

Winter 2015 Cold Weather Operations

Wes Yeomans

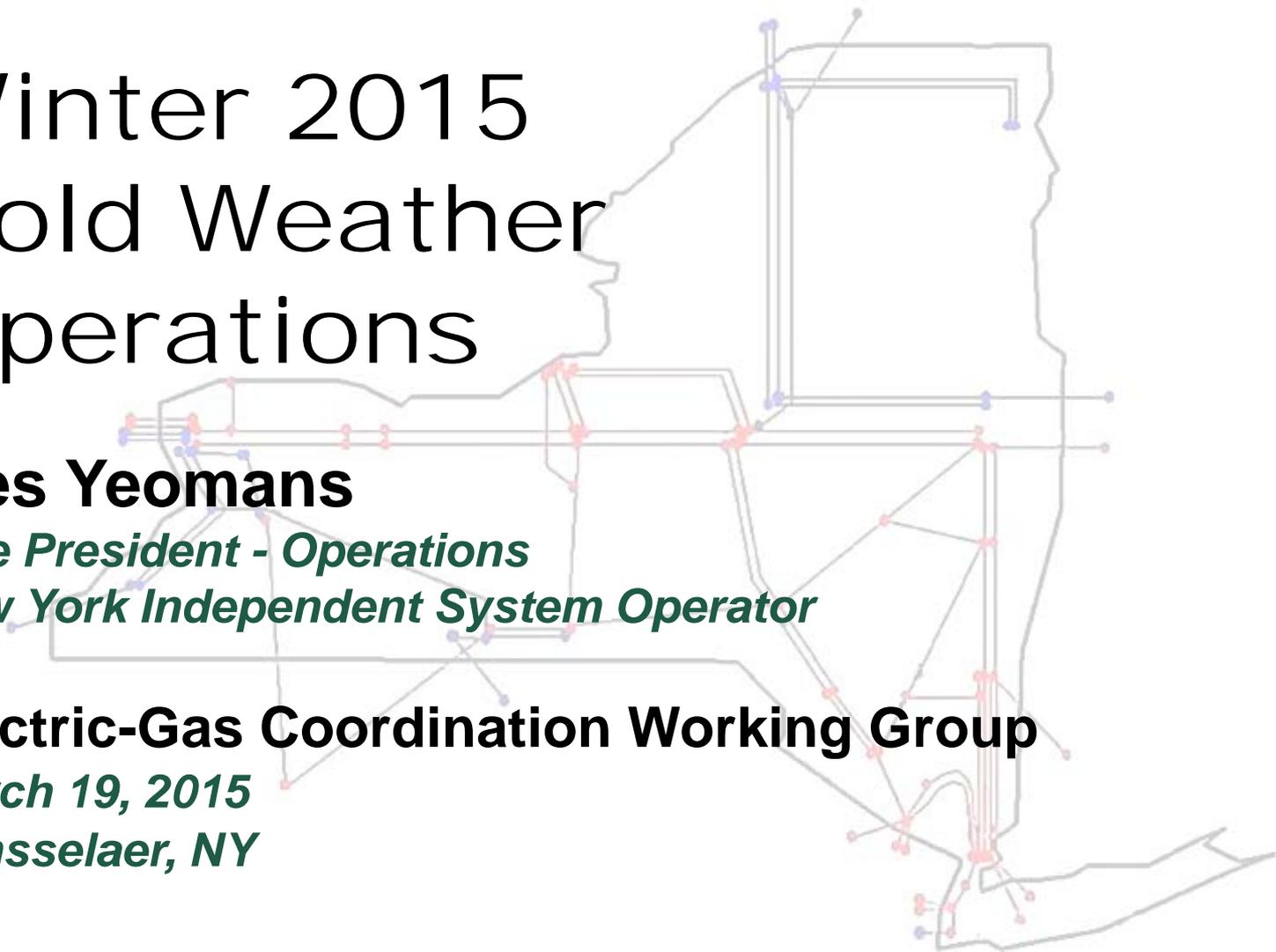
Vice President - Operations

New York Independent System Operator

Electric-Gas Coordination Working Group

March 19, 2015

Rensselaer, NY



Agenda

- ◆ **Cold Weather Preparations**
- ◆ **Winter 2015 Peak Load January 7, 2015**
- ◆ **Winter 2015 Operations**
- ◆ **LNG Prices, LNG Deliveries, Gas Storage**
- ◆ **Gas & Electric Prices**

Cold Weather Preparations

- ◆ **NYISO participated in several NPCC/PJM/MISO coordination conference calls during the winter cold weather conditions.**
 - *More regional coordination calls in February than January*
- ◆ **The NY Transmission Owners rescheduled transmission outages prior to cold weather conditions.**
- **NYISO invoked its “Cold Weather Fuel Inventory Protocol” to monitor and verify gas nominations and oil inventories with generation asset owners on a daily basis before each cold day.**
 - *Daily fuel updates in February were critical, due to the high number of days that gas prices exceeded oil prices*
 - *Cooperation and accuracy of the information were excellent*

January 7, 2015 Peak Load

- ◆ **The Northeast and a large area of the United States experienced cold weather conditions during the week of January 5 with the coldest conditions occurring on January 7 & 8.**
- ◆ **These conditions were not quite as cold as those of January 7, 2014 when New York set an all-time winter peak load.**
- ◆ **NYISO experienced a Winter 2015 peak load of 24,648 MW on Wednesday January 7, 2015.**
 - ***25,738 MW - Winter all time peak load set January 7, 2014***
 - ***24,737 MW - “1 in 2” Forecast Winter Peak for 2014-15***
 - ***26,333 MW - “1 in 10” Forecast Winter Peak for 2014-15***

January 7, 2015 Peak Load

◆ Electric System Operations

- *Gas prices exceeded oil prices in Eastern NY*
- *Good performance of Day Ahead import interchange schedules – no projections of import curtailments nor actual real time curtailments*
- *NYISO total generation forced outages of approximately 2,100 MW (excluding a few long-term forced outages)*
 - **1,600 MW forced outages unavailable to the day ahead market**
 - *More than 75% related to cold weather or lack of gas*
 - **500 MW accepted in the day ahead market but forced outage in real time market**
 - *More than 50% related to cold weather or lack of gas*

January 7, 2015 Peak Load

◆ Regional Electric Conditions

- *Generally, adjacent areas did not experience the high level of generator derates experienced in January 2014*
- *Hydro Quebec did activate Demand Response to meet morning and evening peaks*

◆ Supplemental Capacity Resource Commitments

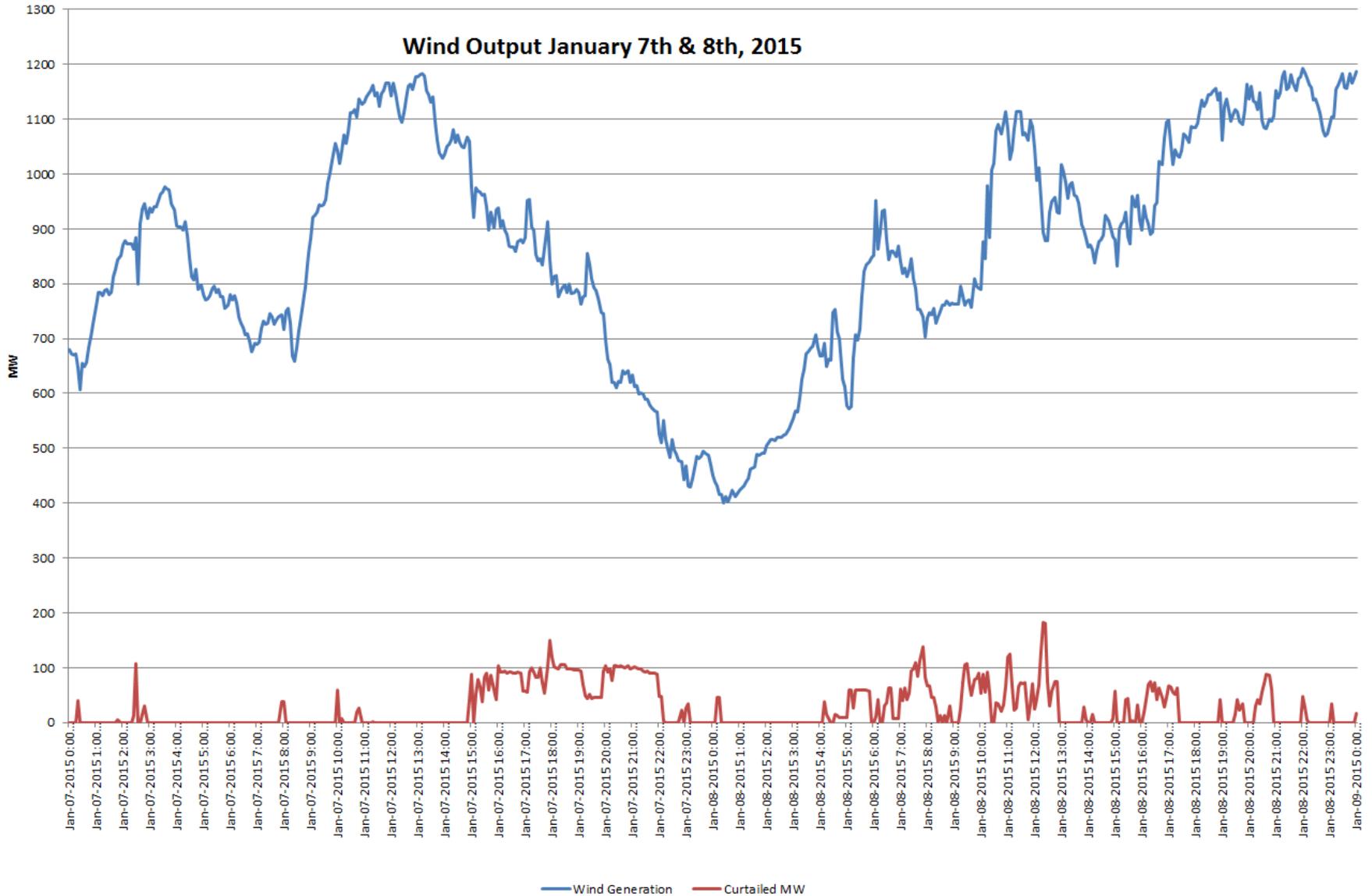
- *No need for the NYISO to schedule Supplemental Capacity Resources*

◆ Demand Response

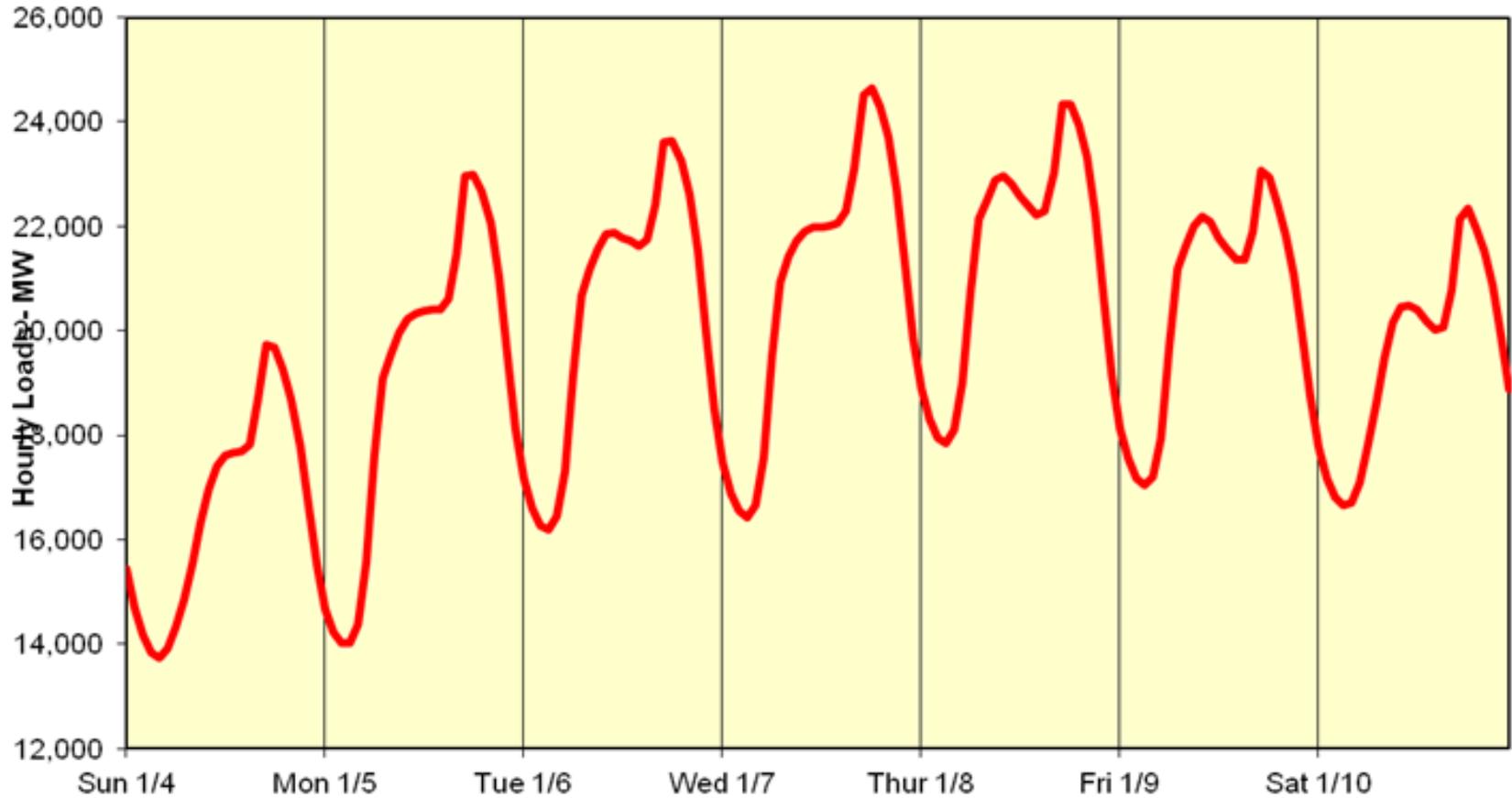
- *No need for the NYISO to notify or activate Demand Response resources*

◆ Regional Pipeline Conditions

- *Majority of the Northeast interstate pipelines and LDCs issued Gas Alerts and Operational Flow Orders*
- *No significant gas infrastructure forced outages*



NYCA Hourly Loads (MW)
 Sunday, January 4 to Saturday, January 10



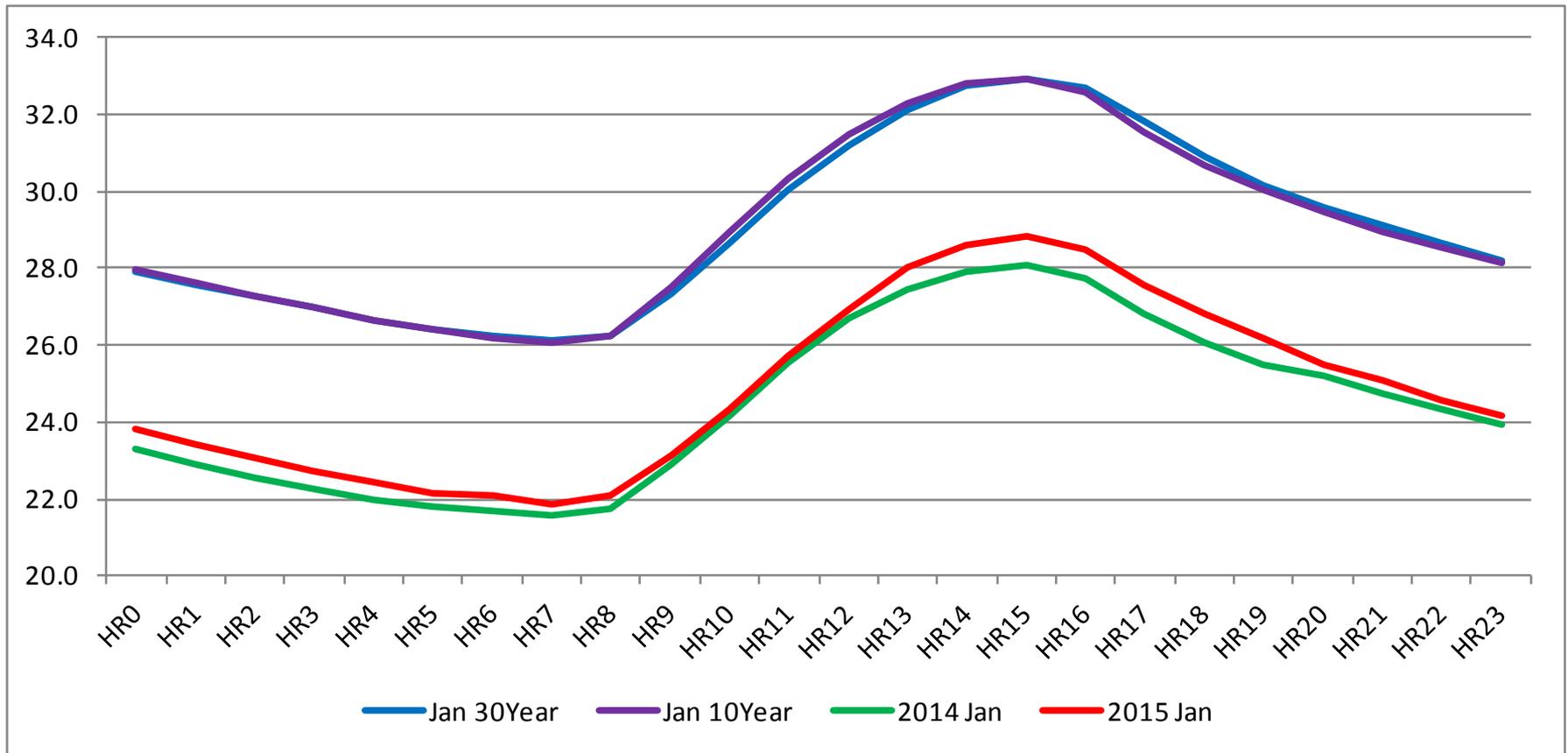
Winter 2015 Cold Weather Operations

- ◆ **January and February were both colder than the 10-year average and 30-year average (next slides)**
 - *Coldest February for New York State, going back to the end of the Great Depression (winter 1941).*
- ◆ **Gas prices in eastern NY exceeded #2 oil the following days:**

	<u># Days</u>
<i>Dec 2014</i>	<i>0</i>
<i>Jan 2015</i>	<i>5</i>
<i>Feb 2015</i>	<i>21</i>
<i>Mar 2015</i>	<i>2</i>

Average Hourly Temperatures – January (F)

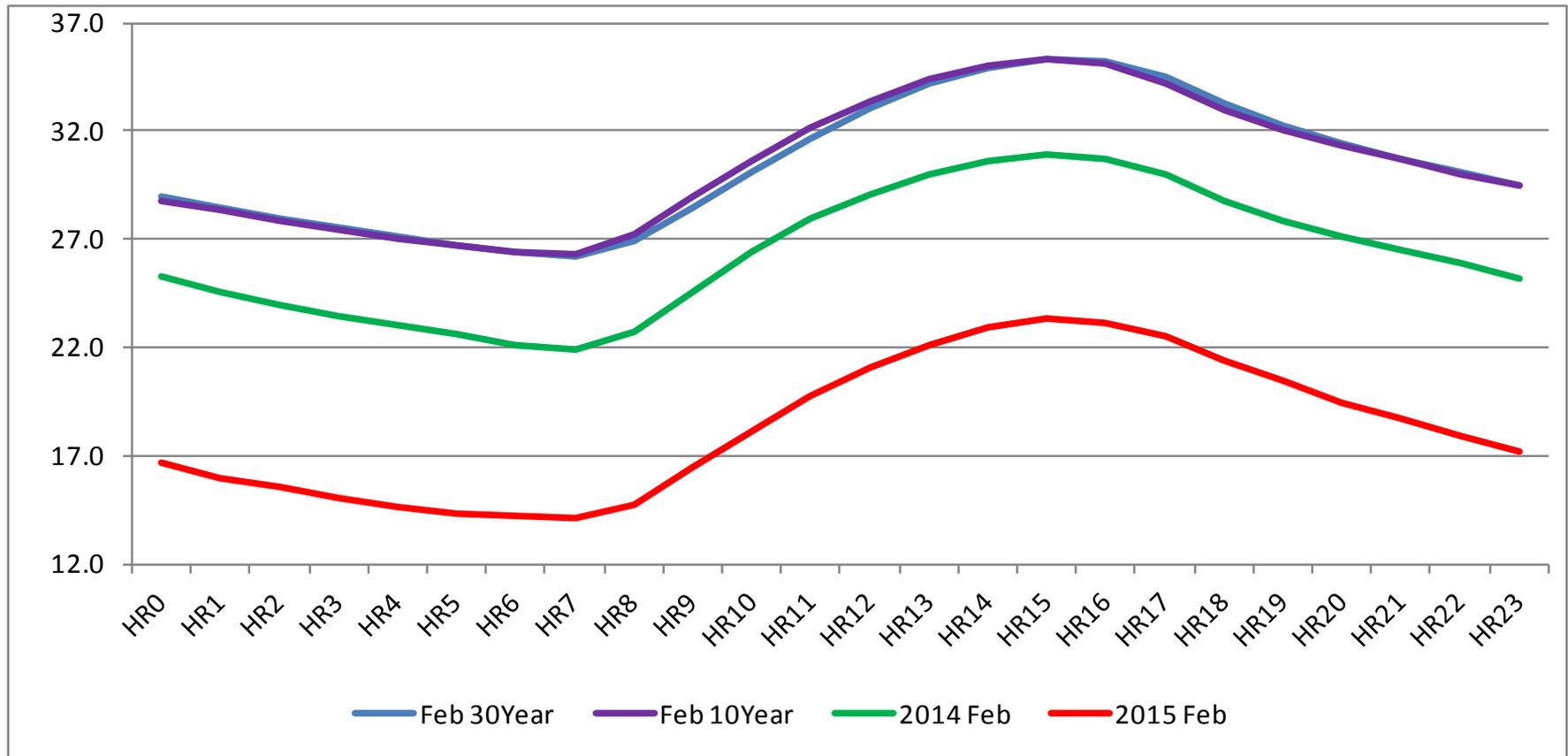
30-Year Average, 10-Year Average, 2014 & 2015



January’s 30-year average and 10-year average NYCA temperature is 29.1 F. January 2014 was well below that average, at 24.4 F and January 2015 was almost as low at 24.9 F.

Average Hourly Temperatures – February (F)

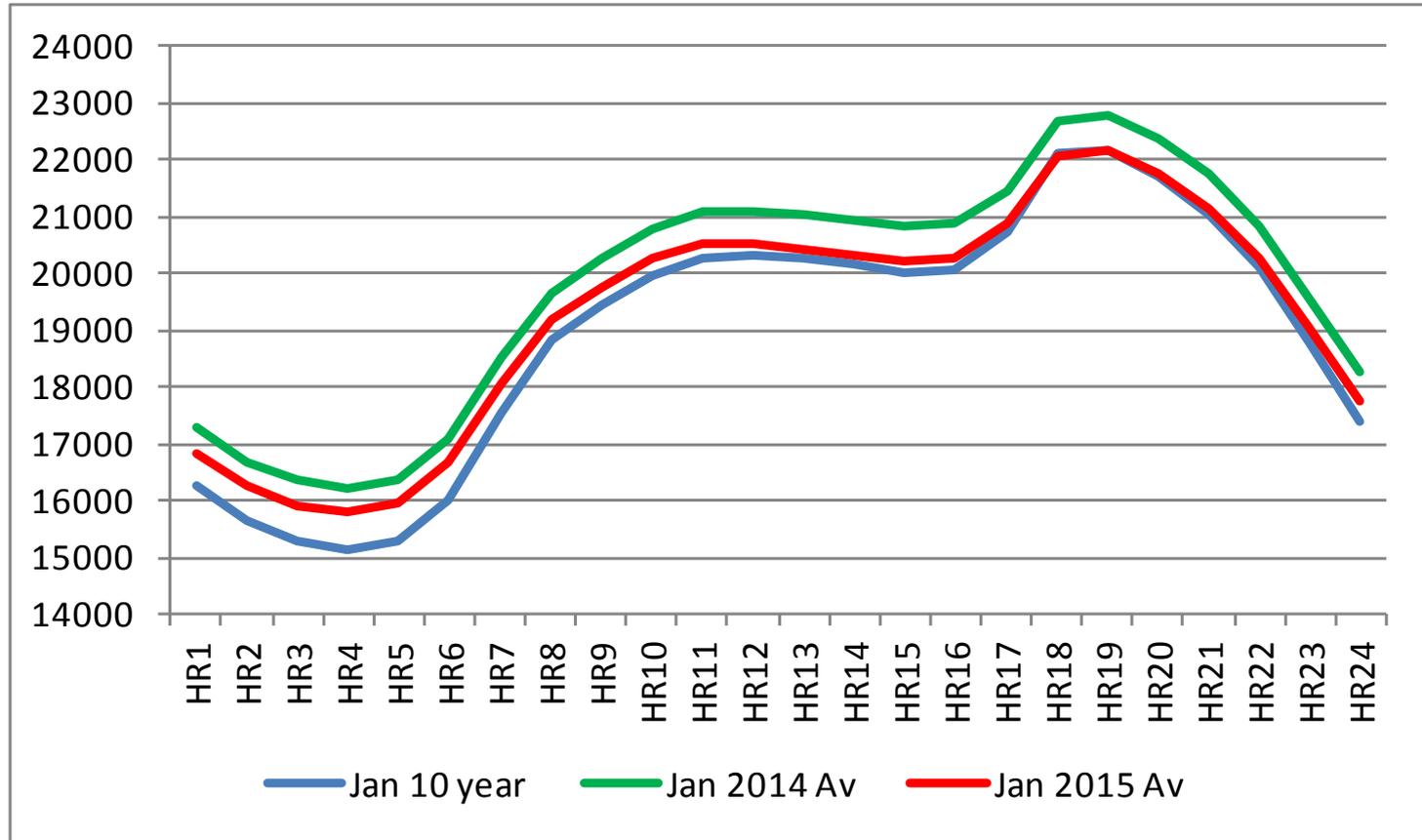
30-Year Average, 10-Year Average, 2014 & 2015



As we would expect, the monthly averages are much lower in February 2015. The NYCA 30-year average is 30.4 F and the 10-year average is 30.5 F. February 2014 came in much below at 26.3 F and February 2015 came in well below at 18.3 F.

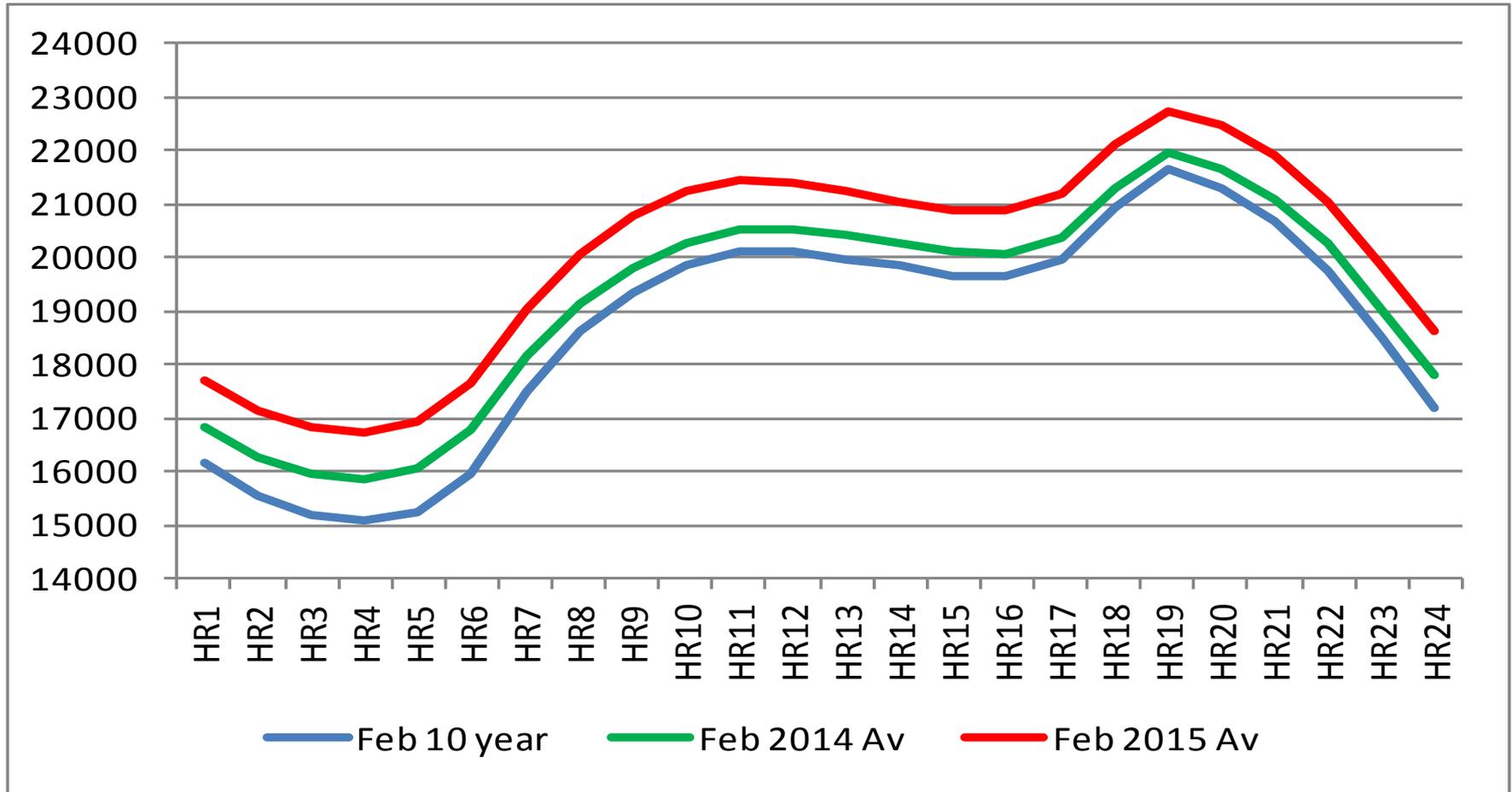
Average Hourly Loads - January (MW)

10-Year Average, 2014 & 2015



January’s 10-year average peak was 22,220 MW. For January 2014, the average peak was 22,820 MW, with an all-time winter peak of 25,738 MW on Jan. 7. For January 2015, the average peak was 22,190 MW. Monthly energy in January 2014 was 14,719 GWh. Monthly energy in January 2015 was 14,325 GWh.

Average Hourly Loads – February (MW) 10-Year Average, 2014 & 2015



February’s 10-year average peak was 21,660 MW. For February 2014, the average peak was 21,950 MW. For February 2015, the average peak was 22,750 MW. Monthly energy in February 2014 was 12,894 GWh. Monthly energy in February 2015 was 13,467 GWh.

Winter 2015 Cold Weather Operations

◆ State-Wide Supplemental Capacity Commitments

- *On February 18 the ISO committed Oswego 5 for reliability purposes all hours for Feb 19th, following the forced outage of the Nine Mile 2 nuclear plant (1310MW) and an outage of a Dominion gas compressor, earlier in the week, which resulted in the loss of 600MW of upstate generation*

◆ Generation Performance

- *Low levels of generator outages across Winter 2015 with the exception of 2,100 MW on January 7 and 1,900 MW on February 18 & 19*

◆ Demand Response

- *On February 18 the ISO provided the 21-hour notification to Demand Response resources for possible activation on February 19. An actual activation was not needed*

◆ Transmission Performance

- *Very few transmission forced outages during Winter 2015*

Winter 2015 Cold Weather Operations

◆ Fuel Inventories

- *Alternative oil fuel supplies were sufficient throughout the winter although supplies became tighter in mid- to late-February*
- *NYISO did initiate the state-agency communication protocol on February 24 due to low inventory at one station*

◆ Regional Electric Conditions

- *Fewer generator derates and import schedule curtailments than previous winter*
- *PJM set new all-time winter peak of 143,800 MW on the morning of February 20*

◆ Regional Pipeline Conditions

- *Majority of the Northeast interstate pipelines and LDCs issued Gas Alerts and Operational Flow Orders during most of the cold weather conditions during January and February*
- *No significant gas infrastructure forced outages*

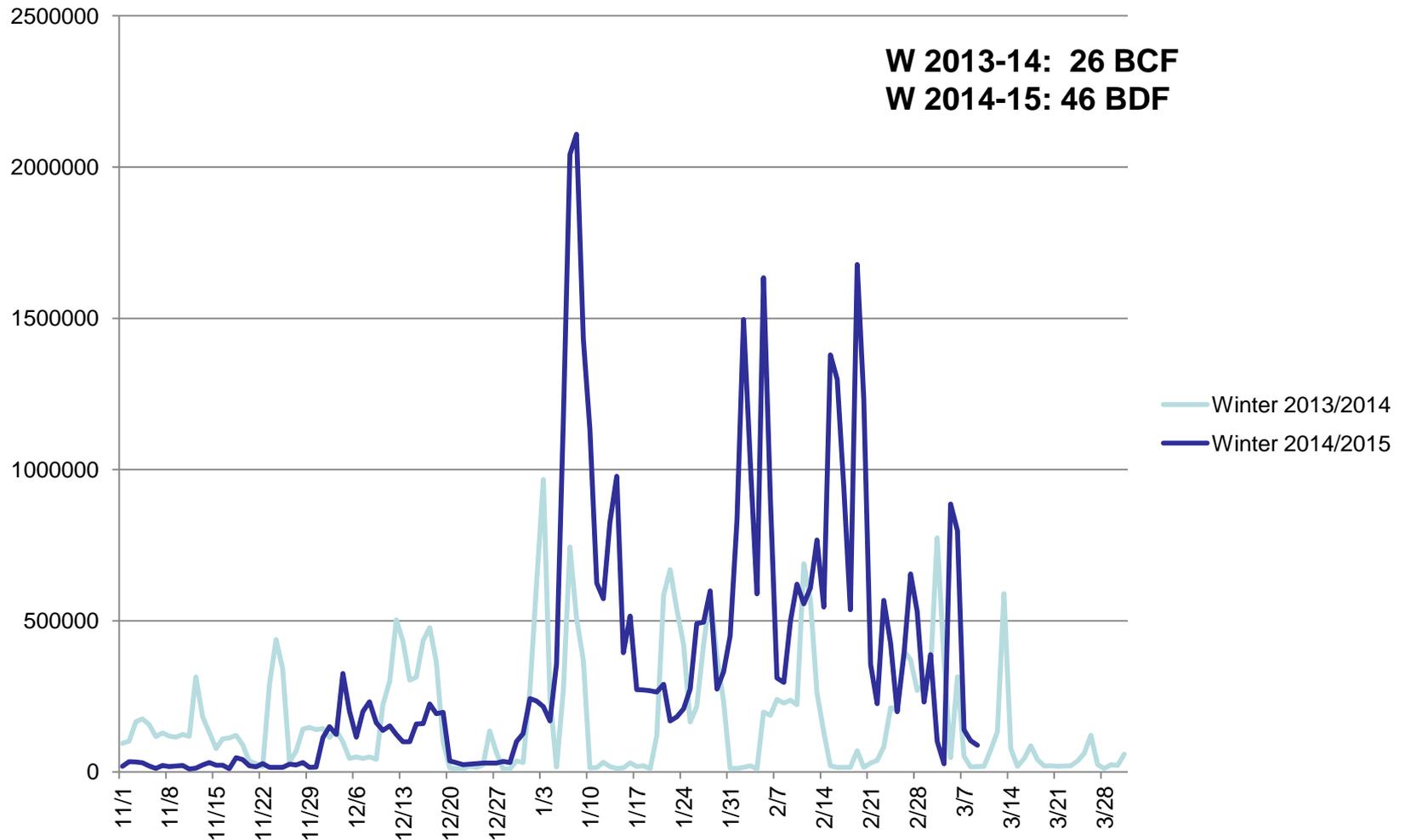
World LNG Prices Fall 2013

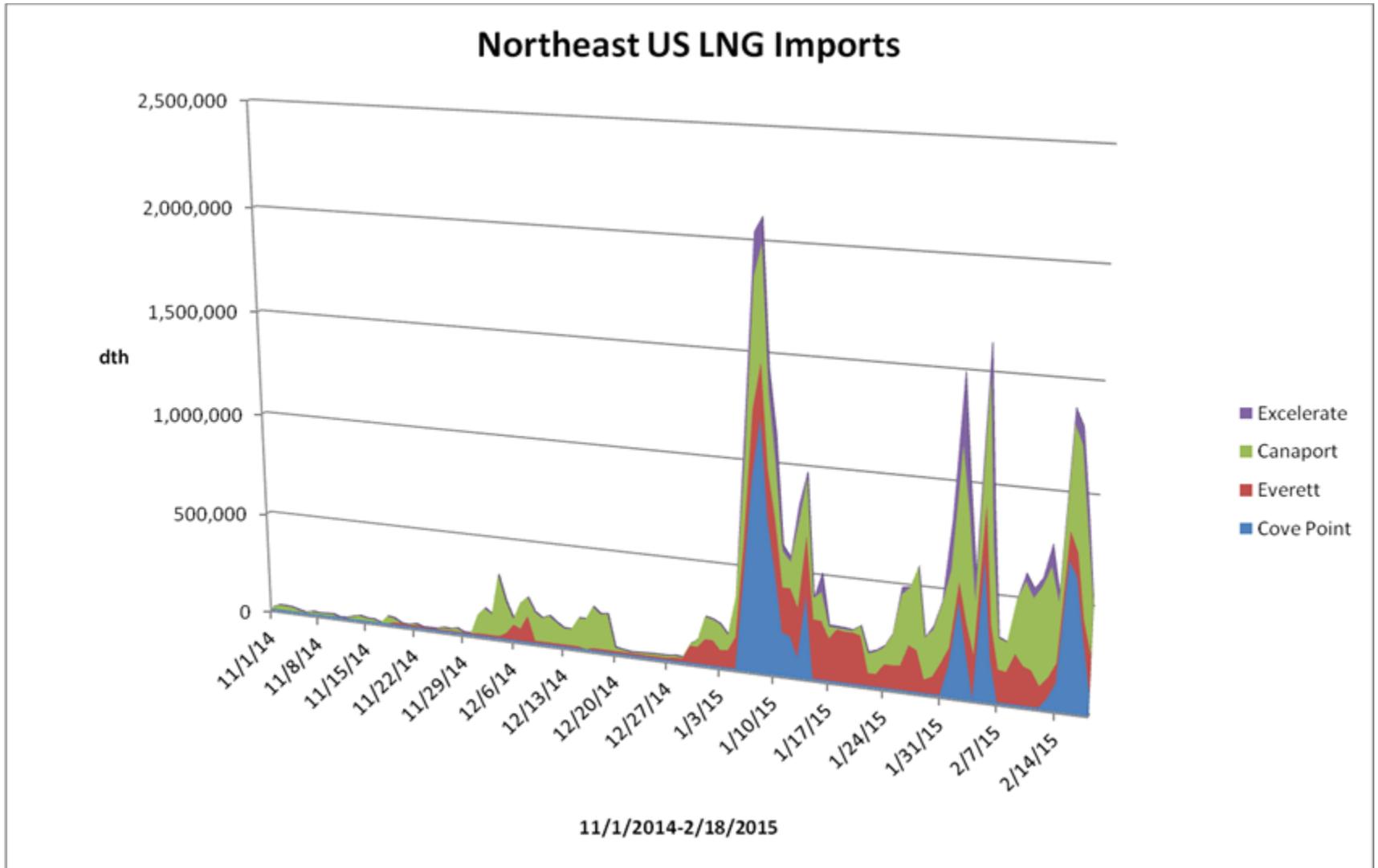


World LNG Estimated December 2014 Landed Prices



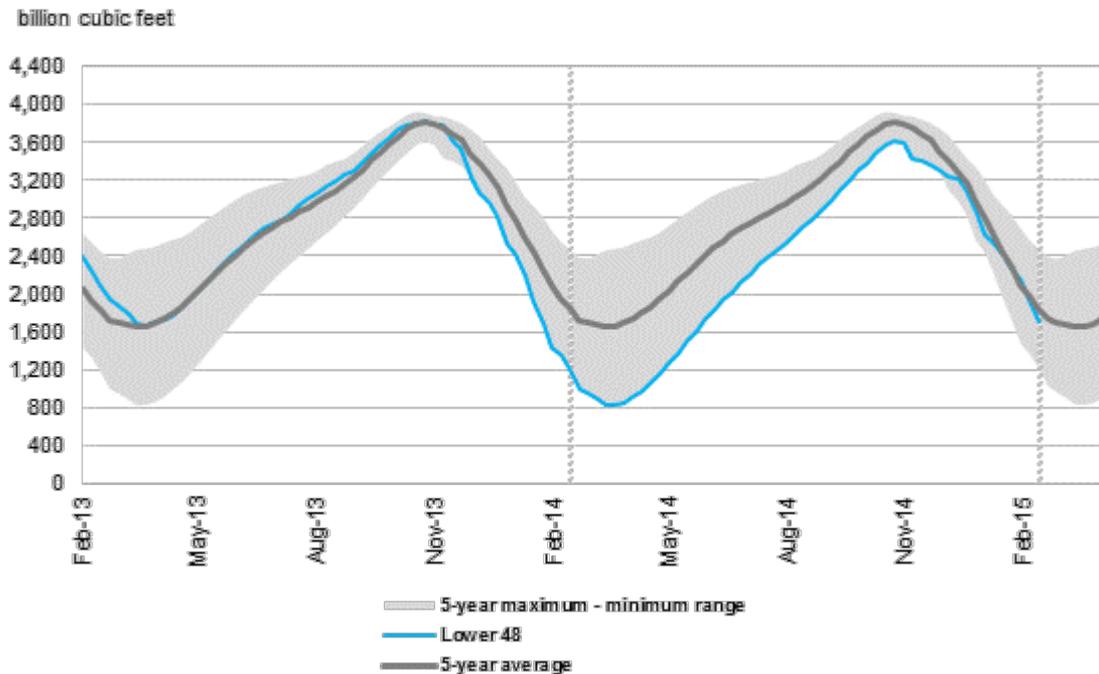
Year on Year LNG Deliveries



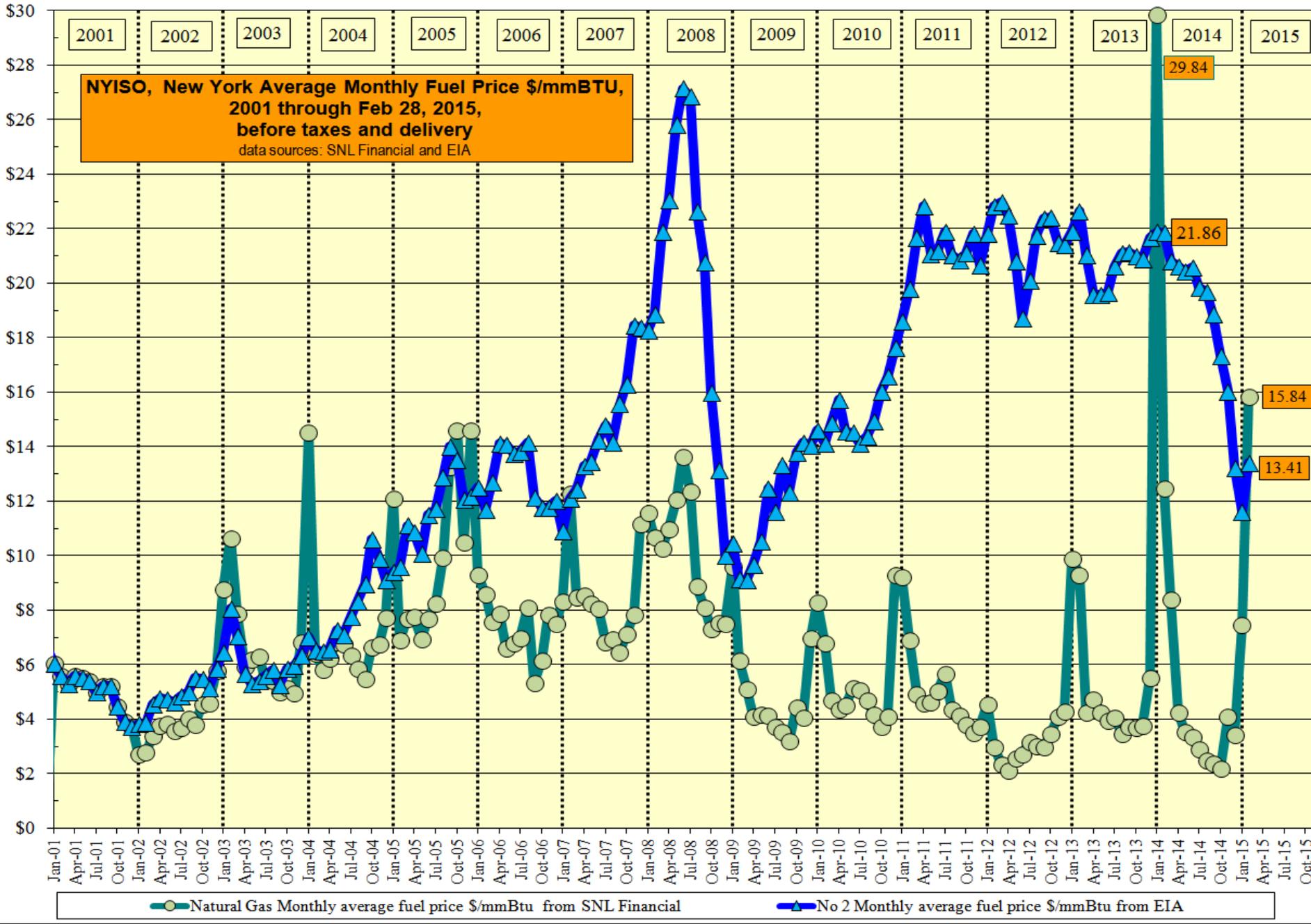


Winter Storage Comparison

Working gas in underground storage compared with the 5-year maximum and minimum

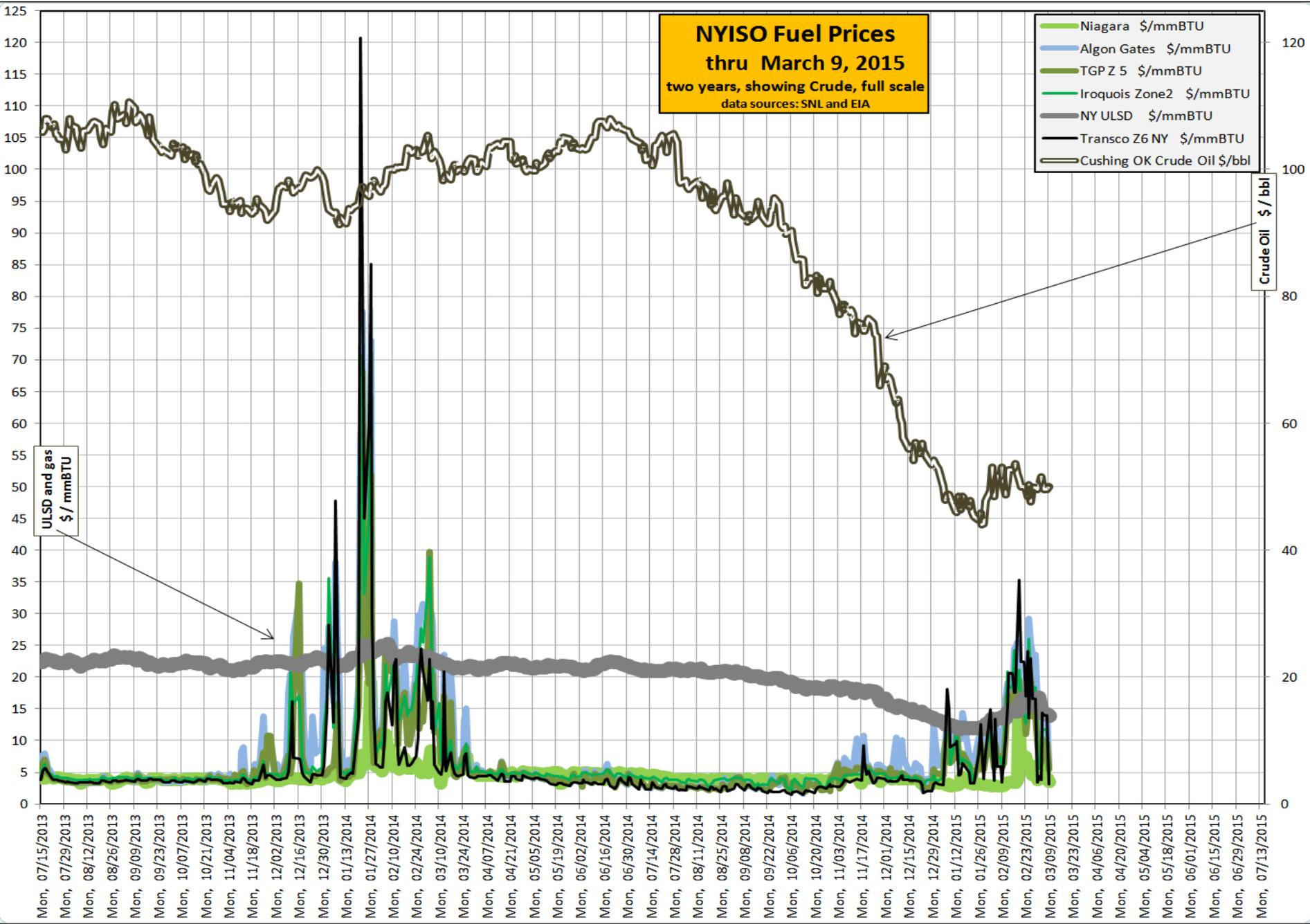


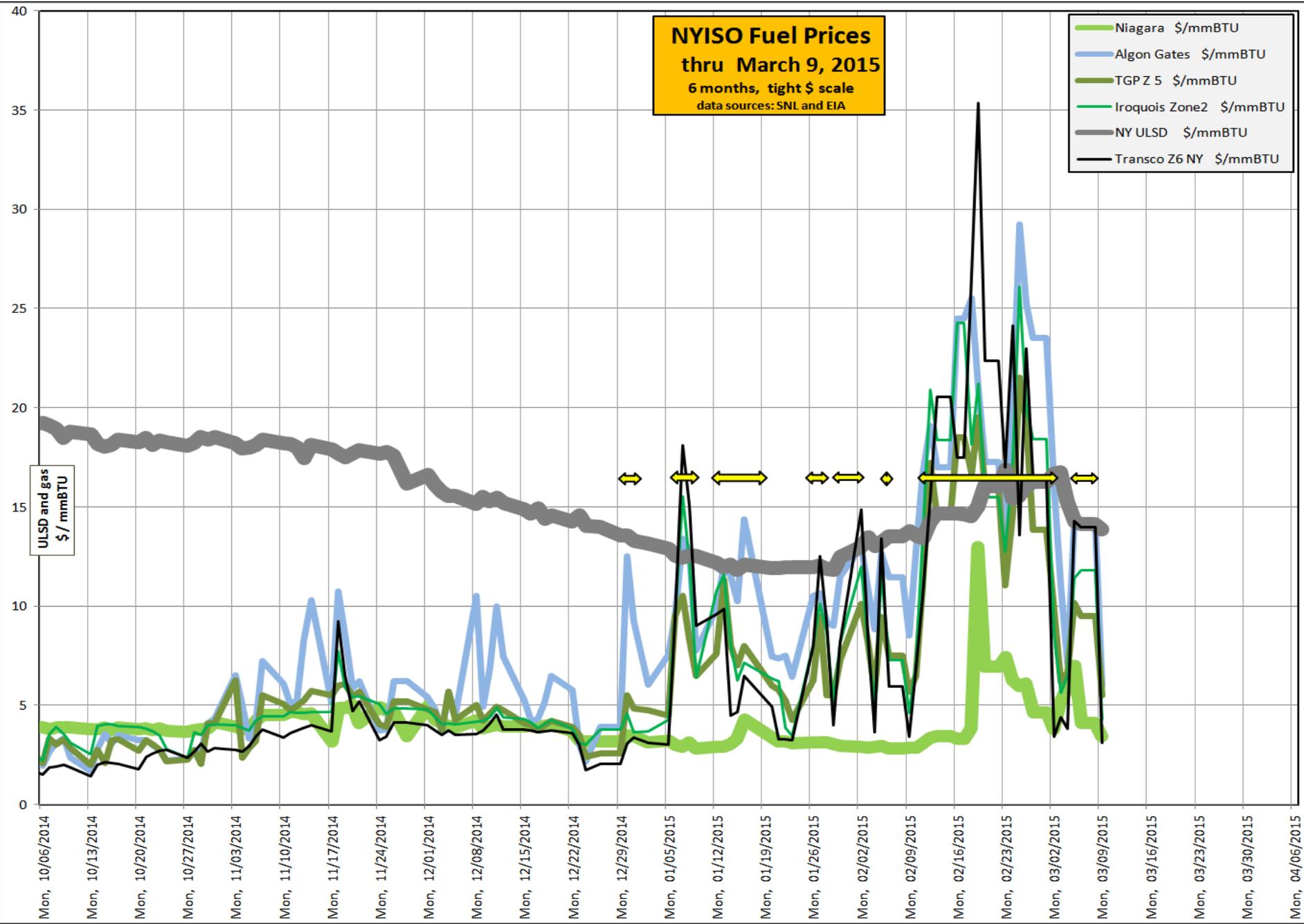
 Source: U.S. Energy Information Administration



**NYISO Fuel Prices
thru March 9, 2015**
two years, showing Crude, full scale
data sources: SNL and EIA

- Niagara \$/mmBTU
- Algon Gates \$/mmBTU
- TGP Z 5 \$/mmBTU
- Iroquois Zone2 \$/mmBTU
- NY ULSD \$/mmBTU
- Transco Z6 NY \$/mmBTU
- Cushing OK Crude Oil \$/ bbl

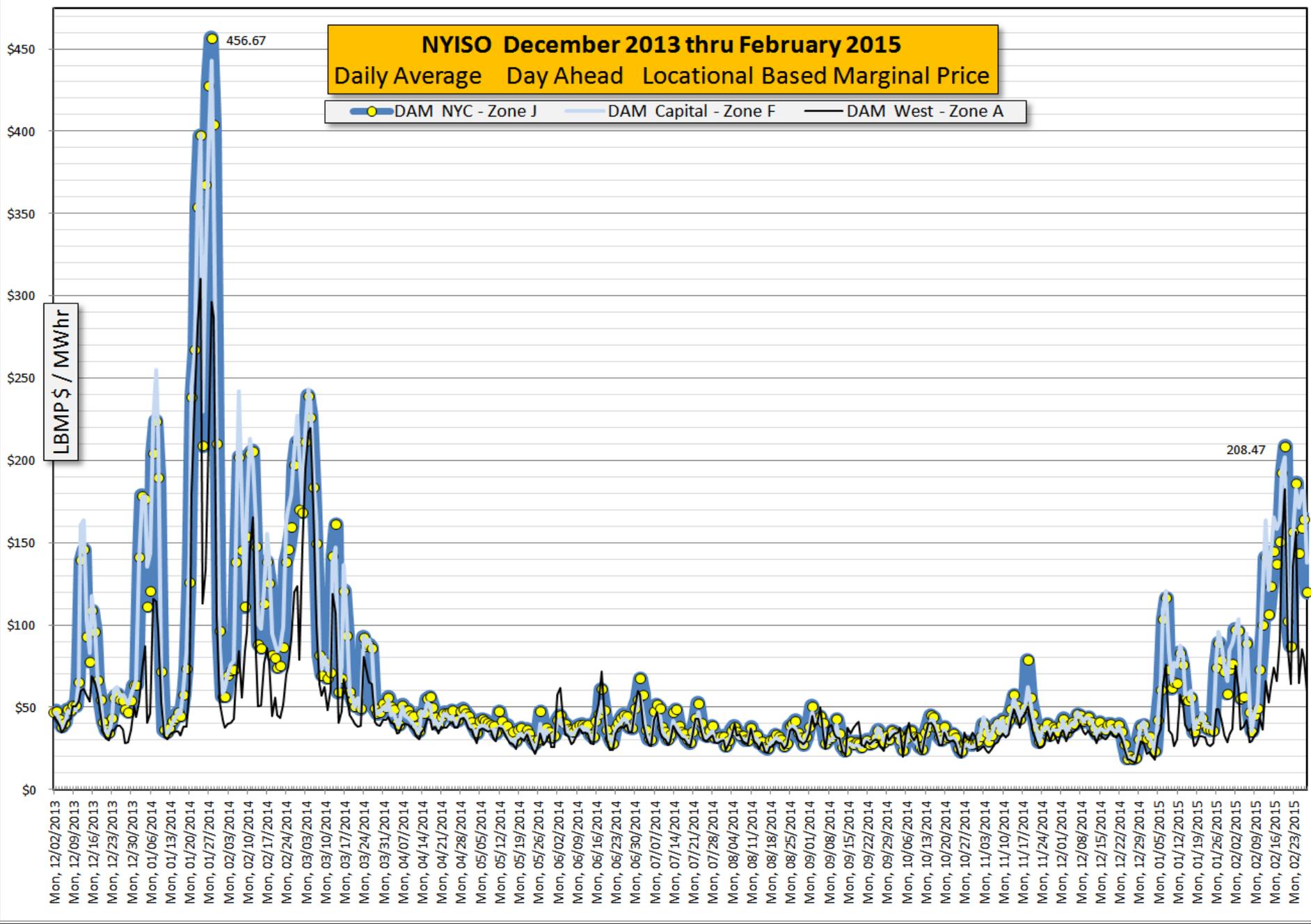




NYISO December 2013 thru February 2015

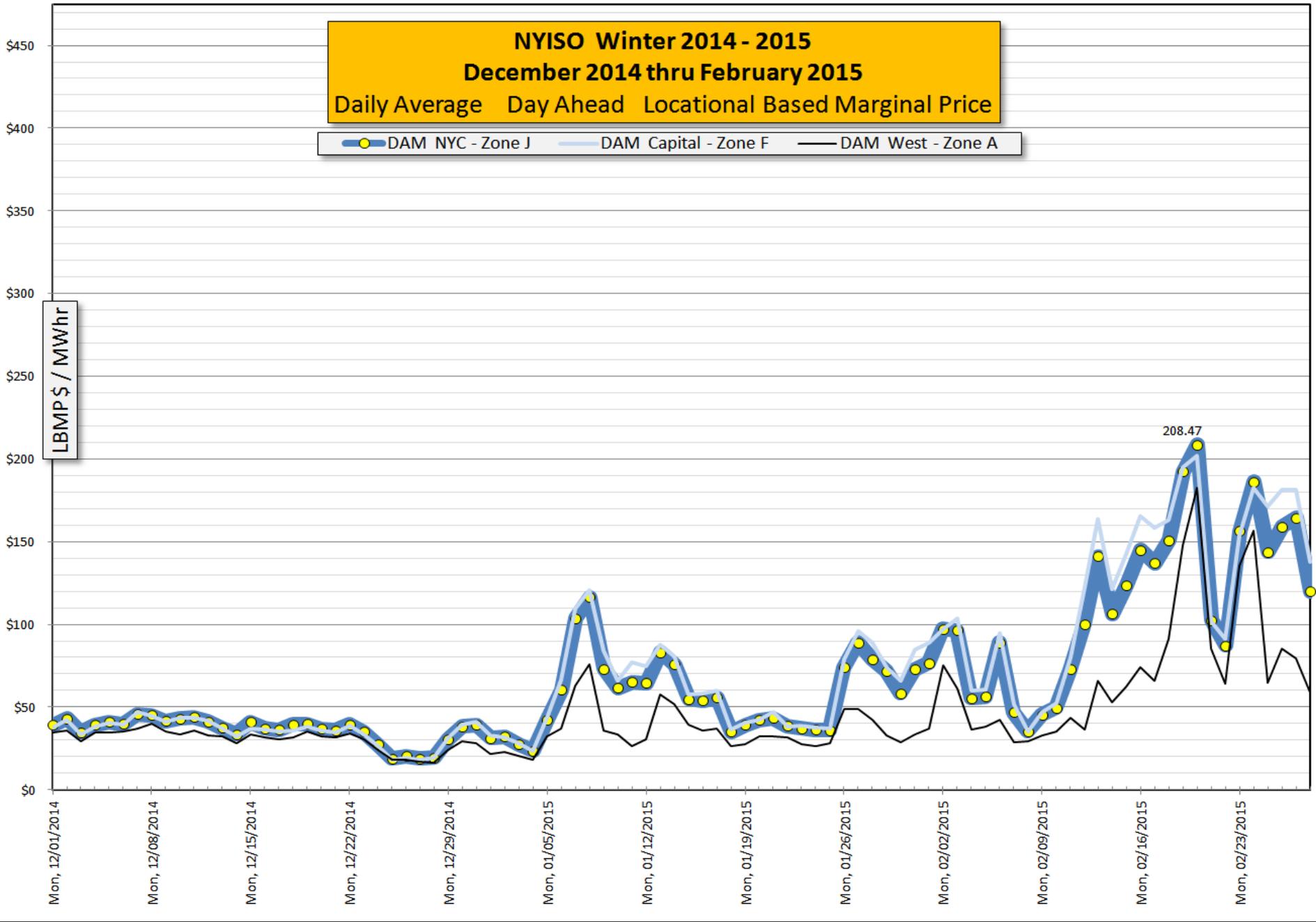
Daily Average Day Ahead Locational Based Marginal Price

● DAM NYC - Zone J
 — DAM Capital - Zone F
 — DAM West - Zone A



NYISO Winter 2014 - 2015
December 2014 thru February 2015
 Daily Average Day Ahead Locational Based Marginal Price

● DAM NYC - Zone J
 — DAM Capital - Zone F
 — DAM West - Zone A



The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



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