

Winter 2018-19 Capacity Assessment Winter Preparedness

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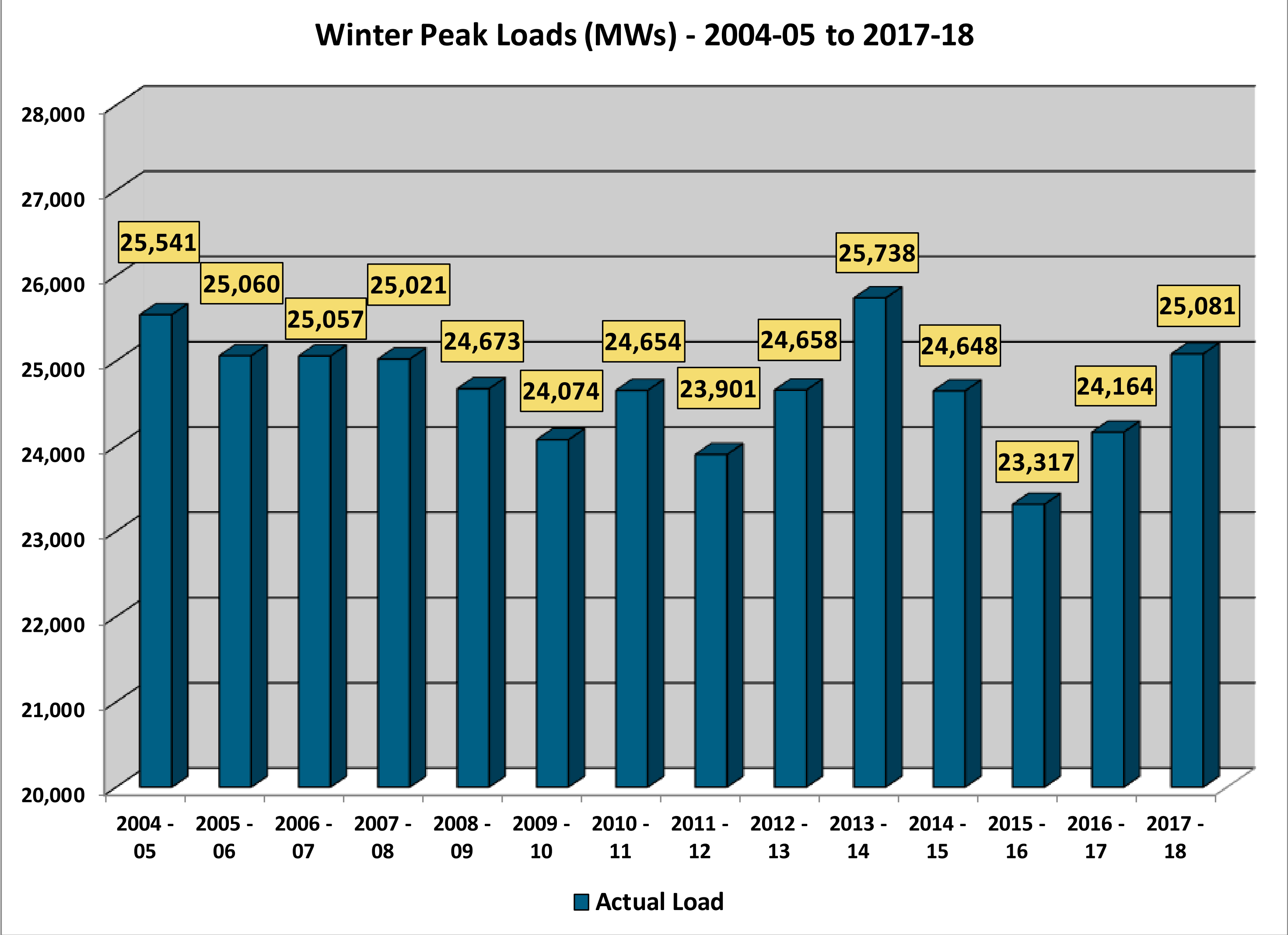
Overview

- **Winter 2018-19 Capacity Assessment**
 - Deterministic Margin Analysis
 - Capacity & Infrastructure Updates

Appendix

- **Winter 2018-19 Preparedness**
- **Continued Challenges**
- **Winter 2017-18**

Historic Winter Peaks 2004-2018



2018-19 Winter Capacity Assessment

For projected baseline forecast peak conditions and expected performance of the transmission system, generation, and pipeline infrastructure the NYISO expects to meet reliability criteria throughout Winter 2018-19

NYISO Base-Case Analysis

- 11,436 MW Projected capacity margin for 50-50 peak winter conditions
- 9,821 MW Projected capacity margin for 90-10 peak winter conditions

NYISO Natural Gas Supply Limitations Scenarios

- 3,290 MW Projected capacity margin for 90-10 peak winter conditions and loss of all gas supplies
- 5,205 MW Projected capacity margin for 90-10 peak winter conditions and retain only units with firm gas supplies

2017-18 & 2018-19 Winter Capacity Assessment & Comparison

Line	Item	2017-18		2018-19	
		Baseline Forecast	90th Percentile Forecast	Baseline Forecast	90th Percentile Forecast
1a	Winter Generation Capacity ¹	41,454	41,454	41,539	41,539
1b	SCR - ICAP Values	792	792	884	884
1c	Net Purchases & Sales	2,311	2,311	1,519	1,519
1	Total Capacity Resources	44,557	44,557	43,943	43,943
2	Assumed Unavailable Capacity (Gen + SCR) ²	-5,924	-5,924	-5,618	-5,618
3 = 1 + 2	Net Capacity Resources	38,633	38,633	38,325	38,325
4	Peak Load Forecast	24,365	26,049	24,269	25,884
5	Operating Reserve Requirement	2,620	2,620	2,620	2,620
6 = 4+5	Total Capacity Requirement	26,985	28,669	26,889	28,504
7 = 3 - 6	Capacity Margin	11,648	9,964	11,436	9,821

1. Reflects the 2018 Gold Book existing capacity with projected and actual deactivations, additions and DMNC updates during 2018
2. Derates: 1,266 MW for wind, 366 MW for Hydro, 2,921 MW for thermal units, 94 MW for other renewables and 261 MW for SCRs



2018-19 Winter Capacity Assessment - Loss of Gas

Line	Item	Baseline Forecast	90th Percentile Forecast
1a	Installed Capacity Resources	41,539	41,539
1b	SCR - ICAP Values	884	884
1c	Net ICAP External Imports	1,519	1,519
1	NYCA Resource Capability	43,943	43,943
2	Total Projected Capacity Outages	-5,618	-5,618
3 = (1-2)	Net Installed Capacity Resources	38,325	38,325
4	Load Forecast	24,269	25,884
5	Operating Reserve Requirement	2,620	2,620
6 = (3-4-5)	Capacity Margin	11,436	9,821
7a	Subtract All Gas Only Units	6,531	6,531
7 = (6-7a)	Capacity Margin, Loss of Gas	4,905	3,290
8a	Add Back Units with Firm Gas Contracts	1,915	1,915
8 = (7-8a)	Expected Capacity, Loss of Gas Case	6,820	5,205

Capacity & Infrastructure Updates

■ Generation (Nameplate Changes Relative to Last Year)

- + 1,080MW Generation Additions: CPV Valley, Arkwright Wind, Bayonne 9 & 10, Bethlehem Uprate
- + 90MW Expected Generation Additions: Copenhagen Wind, Arthur Kill Cogen
- - 440 MW Possible Mothball: Selkirk 1 & 2
- - 470 MW ICAP Ineligible Forced Outages: Ravenswood GTs, Cayuga 2
- - 170 MW DMNC adjustments

■ Transmission (Continuing Forced Outages)

- B and C Lines from NJ to NYC, Hudson Farragut 345 kV B3402 and Marion Farragut 345 kV C3403, out-of-service
- One Phase Angle Regulator (PAR) at the Ontario border, L33P St. Lawrence – Moses, out-of-service

Appendix: Preparedness Steps Continued Challenges Additional Observations from Last Year

Winter 2018-19 Preparedness

- Seasonal generator fuel surveys indicate oil-burning units have sufficient start-of-winter oil inventories along with arrangements for replacement fuel
- The NYISO has performed on-site visits of generating stations to discuss past winter operations and preparations for upcoming winter, including:
 - Generation testing
 - Cold-weather preventative maintenance
 - Fuel capabilities, and
 - Fuel switching capabilities
- Existing Minimum Oil Burn procedures defined by the New York State Reliability Council (NYSRC) establish fuel switching requirements at certain cold weather thresholds to secure electric reliability for NYC LDC gas pipeline contingencies
- NYISO coordination of all requests for transmission and generator outages to alleviate potential impact on power system reliability

Gas-Electric Coordination

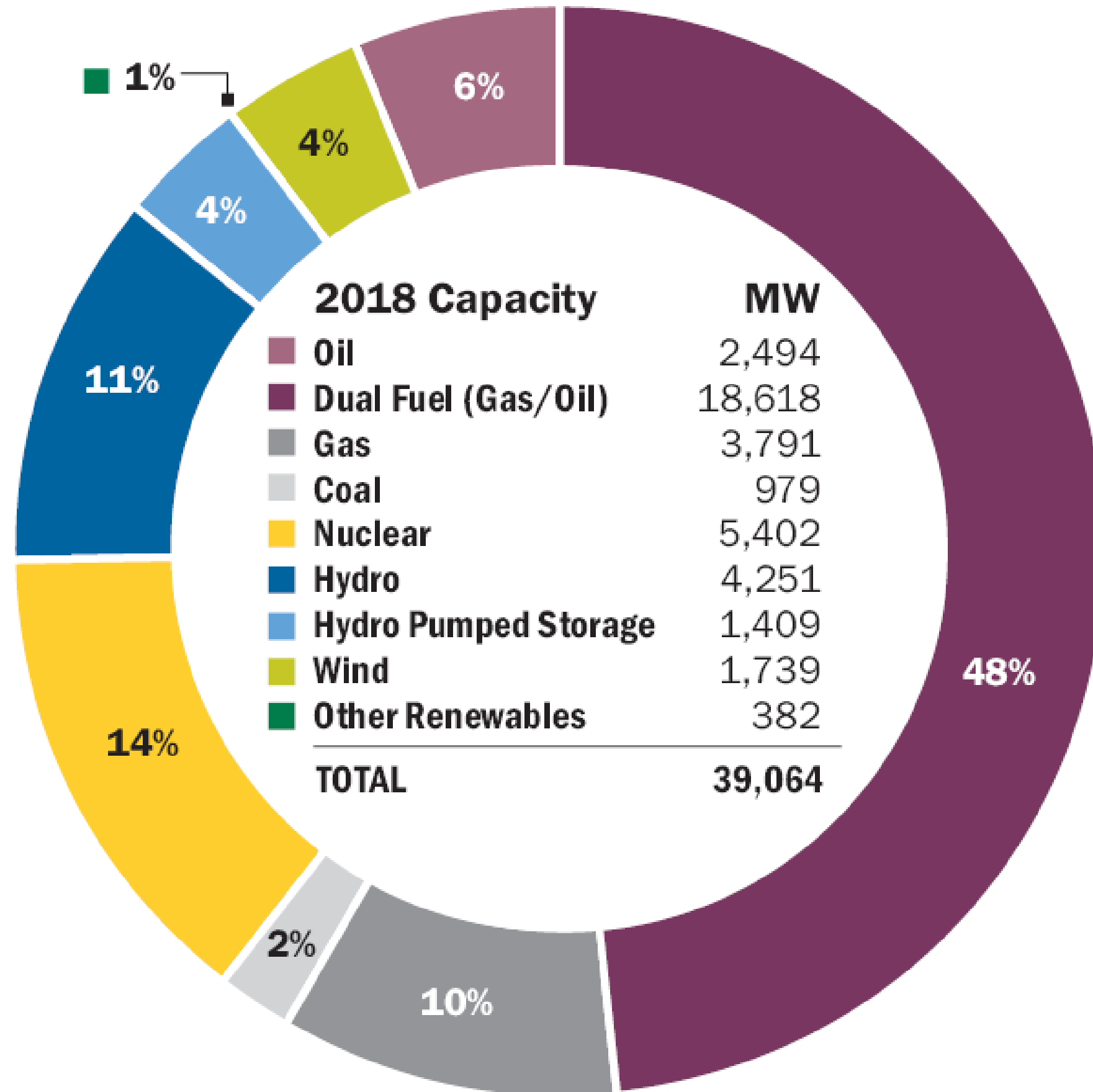
- **A communications protocol is in place with NY state agencies to improve the speed and efficiency of generator requests to state agencies for emissions waivers if needed for reliability**
 - Protocol was leveraged in January 2018 and proved effective in facilitating communications between parties
- **An emergency communication protocol is in place to communicate electric reliability concerns to pipelines and gas LDCs during tight electric operating conditions**
 - Cooperative process with interstate pipelines and LDCs for providing OFO information to the NYISO
- **FERC Order 787**
 - The NYISO has modified its code of conduct per the Order to accommodate pipeline requests for reliability information

Situational Awareness

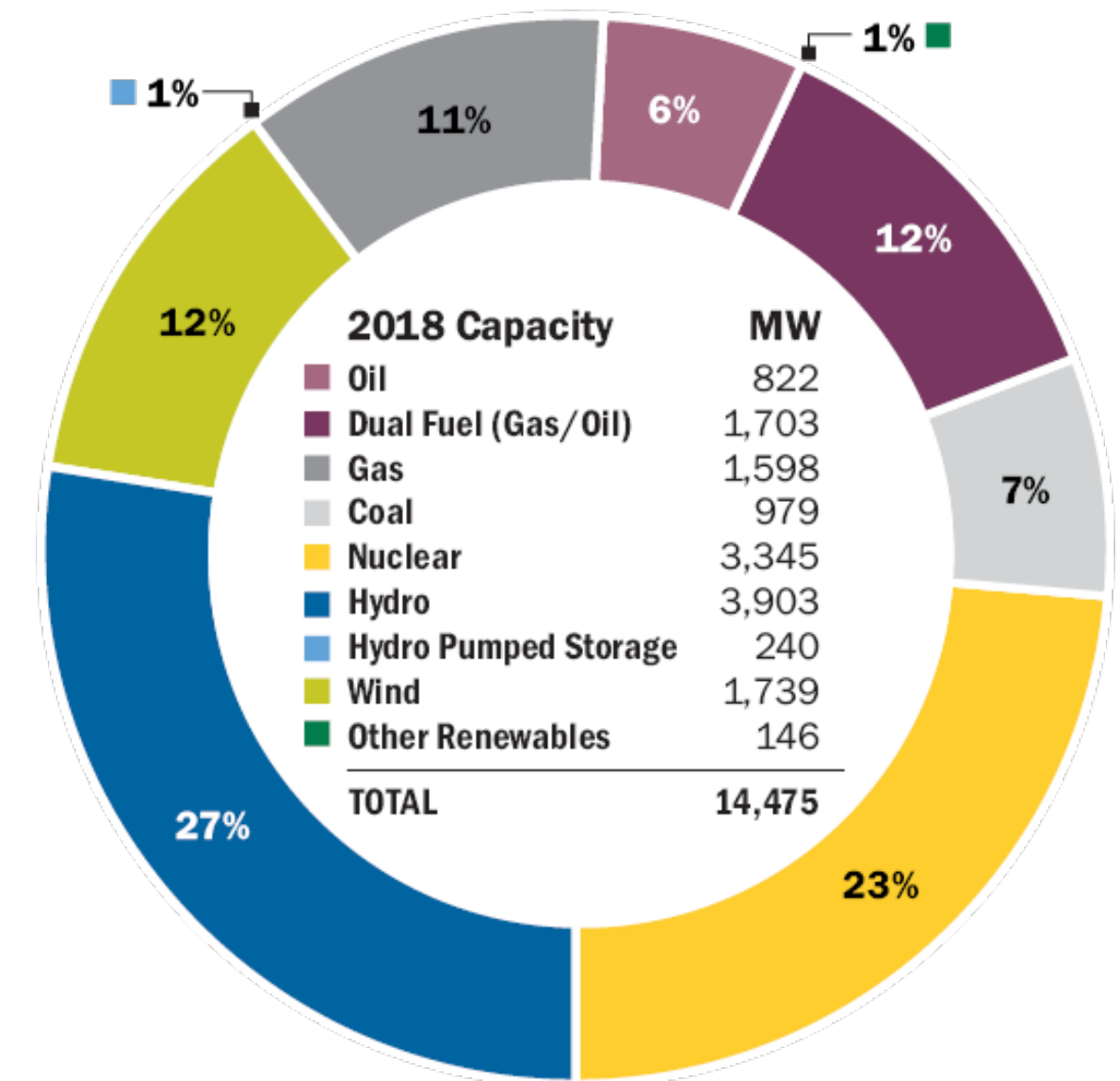
- **Control Room gas-electric support**
- **Video Boards**
 - Northeast interstate pipeline system is displayed
 - Operational Flow Orders are displayed with readily detectable visualization techniques
- **A web-based, fuel survey “portal” provides generator fuel information to the operators**
 - Updated weekly by generators
 - Updated daily during cold weather conditions upon request

Fuel Mix – Generating Capacity

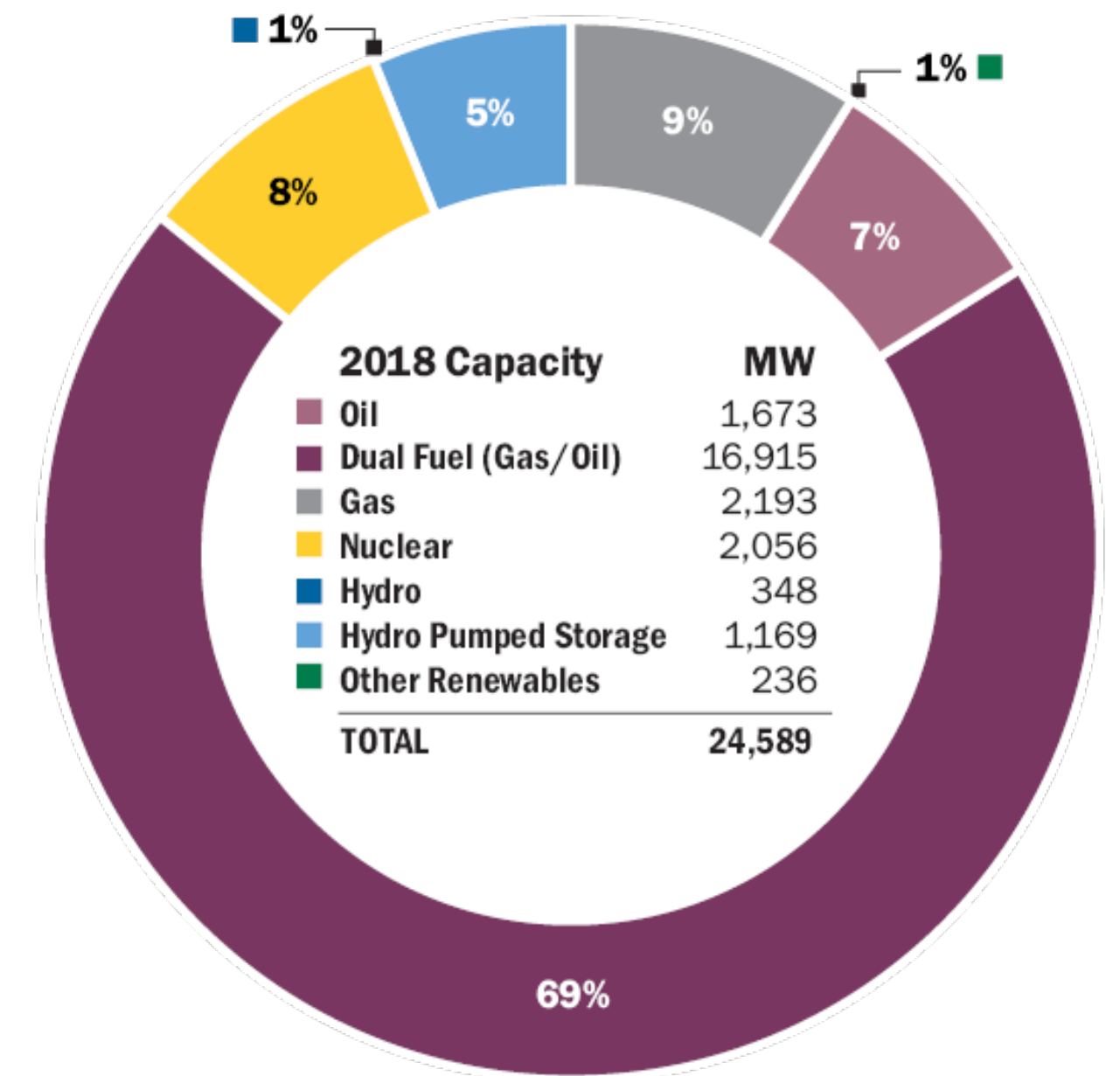
New York Statewide Generating Capacity by Fuel Source: 2018



Upstate (Zones A-E) Generating Capacity by Fuel Source: 2018



Downstate (Zones F-K) Generating Capacity by Fuel Source: 2018



Market Enhancements

- **November 2014** Established capability to allow generators to provide expected costs for day-ahead reference level development
- **November 2015** Implemented enhancements to Shortage Pricing to incent generators to secure sufficient fuel to meet day-ahead schedules
- **November 2015** Increased the Total Operating Reserve Requirement from 1965 MW to 2620 MW and implemented a new 30-minute reserve requirement for Southeastern NY
- **FERC Order 809** NYISO market closes at 5 AM (EST/EDT) and posts day-ahead electric schedules around 9:30 AM
- **June 2016** Enhanced Scarcity Pricing during demand response activations deployed
- **September 2017** Tariff changes to reflect new NYSRC dual fuel testing rules applicable to combined cycle units in New York City

Continued Winter Challenges

- **Gas Availability** | Gas LDC retail load has gas transportation priority over electric power generation
- **Extended Cold Weather Conditions** | Burn rates of alternative fuels can exceed replacement rates of alternative fuels during extended cold weather
- **Emissions challenges to dual fuel capability** | Burning oil may be further restricted by reduced emission limits
- **New gas pipeline siting remains challenging**
- **Fuel Security** | Assess necessity for further enhancements to market mechanisms and requirements to align with reliability needs

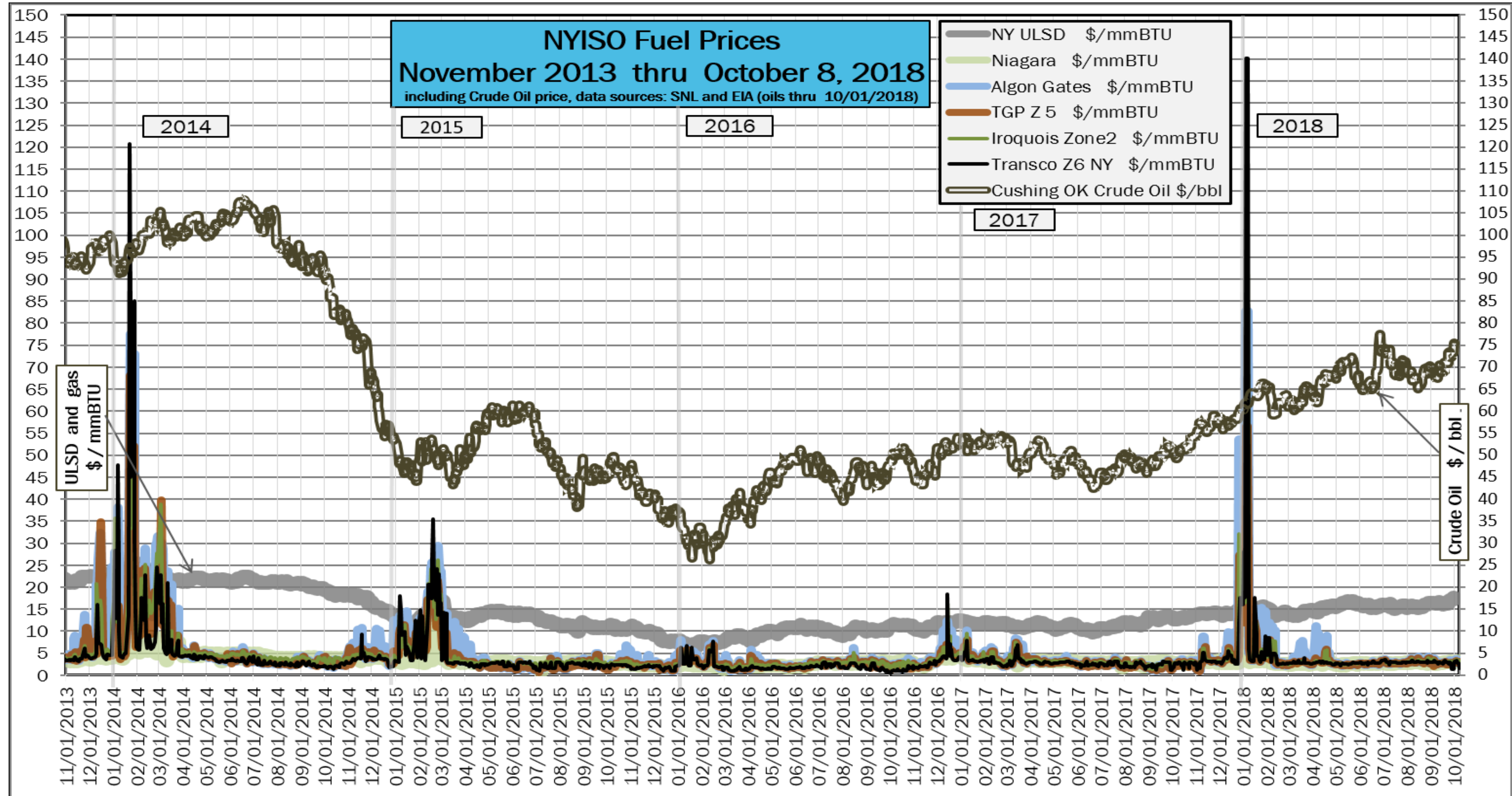
2019 Fuel Security Study

- In 2019, the NYISO will conduct a comprehensive, forward-looking fuel and energy security assessment to evaluate the ability to meet electric system needs during stressed system conditions, such as prolonged cold weather events and disruptions in fuel availability.
- If the study results reveal potential fuel and energy security risks or concerns, the assessment will help identify potential market enhancements that should be further pursued with stakeholders to achieve desired improvements in grid resilience.

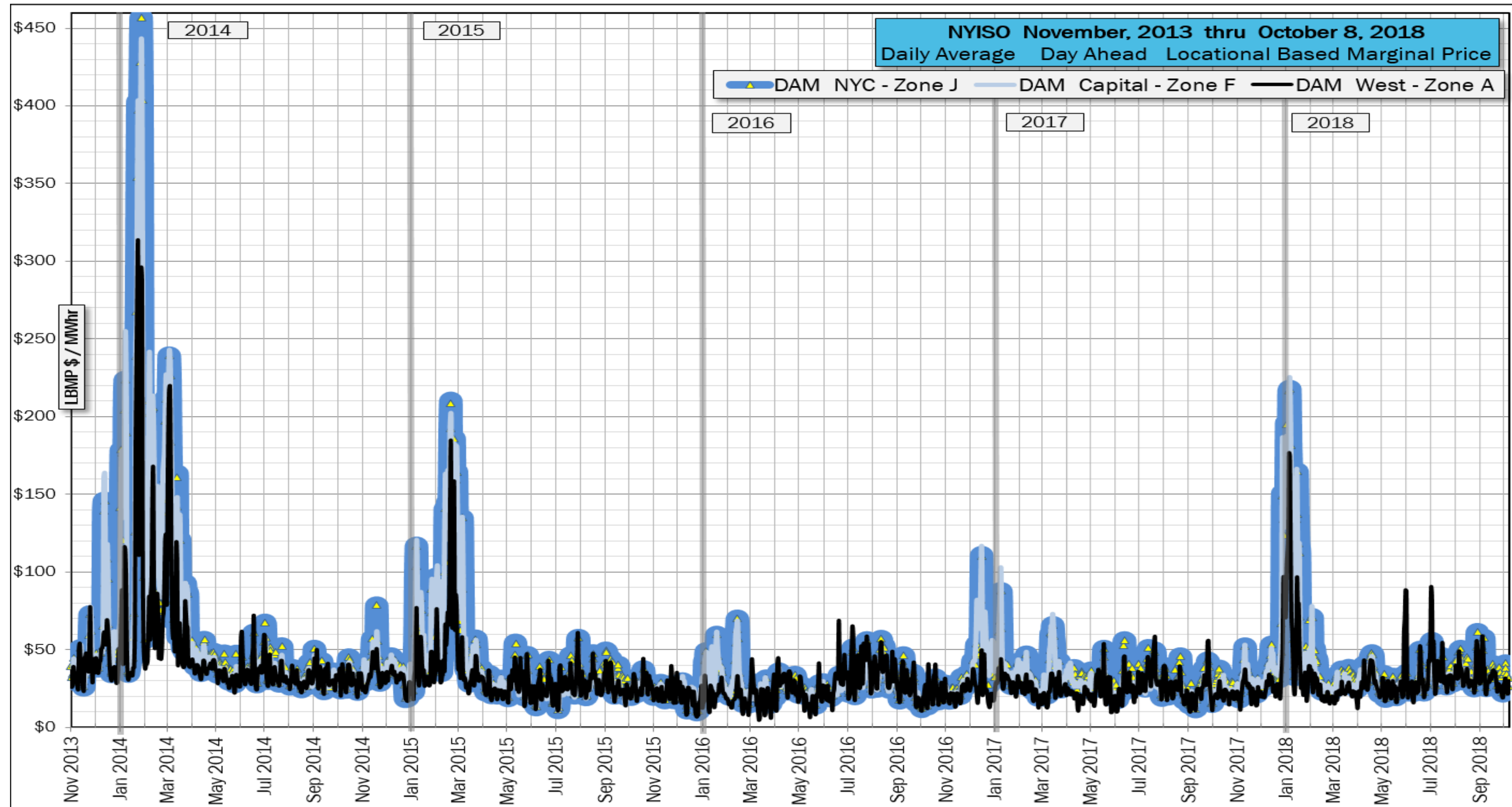
Last Winter: 2017-18 Cold Weather Conditions

- **Northeast Cold Snap:** December 26, 2017 through until January 7, 2018 (13 days)
- **Albany, NY:** Average temperature was 4.5° F between December 27 through January 2 with 7 consecutive days with minimums below 0° F
- **Syracuse, NY:** Coldest start of January in over 100 years with January 1-7 average of 7.3° F
- **New York City:** Temperatures below 32° F for 14 days
- **Coastal Blizzard:** Entire east coast experienced a Coastal Blizzard which impacted NYC, Long Island, and New England on January 4-6
 - NY: Mostly a snow, wind, and cold event

Overview: Fuel Prices



Overview: Energy Prices



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