

# Market Operations Report

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Rana Mukerji

SENIOR VICE PRESIDENT – MARKET STRUCTURES, NYISO

**Business Issues Committee Meeting**

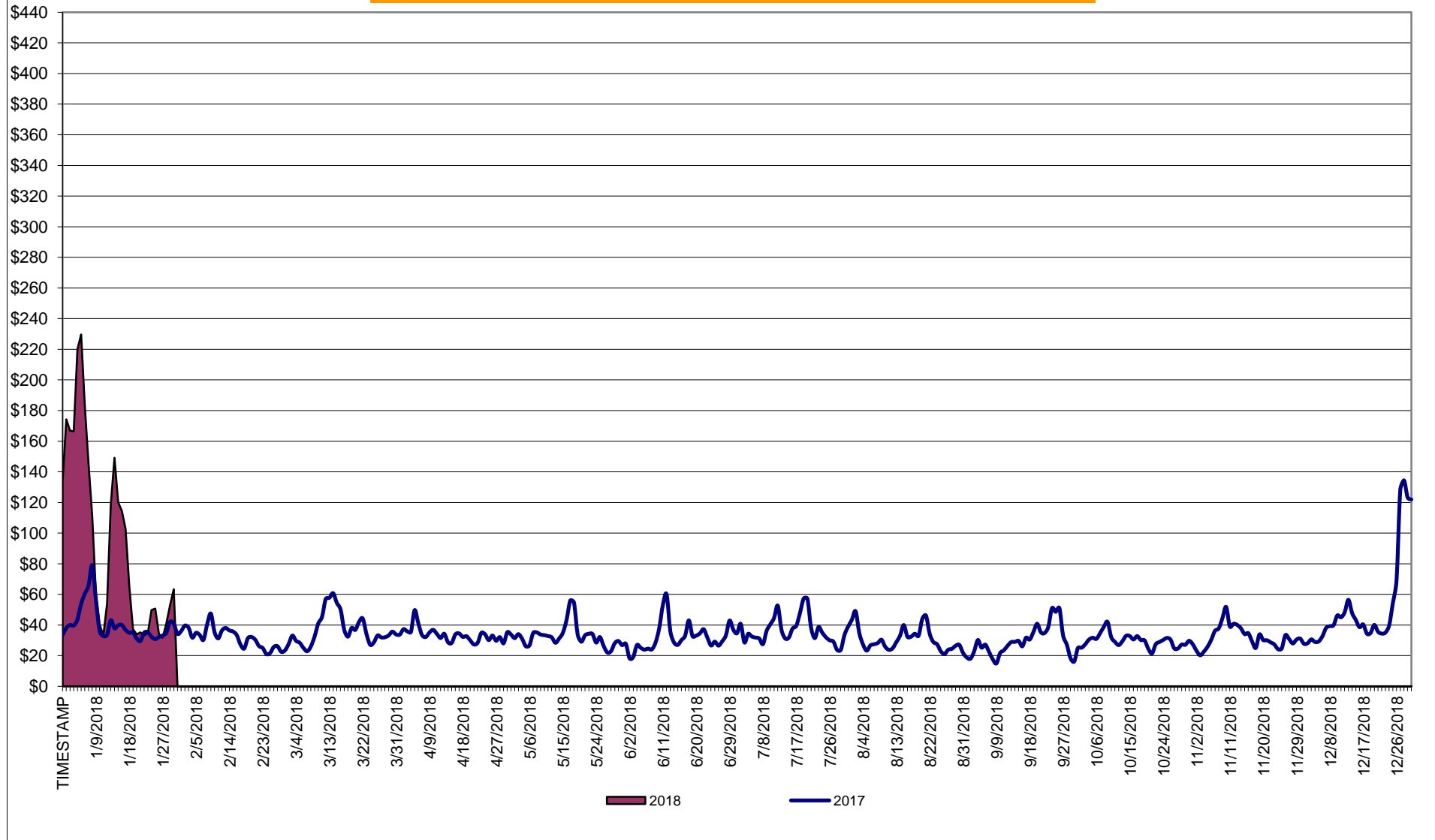
February 14, 2018, Rensselaer, NY

# Market Performance Highlights

## January 2018

- LBMP for January is \$99.55/MWh; higher than \$52.63/MWh in December 2017 and higher than \$40.07/MWh in January 2017.
  - Day Ahead and Real Time Load Weighted LBMPs are higher compared to December.
- January 2018 average year-to-date monthly cost of \$101.54/MWh is a 142% increase from \$41.96/MWh in January 2017.
- Average daily sendout is 463 GWh/day in January; higher than 444 GWh/day in December 2017 and 431 GWh/day in January 2017.
- Natural gas and distillate prices were higher compared to the previous month.
  - Natural Gas (Transco Z6 NY) was \$17.94/MMBtu, up from \$7.59/MMBtu in December.
  - Natural gas prices for the month peaked at \$140.06/MMBtu on January 4, 2018
  - On January 12, 2018 FERC granted a waiver request to enable the NYISO to consider incremental energy and minimum generation offers that exceed \$1,000/MWh if the generator is able to demonstrate such costs. The waiver extends from January 4, 2018 through February 28, 2018.
  - Natural gas prices are up 369.2% year-over-year.
  - Jet Kerosene Gulf Coast was \$14.47/MMBtu, up from \$13.47/MMBtu in December.
  - Ultra Low Sulfur No.2 Diesel NY Harbor was \$14.83/MMBtu, up from \$13.91/MMBtu in December.
  - Distillate prices are up 28.2% year-over-year.
- Uplift per MWh is lower compared to the previous month.
  - Uplift (not including NYISO cost of operations) is (\$0.92)/MWh; lower than (\$0.68)/MWh in December.
    - Local Reliability Share is \$0.59/MWh, higher than \$0.09/MWh in December.
    - Statewide Share is (\$1.52)/MWh, lower than (\$0.78)/MWh in December.
  - TSA \$ per NYC MWh is \$0.00/MWh.
  - Total uplift costs (Schedule 1 components including NYISO Cost of Operations) are lower than December.

**Daily NYISO Average Cost/MWh (Energy & Ancillary Services)\***  
**2017 Annual Average \$36.56/MWh**  
**January 2017 YTD Average \$41.96/MWh**  
**January 2018 YTD Average \$101.54/MWh**



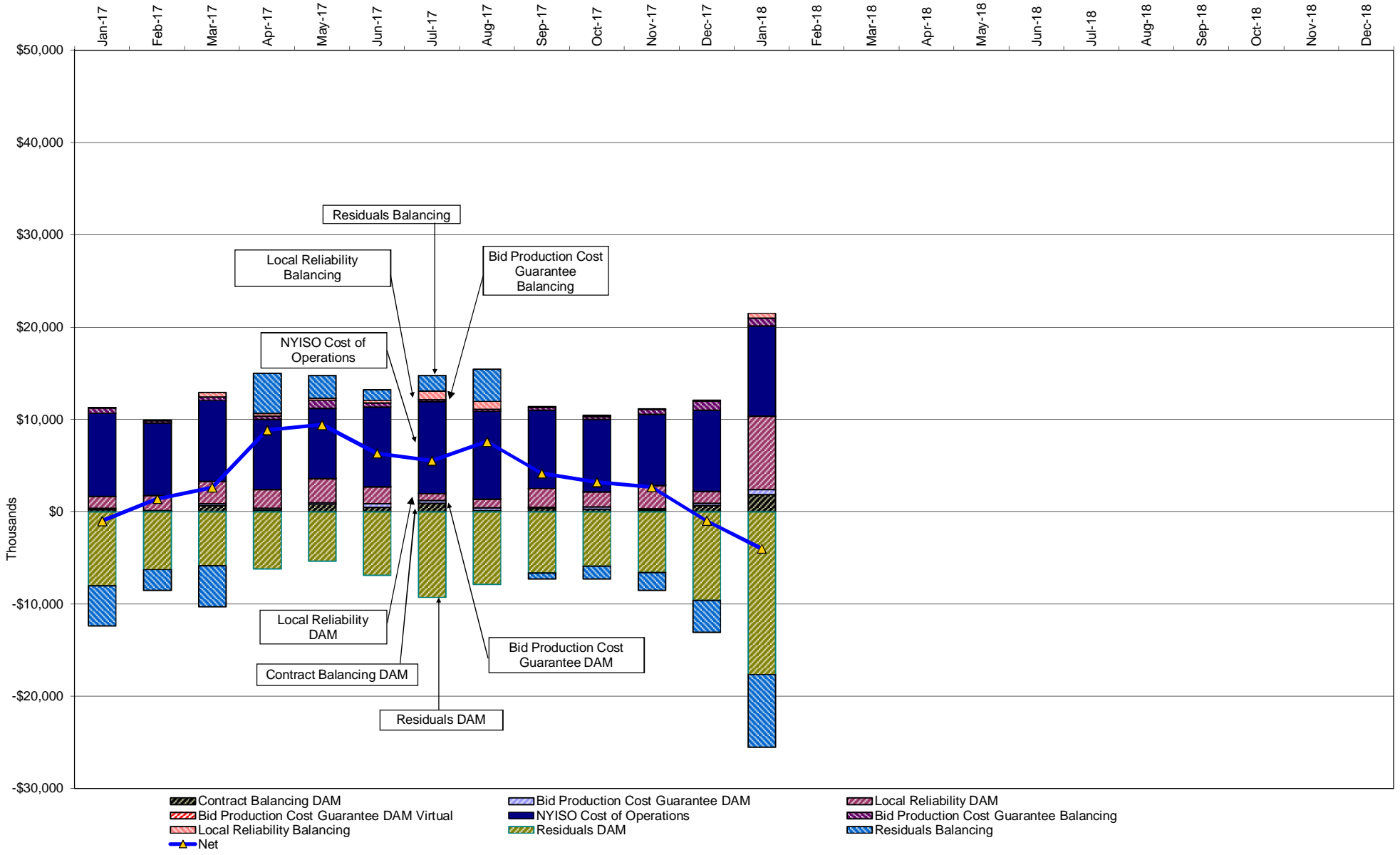
\* Excludes ICAP payments.

**NYISO Average Cost/MWh (Energy and Ancillary Services) \***  
**from the LBMP Customer point of view**

<b>2018</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
LBMP	99.55											
NTAC	0.71											
Reserve	0.92											
Regulation	0.15											
NYISO Cost of Operations	0.65											
FERC Fee Recovery	0.08											
Uplift	(0.92)											
Uplift: Local Reliability Share	0.59											
Uplift: Statewide Share	(1.52)											
Voltage Support and Black Start	0.40											
<b>Avg Monthly Cost</b>	<b>101.54</b>											
Avg YTD Cost	101.54											
TSA \$ per NYC MWh	0.00											
<b>2017</b>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
LBMP	40.07	30.95	34.97	31.06	31.74	31.76	35.84	30.57	29.57	28.35	30.60	52.63
NTAC	0.66	1.11	0.86	1.05	0.79	0.62	0.87	0.59	0.62	0.50	0.75	0.81
Reserve	0.70	0.67	0.74	0.70	0.61	0.55	0.48	0.44	0.47	0.59	0.55	0.71
Regulation	0.14	0.12	0.13	0.17	0.16	0.13	0.10	0.10	0.11	0.13	0.20	0.15
NYISO Cost of Operations	0.65	0.65	0.65	0.65	0.62	0.63	0.63	0.63	0.63	0.62	0.61	0.60
FERC Fee Recovery	0.09	0.10	0.10	0.12	0.10	0.09	0.07	0.08	0.09	0.10	0.10	0.08
Uplift	(0.73)	(0.54)	(0.46)	0.12	0.10	(0.37)	(0.43)	(0.19)	(0.34)	(0.36)	(0.40)	(0.68)
Uplift: Local Reliability Share	0.10	0.13	0.21	0.20	0.24	0.15	0.11	0.12	0.16	0.14	0.20	0.09
Uplift: Statewide Share	(0.83)	(0.67)	(0.67)	(0.08)	(0.13)	(0.52)	(0.54)	(0.31)	(0.50)	(0.50)	(0.60)	(0.78)
Voltage Support and Black Start	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.37	0.37
<b>Avg Monthly Cost</b>	<b>41.96</b>	<b>33.44</b>	<b>37.38</b>	<b>34.26</b>	<b>34.52</b>	<b>33.80</b>	<b>37.94</b>	<b>32.60</b>	<b>31.54</b>	<b>30.31</b>	<b>32.79</b>	<b>54.67</b>
Avg YTD Cost	41.96	38.02	37.81	37.05	36.54	36.01	36.35	35.80	35.34	34.89	34.72	36.56
TSA \$ per NYC MWh	0.00	0.00	0.00	0.08	0.12	0.56	0.42	0.23	0.00	0.00	0.00	0.00

\* Excludes ICAP payments.  
Market Mitigation and Analysis  
Prepared: 2/8/2018 1:40 PM

# NYISO Dollar Flows - Uplift - OATT Schedule 1 components - Data through January 31, 2018



## NYISO Markets Transactions

<b>2018</b>	January	February	March	April	May	June	July	August	September	October	November	December
<b>Day Ahead Market MWh</b>	15,153,751											
DAM LSE Internal LBMP Energy Sales	59%											
DAM External TC LBMP Energy Sales	4%											
DAM Bilateral - Internal Bilaterals	29%											
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%											
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%											
DAM Bilateral - Wheel Through Bilaterals	1%											
<b>Balancing Energy Market MWh</b>	-149,619											
Balancing Energy LSE Internal LBMP Energy Sales	-147%											
Balancing Energy External TC LBMP Energy Sales	74%											
Balancing Energy Bilateral - Internal Bilaterals	9%											
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%											
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	22%											
Balancing Energy Bilateral - Wheel Through Bilaterals	-58%											
<b>Transactions Summary</b>												
LBMP	63%											
Internal Bilaterals	30%											
Import Bilaterals	5%											
Export Bilaterals	2%											
Wheels Through	1%											
<b>Market Share of Total Load</b>												
Day Ahead Market	101.0%											
Balancing Energy +	-1.0%											
Total MWh	15,004,132											
Average Daily Energy Sendout/Month GWh	463											

<b>2017</b>	January	February	March	April	May	June	July	August	September	October	November	December
<b>Day Ahead Market MWh</b>	14,135,019	12,565,206	13,983,865	12,061,475	12,966,981	14,406,180	16,505,801	15,948,927	14,100,695	13,252,368	13,042,826	14,829,403
DAM LSE Internal LBMP Energy Sales	57%	57%	55%	54%	58%	60%	62%	61%	57%	55%	53%	55%
DAM External TC LBMP Energy Sales	2%	2%	1%	1%	1%	1%	1%	1%	1%	2%	3%	5%
DAM Bilateral - Internal Bilaterals	32%	32%	34%	35%	33%	31%	29%	29%	32%	34%	34%	32%
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	6%	4%	5%	4%	5%	5%	5%	5%	5%
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	2%
DAM Bilateral - Wheel Through Bilaterals	2%	2%	2%	2%	2%	2%	3%	3%	4%	2%	3%	2%
<b>Balancing Energy Market MWh</b>	-256,448	-407,284	-509,053	-466,426	-666,048	-564,312	-747,473	-853,898	-633,990	-510,721	-410,072	-254,003
Balancing Energy LSE Internal LBMP Energy Sales	-157%	-132%	-148%	-115%	-120%	-114%	-100%	-87%	-76%	-102%	-108%	-99%
Balancing Energy External TC LBMP Energy Sales	64%	39%	44%	22%	28%	23%	18%	13%	12%	26%	45%	25%
Balancing Energy Bilateral - Internal Bilaterals	15%	8%	12%	5%	1%	4%	3%	2%	3%	5%	5%	-1%
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	10%	7%	5%	4%	3%	3%	1%	1%	1%	4%	7%	9%
Balancing Energy Bilateral - Wheel Through Bilaterals	-32%	-26%	-13%	-15%	-12%	-16%	-22%	-29%	-40%	-33%	-49%	-34%
<b>Transactions Summary</b>												
LBMP	58%	57%	55%	54%	58%	60%	62%	61%	58%	56%	56%	60%
Internal Bilaterals	33%	34%	36%	37%	34%	32%	30%	31%	33%	36%	36%	32%
Import Bilaterals	5%	5%	5%	6%	4%	5%	5%	5%	5%	5%	5%	5%
Export Bilaterals	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Wheels Through	2%	2%	2%	2%	2%	1%	2%	2%	2%	1%	1%	1%
<b>Market Share of Total Load</b>												
Day Ahead Market	101.8%	103.3%	103.8%	104.0%	105.4%	104.1%	104.7%	105.7%	104.7%	104.0%	103.2%	101.7%
Balancing Energy +	-1.8%	-3.3%	-3.8%	-4.0%	-5.4%	-4.1%	-4.7%	-5.7%	-4.7%	-4.0%	-3.2%	-1.7%
Total MWh	13,878,571	12,157,922	13,474,812	11,595,049	12,300,933	13,841,868	15,758,328	15,095,029	13,466,705	12,741,647	12,632,754	14,575,400
Average Daily Energy Sendout/Month GWh	431	418	419	377	383	454	498	477	437	398	403	444

+ Balancing Energy: Load(MW) purchased at Real Time LBMP.

\* The signs for the detail section intuitively reflect the direction of power flow eliminating the use of double negatives when Balancing Energy is negative.

Notes: Percent totals may not equal 100% due to rounding.

Virtual Transactions are not reflected in this chart.

### NYISO Markets 2018 Energy Statistics

	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b><u>DAY AHEAD LBMP</u></b>												
Price *	\$83.53											
Standard Deviation	\$58.94											
Load Weighted Price **	\$88.42											
<b><u>RTC LBMP</u></b>												
Price *	\$81.65											
Standard Deviation	\$60.83											
Load Weighted Price **	\$85.85											
<b><u>REAL TIME LBMP</u></b>												
Price *	\$87.94											
Standard Deviation	\$87.41											
Load Weighted Price **	\$93.59											
Average Daily Energy Sendout/Month GWh	463											

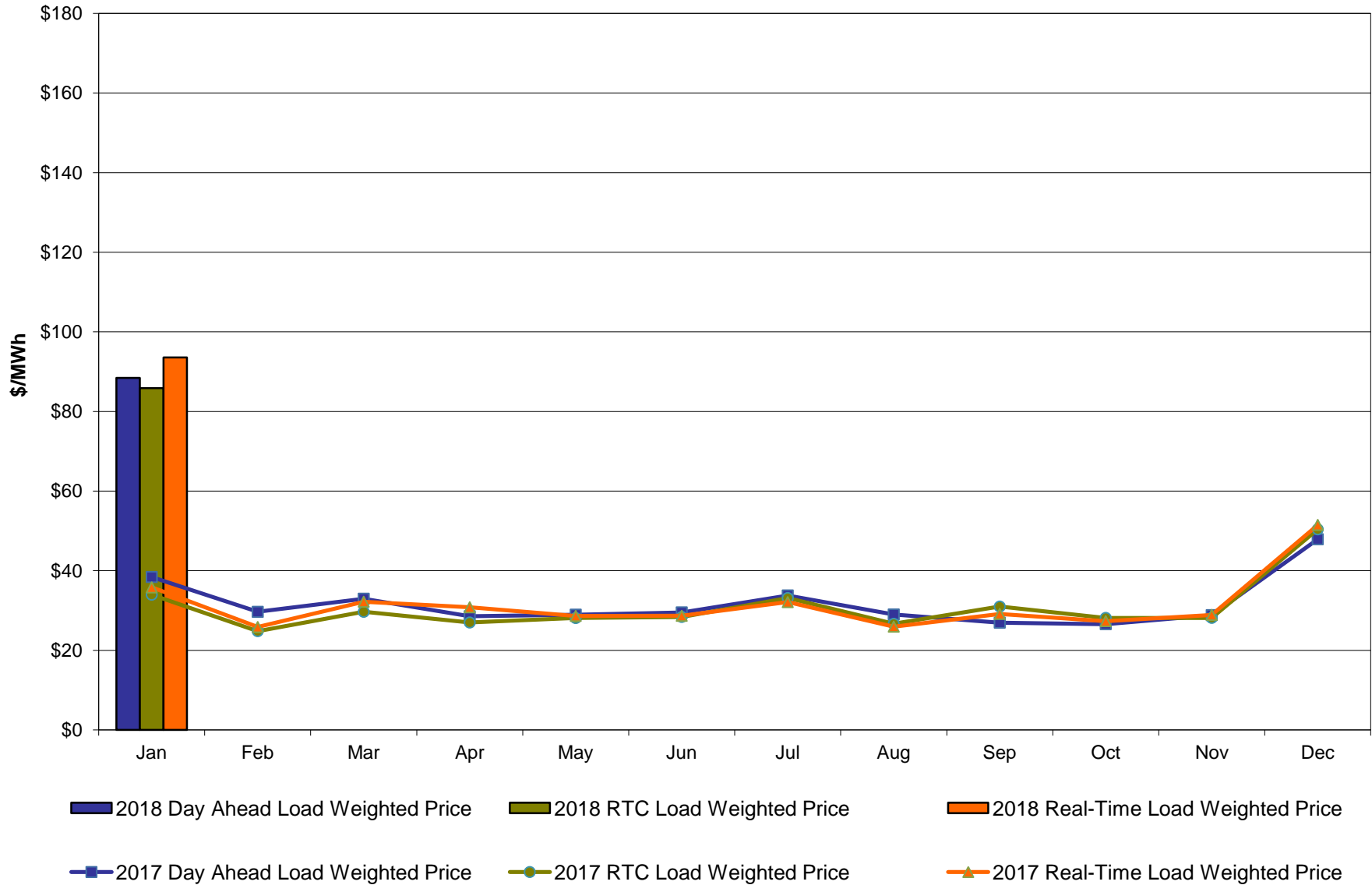
### NYISO Markets 2017 Energy Statistics

	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b><u>DAY AHEAD LBMP</u></b>												
Price *	\$37.22	\$28.84	\$32.04	\$27.70	\$27.66	\$27.37	\$31.64	\$27.28	\$25.05	\$25.49	\$27.88	\$45.46
Standard Deviation	\$13.20	\$7.97	\$11.95	\$7.66	\$9.47	\$12.37	\$13.51	\$10.60	\$12.09	\$8.53	\$9.87	\$31.56
Load Weighted Price **	\$38.42	\$29.66	\$32.96	\$28.56	\$28.95	\$29.52	\$33.78	\$29.00	\$26.95	\$26.57	\$28.83	\$47.90
<b><u>RTC LBMP</u></b>												
Price *	\$32.87	\$24.09	\$28.86	\$26.19	\$26.19	\$26.40	\$30.84	\$25.26	\$27.97	\$26.91	\$27.35	\$47.75
Standard Deviation	\$14.57	\$9.52	\$13.70	\$10.36	\$21.29	\$14.76	\$18.14	\$13.08	\$27.14	\$13.40	\$10.54	\$37.33
Load Weighted Price **	\$33.96	\$24.81	\$29.67	\$26.98	\$28.10	\$28.39	\$33.13	\$26.65	\$30.98	\$28.13	\$28.15	\$50.39
<b><u>REAL TIME LBMP</u></b>												
Price *	\$34.61	\$25.14	\$31.21	\$29.61	\$26.56	\$26.16	\$29.47	\$24.36	\$26.08	\$25.95	\$27.91	\$48.42
Standard Deviation	\$18.20	\$14.21	\$25.02	\$39.82	\$26.11	\$19.00	\$20.25	\$14.03	\$25.72	\$14.49	\$15.86	\$42.66
Load Weighted Price **	\$35.80	\$25.84	\$32.21	\$30.81	\$28.64	\$28.67	\$32.11	\$25.95	\$29.13	\$27.33	\$28.90	\$51.49
Average Daily Energy Sendout/Month GWh	431	418	419	377	383	454	498	477	437	398	403	444

\* Average zonal load weighted prices.

\*\* Average zonal load weighted prices, load weighted in each hour.

### NYISO Monthly Average Internal LBMPs 2017- 2018



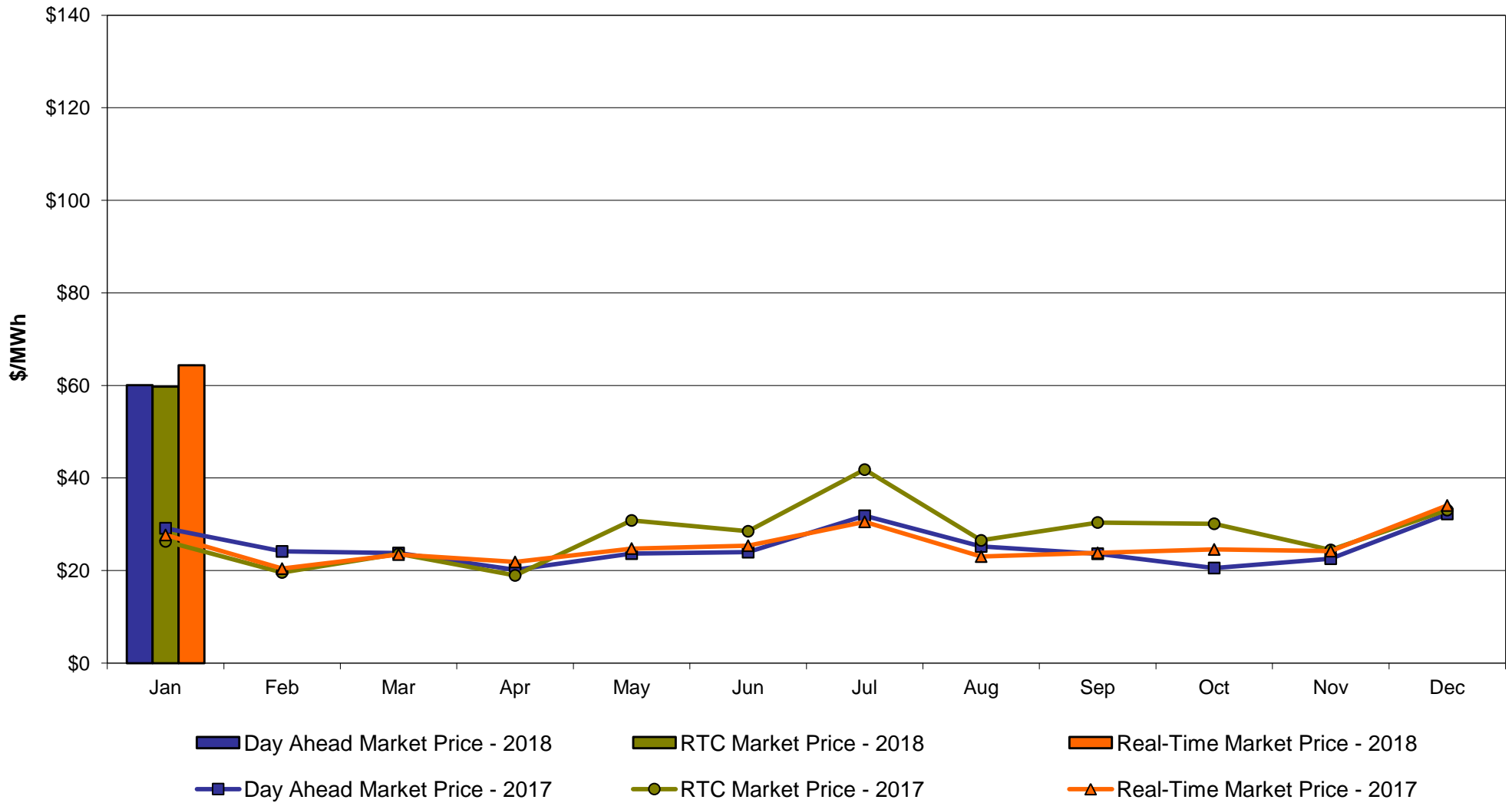


**January 2018 Zonal LBMP Statistics for NYISO (\$/MWh)**

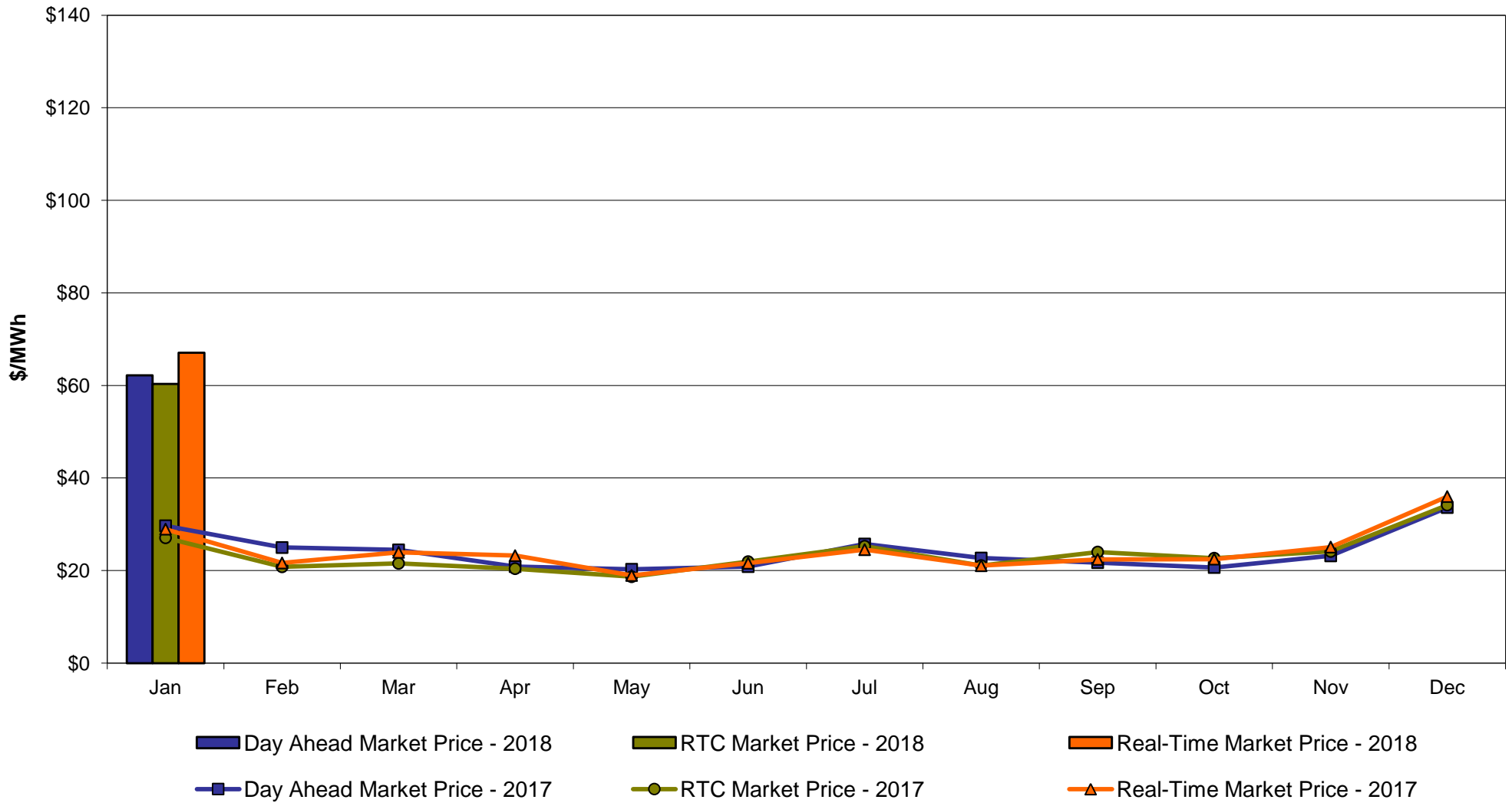
	<u>WEST Zone A</u>	<u>GENESEE Zone B</u>	<u>NORTH Zone D</u>	<u>CENTRAL Zone C</u>	<u>MOHAWK VALLEY Zone E</u>	<u>CAPITAL Zone F</u>	<u>HUDSON VALLEY Zone G</u>	<u>MILLWOOD Zone H</u>	<u>DUNWOODIE Zone I</u>	<u>NEW YORK CITY Zone J</u>	<u>LONG ISLAND Zone K</u>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	60.05	59.26	56.38	62.19	64.51	95.11	87.41	88.23	89.57	96.58	99.85
Standard Deviation	47.85	47.70	49.39	49.63	52.04	68.21	62.68	63.12	63.11	67.84	63.11
<b><u>RTC LBMP</u></b>											
Unweighted Price *	59.73	56.88	54.86	60.34	62.99	95.27	86.76	87.38	87.81	94.50	95.13
Standard Deviation	56.21	50.68	53.13	52.89	55.56	74.11	66.48	66.92	66.40	69.20	67.58
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	64.35	63.53	61.92	67.09	70.20	101.40	93.35	94.01	94.77	102.07	100.23
Standard Deviation	74.10	74.29	77.12	77.42	81.27	104.52	95.45	96.04	95.23	98.01	93.86
	<u>ONTARIO IESO Zone O</u>	<u>HYDRO QUEBEC (Wheel) Zone M</u>	<u>HYDRO QUEBEC (Import/Export) Zone M</u>	<u>PJM Zone P</u>	<u>NEW ENGLAND Zone N</u>	<u>CROSS SOUND CABLE Controllable Line</u>	<u>NORTHPORT- NORWALK Controllable Line</u>	<u>NEPTUNE Controllable Line</u>	<u>LINDEN VFT Controllable Line</u>	<u>HUDSON Controllable Line</u>	<u>Dennison Controllable Line</u>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	58.20	51.66	51.66	75.54	101.80	96.12	98.01	93.74	93.81	92.96	55.45
Standard Deviation	45.66	42.56	42.56	57.06	64.04	59.63	58.86	60.44	66.73	65.29	48.66
<b><u>RTC LBMP</u></b>											
Unweighted Price *	54.89	10.88	10.88	74.46	101.49	92.45	90.77	89.18	89.19	89.14	53.99
Standard Deviation	47.64	157.59	157.59	58.56	64.53	64.14	62.96	63.15	66.80	66.42	51.71
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	62.32	54.48	54.48	80.83	102.80	98.23	100.58	95.11	93.80	96.13	52.87
Standard Deviation	72.79	71.60	71.60	83.67	94.27	91.44	89.58	89.14	106.38	93.72	64.12

\* Straight LBMP averages

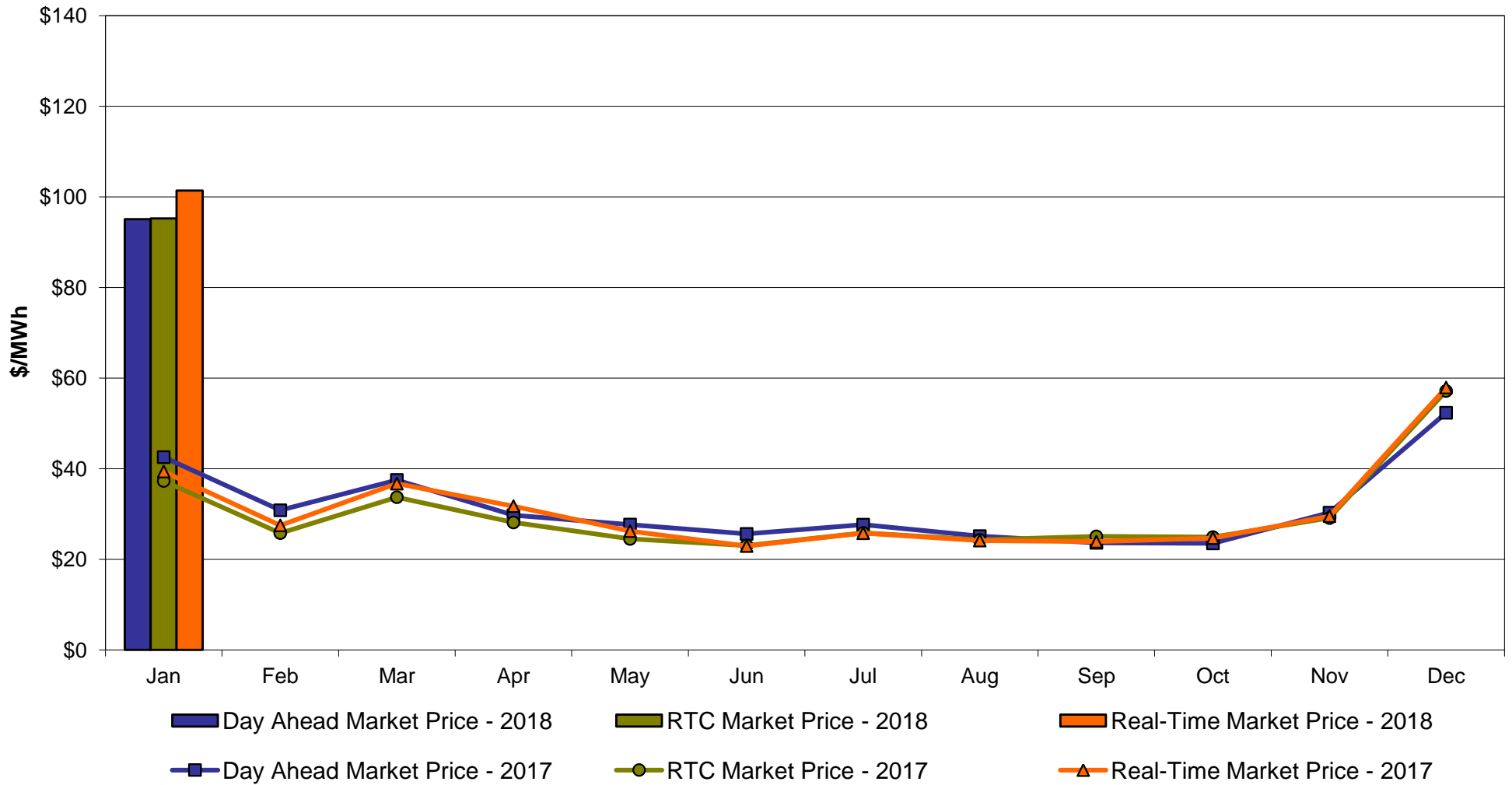
**West Zone A  
Monthly Average LBMP Prices 2017 - 2018**



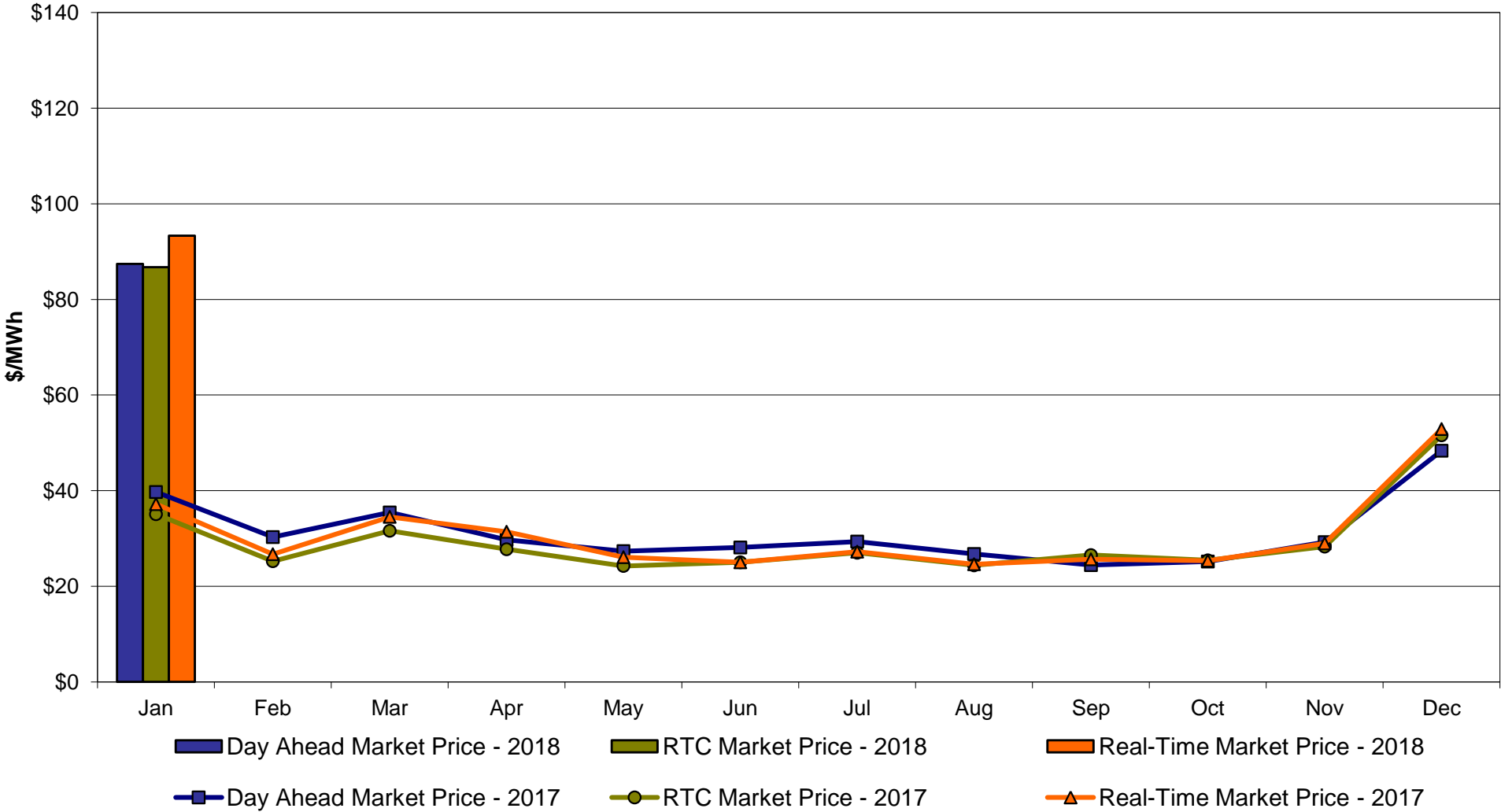
**Central Zone C  
Monthly Average LBMP Prices 2017 - 2018**



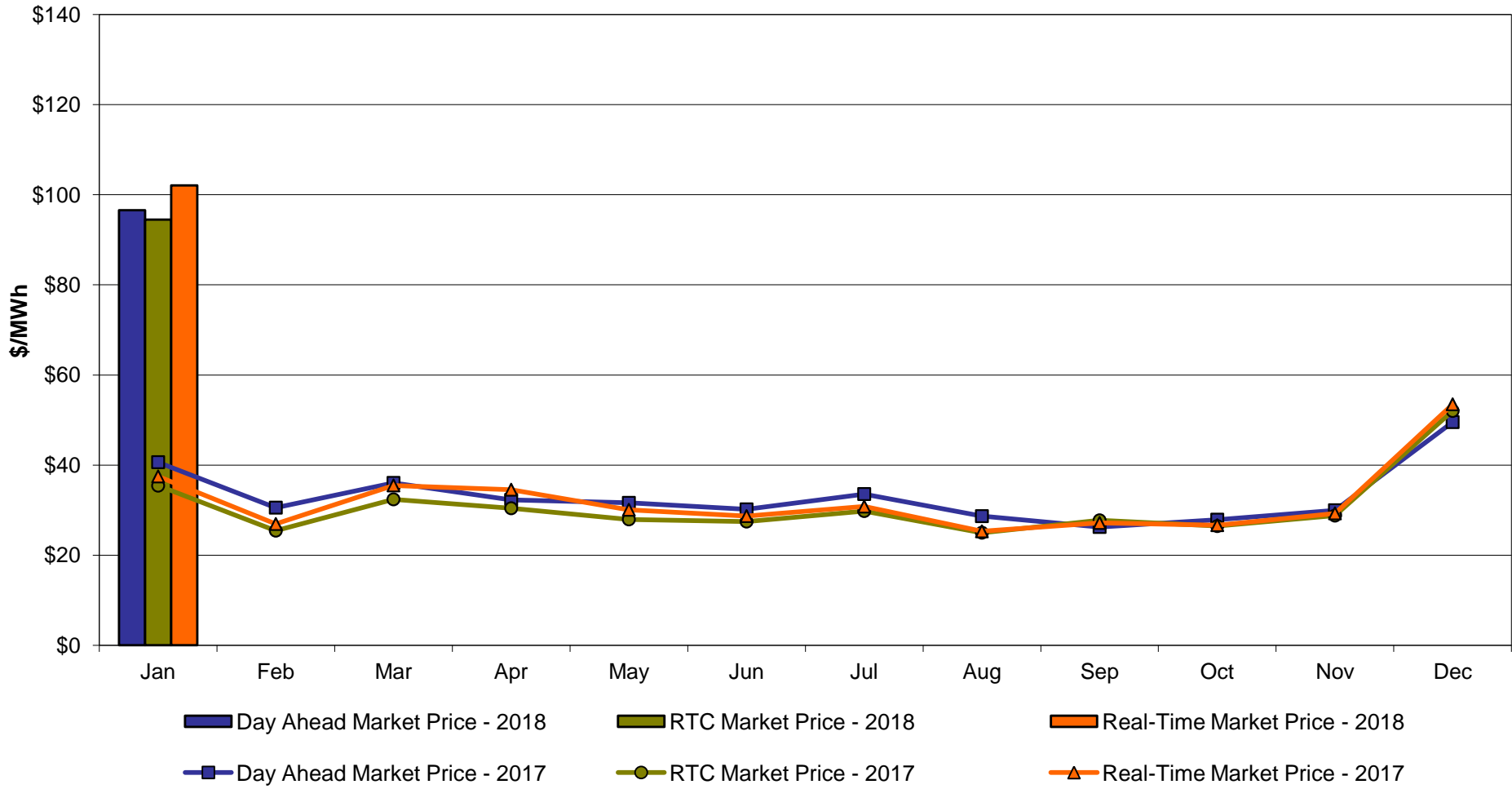
## Capital Zone F Monthly Average LBMP Prices 2017 - 2018



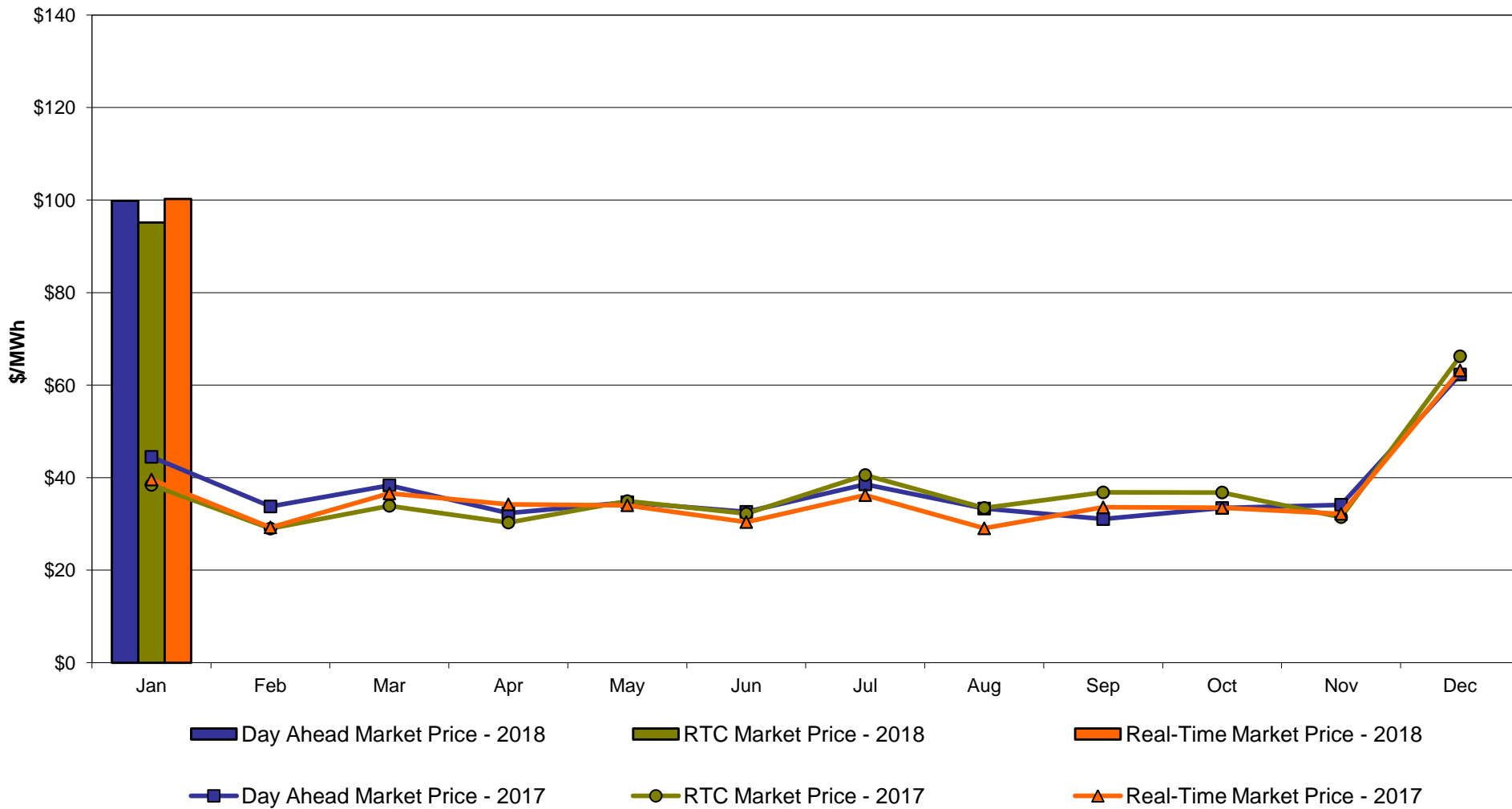
## Hudson Valley Zone G Monthly Average LBMP Prices 2017 - 2018



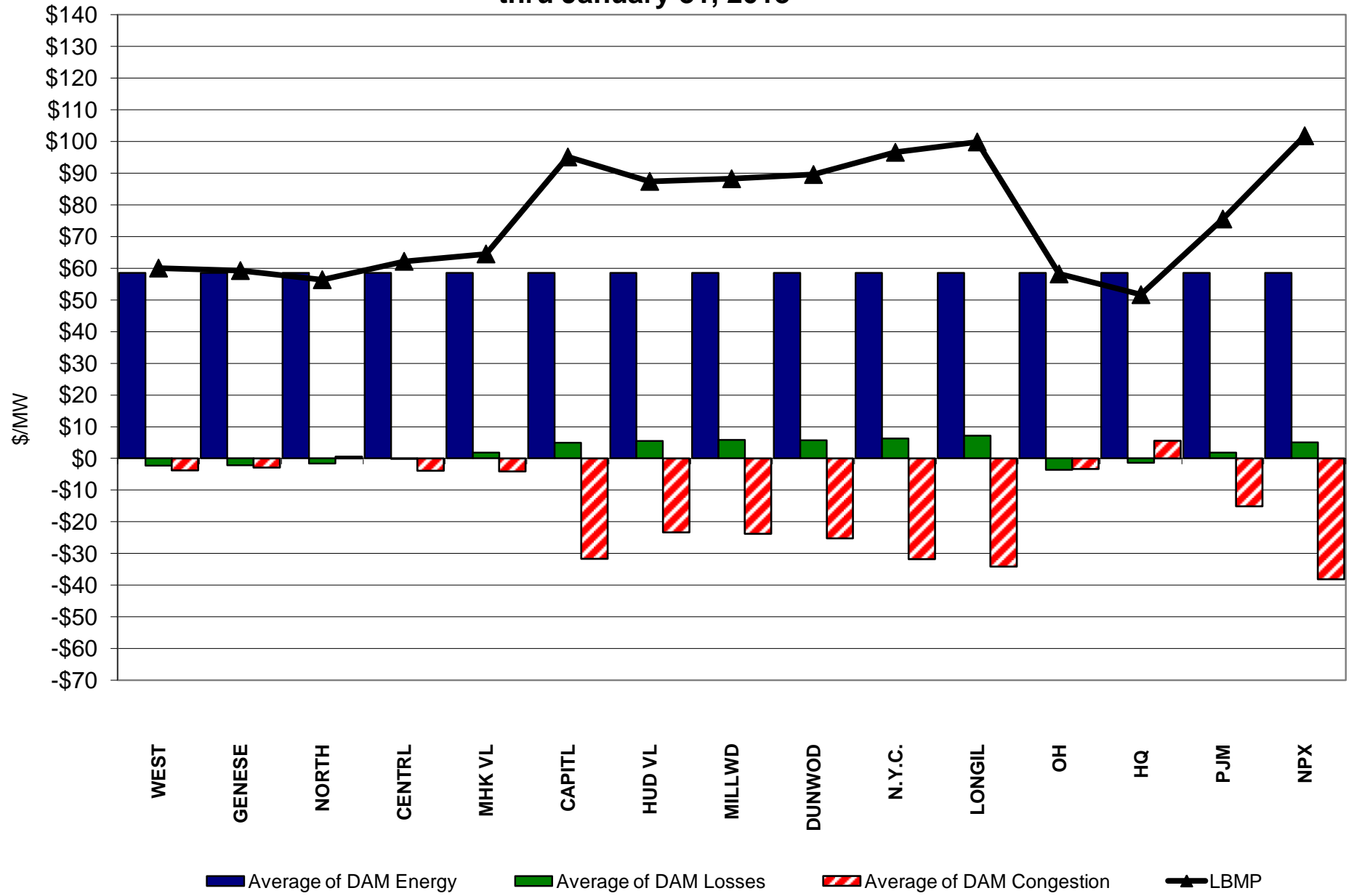
## NYC Zone J Monthly Average LBMP Prices 2017 - 2018



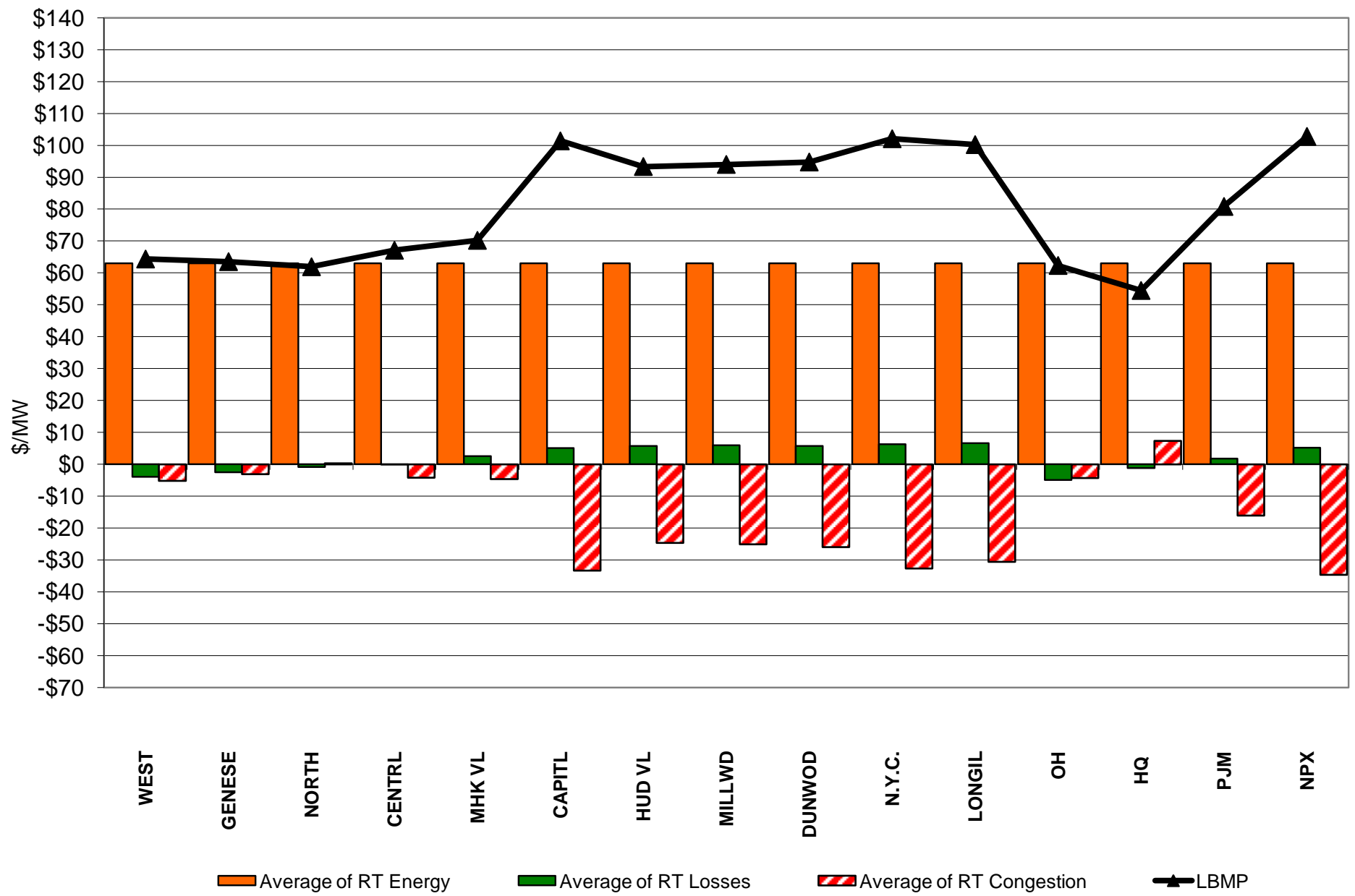
## Long Island Zone K Monthly Average LBMP Prices 2017 - 2018



**DAM Zonal Unweighted Monthly Average LBMP Components  
thru January 31, 2018**

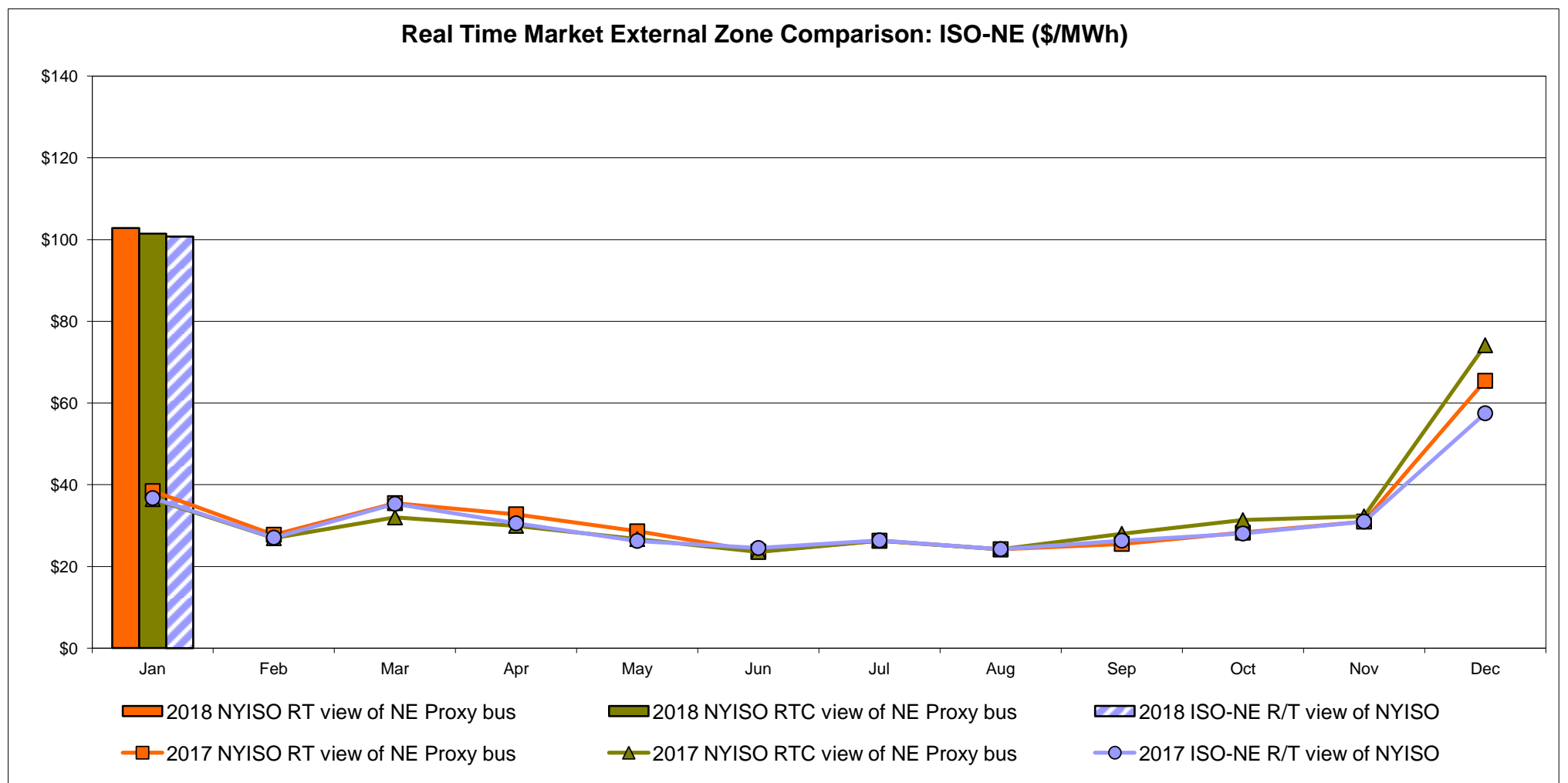
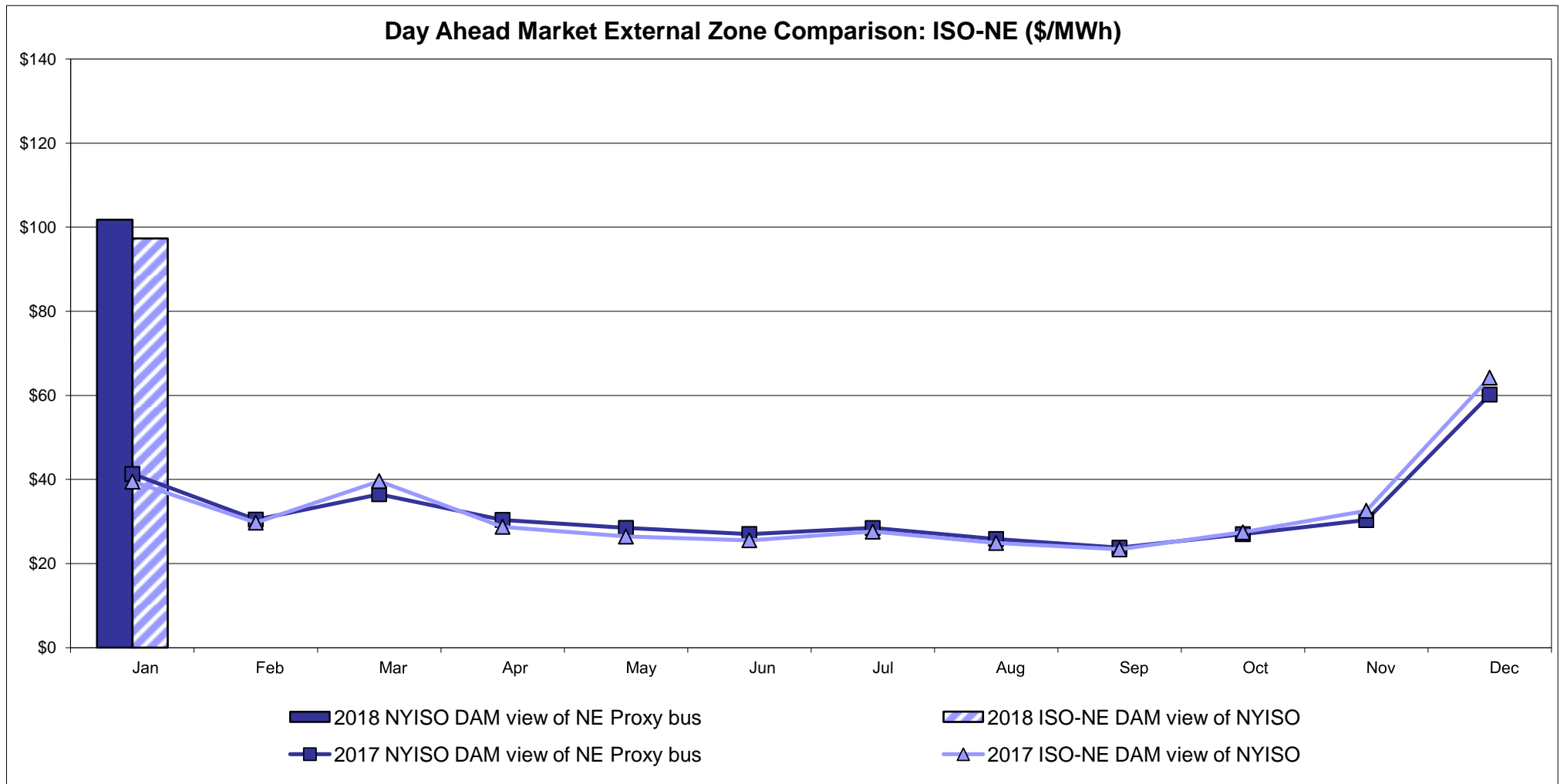


**RT Zonal Unweighted Monthly Average LBMP Components  
thru January 31, 2018**



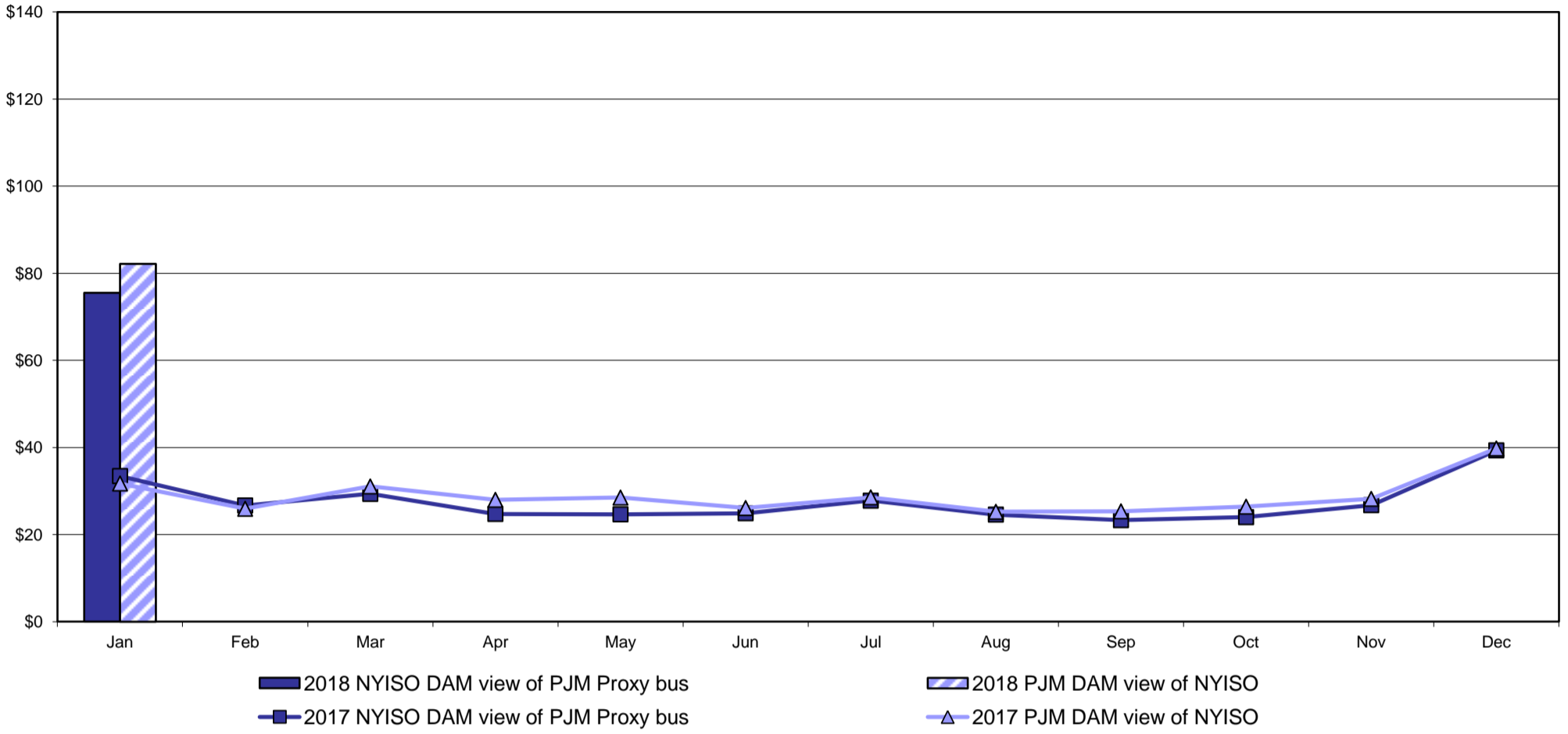


# External Comparison ISO-New England

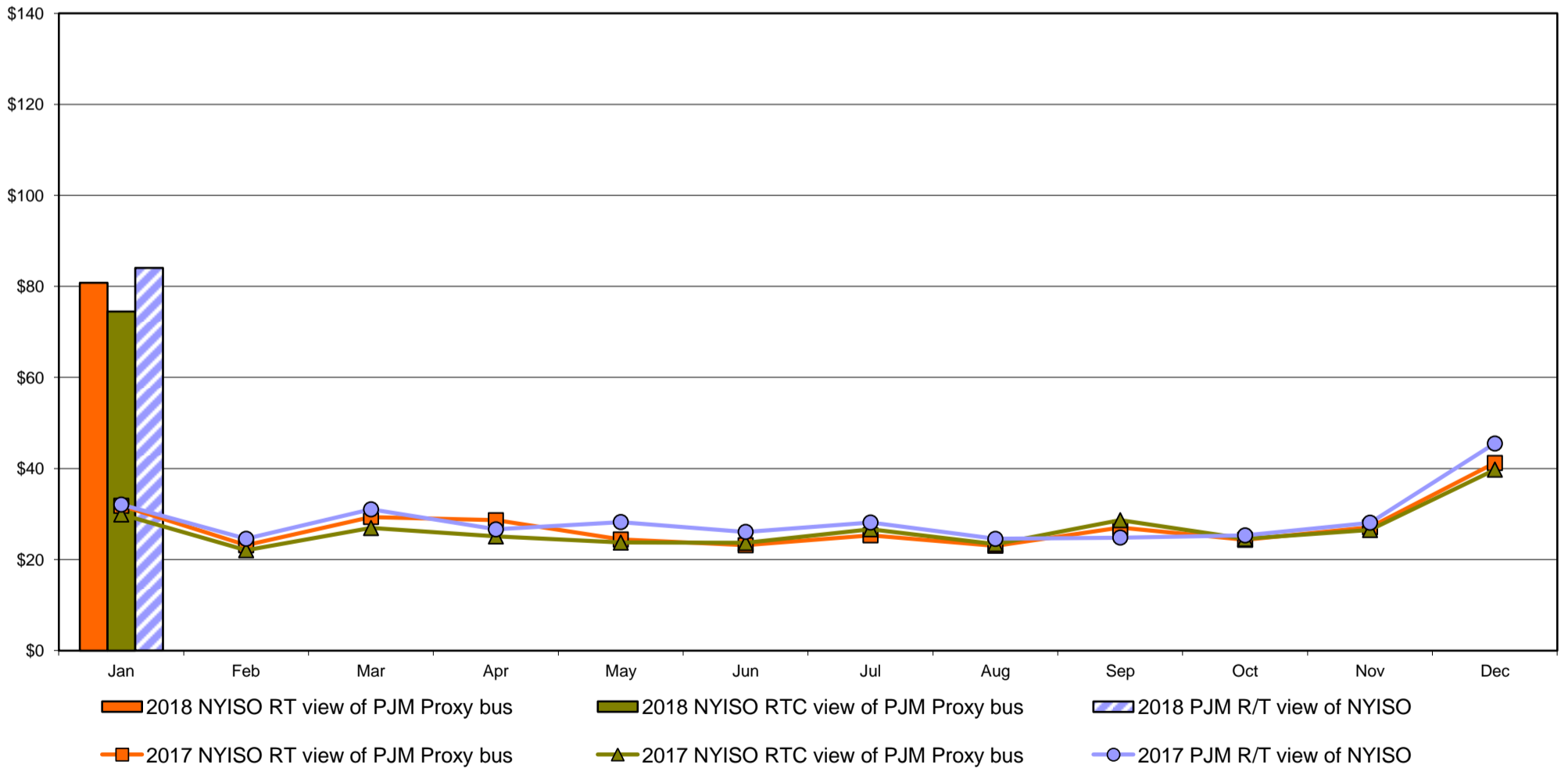


# External Comparison PJM

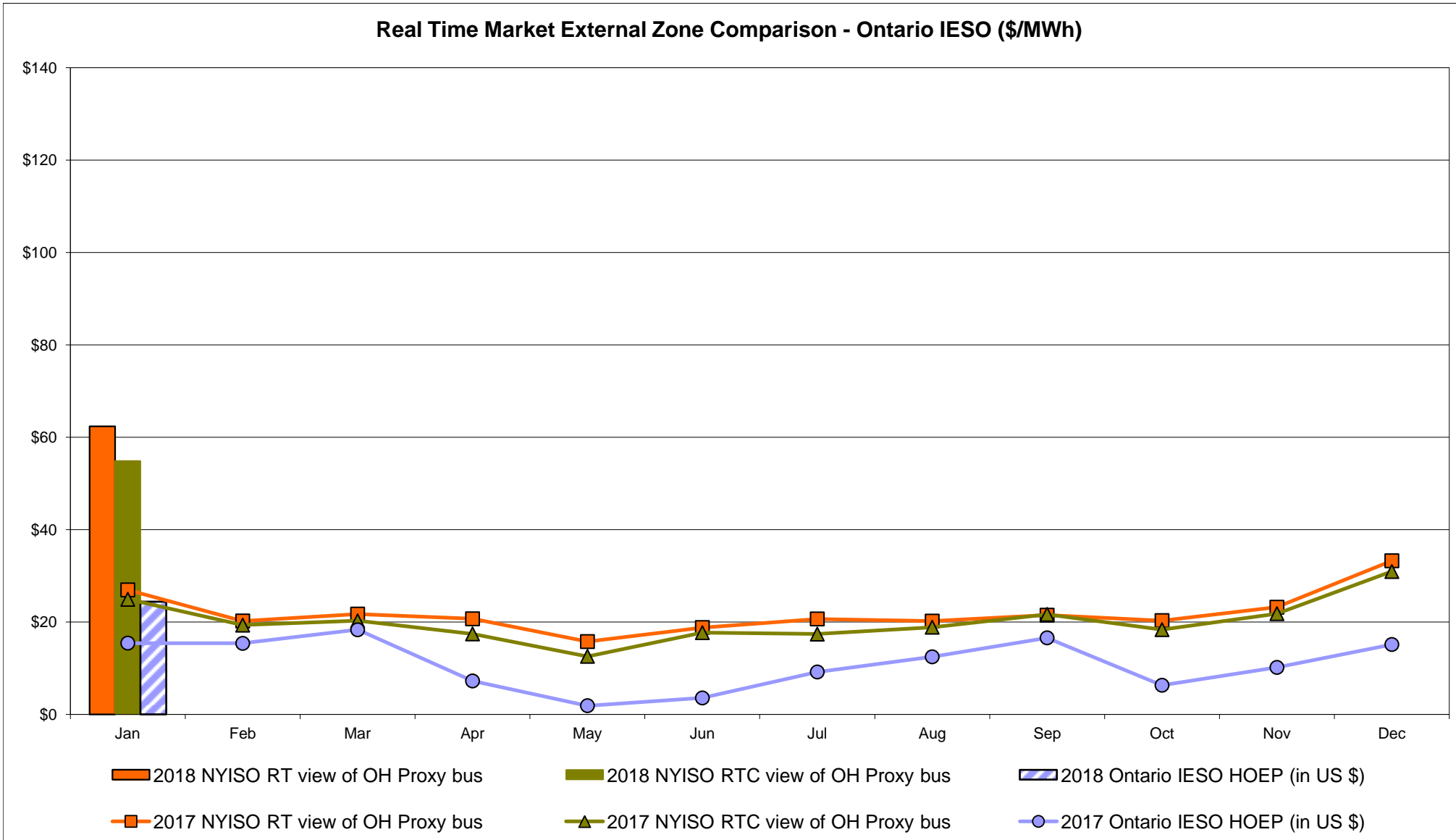
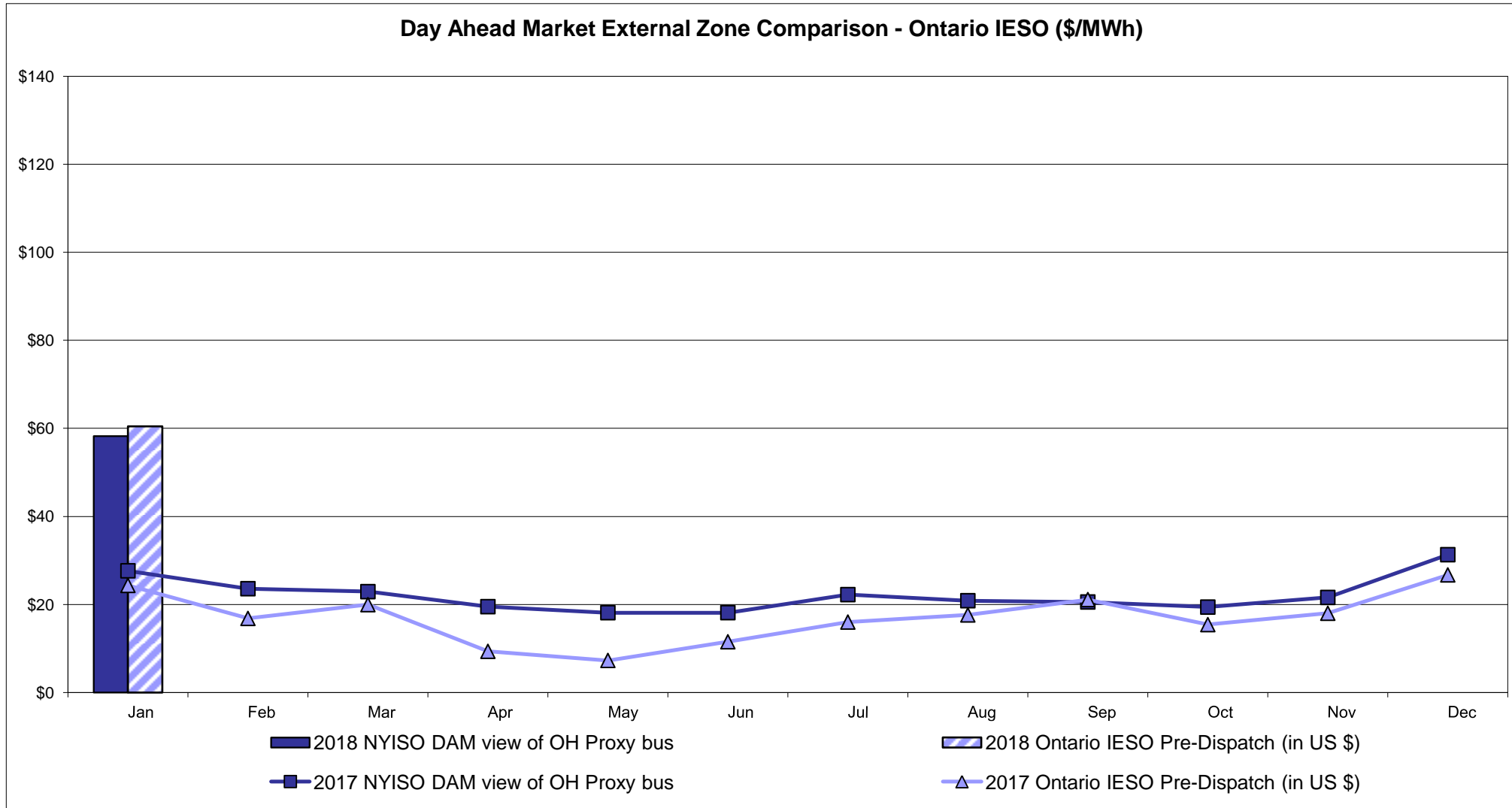
## Day Ahead Market External Zone Comparison - PJM (\$/MWh)



## Real Time Market External Zone Comparison - PJM (\$/MWh)

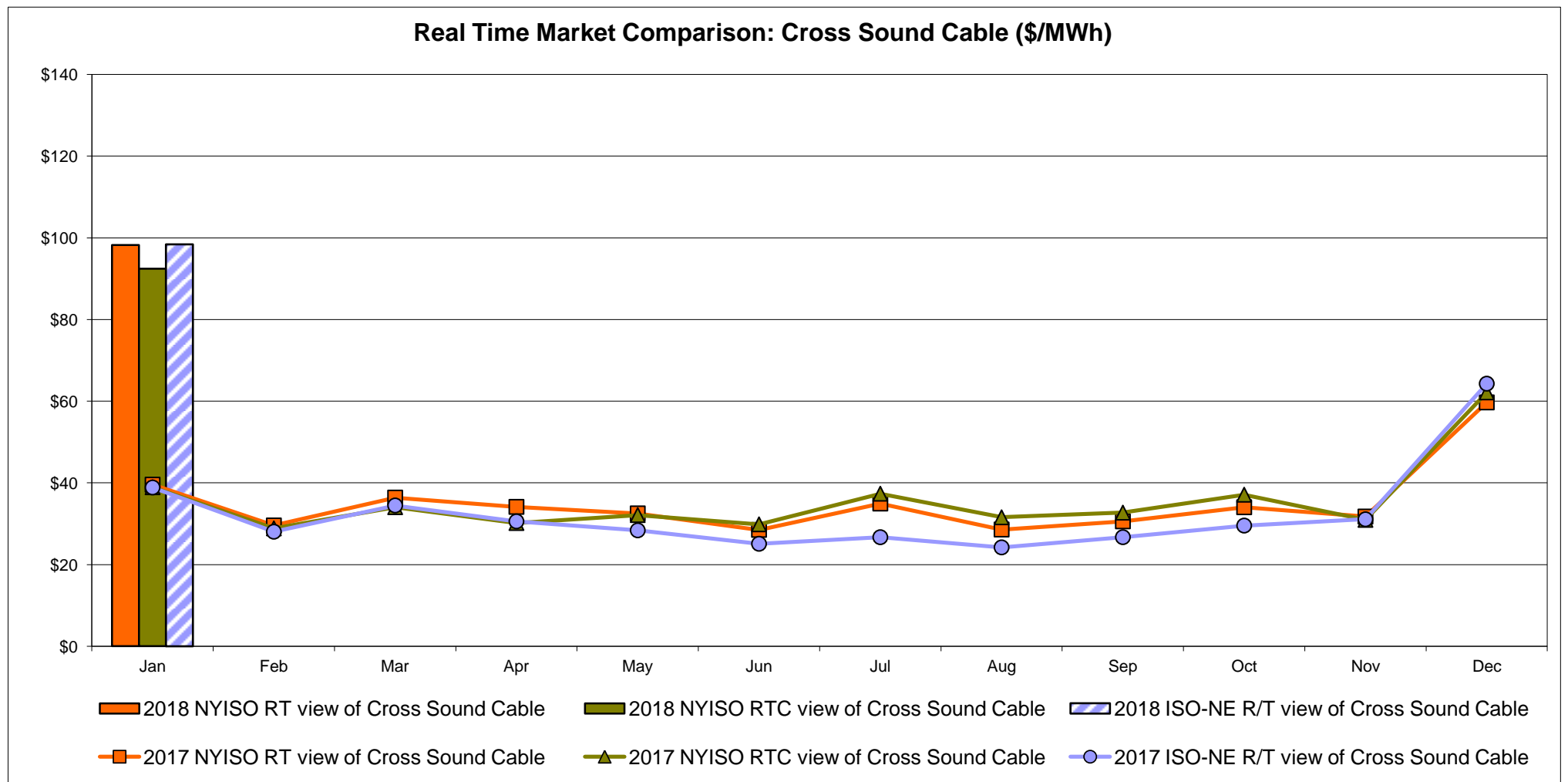
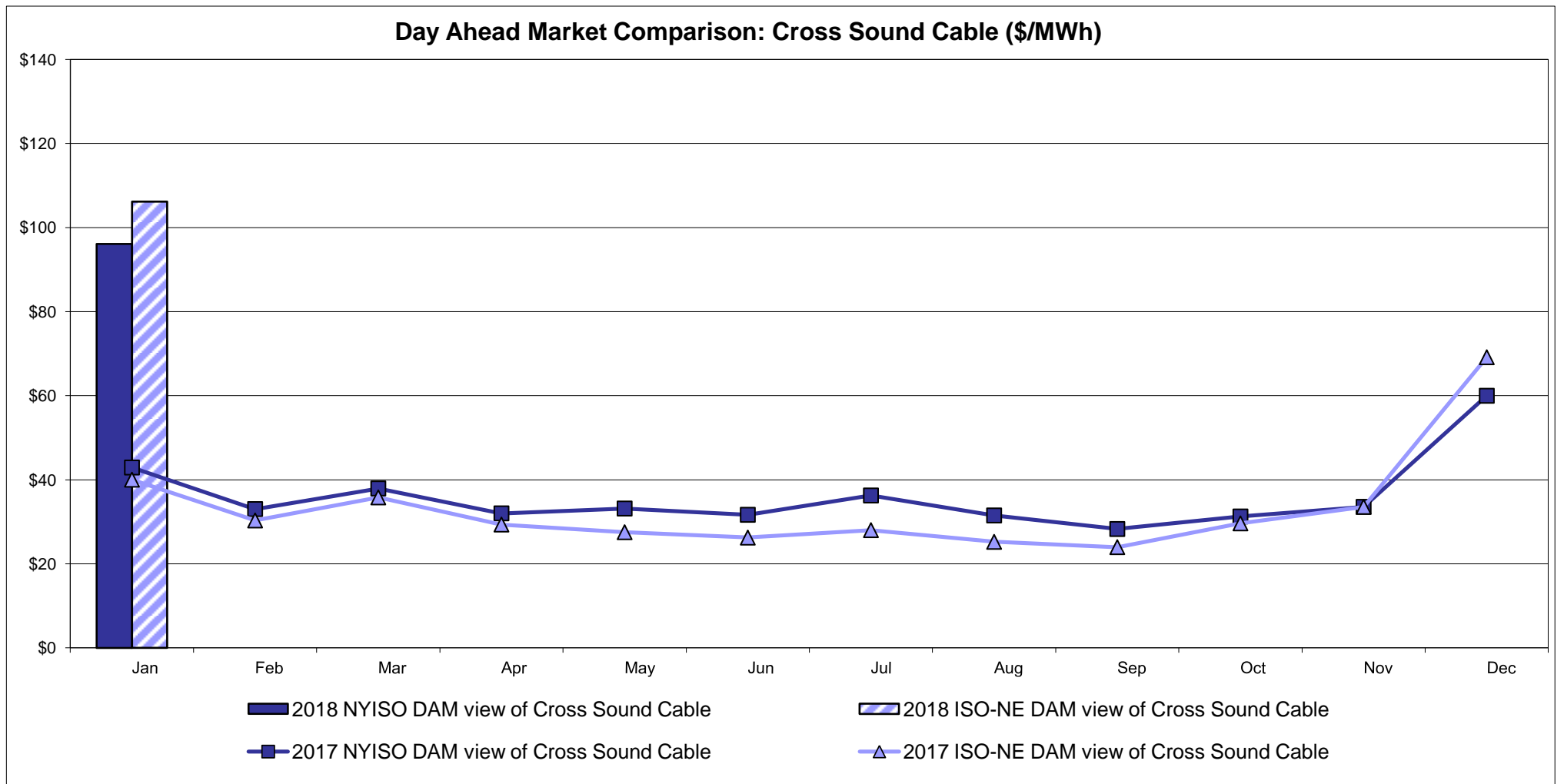


# External Comparison Ontario IESO



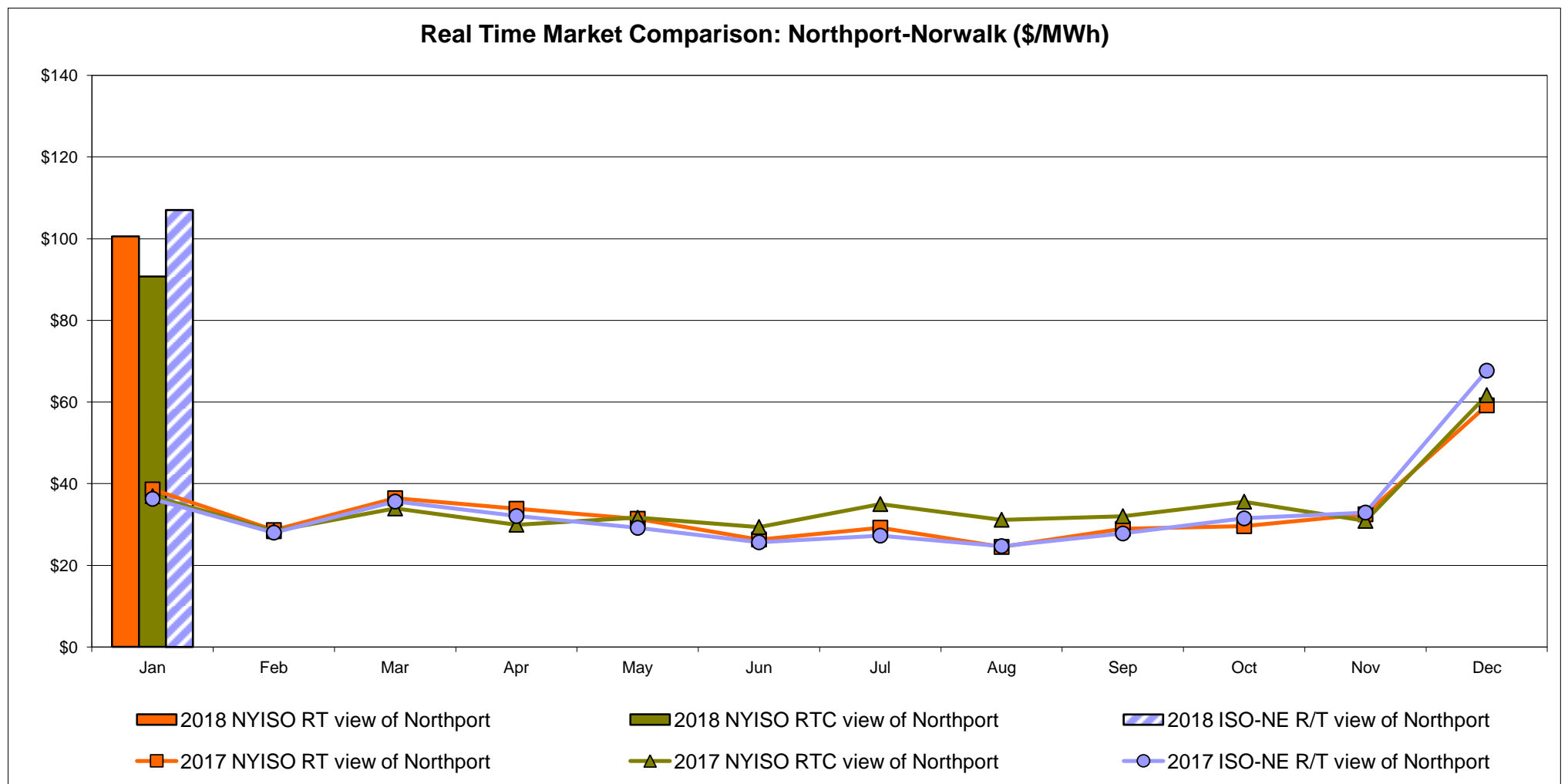
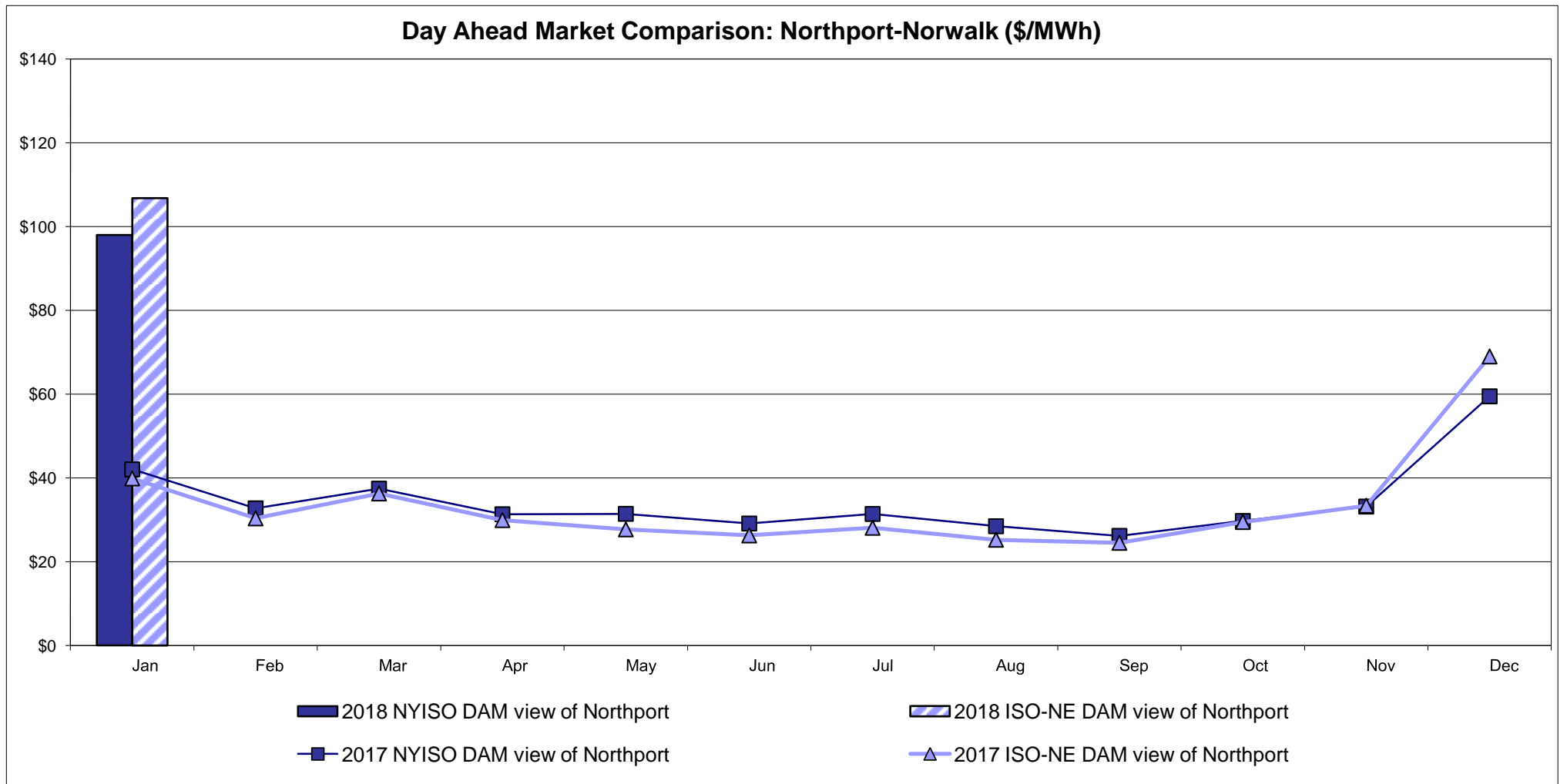
Notes: Exchange factor used for January 2018 was 0.804569957357792 to US  
 HOEP: Hourly Ontario Energy Price  
 Pre-Dispatch: Projected Energy Price

# External Controllable Line: Cross Sound Cable (New England)



**Note:**  
 ISO-NE Forecast is an advisory posting @ 18:00 day before.  
 The DAM and R/T prices at the Shorham 13899 interface are used for ISO-NE.  
 The DAM and R/T prices at the CSC interface are used for NYISO.

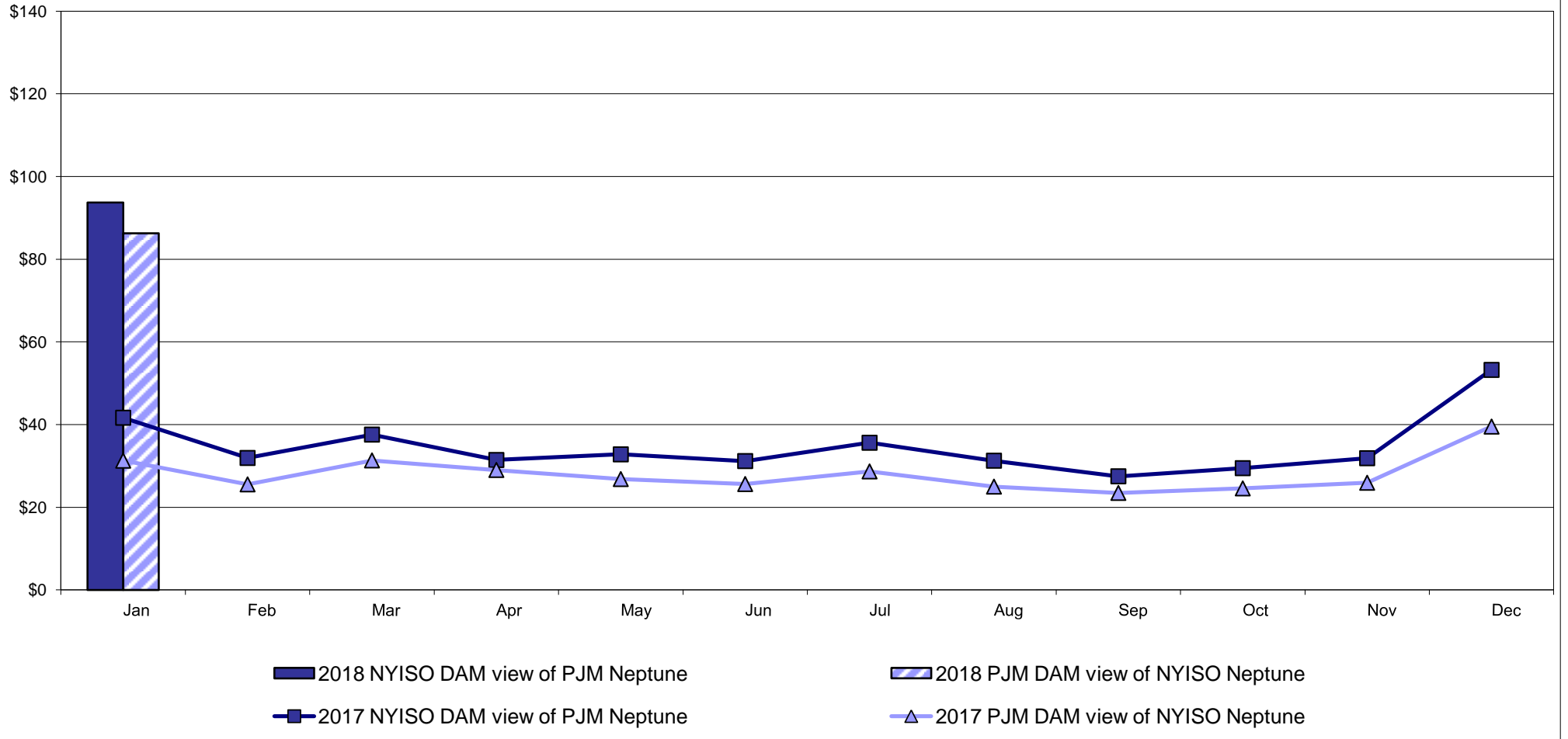
# External Controllable Line: Northport - Norwalk (New England)



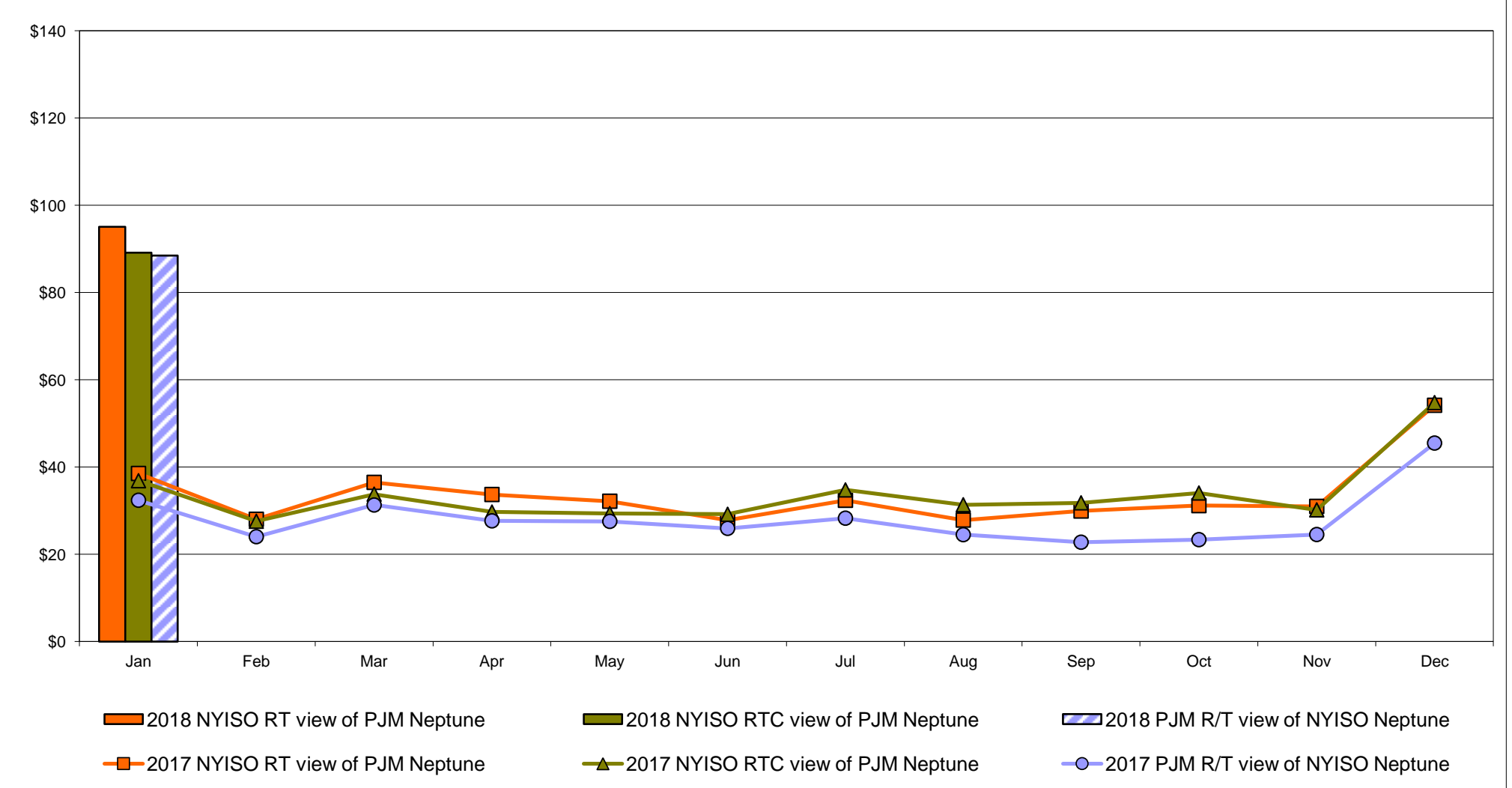
Note:  
 ISO-NE Forecast is an advisory posting @ 18:00 day before.  
 The DAM and R/T prices at the Northport 138 interface are used for ISO-NE.  
 The DAM and R/T prices at the 1385 interface are used for NYISO.

# External Controllable Line: Neptune (PJM)

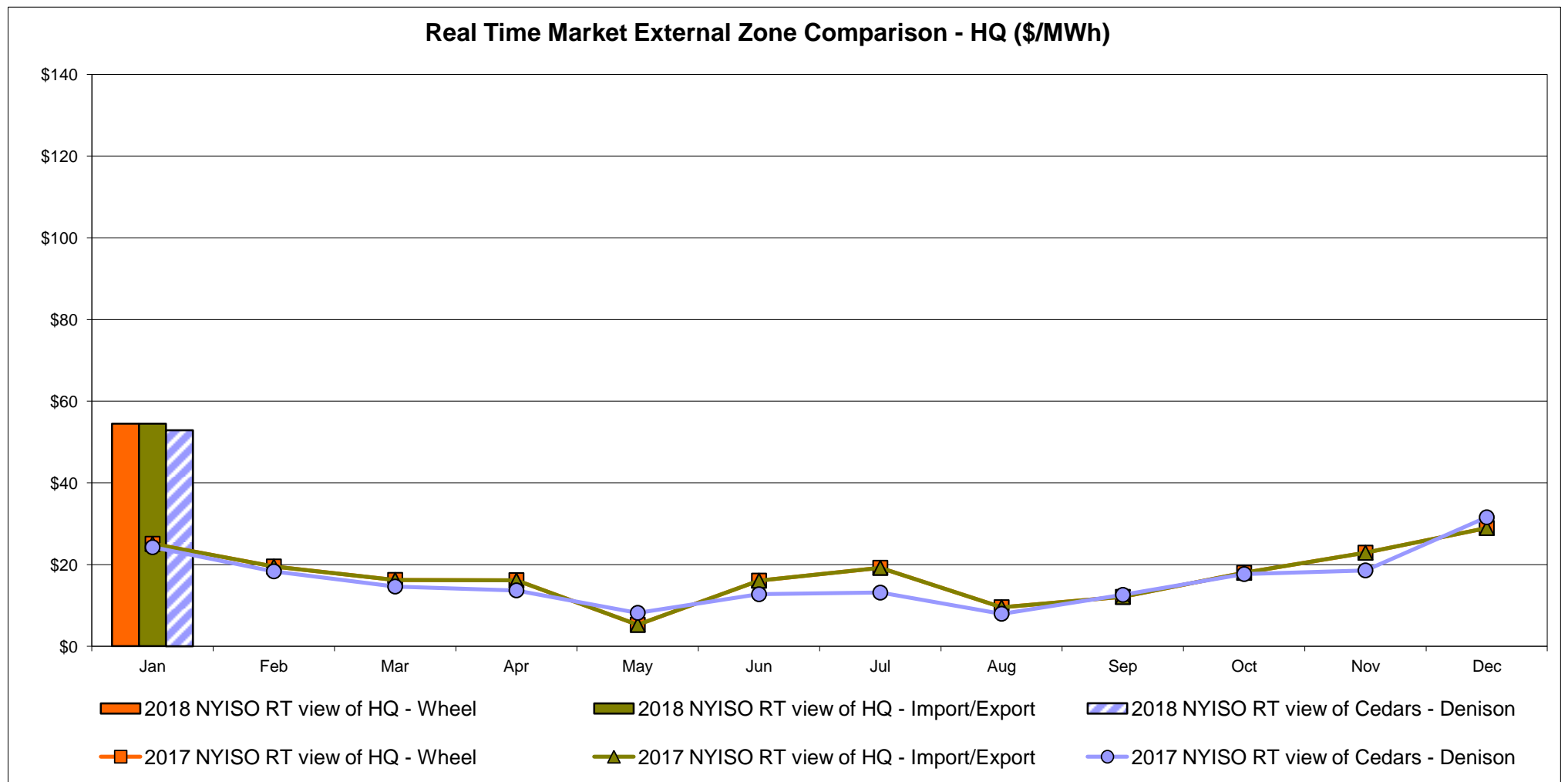
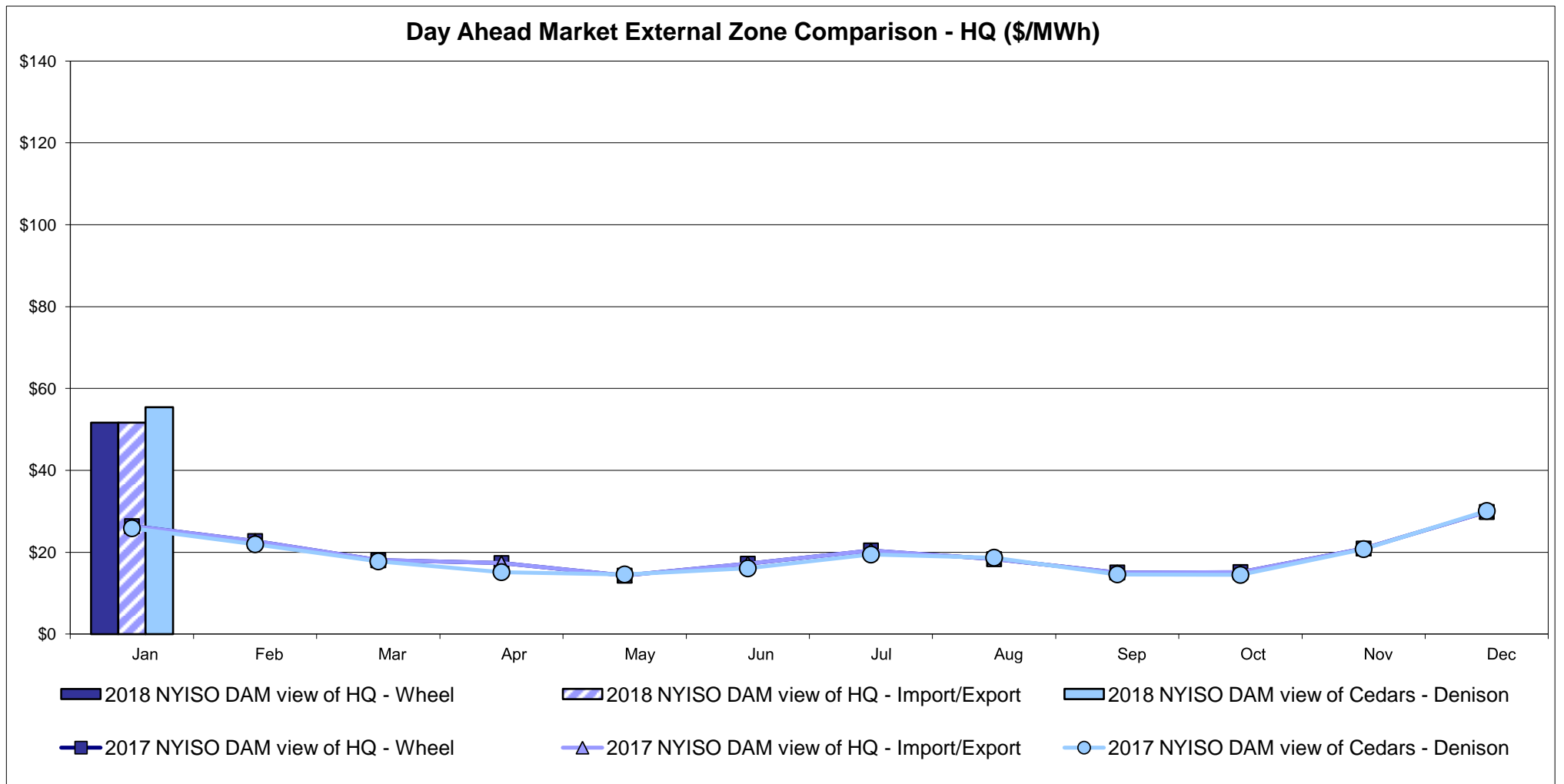
### Day Ahead Market Comparison: Neptune (\$/MWh)



### Real Time Market Comparison: Neptune (\$/MWh)

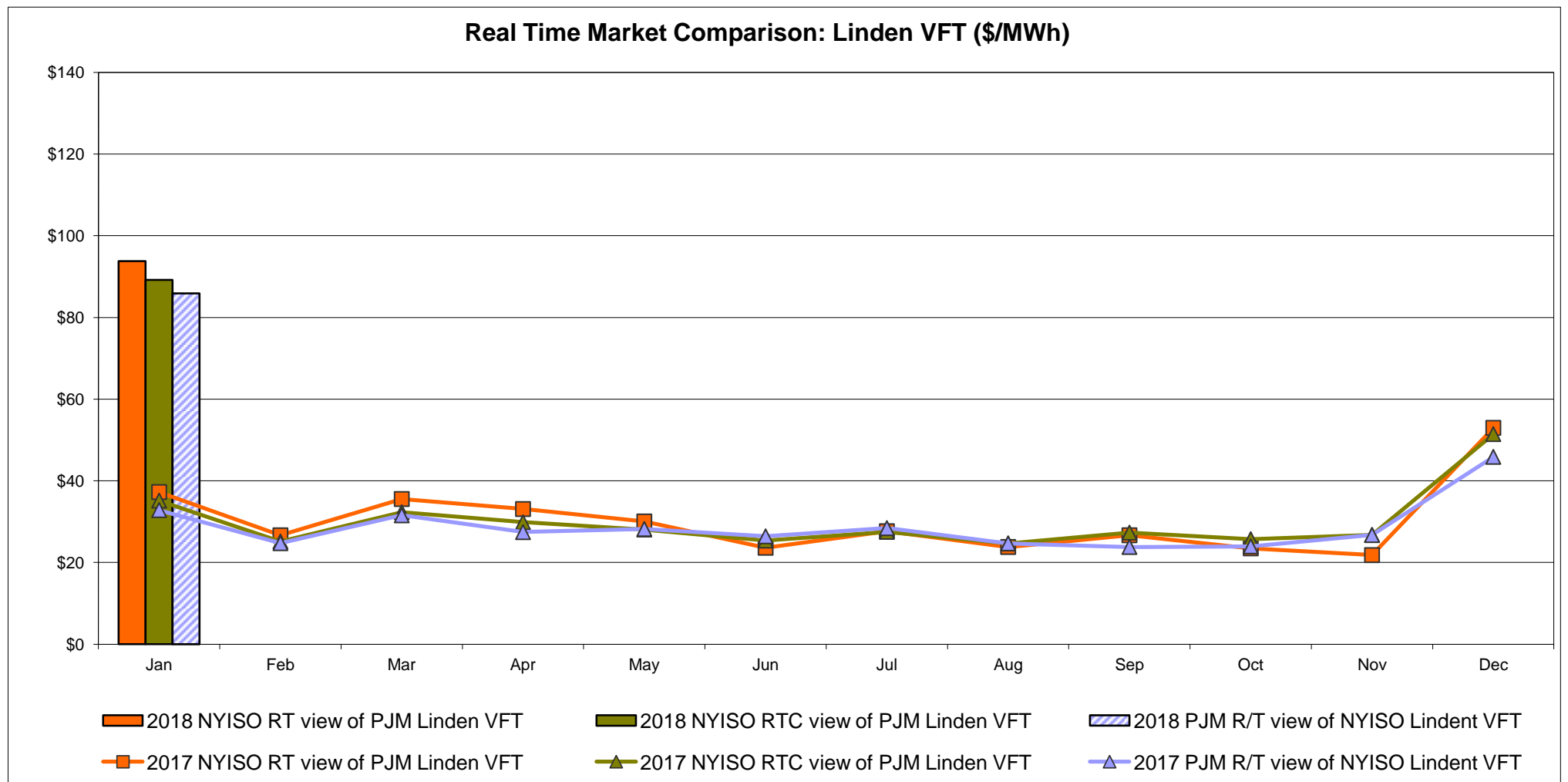
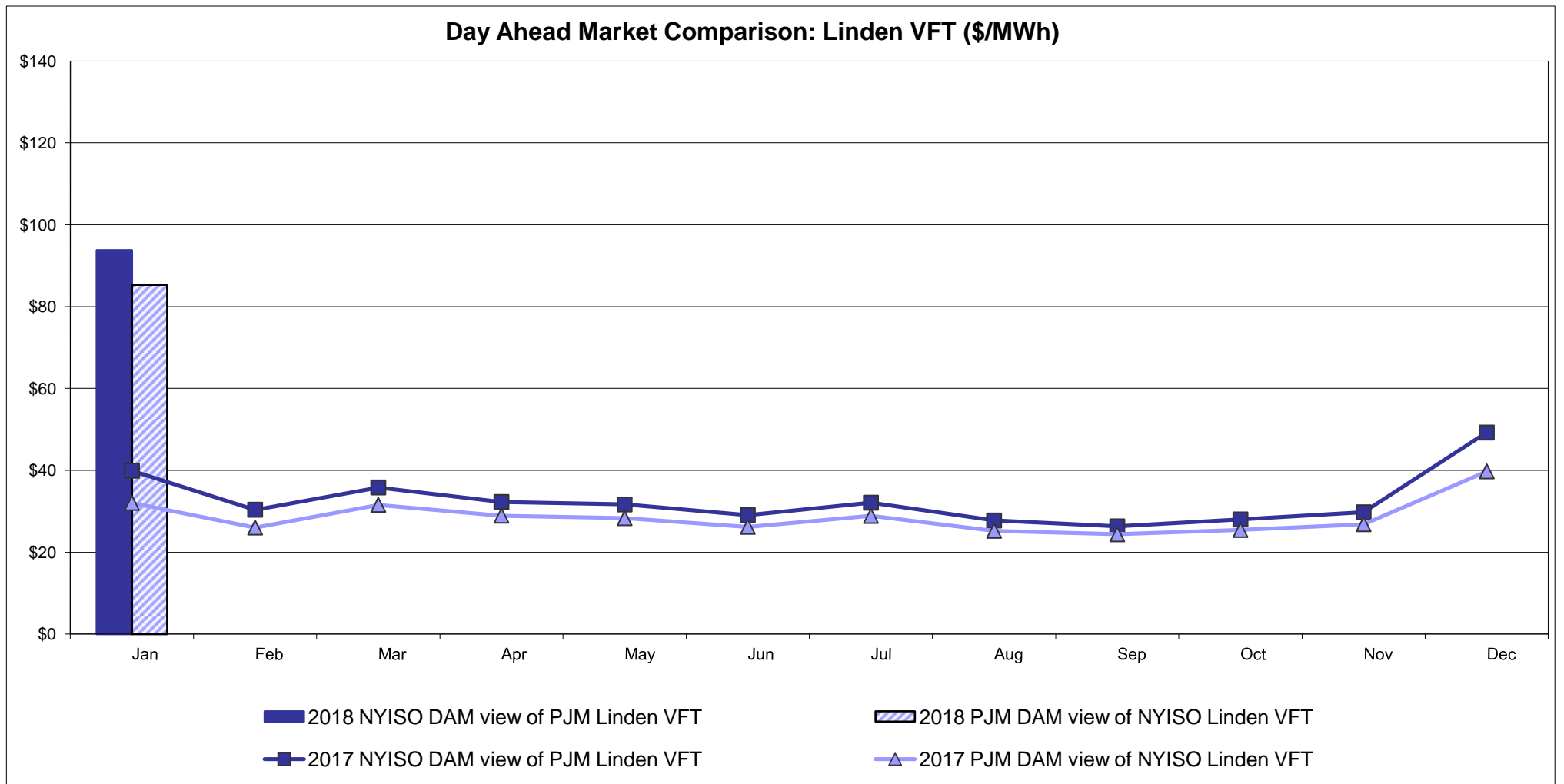


# External Comparison Hydro-Quebec



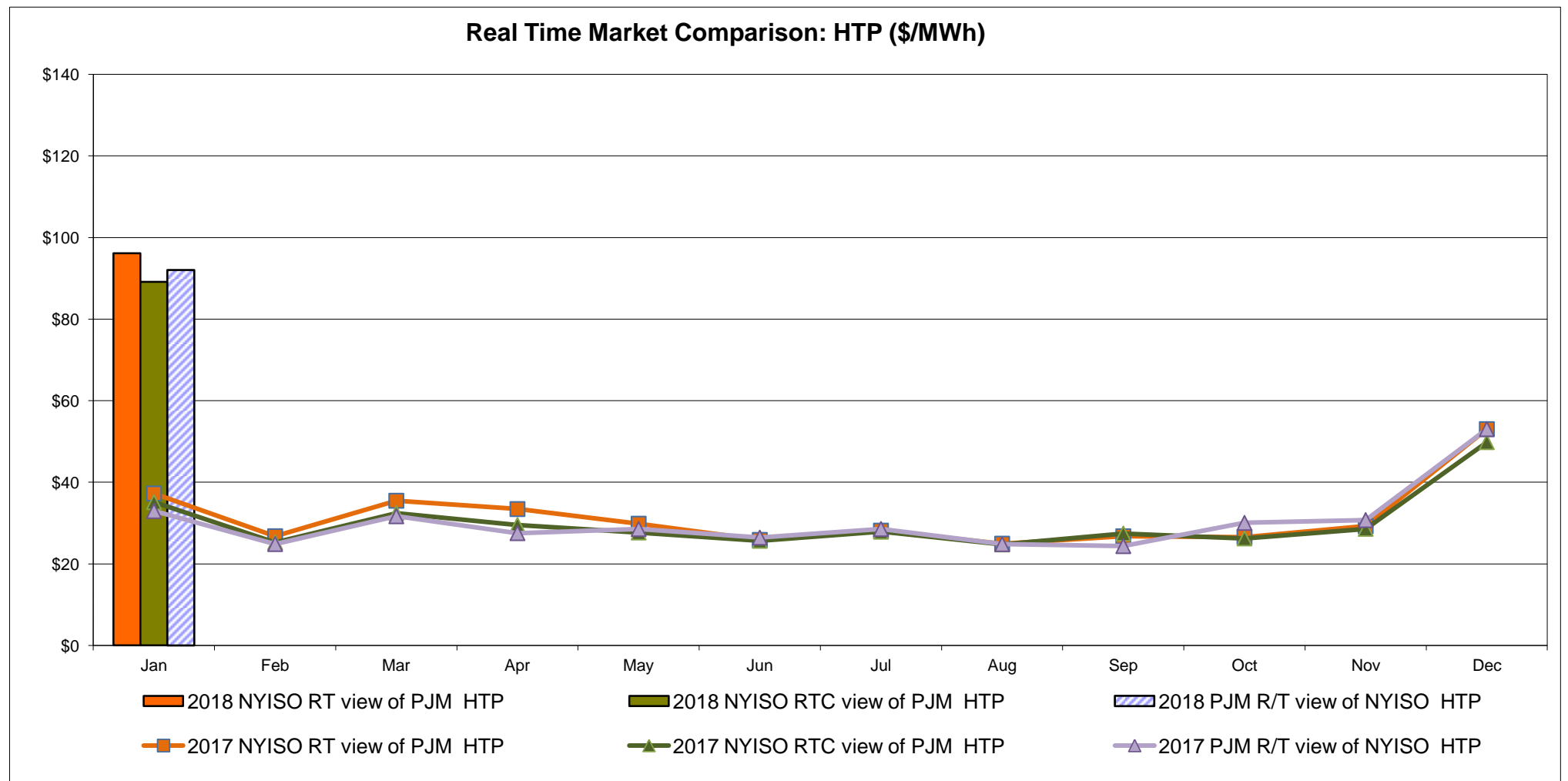
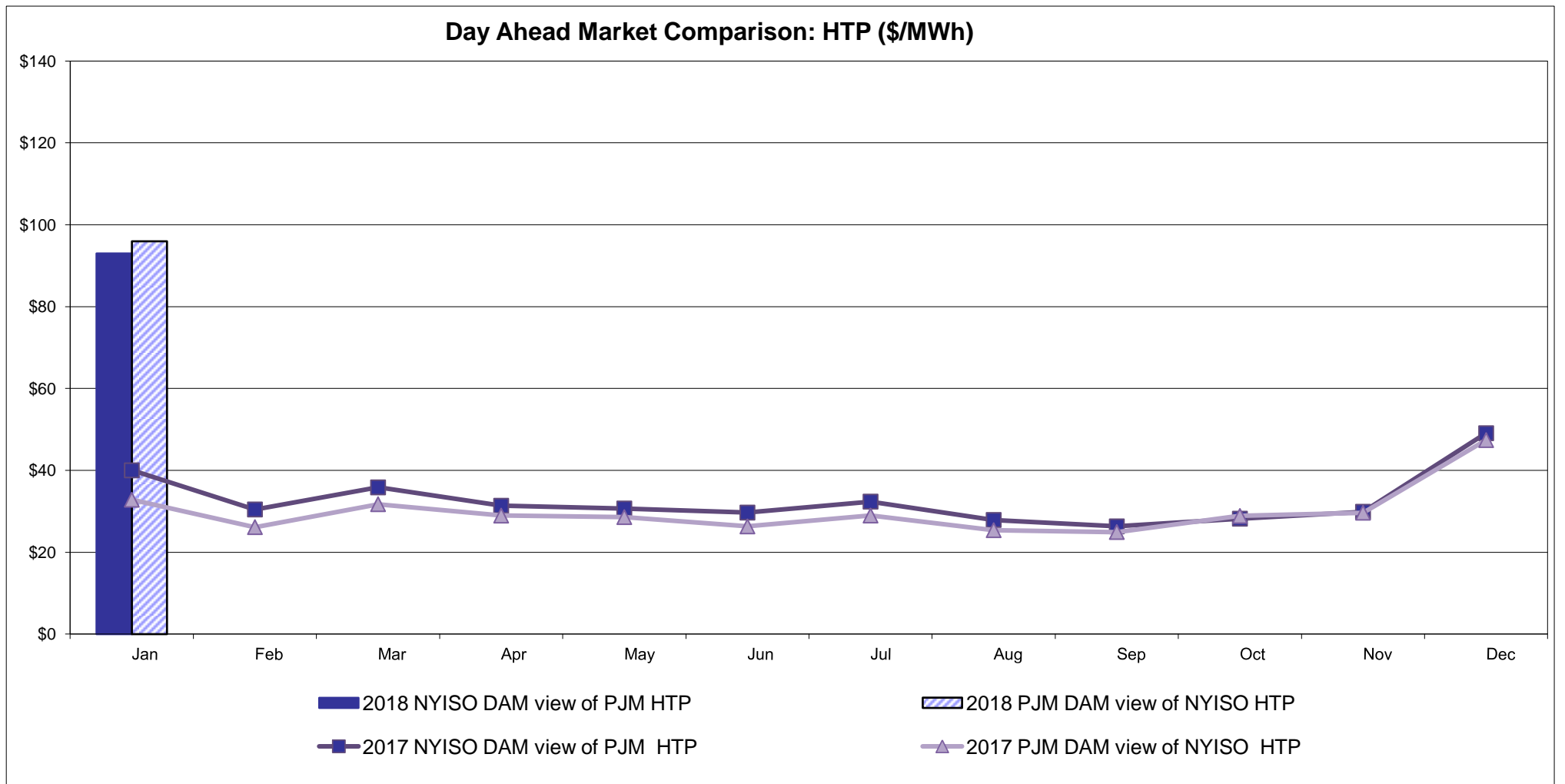
Note:  
Hydro-Quebec Prices are unavailable.

# External Controllable Line: Linden VFT (PJM)





# External Controllable Line: Hudson (PJM)

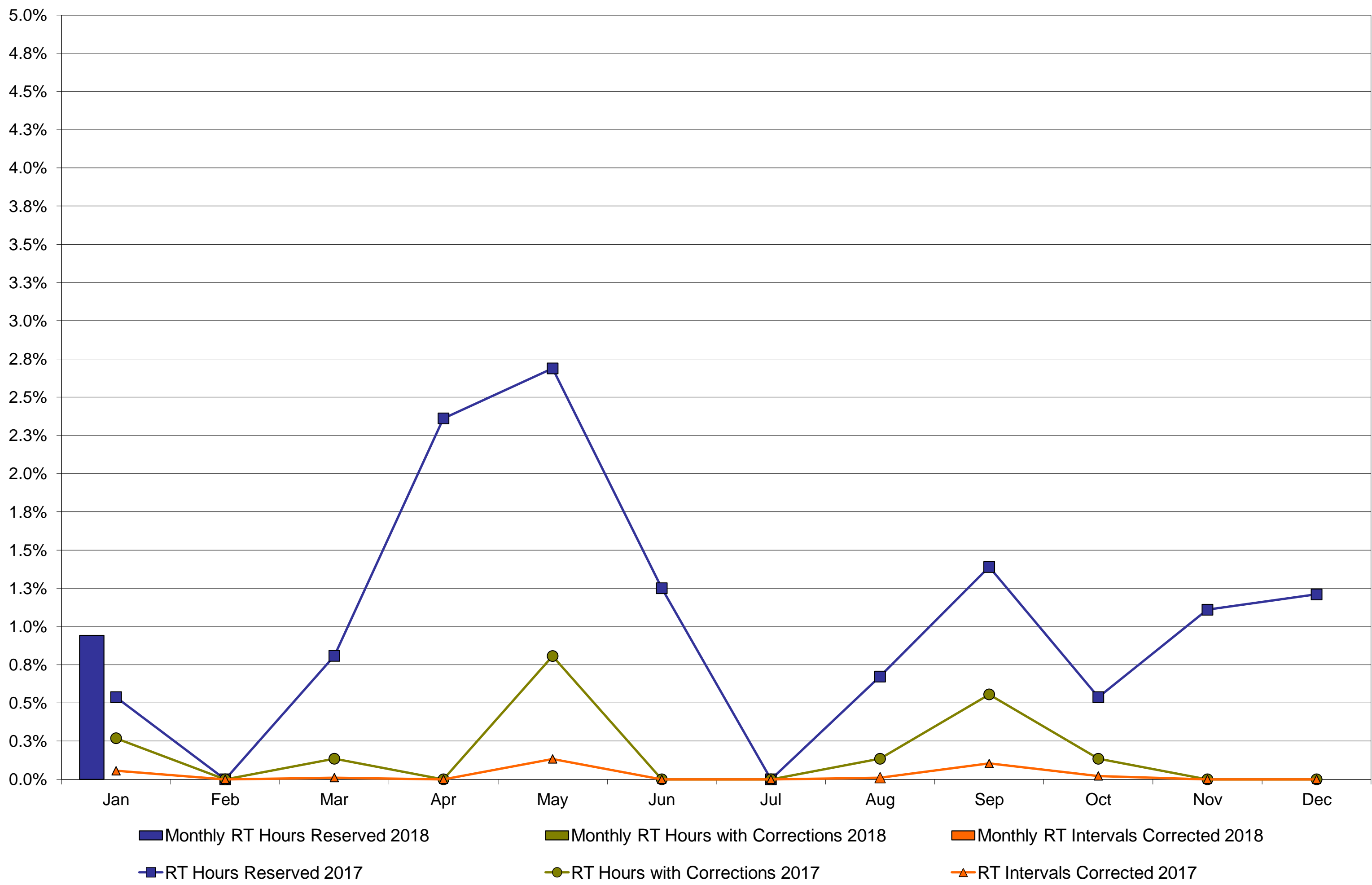


## NYISO Real Time Price Correction Statistics

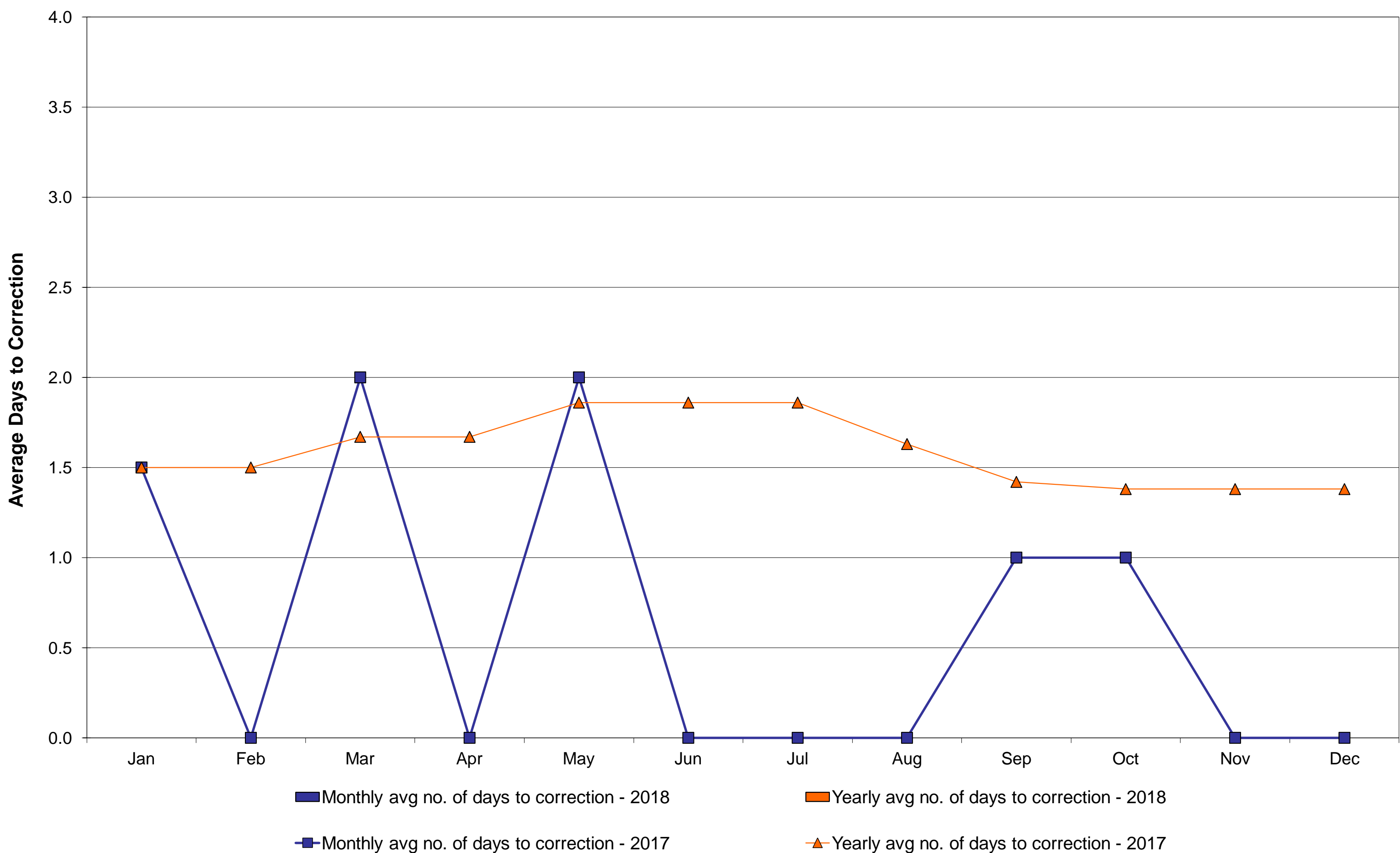
<b>2018</b>		<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b>Hour Corrections</b>													
Number of hours with corrections	in the month	0											
Number of hours	in the month	744											
% of hours with corrections	in the month	0.00%											
% of hours with corrections	year-to-date	0.00%											
<b>Interval Corrections</b>													
Number of intervals corrected	in the month	0											
Number of intervals	in the month	9,021											
% of intervals corrected	in the month	0.00%											
% of intervals corrected	year-to-date	0.00%											
<b>Hours Reserved</b>													
Number of hours reserved	in the month	7											
Number of hours	in the month	744											
% of hours reserved	in the month	0.94%											
% of hours reserved	year-to-date	0.94%											
<b>Days to Correction *</b>													
Avg. number of days to correction	in the month	0.00											
Avg. number of days to correction	year-to-date	0.00											
<b>Days Without Corrections</b>													
Days without corrections	in the month	31											
Days without corrections	year-to-date	31											
<b>2017</b>		<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b>Hour Corrections</b>													
Number of hours with corrections	in the month	2	0	1	0	6	0	0	1	4	1	0	0
Number of hours	in the month	744	672	743	720	744	720	744	744	720	744	721	744
% of hours with corrections	in the month	0.27%	0.00%	0.13%	0.00%	0.81%	0.00%	0.00%	0.13%	0.56%	0.13%	0.00%	0.00%
% of hours with corrections	year-to-date	0.27%	0.14%	0.14%	0.10%	0.25%	0.21%	0.18%	0.17%	0.21%	0.21%	0.19%	0.17%
<b>Interval Corrections</b>													
Number of intervals corrected	in the month	5	0	1	0	12	0	0	1	9	2	0	0
Number of intervals	in the month	8,983	8,101	9,026	8,745	9,004	8,712	8,968	8,980	8,701	9,006	8,712	9,063
% of intervals corrected	in the month	0.06%	0.00%	0.01%	0.00%	0.13%	0.00%	0.00%	0.01%	0.10%	0.02%	0.00%	0.00%
% of intervals corrected	year-to-date	0.06%	0.03%	0.02%	0.02%	0.04%	0.03%	0.03%	0.03%	0.04%	0.03%	0.03%	0.03%
<b>Hours Reserved</b>													
Number of hours reserved	in the month	4	0	6	17	20	9	0	5	10	4	8	9
Number of hours	in the month	744	672	743	720	744	720	744	744	720	744	721	744
% of hours reserved	in the month	0.54%	0.00%	0.81%	2.36%	2.69%	1.25%	0.00%	0.67%	1.39%	0.54%	1.11%	1.21%
% of hours reserved	year-to-date	0.54%	0.28%	0.46%	0.94%	1.30%	1.29%	1.10%	1.05%	1.08%	1.03%	1.04%	1.05%
<b>Days to Correction *</b>													
Avg. number of days to correction	in the month	1.50	0.00	2.00	0.00	2.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00
Avg. number of days to correction	year-to-date	1.50	1.50	1.67	1.67	1.86	1.86	1.86	1.63	1.42	1.38	1.38	1.38
<b>Days Without Corrections</b>													
Days without corrections	in the month	29	28	30	30	27	30	31	30	26	30	30	31
Days without corrections	year-to-date	29	57	87	117	144	174	205	235	261	291	321	352

\* Calendar days from reservation date.

### Percentage of Real-Time Corrections

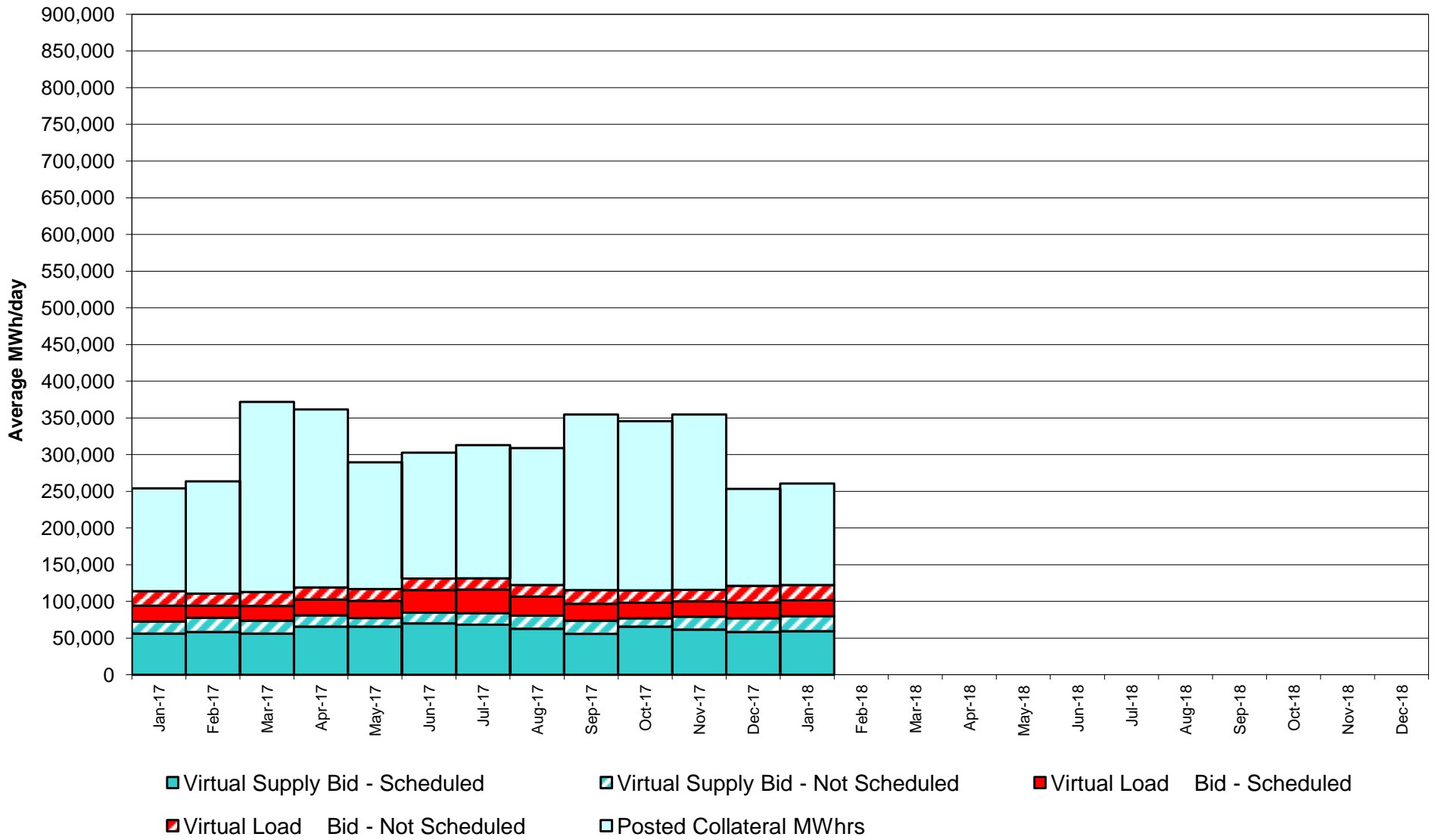


### Annual average time period for making Price Corrections (from reservation date) \*

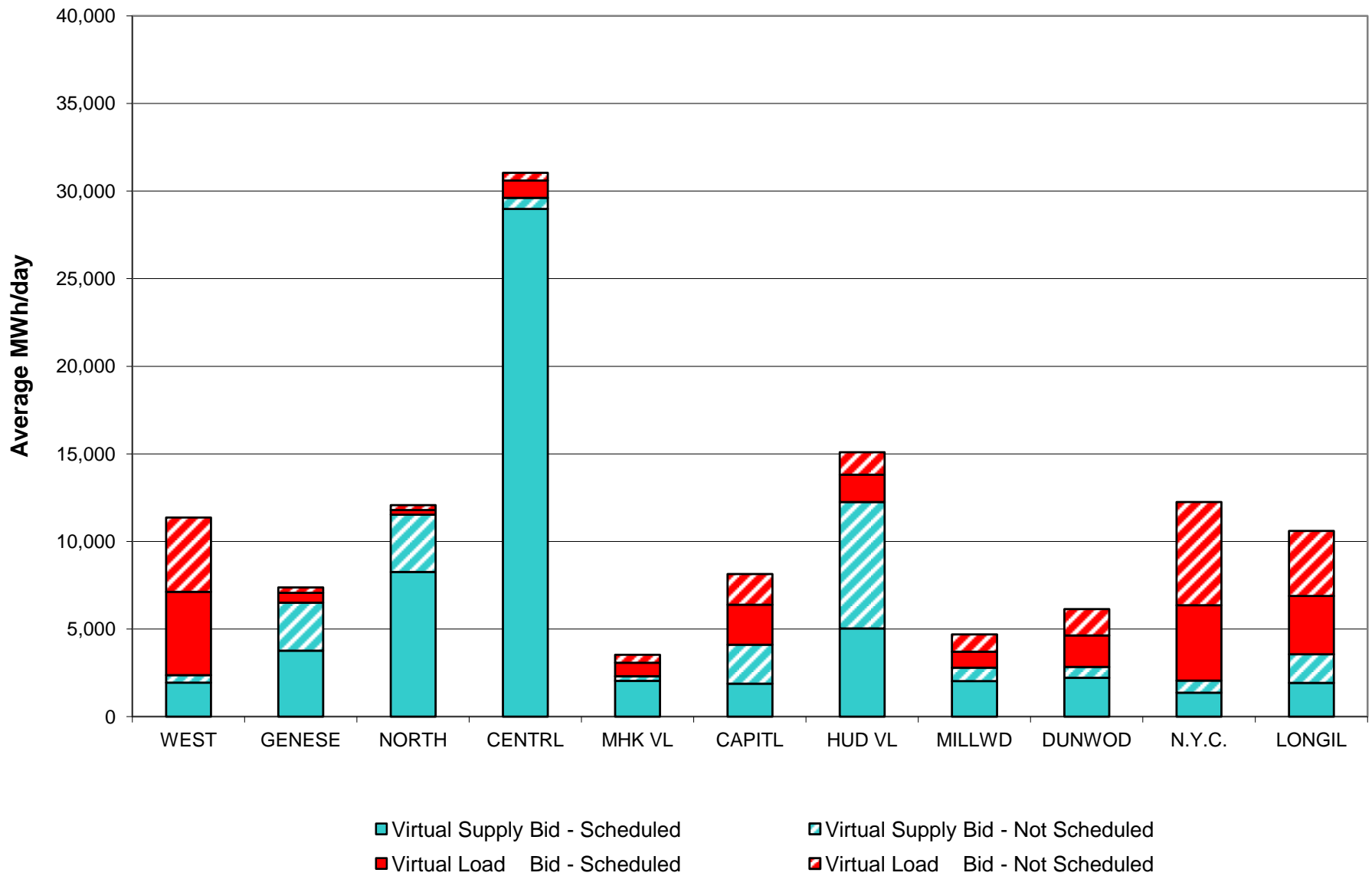


\* Calendar days from reservation date.

## NYISO Virtual Trading Average MWh per day



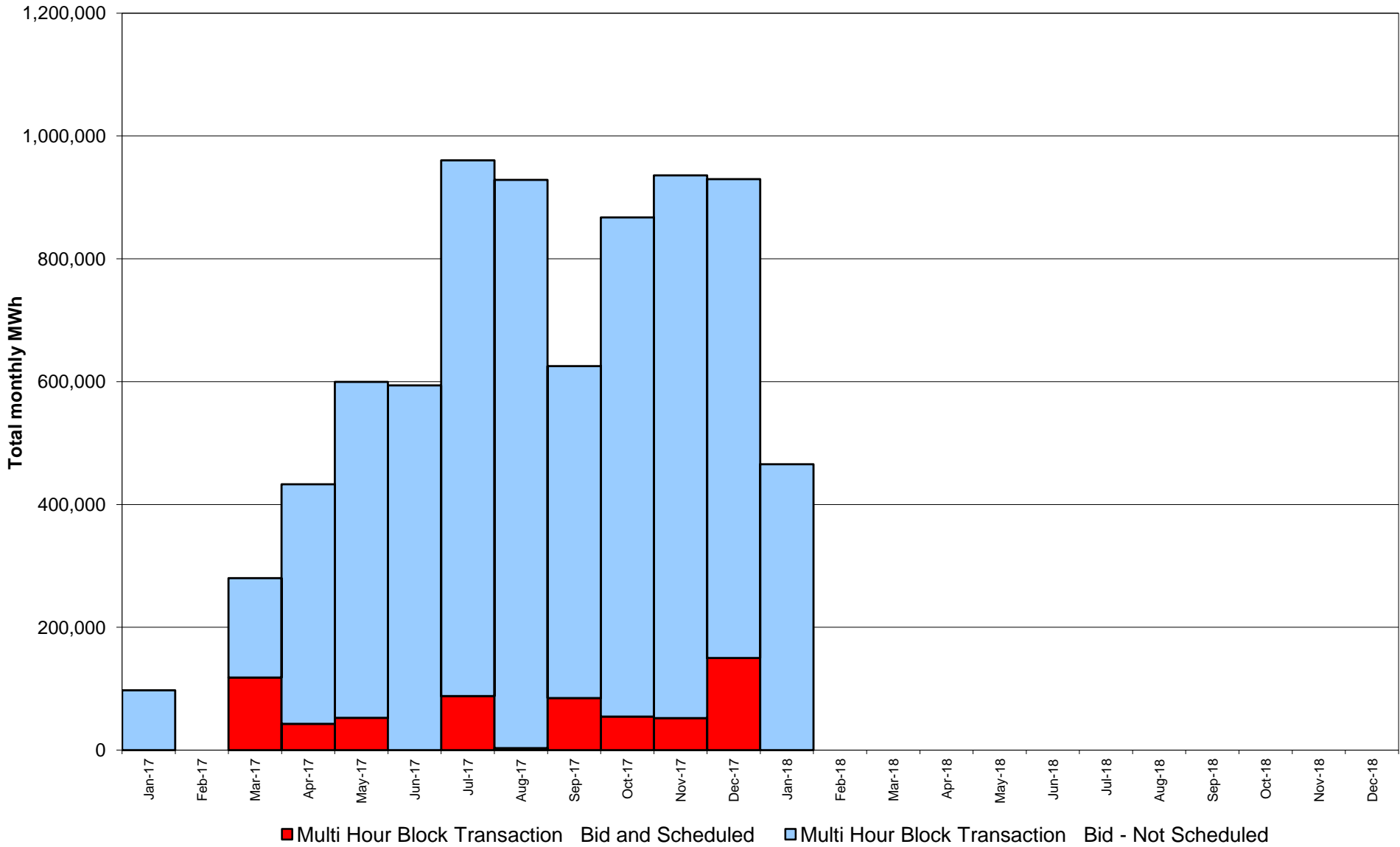
### Virtual Load and Supply Zonal Statistics through January 31, 2018



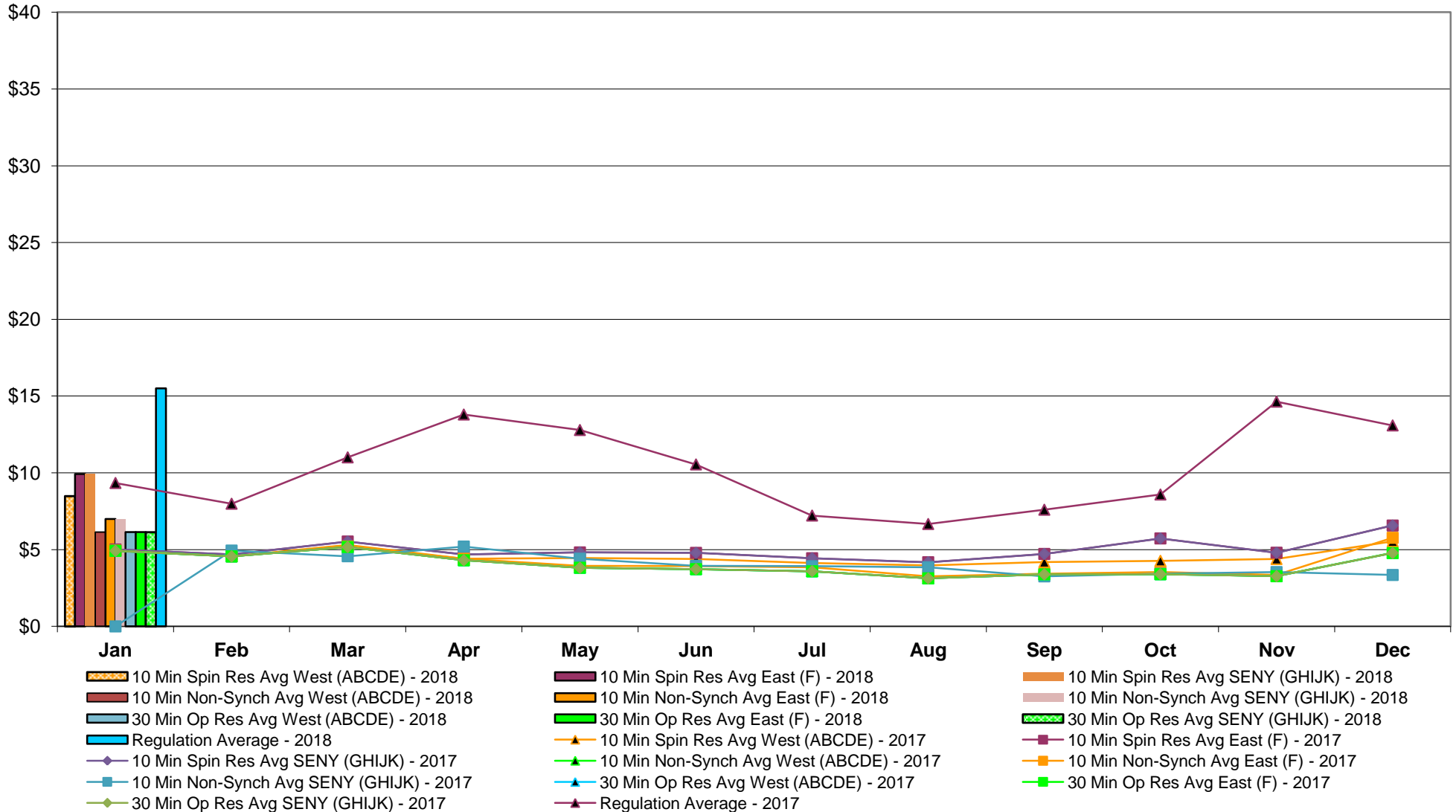
**Virtual Load and Supply Zonal Statistics (Average MWh/day) - 2018**

		Virtual Load Bid		Virtual Supply Bid				Virtual Load Bid		Virtual Supply Bid				Virtual Load Bid		Virtual Supply Bid	
Zone	Date	Scheduled	Not Scheduled	Scheduled	Not Scheduled	Zone	Date	Scheduled	Not Scheduled	Scheduled	Not Scheduled	Zone	Date	Scheduled	Not Scheduled	Scheduled	Not Scheduled
<b>WEST</b>	Jan-18	4,761	4,241	1,938	427	<b>MHK VL</b>	Jan-18	763	456	2,040	266	<b>DUNWOD</b>	Jan-18	1,795	1,509	2,215	620
	Feb-18						Feb-18						Feb-18				
	Mar-18						Mar-18						Mar-18				
	Apr-18						Apr-18						Apr-18				
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				
<b>GENESE</b>	Jan-18	554	310	3,772	2,739	<b>CAPITL</b>	Jan-18	2,291	1,751	1,887	2,212	<b>N.Y.C.</b>	Jan-18	4,302	5,885	1,359	704
	Feb-18						Feb-18						Feb-18				
	Mar-18						Mar-18						Mar-18				
	Apr-18						Apr-18						Apr-18				
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				
<b>NORTH</b>	Jan-18	274	282	8,259	3,265	<b>HUD VL</b>	Jan-18	1,562	1,285	5,029	7,218	<b>LONGIL</b>	Jan-18	3,335	3,714	1,932	1,622
	Feb-18						Feb-18						Feb-18				
	Mar-18						Mar-18						Mar-18				
	Apr-18						Apr-18						Apr-18				
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				
<b>CENTRL</b>	Jan-18	983	434	28,975	647	<b>MILLWD</b>	Jan-18	923	988	2,033	757	<b>NYISO</b>	Jan-18	21,542	20,854	59,437	20,478
	Feb-18						Feb-18						Feb-18				
	Mar-18						Mar-18						Mar-18				
	Apr-18						Apr-18						Apr-18				
	May-18						May-18						May-18				
	Jun-18						Jun-18						Jun-18				
	Jul-18						Jul-18						Jul-18				
	Aug-18						Aug-18						Aug-18				
	Sep-18						Sep-18						Sep-18				
	Oct-18						Oct-18						Oct-18				
	Nov-18						Nov-18						Nov-18				
	Dec-18						Dec-18						Dec-18				

## NYISO Multi Hour Block Transactions Monthly Total MWh

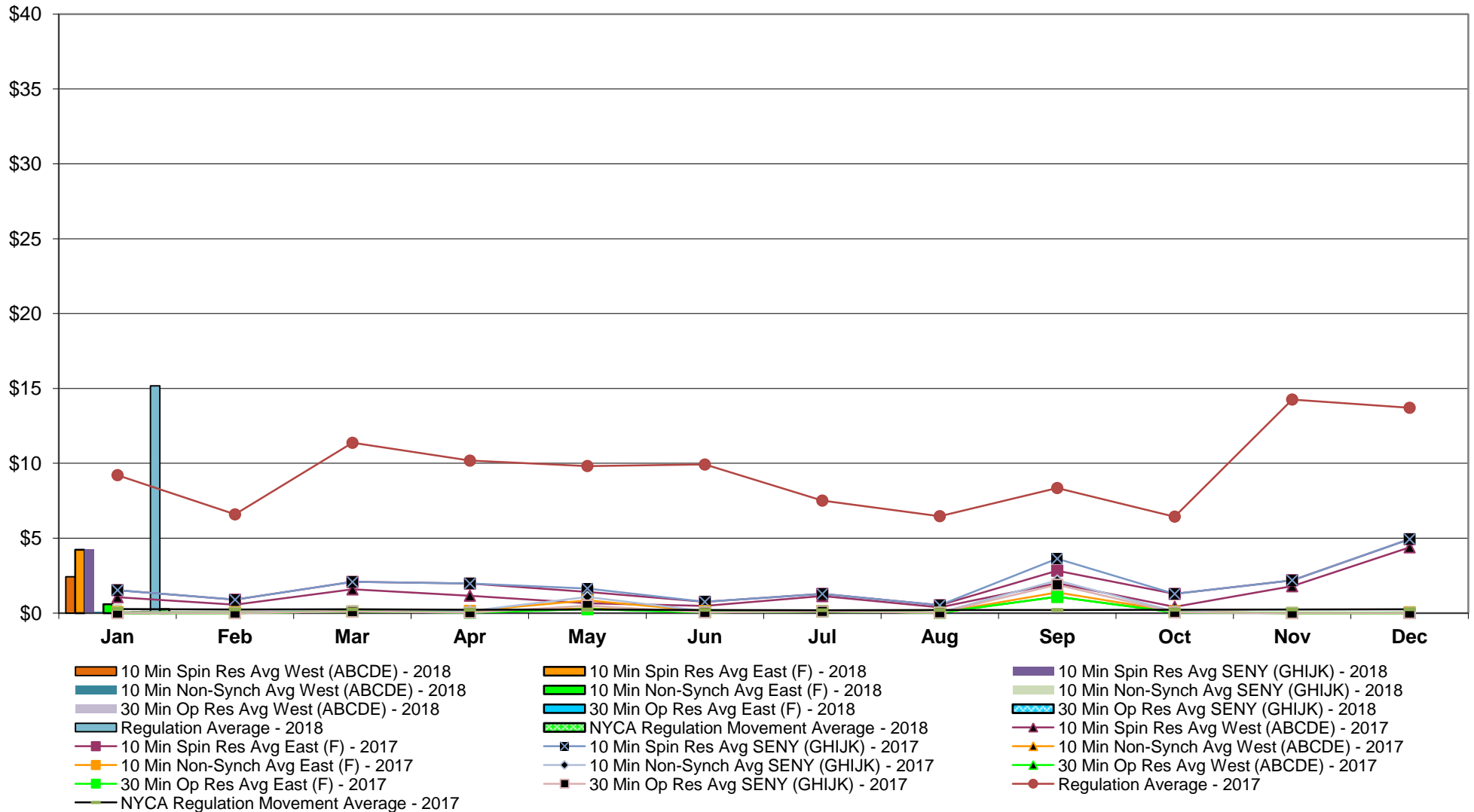


## NYISO Monthly Average Ancillary Service Prices Day Ahead Market 2017 - 2018

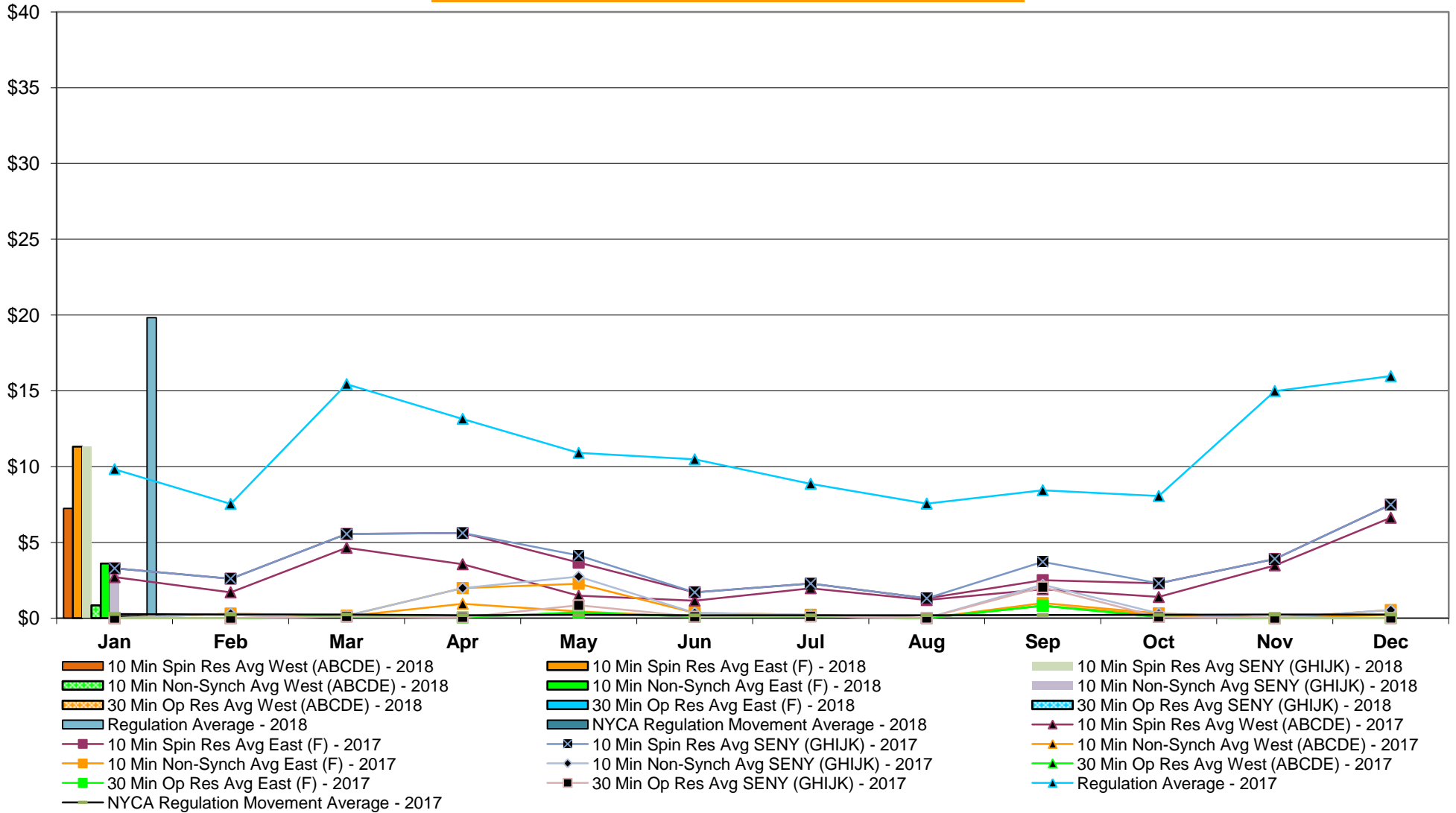




## NYISO Monthly Average Ancillary Service Prices RTC Market 2017 - 2018



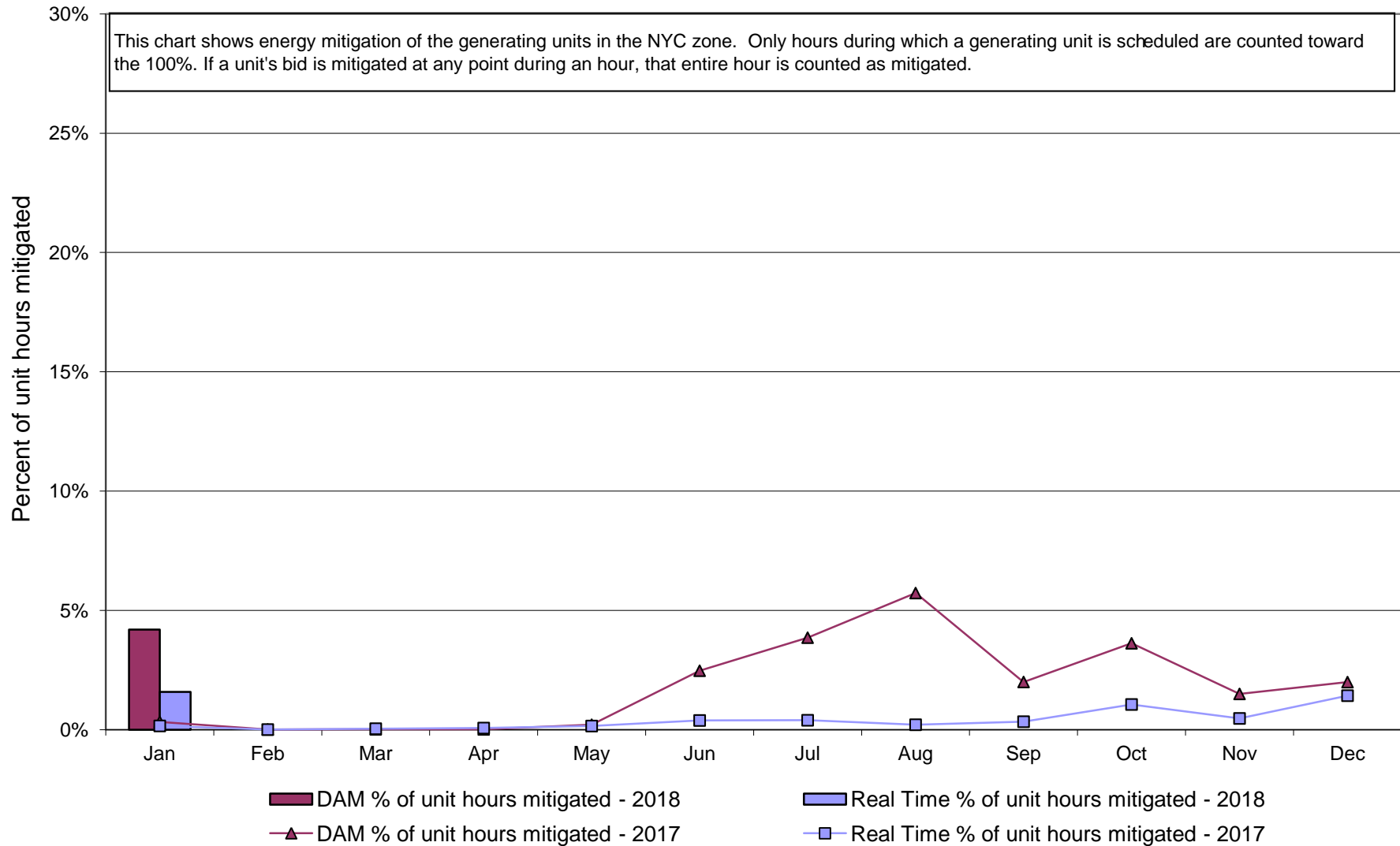
## NYISO Monthly Average Ancillary Service Prices Real Time Market 2017 - 2018



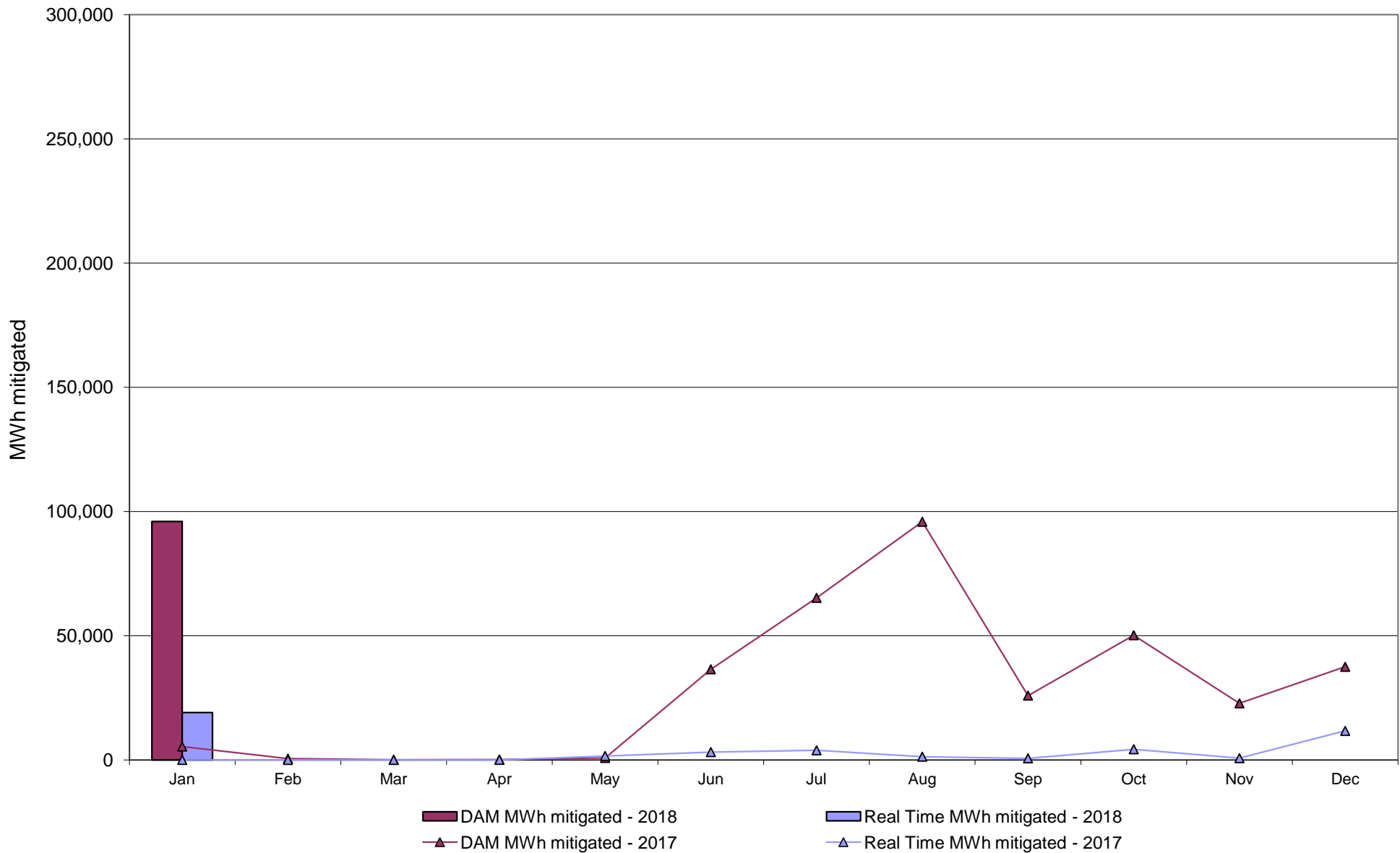
## NYISO Markets Ancillary Services Statistics - Unweighted Price (\$/MWH)

<u>2018</u>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b>Day Ahead Market</b>												
10 Min Spin SENY (GHIJK)	9.93											
10 Min Spin East (F)	9.93											
10 Min Spin West (ABCDE)	8.49											
10 Min Non Synch SENY (GHIJK)	6.99											
10 Min Non Synch East (F)	6.99											
10 Min Non Synch West (ABCDE)	6.15											
30 Min SENY (GHIJK)	6.14											
30 Min East (F)	6.14											
30 Min West (ABCDE)	6.14											
Regulation	15.51											
<b>RTC Market</b>												
10 Min Spin SENY (GHIJK)	4.23											
10 Min Spin East (F)	4.23											
10 Min Spin West (ABCDE)	2.43											
10 Min Non Synch SENY (GHIJK)	0.59											
10 Min Non Synch East (F)	0.59											
10 Min Non Synch West (ABCDE)	0.08											
30 Min SENY (GHIJK)	0.08											
30 Min East (F)	0.08											
30 Min West (ABCDE)	0.08											
Regulation	15.17											
NYCA Regulation Movement	0.26											
<b>Real Time Market</b>												
10 Min Spin SENY (GHIJK)	11.31											
10 Min Spin East (F)	11.31											
10 Min Spin West (ABCDE)	7.24											
10 Min Non Synch SENY (GHIJK)	3.61											
10 Min Non Synch East (F)	3.61											
10 Min Non Synch West (ABCDE)	0.85											
30 Min SENY (GHIJK)	0.13											
30 Min East (F)	0.13											
30 Min West (ABCDE)	0.13											
Regulation	19.82											
NYCA Regulation Movement	0.24											
<u>2017</u>	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b>Day Ahead Market</b>												
10 Min Spin SENY (GHIJK)	5.01	5.38	5.04	6.31	4.93	4.62	6.41	7.12	5.57	5.37	4.83	4.89
10 Min Spin East (F)	5.01	5.38	5.04	6.31	4.93	4.62	6.41	7.12	5.57	5.37	4.83	4.89
10 Min Spin West (ABCDE)	4.94	5.25	4.84	5.60	4.77	4.52	5.78	6.20	5.14	4.89	4.50	4.73
10 Min Non Synch SENY (GHIJK)	4.94	5.25	4.88	5.80	4.83	4.36	6.34	7.07	5.52	5.09	4.43	4.49
10 Min Non Synch East (F)	4.94	5.25	4.88	5.80	4.83	4.36	6.34	7.07	5.52	5.09	4.43	4.49
10 Min Non Synch West (ABCDE)	4.92	5.20	4.84	5.58	4.68	4.32	5.72	6.15	5.10	4.82	4.39	4.43
30 Min SENY (GHIJK)	4.92	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
30 Min East (F)	4.92	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
30 Min West (ABCDE)	4.92	5.20	4.84	5.58	4.67	4.32	5.70	6.15	5.10	4.82	4.39	4.43
Regulation	9.34	8.19	8.05	7.93	6.11	7.00	8.19	8.61	7.00	8.57	7.77	13.80
<b>RTC Market</b>												
10 Min Spin SENY (GHIJK)	1.53	0.59	0.71	1.81	0.43	0.49	2.79	7.26	0.61	0.99	1.05	1.92
10 Min Spin East (F)	1.53	0.59	0.71	1.81	0.43	0.46	2.77	6.88	0.61	0.99	1.05	1.92
10 Min Spin West (ABCDE)	1.06	0.26	0.08	0.95	0.23	0.24	1.72	4.80	0.30	0.29	0.82	1.14
10 Min Non Synch SENY (GHIJK)	0.06	0.00	0.17	0.14	0.05	0.05	1.89	6.06	0.21	0.09	0.00	0.00
10 Min Non Synch East (F)	0.06	0.00	0.17	0.14	0.05	0.02	1.87	5.67	0.21	0.09	0.00	0.00
10 Min Non Synch West (ABCDE)	0.00	0.00	0.00	0.14	0.04	0.02	1.18	3.80	0.16	0.08	0.00	0.00
30 Min SENY (GHIJK)	0.00	0.00	0.00	0.14	0.04	0.04	0.94	3.65	0.15	0.08	0.00	0.00
30 Min East (F)	0.00	0.00	0.00	0.14	0.04	0.02	0.93	3.27	0.15	0.08	0.00	0.00
30 Min West (ABCDE)	0.00	0.00	0.00	0.14	0.04	0.02	0.93	3.27	0.15	0.08	0.00	0.00
Regulation	9.21	6.86	7.15	7.07	5.43	6.09	7.51	10.25	5.52	6.86	7.00	16.70
NYCA Regulation Movement	0.27	0.21	0.20	0.25	0.25	0.23	0.23	0.24	0.24	0.26	0.24	0.26
<b>Real Time Market</b>												
10 Min Spin SENY (GHIJK)	3.29	1.12	1.73	4.34	1.19	1.43	4.73	8.04	1.59	1.96	2.69	3.18
10 Min Spin East (F)	3.29	1.12	1.73	4.34	1.19	1.40	4.72	7.68	1.59	1.96	2.69	3.18
10 Min Spin West (ABCDE)	2.71	0.58	0.48	2.23	0.79	1.00	2.51	4.72	0.90	1.16	2.29	2.33
10 Min Non Synch SENY (GHIJK)	0.00	0.00	0.22	1.20	0.06	0.15	3.49	6.70	0.59	0.18	0.00	0.00
10 Min Non Synch East (F)	0.00	0.00	0.22	1.20	0.06	0.11	3.48	6.34	0.59	0.18	0.00	0.00
10 Min Non Synch West (ABCDE)	0.00	0.00	0.00	0.26	0.03	0.04	1.65	3.56	0.21	0.11	0.00	0.00
30 Min SENY (GHIJK)	0.00	0.00	0.00	0.25	0.03	0.07	0.98	3.48	0.21	0.11	0.00	0.00
30 Min East (F)	0.00	0.00	0.00	0.25	0.03	0.04	0.97	3.12	0.21	0.11	0.00	0.00
30 Min West (ABCDE)	0.00	0.00	0.00	0.25	0.03	0.04	0.97	3.12	0.21	0.11	0.00	0.00
Regulation	9.83	7.21	7.73	8.30	6.06	6.92	8.37	10.31	6.42	7.70	8.21	14.88
NYCA Regulation Movement	0.27	0.22	0.20	0.25	0.25	0.23	0.23	0.24	0.24	0.26	0.23	0.24

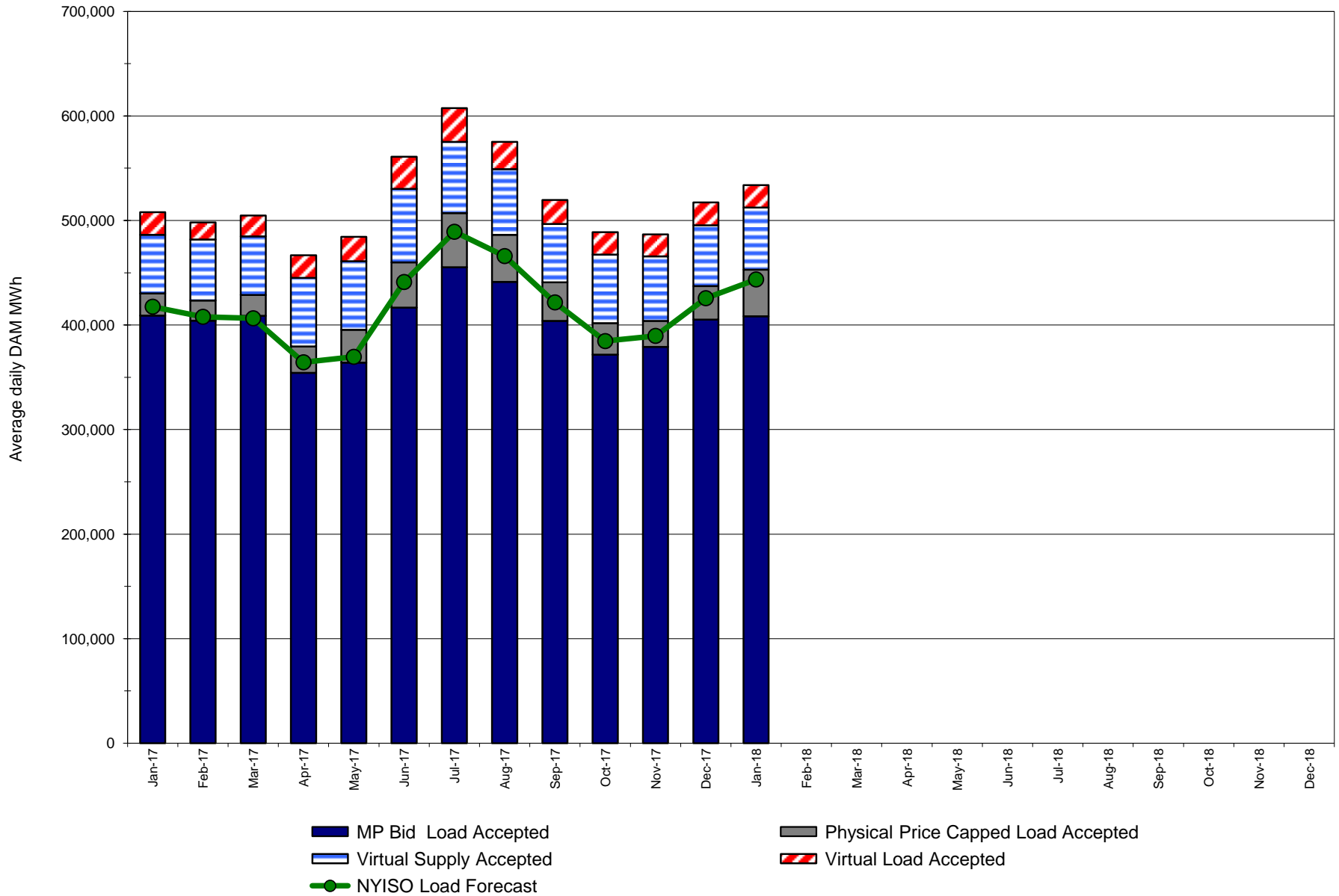
## NYISO In City Energy Mitigation - AMP (NYC Zone) 2017 - 2018 Percentage of committed unit-hours mitigated



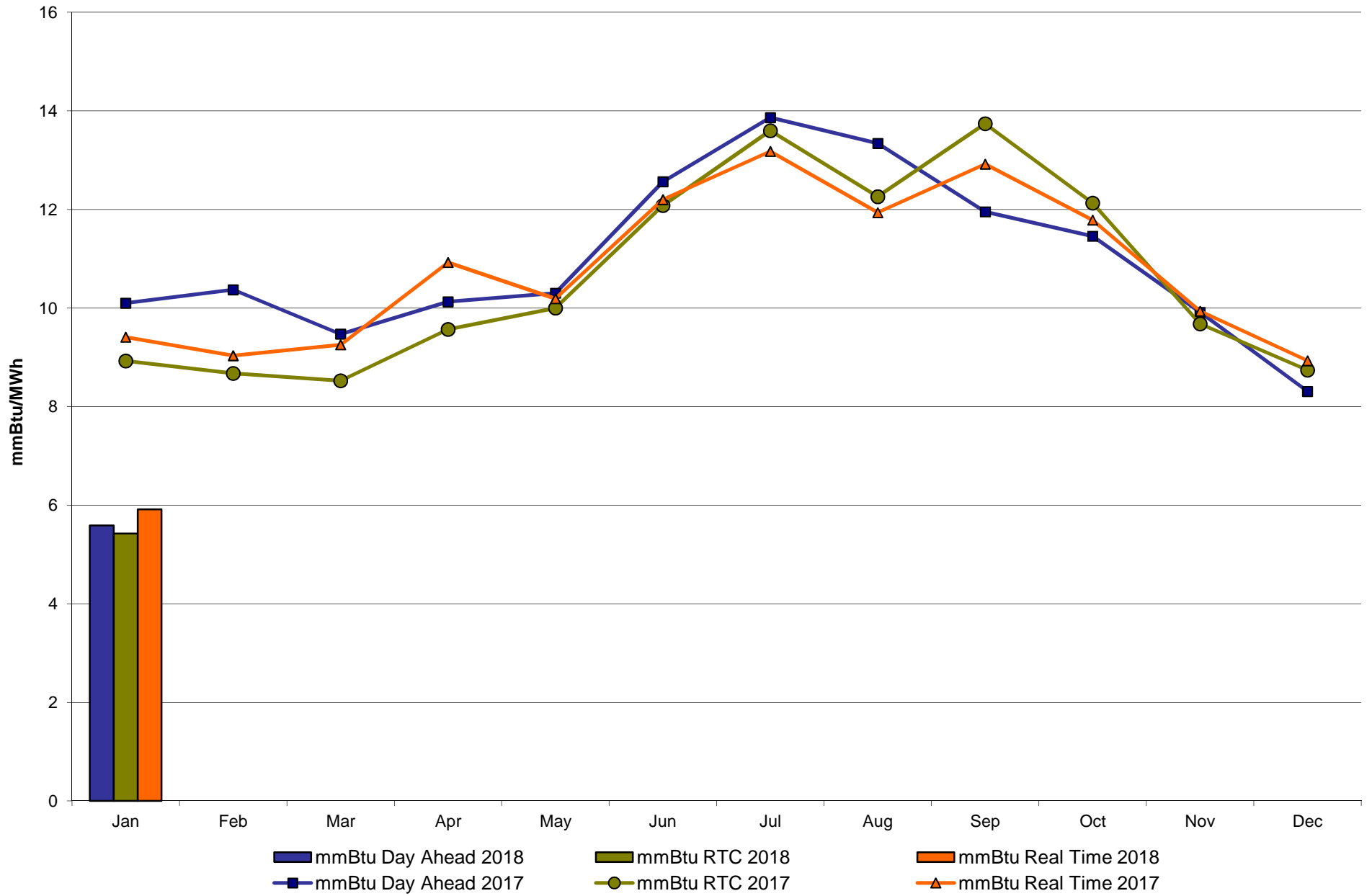
**NYISO In City Energy Mitigation (NYC Zone) 2017 - 2018**  
**Monthly megawatt hours mitigated**



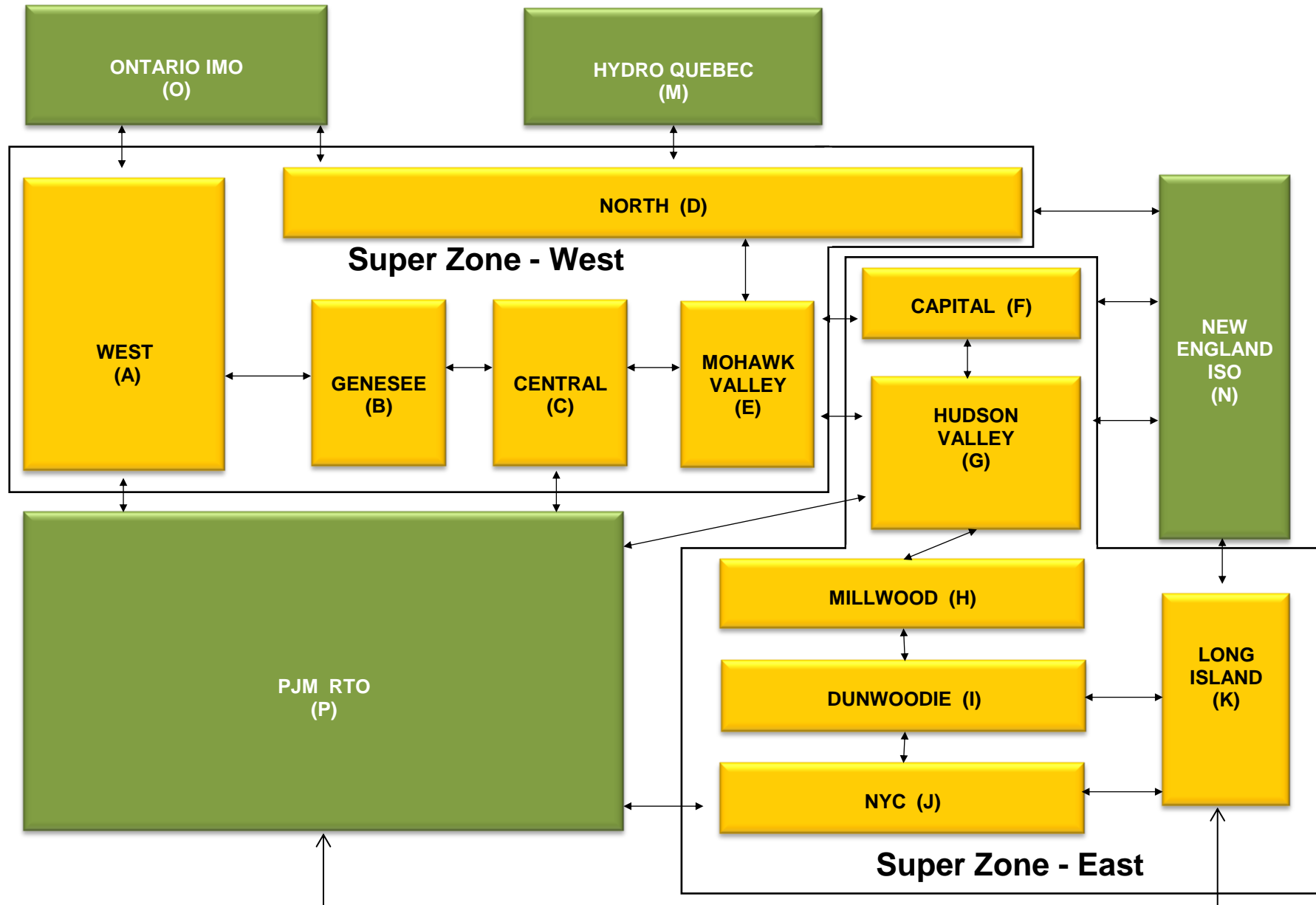
### NYISO Average Daily DAM Load Bid Summary



## Monthly Implied Heat Rate 2017-2018



# NYISO LBMP ZONES





**Billing Codes for Chart C**

<b>Chart - C Category Name</b>	<b>Billing Code</b>	<b>Billing Category Name</b>
Bid Production Cost Guarantee Balancing	81203	Balancing NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee Balancing	81204	Balancing NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee Balancing	81205	Balancing NYISO Bid Production Cost Guarantee Expenditure due to Curtailed Imports
Bid Production Cost Guarantee Balancing	81208	Balancing NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee Balancing	81209	Balancing NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee Balancing	81213	Balancing NYISO Bid Production Cost Guarantee Expenditure due to Curtailed Imports
Bid Production Cost Guarantee DAM	81201	DAM NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee DAM	84001	EDRP/SCR Demand Response - Local
Bid Production Cost Guarantee DAM	84101	EDRP/SCR Demand Response - NYISO Wide
Bid Production Cost Guarantee DAM	81401	DAM Price Responsive Load Program
Bid Production Cost Guarantee DAM	81202	DAM NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee DAM	81206	DAM NYISO Bid Production Cost Guarantee - Internal Units
Bid Production Cost Guarantee DAM	81207	DAM NYISO Bid Production Cost Guarantee - External Units
Bid Production Cost Guarantee DAM Virtual	81501	DAM Virtual Bid Production Cost Guarantee
DAM Contract Balancing	81315	DAM Contract Balancing
DAM Contract Balancing	81317	DAM Contract Balancing
Local Reliability Balancing	81002	Balancing Local Reliability Bid Production Cost Guarantee
Local Reliability Balancing	83901	Margin Restoration (MOB) Revenue
Local Reliability DAM	81001	DAM Local Reliability Bid Production Cost Guarantee
NYISO Cost of Operations	80901	NYISO Cost Of Operations
NYISO Cost of Operations	80902	NYISO Cost Of Operations
NYISO Cost of Operations	83501	NYISO Cost Of Operations
NYISO Cost of Operations	83502	NYISO Cost Of Operations
Residuals Balancing	81302	Balancing Market Energy Residual
Residuals Balancing	81304	Balancing Market Loss Residual
Residuals Balancing	81305	Balancing Market Congestion Balancing
Residuals Balancing	81306	Emergency Energy Purchases
Residuals Balancing	81307	Emergency Energy Sales
Residuals Balancing	81309	Balancing Market Energy Residual
Residuals Balancing	81311	Balancing Market Loss Residual
Residuals Balancing	81312	Balancing Market Congestion Balancing
Residuals Balancing	81313	Emergency Energy Purchases
Residuals Balancing	81314	Emergency Energy Sales
Residuals DAM	81301	Day Ahead Market Energy Residual
Residuals DAM	81303	Day Ahead Market Loss Residual
Residuals DAM	81308	Day Ahead Market Energy Residual
Residuals DAM	81310	Day Ahead Market Loss Residual

# The Mission of the New York Independent System Operator is to:

- Serve the public interest and
- Provide benefit to stakeholders 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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