

Winter 2018 Capacity Assessment Winter Preparedness

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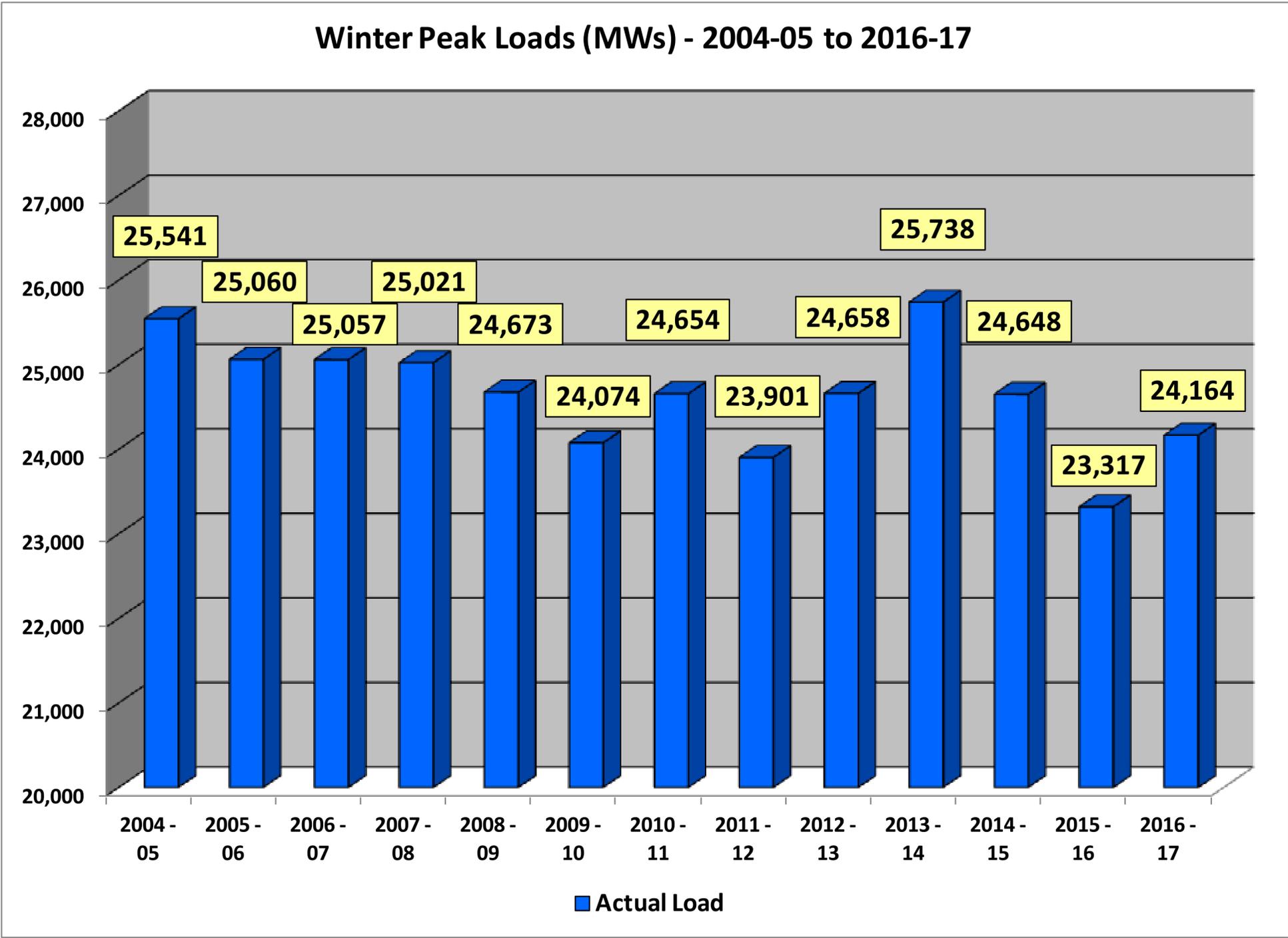
Vice President, Operations NYISO

NYISO Management Committee

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Historic Winter Peaks



Winter 2018 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 2017-18

| Winter 2017-18 Projected Capacity Margins (MW) | | | | |
|--|----------------|--------------|-------------------------------------|--------------|
| Region | Base Condition | | Loss of Interruptible Gas Condition | |
| | Normal Weather | 90th Weather | Normal Weather | 90th Weather |
| NY State | 11,648 | 10,024 | 7,511 | 5,887 |
| Lower Hudson Valley | 8,231 | 7,556 | 5,779 | 5,104 |

2016-17 & 2017-18 Winter Capacity Assessment & Comparison

| Line | Item | 2016-17 | | 2017-18 | |
|------------------|--|-------------------|--------------------------|-------------------|--------------------------|
| | | Baseline Forecast | 90th Percentile Forecast | Baseline Forecast | 90th Percentile Forecast |
| 1a | Winter Generation Capacity ¹ | 40,092 | 40,092 | 41,454 | 41,454 |
| 1b | SCR - ICAP Values | 842 | 842 | 792 | 792 |
| 1c | Net Purchases & Sales | 2,034 | 2,034 | 2,311 | 2,311 |
| 1 | Total Capacity Resources | 42,968 | 42,968 | 44,557 | 44,557 |
| 2 | Assumed Unavailable Capacity (Gen + SCR) | -4,940 | -4,940 | -5,924 | -5,924 |
| 3 = 1 + 2 | Net Capacity Resources | 38,028 | 38,028 | 38,633 | 38,633 |
| 4 | Peak Load Forecast | 24,445 | 26,049 | 24,365 | 25,989 |
| 5 | Operating Reserve Requirement | 2,620 | 2,620 | 2,620 | 2,620 |
| 6 = 4+5 | Total Capacity Requirement | 27,065 | 28,669 | 26,985 | 28,609 |
| 7 = 3 - 6 | Capacity Margin | 10,963 | 9,359 | 11,648 | 10,024 |

Line 1a: Reflects the 2017 Gold Book existing capacity with projected and actual deactivations, additions and DMNC updates during 2017

Line 2: Unavailable: 1145 MW Wind, 416 MW Hydro, 2,957 MW Thermal, 231 MW Demand Response, 1,152 Schedule Outages, 23 Other

2017-18 Winter Capacity Assessment - Loss of Gas

| Line | Item | Baseline Forecast | 90th Percentile Forecast |
|--------------------|--|-------------------|--------------------------|
| 1a | Installed Capacity Resources | 41,454 | 41,454 |
| 1b | SCR - ICAP Values | 792 | 792 |
| 1c | Net ICAP External Imports | 2,311 | 2,311 |
| 1 | NYCA Resource Capability | 44,557 | 44,557 |
| 2 | Total Projected Capacity Outages | -5,924 | -5,924 |
| 3 = (1-2) | Net Installed Capacity Resources | 38,633 | 38,633 |
| 4 | Load Forecast | 24,365 | 25,989 |
| 5 | Operating Reserve Requirement | 2,620 | 2,620 |
| 6 = (3-4-5) | Capacity Margin | 11,648 | 10,024 |
| 7a | Subtract All Gas Only Units | 6,901 | 6,901 |
| 7 = (6-7a) | Capacity Margin, Loss of Gas | 4,747 | 3,123 |
| 8a | Add Back Units with Firm Gas Contracts | 2,764 | 2,764 |
| 8 = (7-8a) | Expected Capacity, Loss of Gas Case | 7,511 | 5,887 |

Capacity & Infrastructure Updates

- **Generation (relative to fall 2016 projections)**
 - Fitzpatrick not expected last winter
 - Greenidge Unit 4 in-service (return to market)
 - DMNC increases
 - + 0 MW (CPV possible oil-fired test generation)
 - Retirements of Stony Brook & Binghamton Cogen
- **Transmission**
 - Two Phase Angle Regulators (PARs) in-service at the Con Edison Ramapo Substation
 - Expect HTP in-service this winter
 - 345 kV Dolson Ave Substation complete - Interconnection for CPV on the 345 kV Coopers Corners – Rock Tavern 42

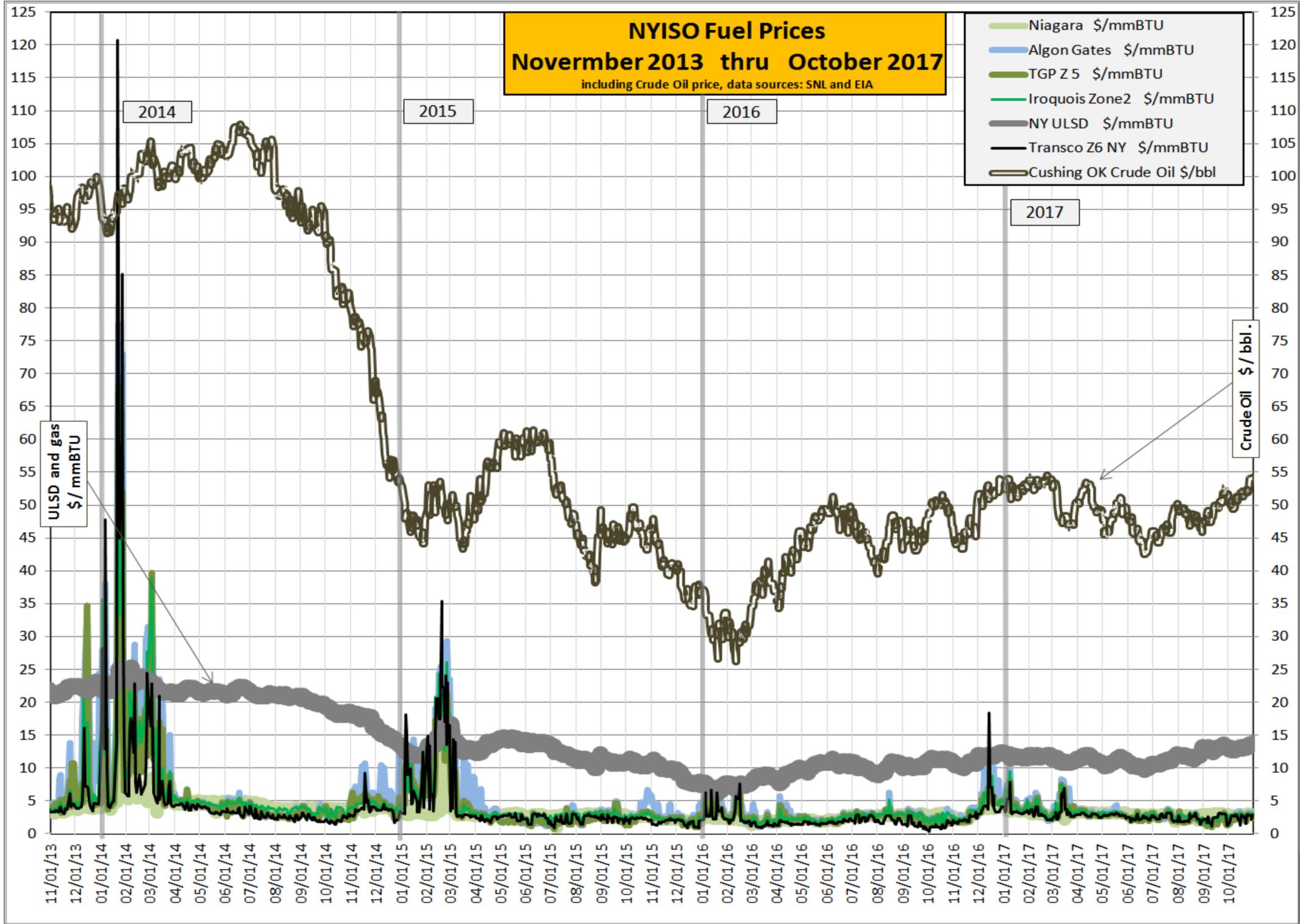
Appendix

Recent Prices,

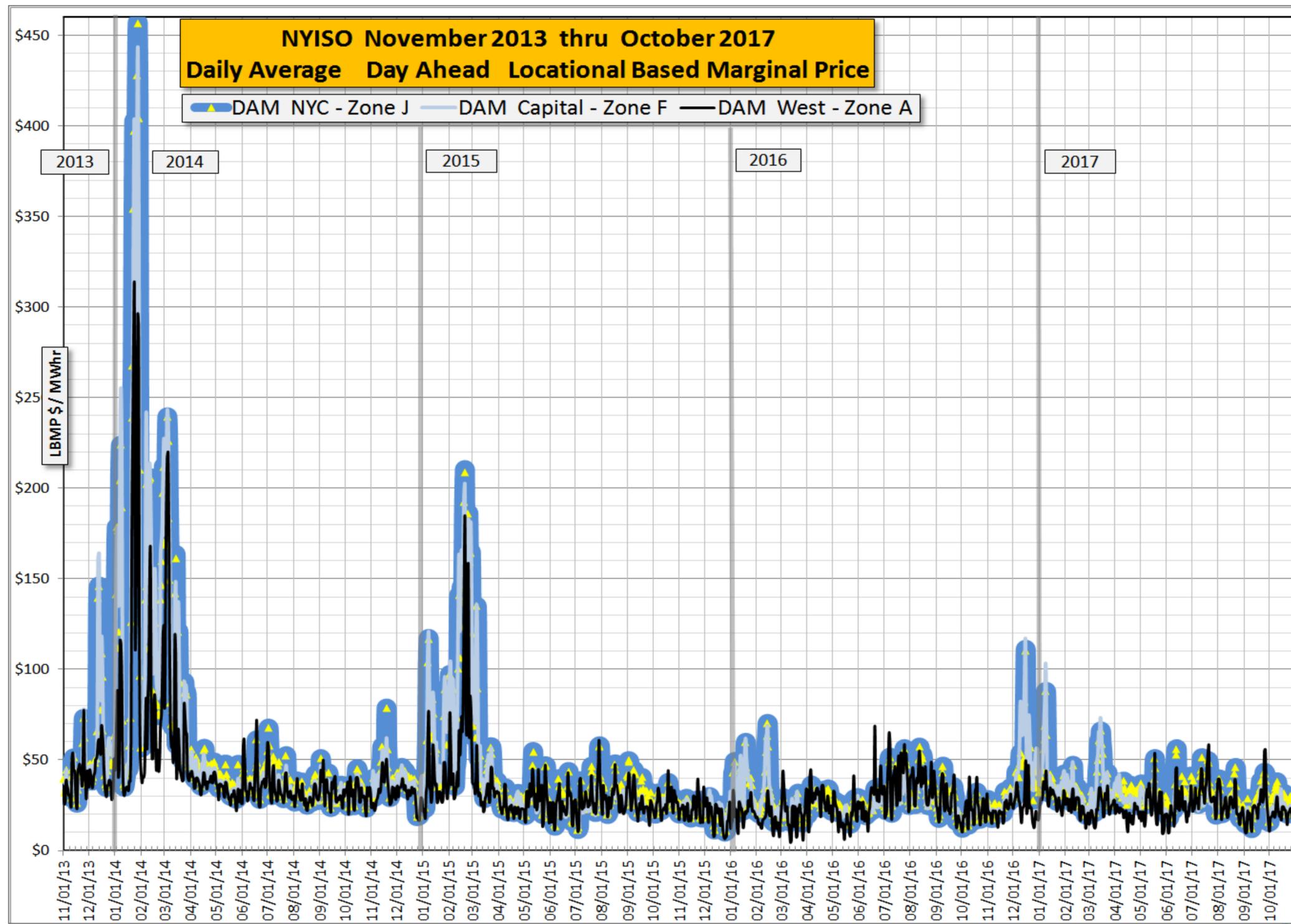
Preparedness

Challenges

Historic Fuel Prices - Past 4 years



Historic Electric Prices: Past 4 Years



Recent 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
- **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 for Demand Response activations deployed
- **May 2017** Guide 19: Expectations of Generator Operation During Gas Restrictions
- **Ongoing** Continuing discussions with Stakeholders on fuel assurance in the form of capacity market enhancements

Winter 2017-18 Preparedness

- Seasonal generator fuel surveys indicate oil-burning units have sufficient winter starting 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 load thresholds to secure electric reliability for NYC and Long Island LDC gas pipeline contingencies
- Tariff changes to reflect new NYSRC dual fuel testing rules applicable to combine cycle units in New York City were approved by FERC in September

Situational Awareness

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

Continued Winter Challenges

- **Gas Availability** | Firm Gas LDC retail load has gas transportation priority on the NY LDC's over electric power generation during cold weather conditions
- **Extended Cold Weather Conditions** | Burn rates of alternative fuels can exceed replacement rates of alternative fuels during extended cold weather or when oil costs are below gas costs for an extended period of time
- **Emissions challenges to dual fuel capability** | Burning oil may be further restricted by reduced NOx emission limits, less Northeast refinery capability, or potential for reduced carbon emissions targets
- **New gas pipeline siting remains challenging**

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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