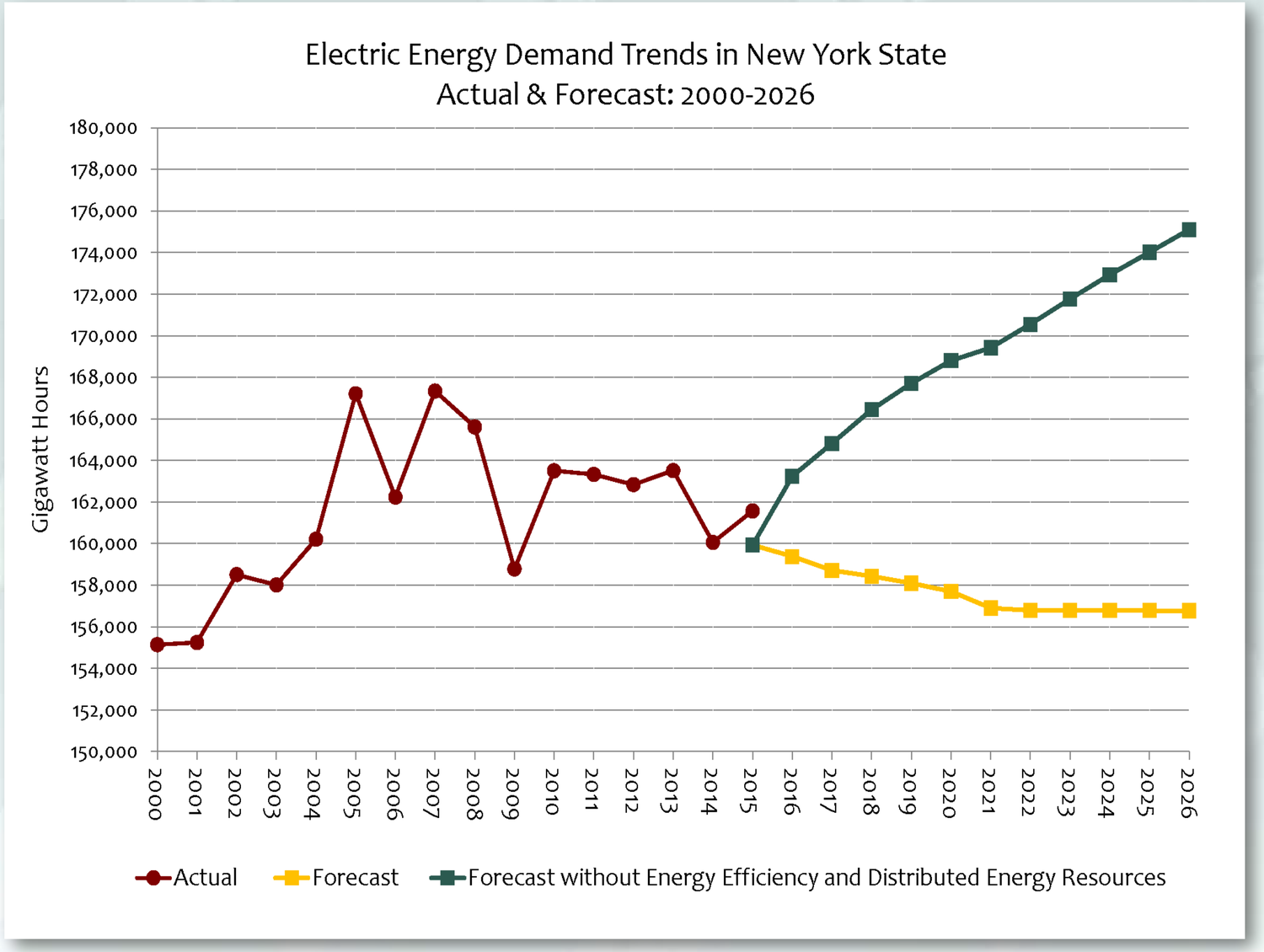
Solar Energy



Distribution-level Solar PV estimated summer capability – 250+ MW in 2016

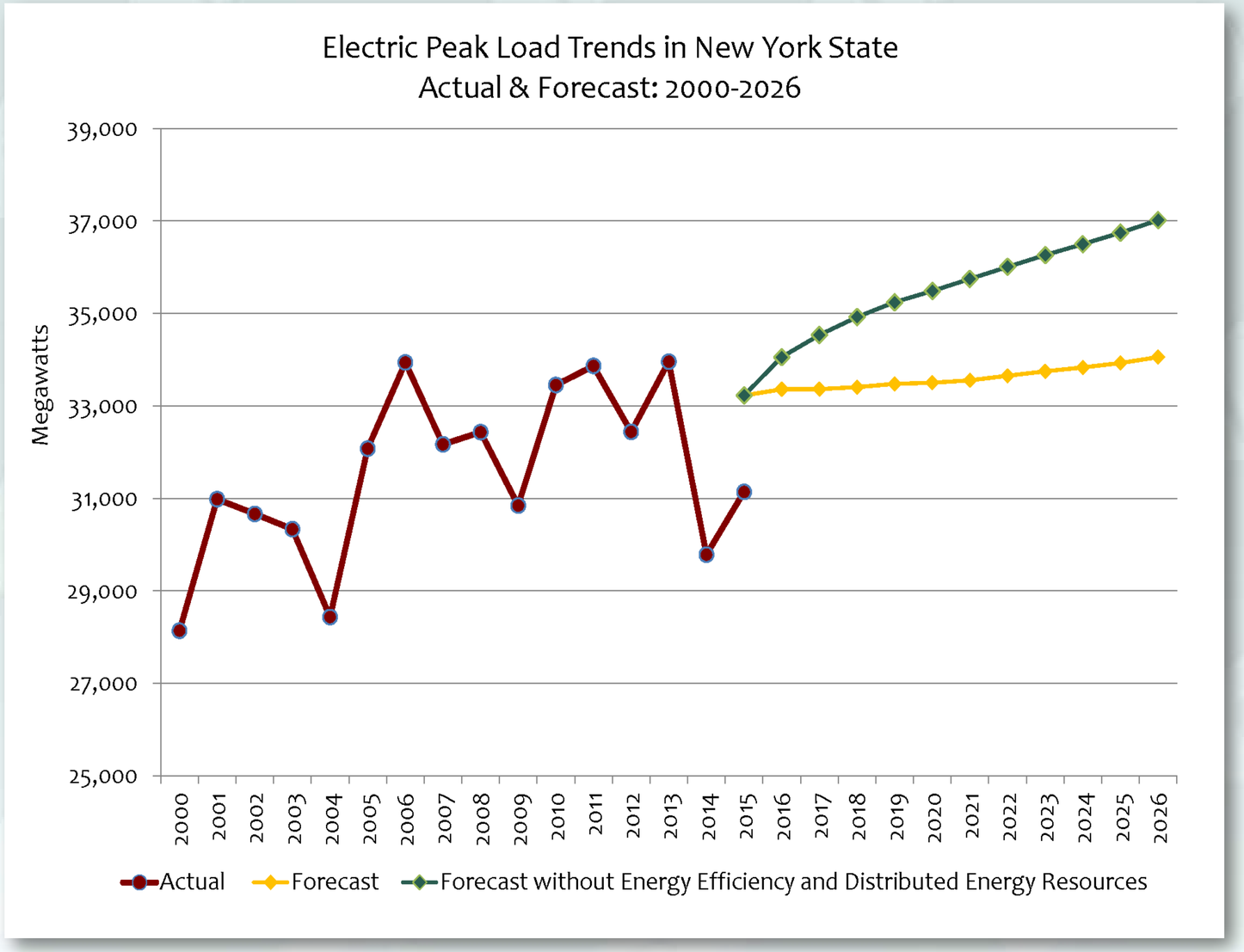
Total expected to triple by 2026

Energy Trends



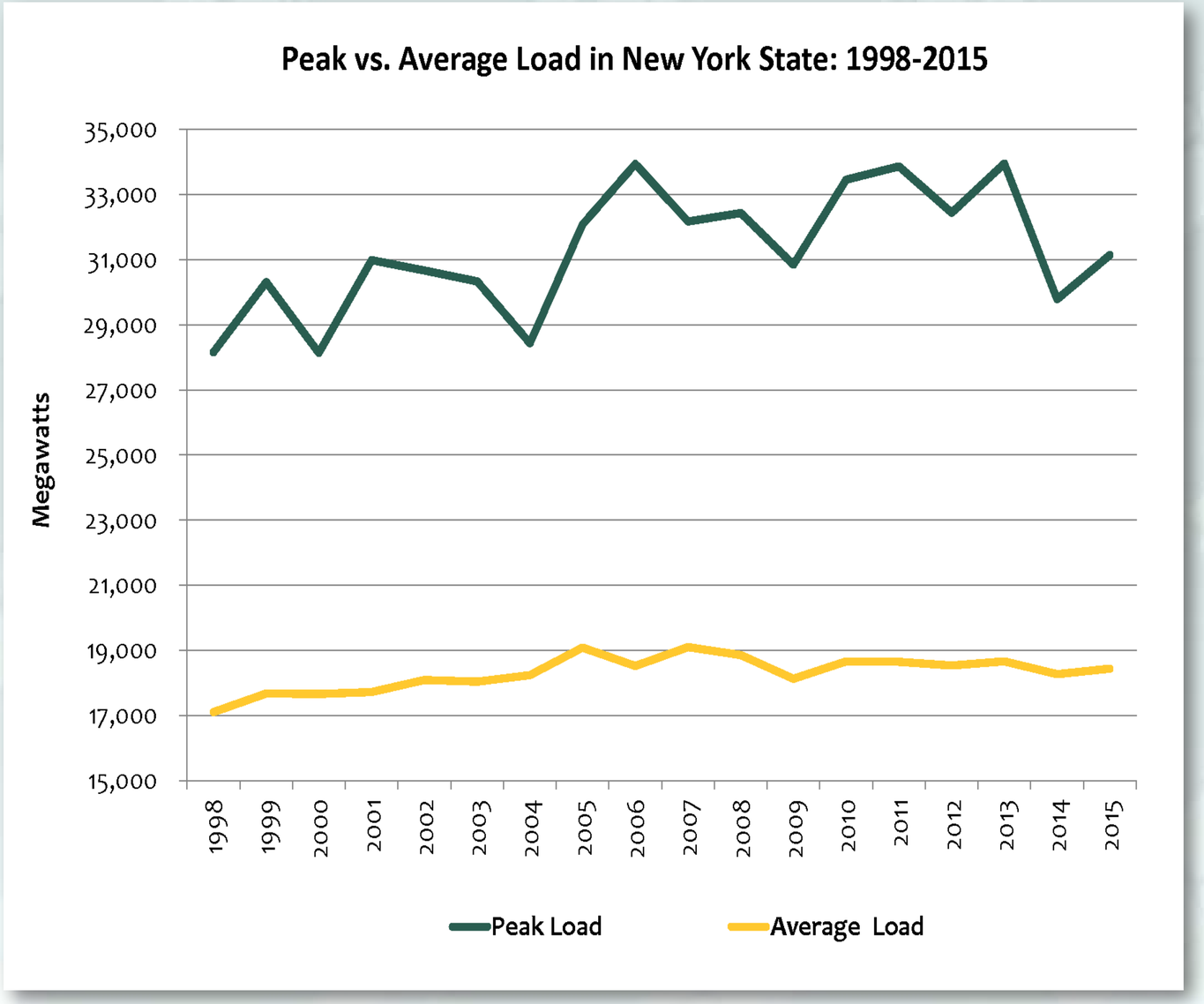
Energy Demand
-- with energy efficiency and distributed energy resource impacts --
projected to be flat or decline slightly over next decade

Peak Trends



Peak Loads
-- with energy efficiency and distributed resource impacts --
are expected to increase moderately

Peak vs. Average

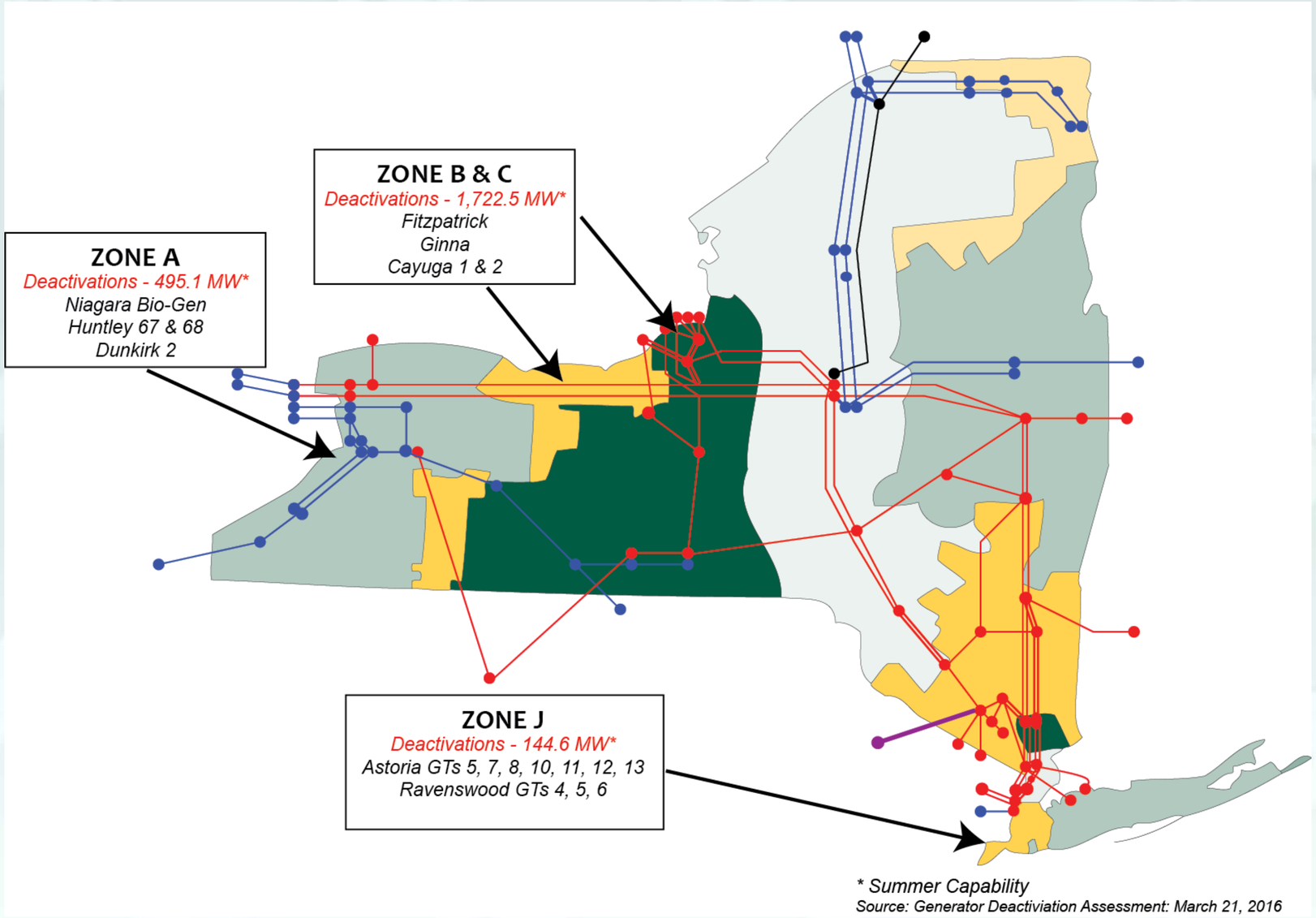


Peak Load represents a small fraction of annual overall power usage

However, the electric system must be constantly prepared to supply those periods of highest use

Reliability requirements are based on projected Peak Load

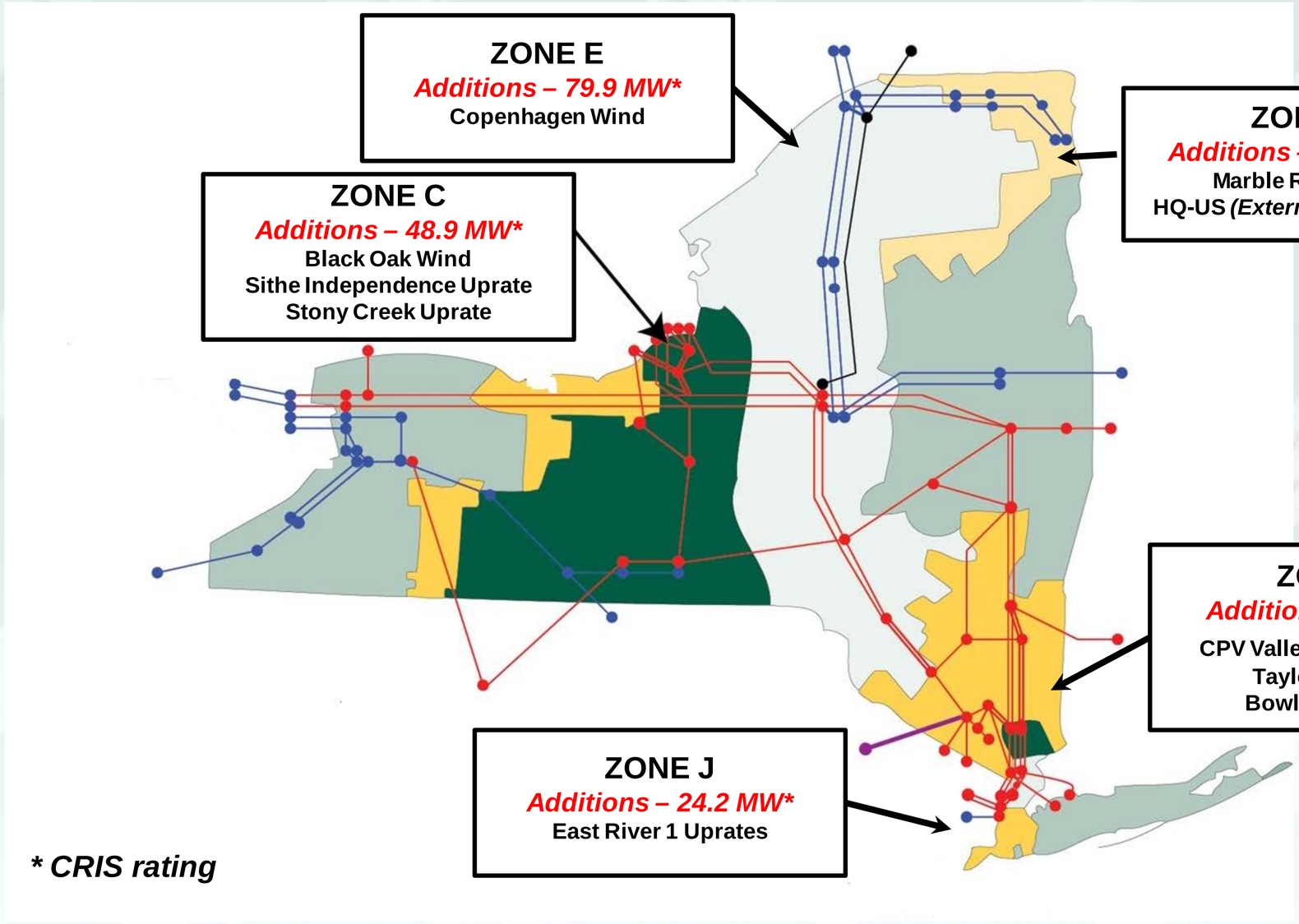
Assumed Generator Deactivations



* Summer Capability

Source: Generator Deactiviation Assessment: March 21, 2016

Assumed Generator Additions



** CRIS rating*

2016 RNA: Load and Resources Comparison for Year 5 (2021)

There is a net increase in the MW resource surplus compared to the 2014 CRP, mainly due to the reduction in the baseline load forecast.

2016 RNA vs. 2014 CRP

Year 2021	2014 CRP	2016 RNA	Delta
Total Capacity without SCRs	41,193	39,899	-1,294
SCRs	1,189	1,248	59
Baseline Peak Load	35,765	33,555	-2,210
Surplus (Resources – Load)	**6,617**	**7,592**	**Net change in surplus 975**

2016 RNA Results

Resource Adequacy Results

- **Loss of Load Expectation (LOLE) Criterion**
  - ***LOLE must be less than one day in ten years, or 0.1 days per year***
- **Base Case LOLE Results**
  - ***LOLE was between 0.02 to 0.05 for the entire 10-year RNA study period***
- **Resource Adequacy Conclusion:**
  - ***The LOLE criterion was met for each of the 10 years, and there are no resource adequacy Reliability Needs.***

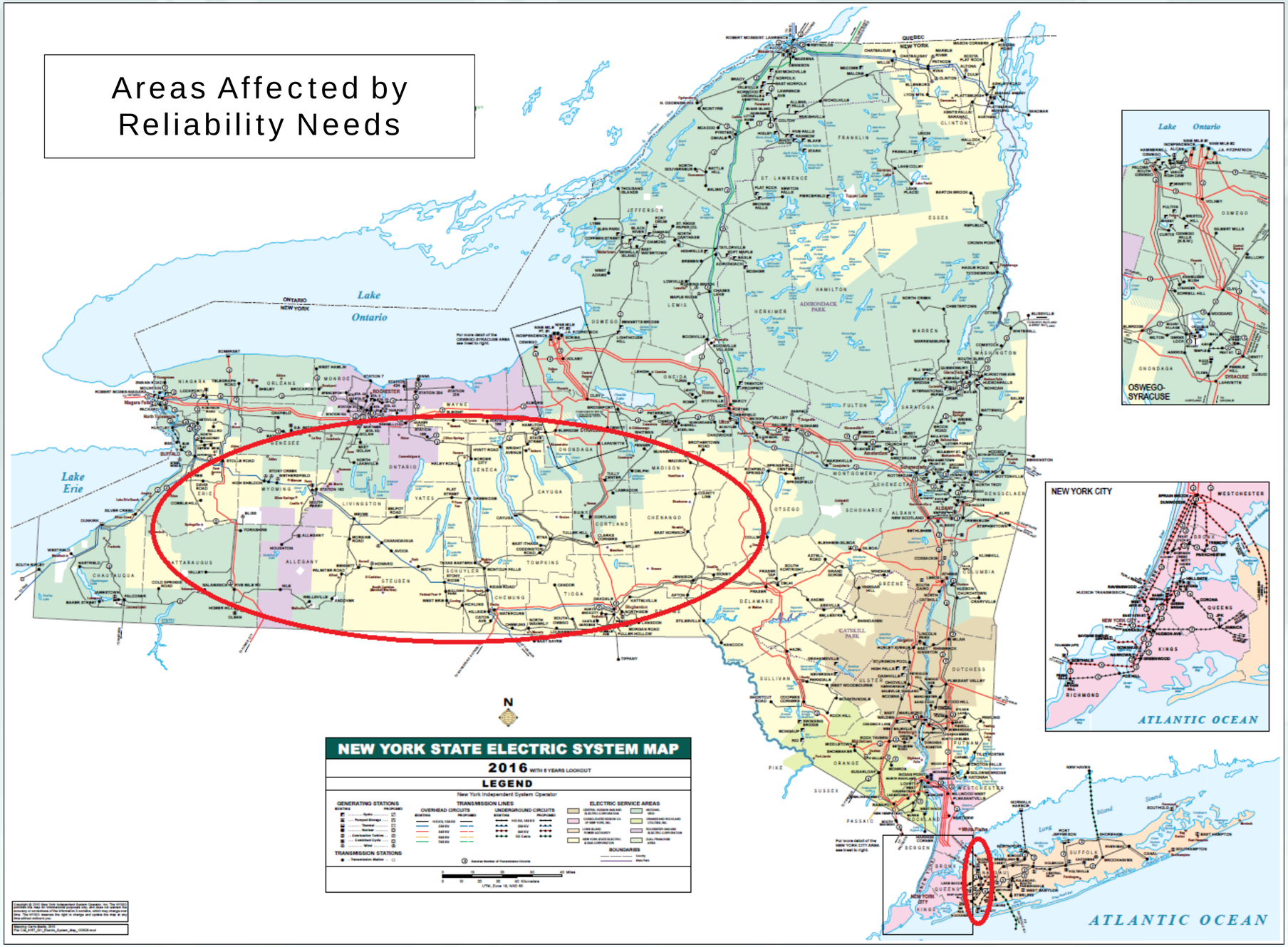
Transmission Security

- **Starting from an all-facilities-in-service base condition (N), system performance is evaluated for one contingency event (N-1) followed by another contingency event (N-1-1).**
- **Design requirement by NERC, NPCC, and NYSRC**
  - ***NPCC and NYSRC are more stringent for a subset of facilities: All design contingencies are evaluated and virtually no load shedding is allowed***
- **A reliability violation is identified when any allowable re-dispatch of the system cannot alleviate a thermal overload.**
  - ***If overloads occur, system is dispatched to minimize overloads***

Transmission Security Results

- **Two transmission security Reliability Needs have been identified, both beginning in 2017:**
  - ***Western & Central NY: NYSEG's Oakdale 345/115 kV transformer***
  - ***Long Island: LIPA's East Garden City to Valley Stream 138 kV circuit***

Areas Affected by Reliability Needs



Scenarios

- **Scenarios are variations on the preliminary RNA Base Case to assess the impact of possible changes in key study assumptions**
  - ***Scenarios suggest how the timing, location, or degree of violations of Reliability Criteria on the NYCA system could change***
  - ***Scenarios do not identify additional Reliability Needs***
- **Resource Adequacy Scenarios:**
  - ***High (Econometric) Load Forecast***
  - ***Zonal Capacity at Risk***
  - ***Indian Point Energy Center (IPEC) Plant Retirement***
  - ***No Nuclear***
  - ***No Coal***
  - ***Continued Forward Capacity Sales to External Control Areas***
- **Transmission Security Scenarios:**
  - ***90/10 Forecast Peak Load***
  - ***Western NY Public Policy Transmission Need***

Resource Adequacy Scenario Results

Scenario	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Base Case	0.04	0.03	0.04	0.02	0.03	0.03	0.03	0.04	0.04	0.05
Capacity Continuing to Sell to ISO-NE	0.04	0.03	0.03	0.04	0.04	0.04	0.05	0.06	0.06	0.07
No Coal	0.06	0.07	0.07	0.04	0.05	0.05	0.06	0.06	0.07	0.07
High Load Forecast	0.09	0.10	**0.11**	**0.10**	**0.12**	**0.13**	**0.15**	**0.18**	**0.21**	**0.24**
Retirement of IPEC Gen.	**0.21**	**0.15**	**0.15**	**0.13**	**0.14**	**0.15**	**0.17**	**0.18**	**0.19**	**0.22**
No Nuclear	**0.36**	**0.28**	**0.28**	**0.23**	**0.23**	**0.25**	**0.26**	**0.28**	**0.30**	**0.33**

Bold indicates a violation of the 0.1 LOLE criterion

Zonal Capacity at Risk Scenario

- **Identifies the maximum level of zonal MW capacity that can be removed without causing NYCA LOLE violations or exceeding the zonal capacity.**
  - ***The zones at risk assessment does not evaluate the impact of removing capacity on transmission security or on the transfer capability of the transmission system; thus, in reality, reliability issues at specific transmission locations may occur at lower amounts of capacity removal.***
  - ***The reported zonal quantities differ by zone because the location of resource removal can have different impacts due to existing transfer limitations between zones.***

Zonal Capacity at Risk Results

Maximum zonal MW that can be removed without causing a NYCA LOLE violation:

Zonal Groups	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Zones A-F	1,500	1,500	1,450	2,100	1,950	1,900	1,700	1,550	1,500	1,250
Zones G-I	1,150	1,350	1,300	1,650	1,600	1,550	1,400	1,300	1,250	1,000
Zone J	950	1,050	1,000	1,150	1,150	1,100	1,050	1,000	950	850
Zone K	750	800	800	900	850	800	750	650	600	500

90/10 Forecast Peak Load

- **The 90/10 peak load forecast represents an extreme weather condition**
- **Scenario Results:**
  - ***Several overloads occur on the 230 kV and 115 kV system in the Western and Central area***
  - ***New overloads occur on 345/115 kV and 230/115 kV transformers in the Central area***
  - ***Two additional overloads occur on Long Island***

Western NY Public Policy

- **Goal of Western NY Public Policy is to relieve constraints in Western NY, including access to full output of Niagara and additional imports from Ontario.**
  - ***Multiple transmission projects have been proposed in the NYISO Public Policy Transmission Planning Process for the Western NY Public Policy Transmission Need.***
- **To simulate a generic transmission solution to the Western NY Public Policy Transmission Need, the constraints in the Niagara area were relaxed.**
- **Results: Western NY transmission would alleviate the Reliability Need in Western & Central NY.**

Next Steps

- **NYISO Board approved the 2016 RNA on October 18**
- **November 7 ESPWG/TPAS:**
  - ***The Responsible Transmission Owner(s) will report to stakeholders information regarding any updates in its LTPs that could affect the Reliability Needs.***
  - ***The NYISO will report any changes in the Reliability Needs as a result of the updated LTPs and other system changes.***
- **If a Reliability Need still remains, the NYISO will issue a solicitation for market-based and regulated solutions.**
- **The Comprehensive Reliability Plan (CRP) will identify all projects and plans necessary to maintain reliability for the 10-year planning horizon.**

Questions?

The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by:

- ***Maintaining and enhancing regional reliability***
- ***Operating open, fair and competitive wholesale electricity markets***
- ***Planning the power system for the future***
- ***Providing factual information to policy makers, stakeholders and investors in the power system***

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