

# Market Operations Report

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Rana Mukerji

SENIOR VICE PRESIDENT – MARKET STRUCTURES, NYISO

**Business Issues Committee Meeting**

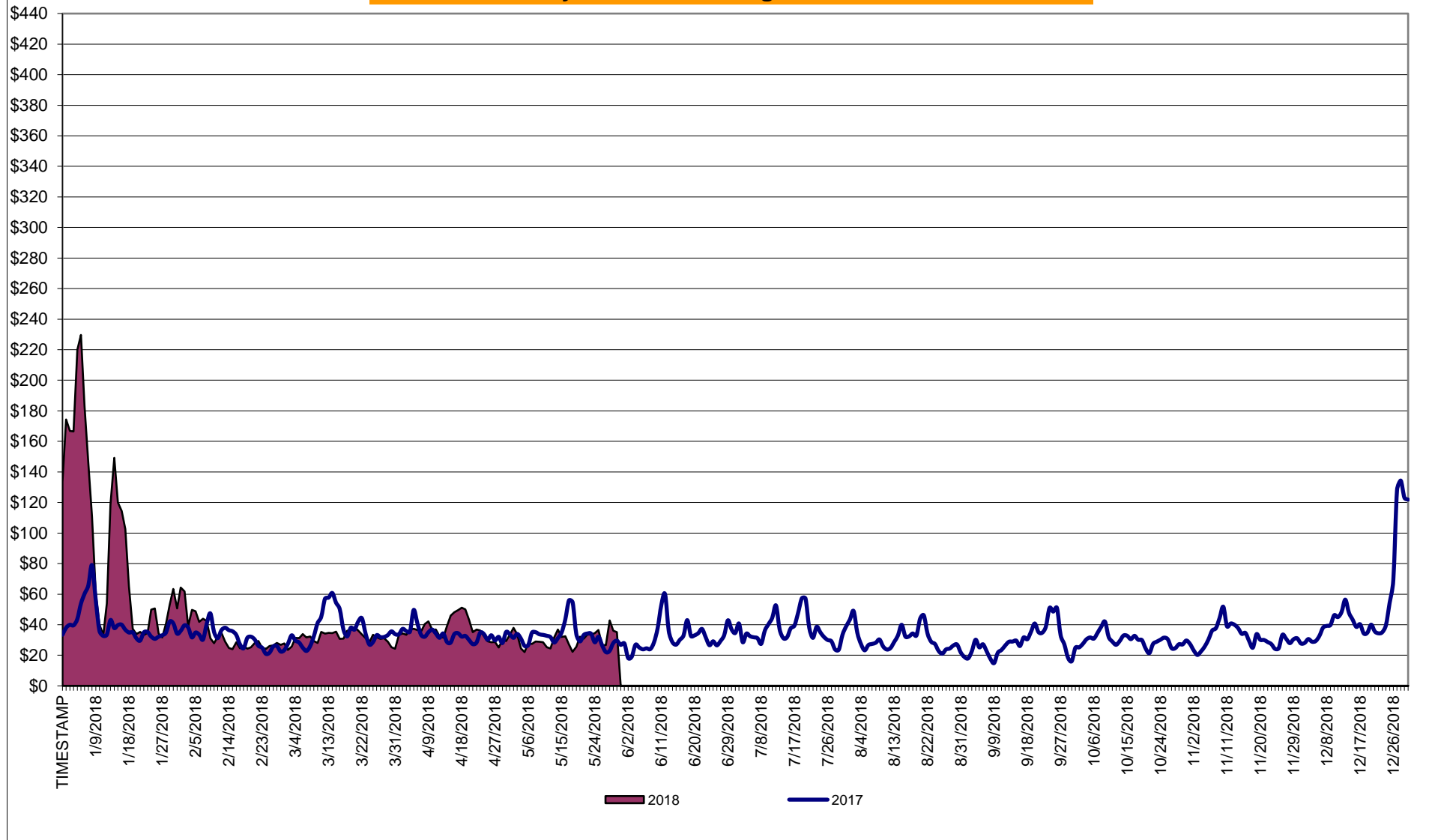
June 20, 2018, Rensselaer, NY

# Market Performance Highlights

## May 2018

- LBMP for May is \$28.78/MWh; lower than \$35.00/MWh in April 2018 and \$31.74/MWh in May 2017.
  - Day Ahead and Real Time Load Weighted LBMPs are lower compared to April.
- May 2018 average year-to-date monthly cost of \$50.20/MWh is a 37% increase from \$36.54/MWh in May 2017.
- Average daily sendout is 397 GWh/day in May; higher than 390 GWh/day in April 2018 and higher than 383 GWh/day in May 2017.
- Natural gas prices were lower and distillate prices were higher compared to the previous month.
  - Natural Gas (Transco Z6 NY) was \$2.55/MMBtu, down from \$2.79/MMBtu in April.
  - Natural gas prices are down 8.8% year-over-year.
  - Jet Kerosene Gulf Coast was \$15.96/MMBtu, up from \$14.94/MMBtu in April.
  - Ultra Low Sulfur No.2 Diesel NY Harbor was \$15.92/MMBtu, up from \$14.85/MMBtu in April.
  - Distillate prices are up 49.7% year-over-year.
- Uplift per MWh is higher compared to the previous month.
  - Uplift (not including NYISO cost of operations) is \$0.05/MWh; higher than (\$0.45)/MWh in April.
    - Local Reliability Share is \$0.22/MWh, higher than \$0.12/MWh in April.
    - Statewide Share is (\$0.17)/MWh, higher than (\$0.57)/MWh in April.
  - TSA \$ per NYC MWh is \$0.08/MWh.
  - Total uplift costs (Schedule 1 components including NYISO Cost of Operations) are higher than April.

**Daily NYISO Average Cost/MWh (Energy & Ancillary Services)\***  
**2017 Annual Average \$36.56/MWh**  
**May 2017 YTD Average \$36.71/MWh**  
**May 2018 YTD Average \$50.20/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	33.83	29.91	35.00	28.78							
NTAC	0.71	0.58	0.88	1.09	0.88							
Reserve	0.92	0.65	0.64	0.81	0.68							
Regulation	0.15	0.15	0.16	0.12	0.14							
NYISO Cost of Operations	0.65	0.65	0.66	0.65	0.66							
FERC Fee Recovery	0.08	0.10	0.09	0.10	0.09							
Uplift	(0.92)	(0.50)	(0.31)	(0.45)	0.05							
Uplift: Local Reliability Share	0.59	0.14	0.19	0.12	0.22							
Uplift: Statewide Share	(1.52)	(0.64)	(0.51)	(0.57)	(0.17)							
Voltage Support and Black Start	0.40	0.41	0.42	0.41	0.42							
<b>Avg Monthly Cost</b>	101.54	35.87	32.45	37.74	31.70							
Avg YTD Cost	101.54	72.85	60.06	54.82	50.20							
TSA \$ per NYC MWh	0.00	0.00	0.04	0.00	0.08							
<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>	41.96	33.44	37.38	34.26	34.52	33.80	37.94	32.60	31.54	30.31	32.79	54.67
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: 6/7/2018 11:55 AM

As of Jan. 2016, the annual FERC fee is recovered separately from Cost of Ops.



## NYISO Markets Transactions

<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>Day Ahead Market MWh</b>	15,153,751	12,643,854	13,521,386	12,158,686	12,721,073							
DAM LSE Internal LBMP Energy Sales	59%	57%	58%	60%	61%							
DAM External TC LBMP Energy Sales	4%	3%	2%	2%	2%							
DAM Bilateral - Internal Bilaterals	29%	31%	32%	30%	29%							
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	5%	5%							
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%	2%	2%	2%	2%							
DAM Bilateral - Wheel Through Bilaterals	1%	2%	2%	2%	2%							
<b>Balancing Energy Market MWh</b>	-149,619	-299,377	-386,811	-72,862	-29,539							
Balancing Energy LSE Internal LBMP Energy Sales	-147%	-101%	-128%	-208%	-458%							
Balancing Energy External TC LBMP Energy Sales	74%	24%	37%	189%	564%							
Balancing Energy Bilateral - Internal Bilaterals	9%	5%	0%	-11%	29%							
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	0%	0%	0%	0%							
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	22%	9%	6%	34%	51%							
Balancing Energy Bilateral - Wheel Through Bilaterals	-58%	-36%	-15%	-103%	-287%							
<b>Transactions Summary</b>												
LBMP	63%	59%	59%	62%	63%							
Internal Bilaterals	30%	32%	33%	30%	29%							
Import Bilaterals	5%	5%	6%	5%	5%							
Export Bilaterals	2%	2%	2%	2%	2%							
Wheels Through	1%	1%	1%	1%	1%							
<b>Market Share of Total Load</b>												
Day Ahead Market	101.0%	102.4%	102.9%	100.6%	100.2%							
Balancing Energy +	-1.0%	-2.4%	-2.9%	-0.6%	-0.2%							
Total MWh	15,004,132	12,344,477	13,134,575	12,085,824	12,691,534							
Average Daily Energy Sendout/Month GWh	463	426	413	390	397							

<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>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	\$30.37	\$27.37	\$32.40	\$25.97							
Standard Deviation	\$58.94	\$12.38	\$6.34	\$9.06	\$9.22							
Load Weighted Price **	\$88.42	\$31.44	\$27.95	\$33.14	\$27.26							
<b><u>RTC LBMP</u></b>												
Price *	\$81.65	\$27.73	\$25.99	\$30.80	\$25.40							
Standard Deviation	\$60.83	\$11.96	\$8.99	\$14.30	\$20.37							
Load Weighted Price **	\$85.85	\$28.54	\$26.46	\$31.47	\$27.08							
<b><u>REAL TIME LBMP</u></b>												
Price *	\$87.94	\$28.50	\$26.49	\$34.53	\$25.57							
Standard Deviation	\$87.41	\$17.36	\$12.25	\$26.57	\$23.49							
Load Weighted Price **	\$93.59	\$29.49	\$27.09	\$35.72	\$27.47							
Average Daily Energy Sendout/Month GWh	463	426	413	390	397							

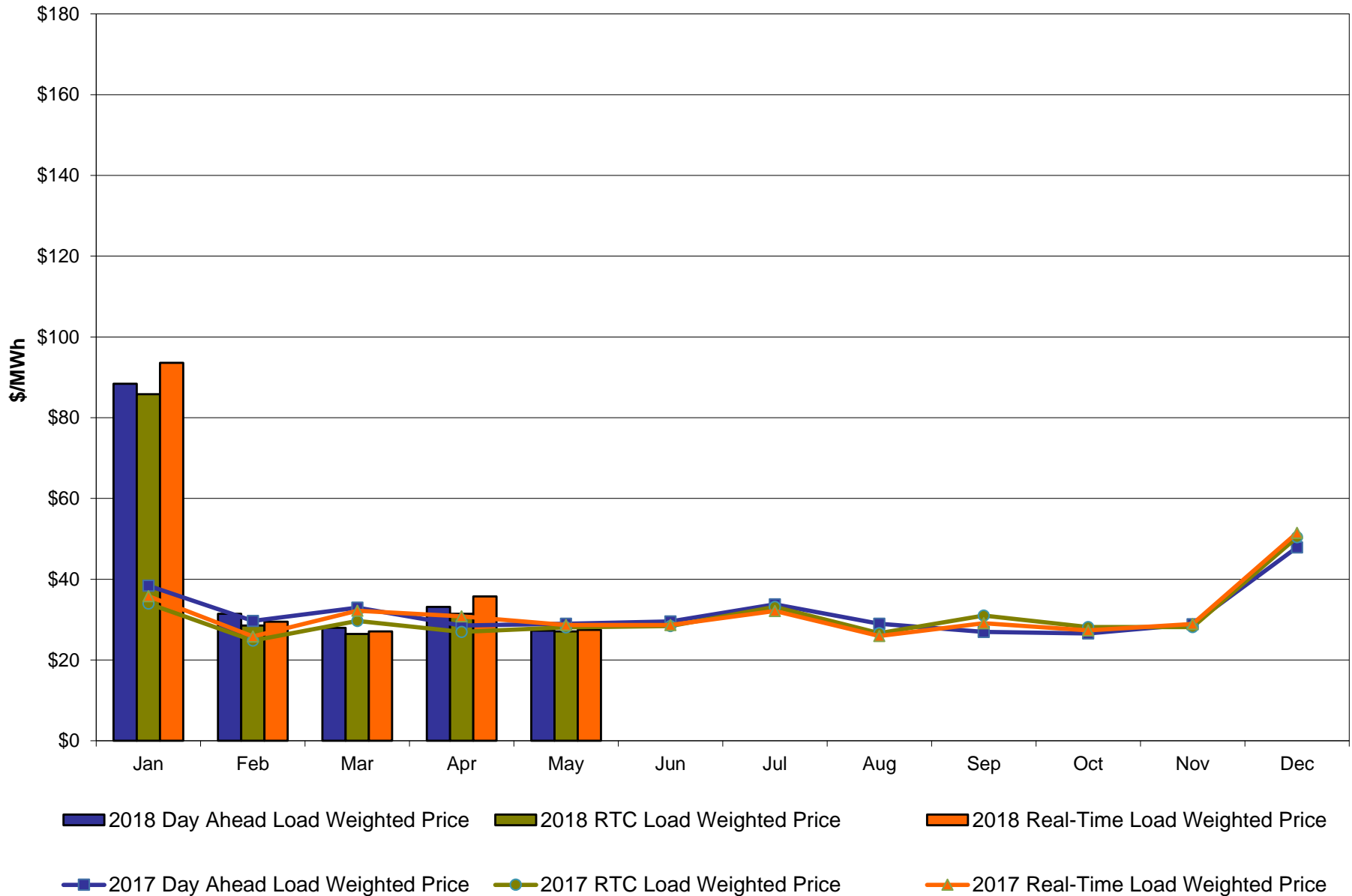
### NYISO Markets 2017 Energy Statistics

	<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



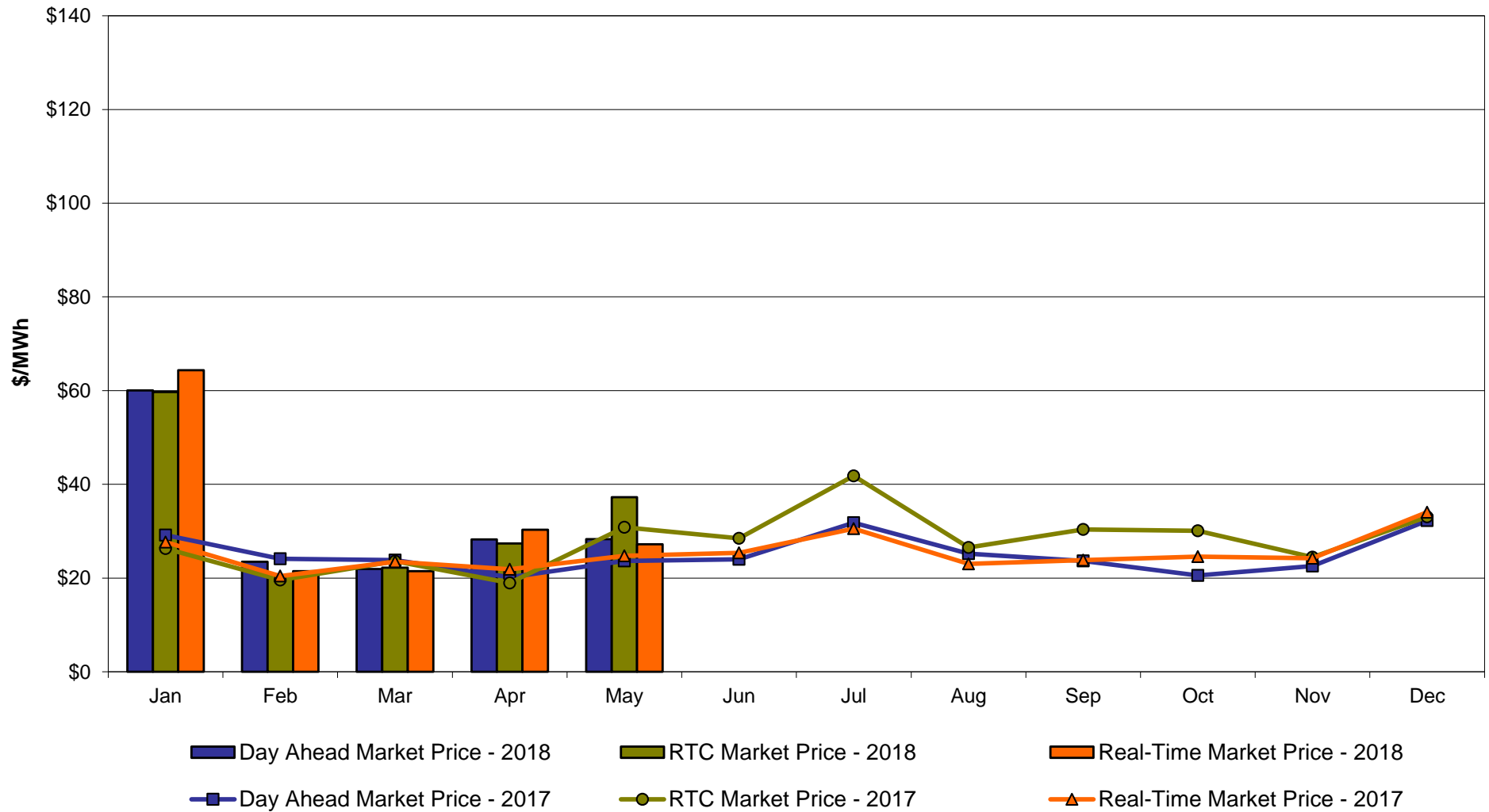


**May 2018 Zonal LBMP Statistics for NYISO (\$/MWh)**

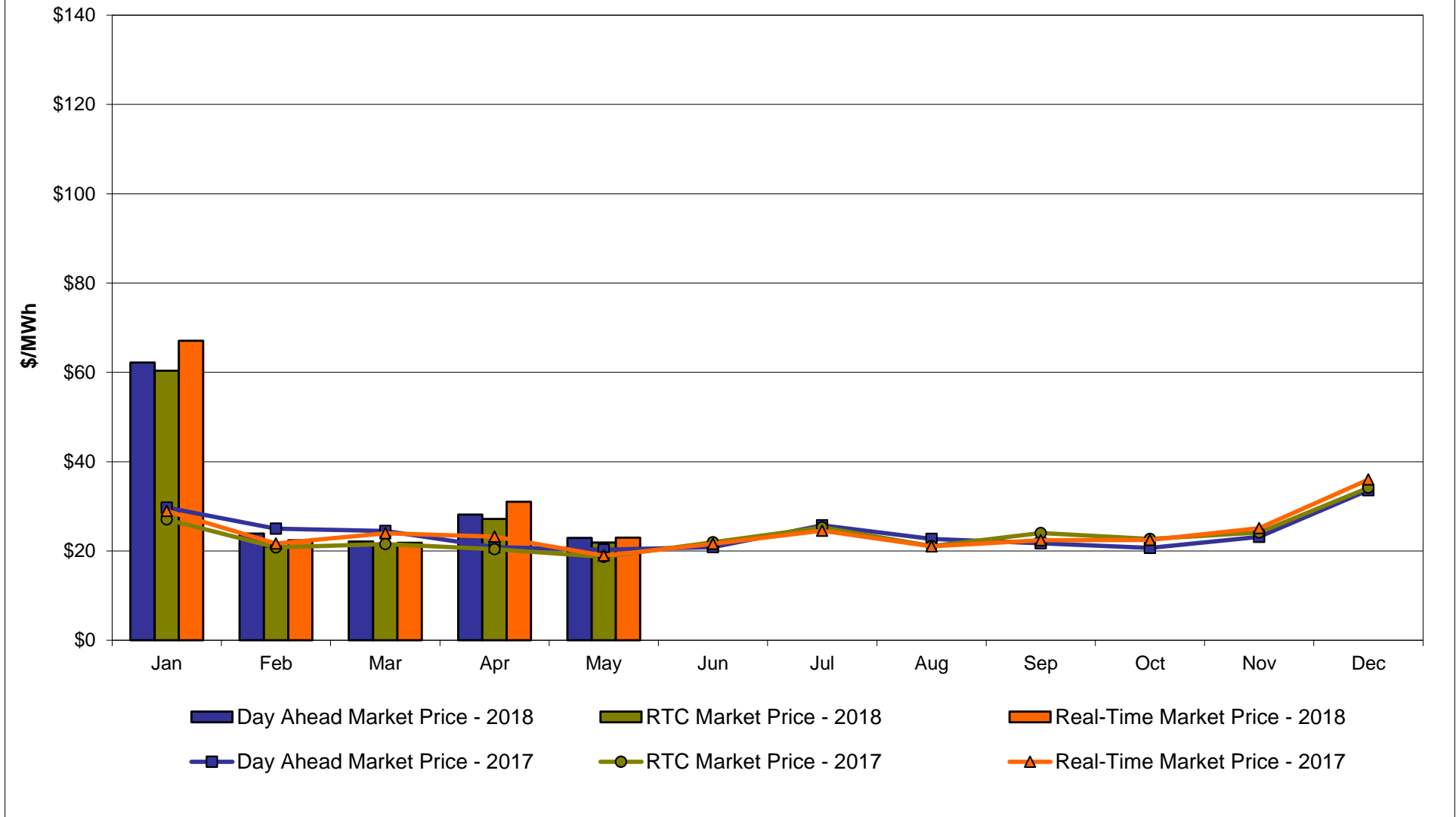
	<u>WEST Zone A</u>	<u>GENESEE Zone B</u>	<u>NORTH Zone D</u>	<u>CENTRAL Zone C</u>	<u>MOHAWK VALLEY Zone E</u>	<u>CAPITAL Zone F</u>	<u>HUDSON VALLEY Zone G</u>	<u>MILLWOOD Zone H</u>	<u>DUNWOODIE Zone I</u>	<u>NEW YORK CITY Zone J</u>	<u>LONG ISLAND Zone K</u>
<b><u>DAY AHEAD LBMP</u></b>											
Unweighted Price *	28.31	22.22	10.35	22.94	21.60	24.99	25.61	25.71	25.75	26.96	30.44
Standard Deviation	23.83	7.93	6.72	7.98	7.24	7.50	8.29	8.35	8.36	9.14	9.94
<b><u>RTC LBMP</u></b>											
Unweighted Price *	37.27	21.21	8.87	21.87	19.89	23.25	23.57	23.60	23.62	25.64	27.11
Standard Deviation	103.93	16.29	44.87	14.95	14.95	13.52	14.07	14.11	14.10	14.27	18.49
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	27.22	22.08	9.30	22.97	21.27	24.81	25.18	25.21	25.22	27.63	27.58
Standard Deviation	59.08	21.66	45.03	22.20	21.90	21.76	22.58	22.64	22.64	23.11	24.48
	<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 *	19.76	13.25	13.25	24.68	25.28	29.82	28.27	29.32	27.07	26.09	8.94
Standard Deviation	7.27	6.77	6.77	8.87	7.44	9.67	8.64	9.56	9.35	8.53	5.49
<b><u>RTC LBMP</u></b>											
Unweighted Price *	15.62	11.55	11.55	26.02	22.62	26.55	26.06	26.35	25.76	24.01	7.60
Standard Deviation	20.54	34.04	34.04	48.37	14.30	17.59	16.21	17.68	13.87	14.25	47.43
<b><u>REAL TIME LBMP</u></b>											
Unweighted Price *	19.18	11.50	11.50	26.63	24.49	27.13	25.94	26.95	27.71	25.73	8.41
Standard Deviation	23.81	46.22	46.22	50.14	20.71	24.33	25.61	24.44	23.00	22.81	46.07

\* Straight LBMP averages

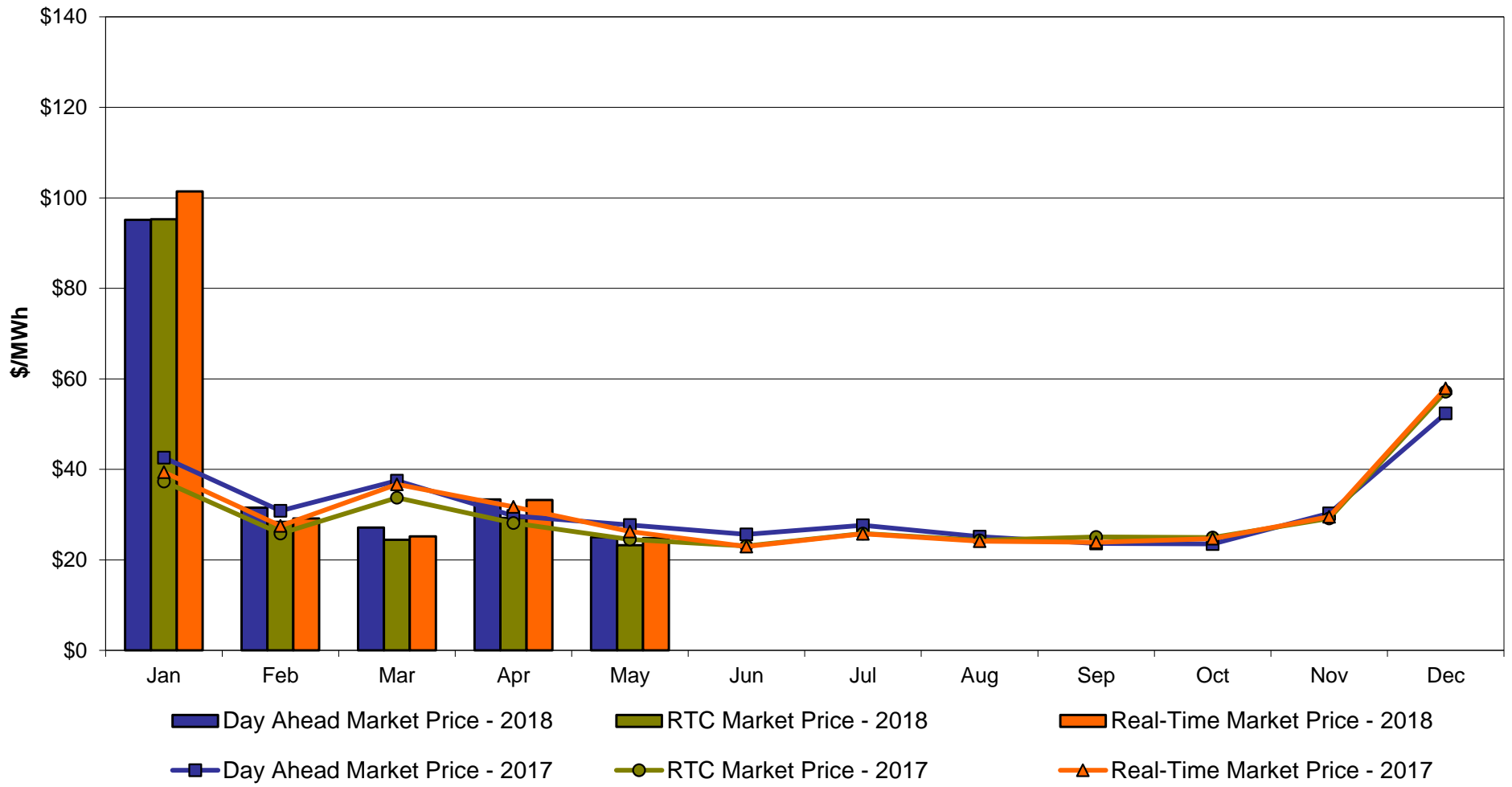
**West Zone A  
Monthly Average LBMP Prices 2017 - 2018**



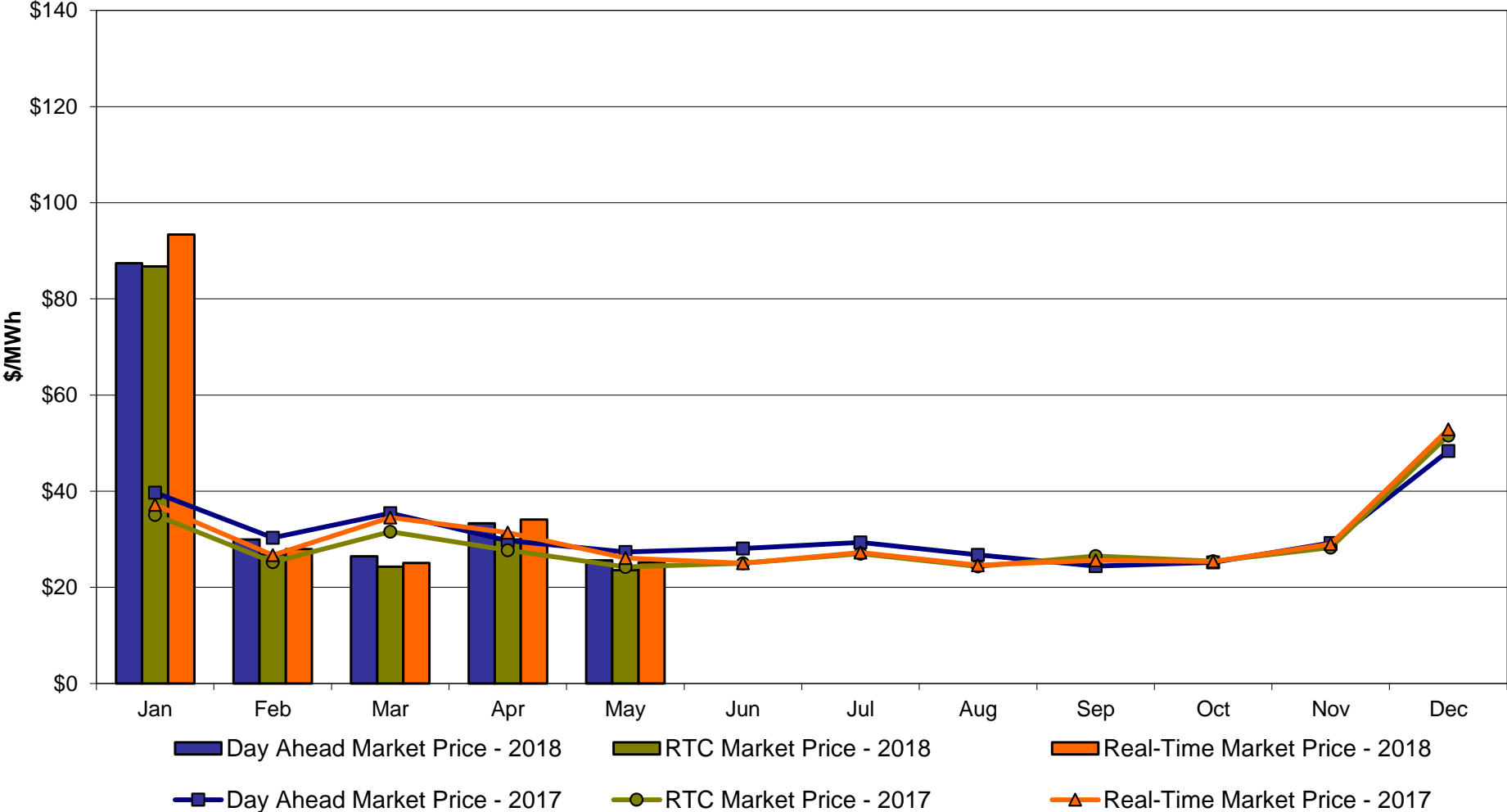
### Central Zone C Monthly Average LBMP Prices 2017 - 2018



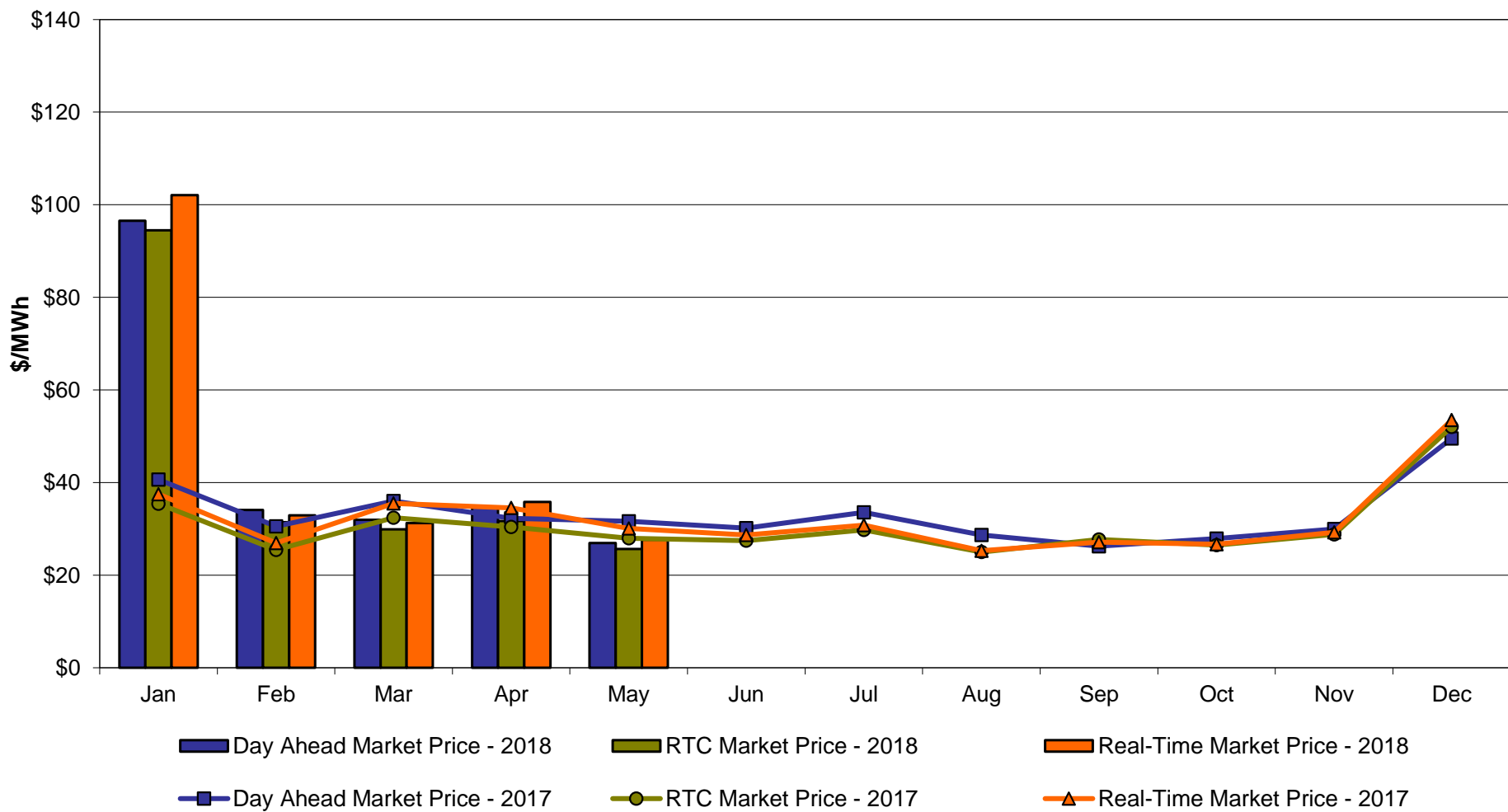
## Capital Zone F Monthly Average LBMP Prices 2017 - 2018



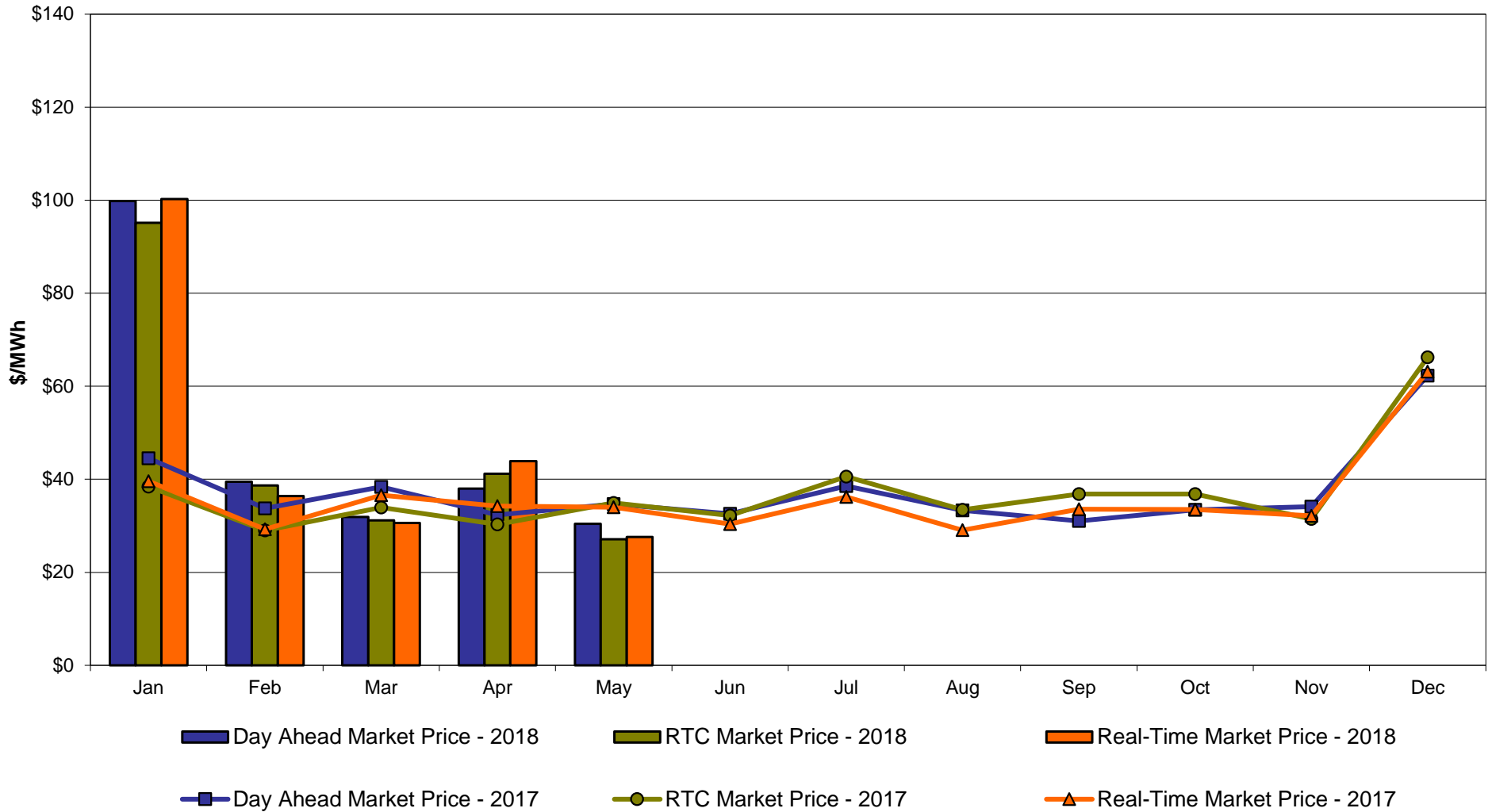
### Hudson Valley Zone G Monthly Average LBMP Prices 2017 - 2018



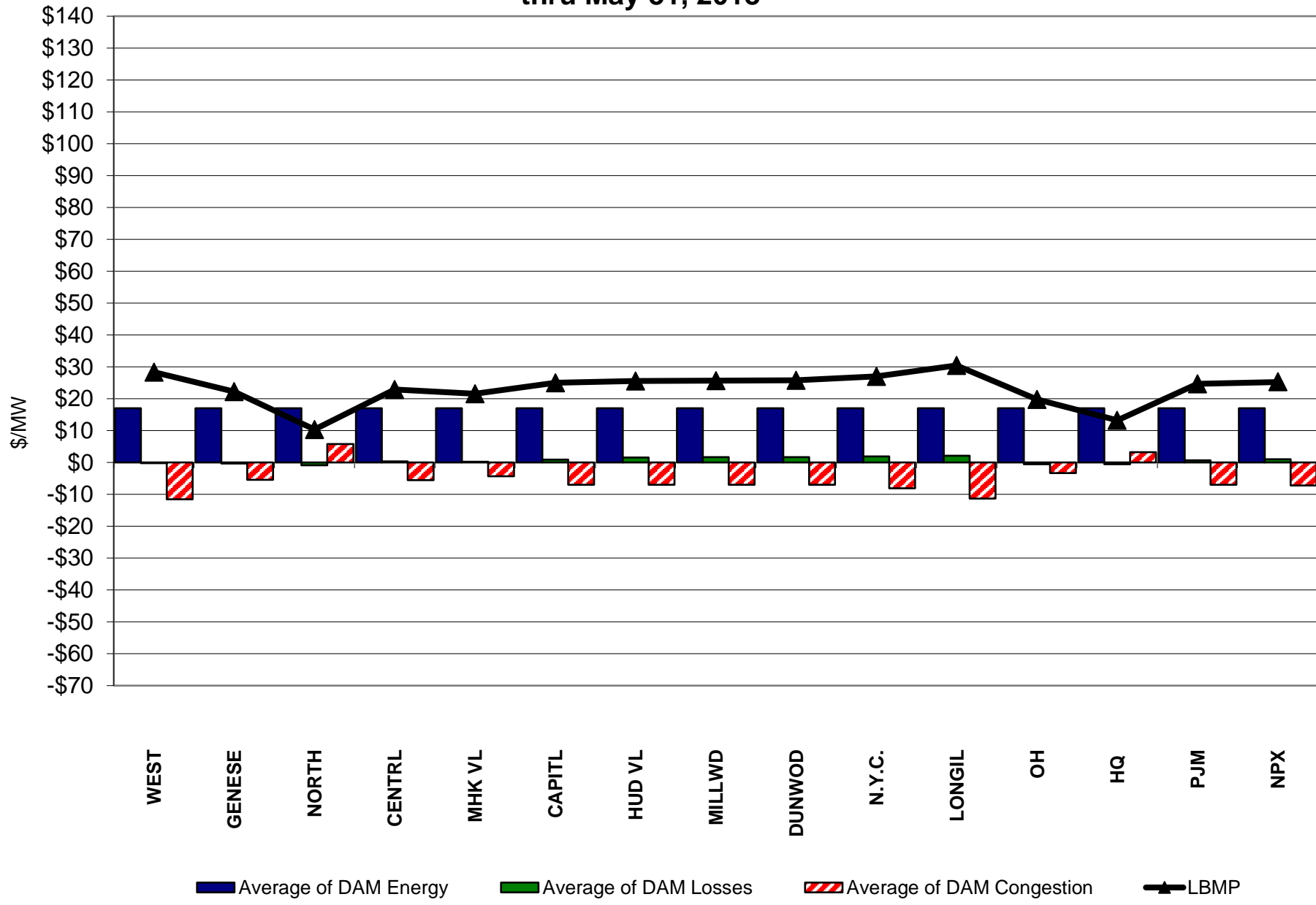
## NYC Zone J Monthly Average LBMP Prices 2017 - 2018



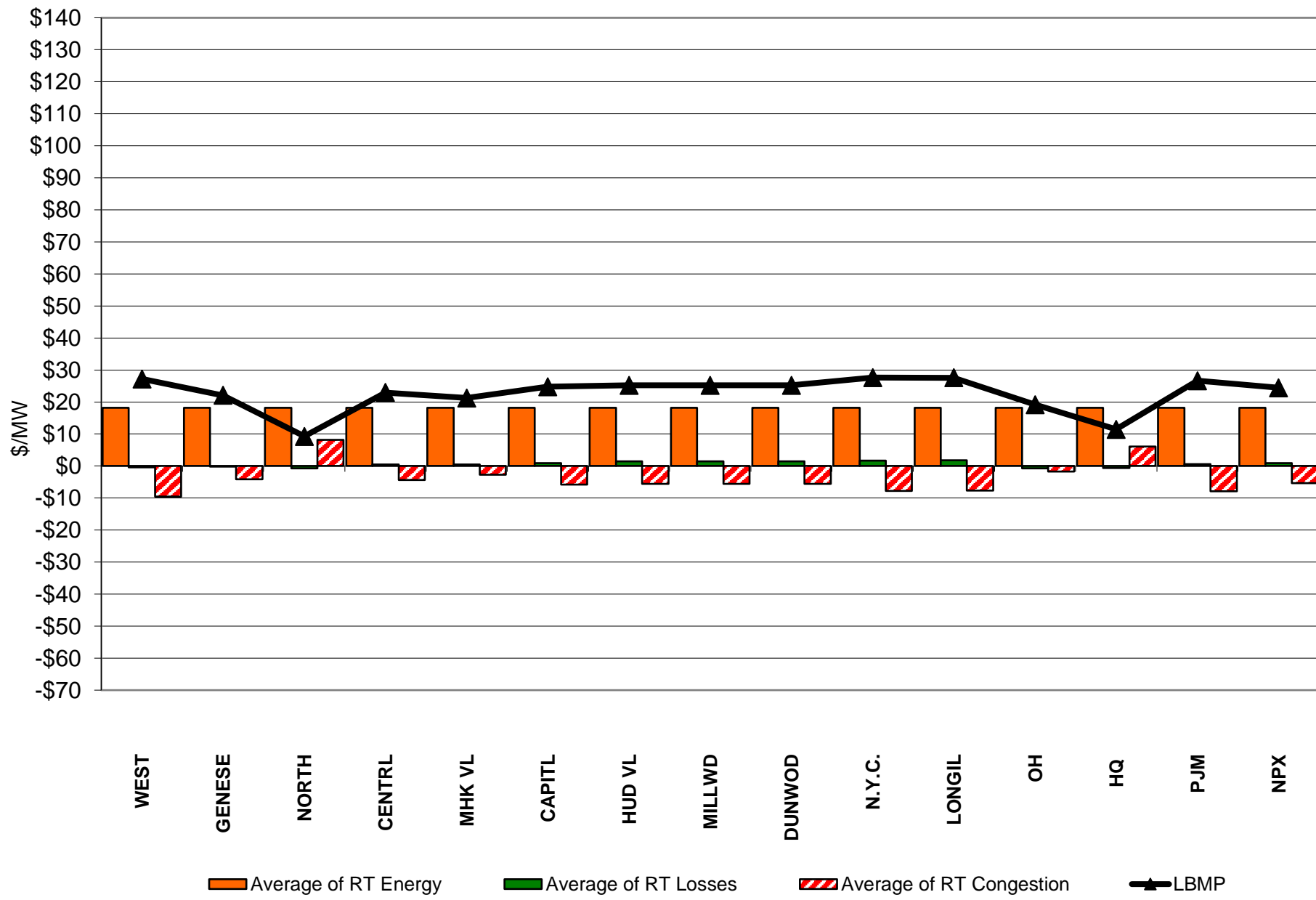
## Long Island Zone K Monthly Average LBMP Prices 2017 - 2018



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

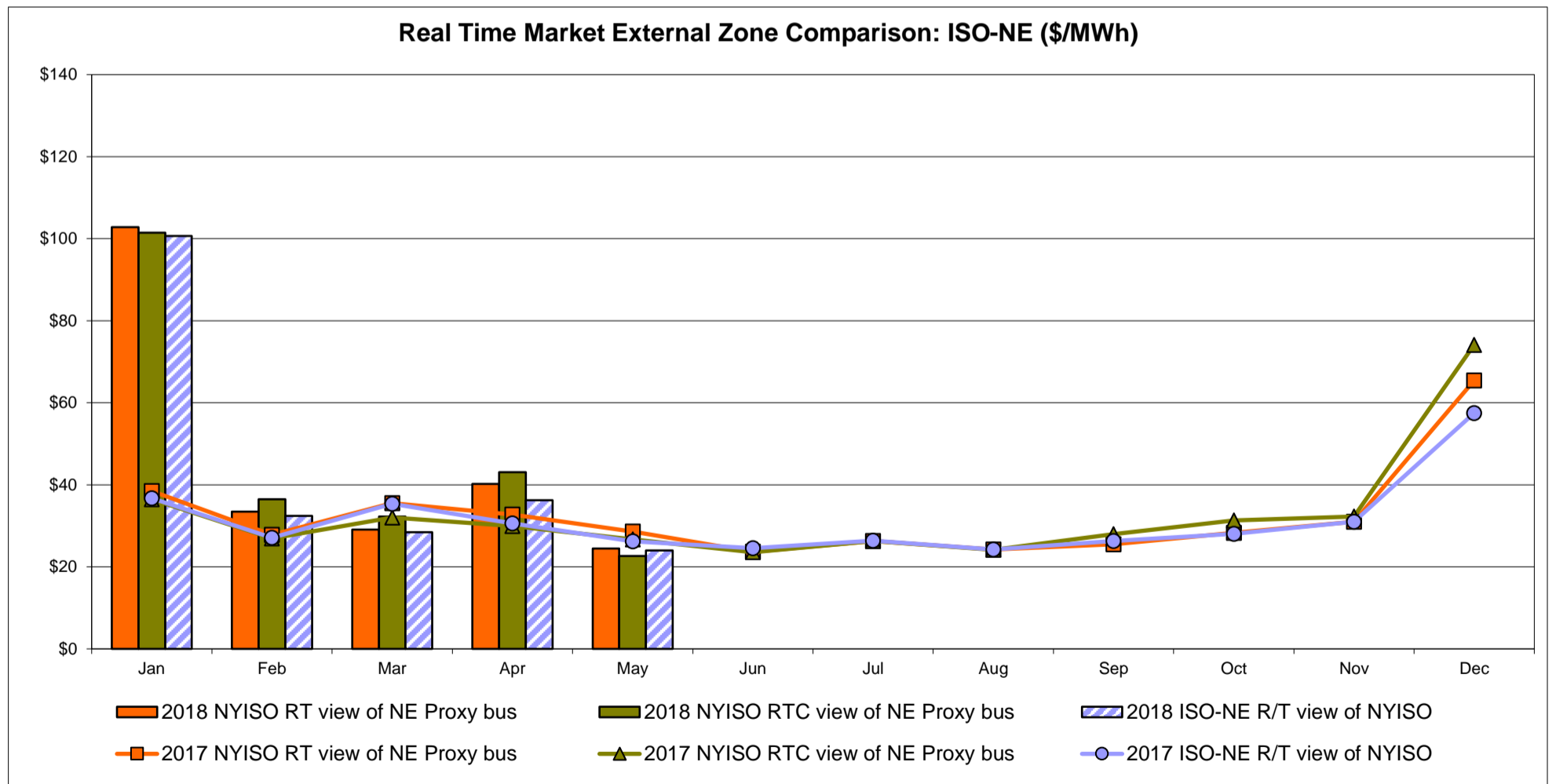
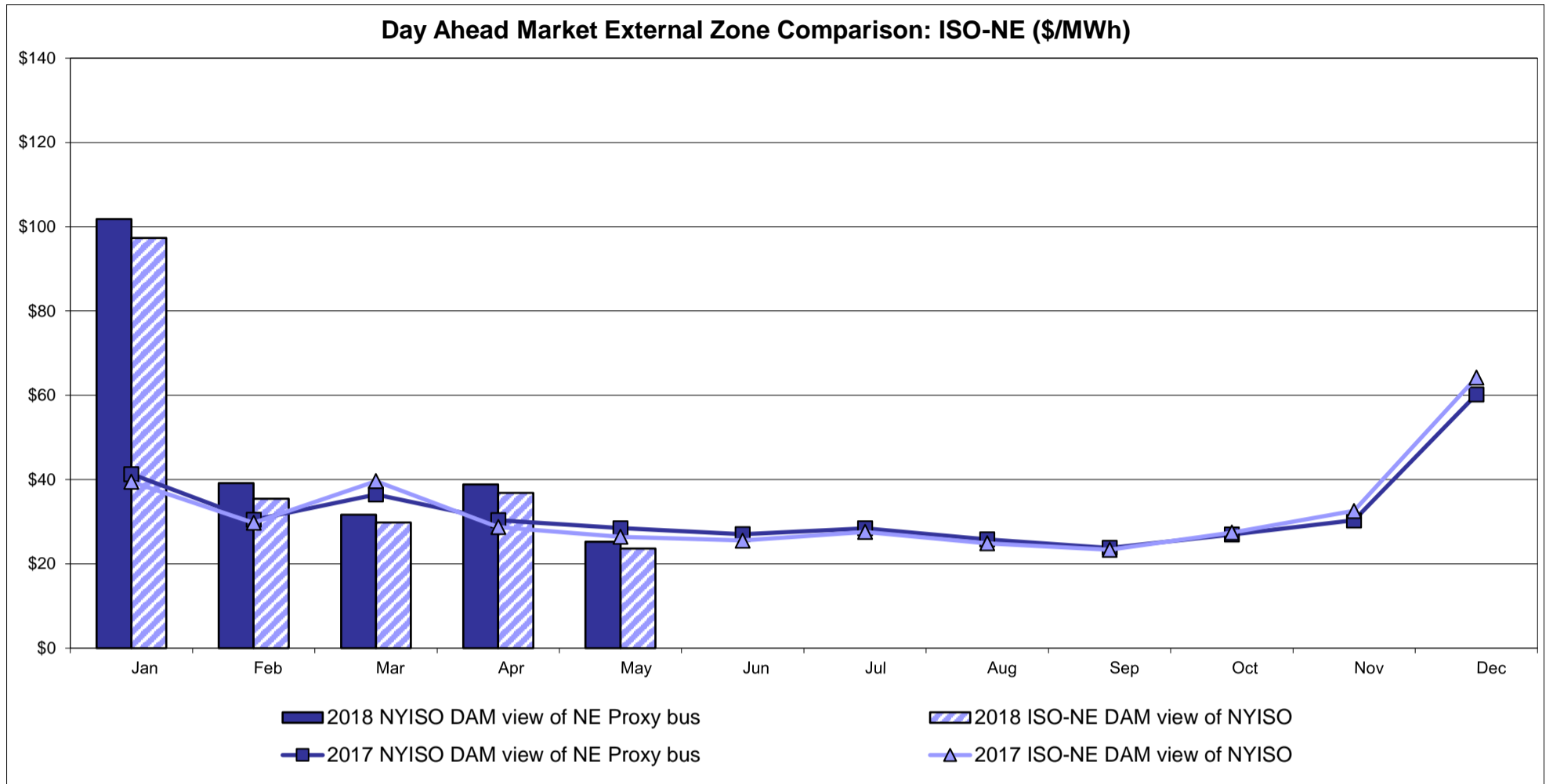


**RT Zonal Unweighted Monthly Average LBMP Components  
thru May 31, 2018**



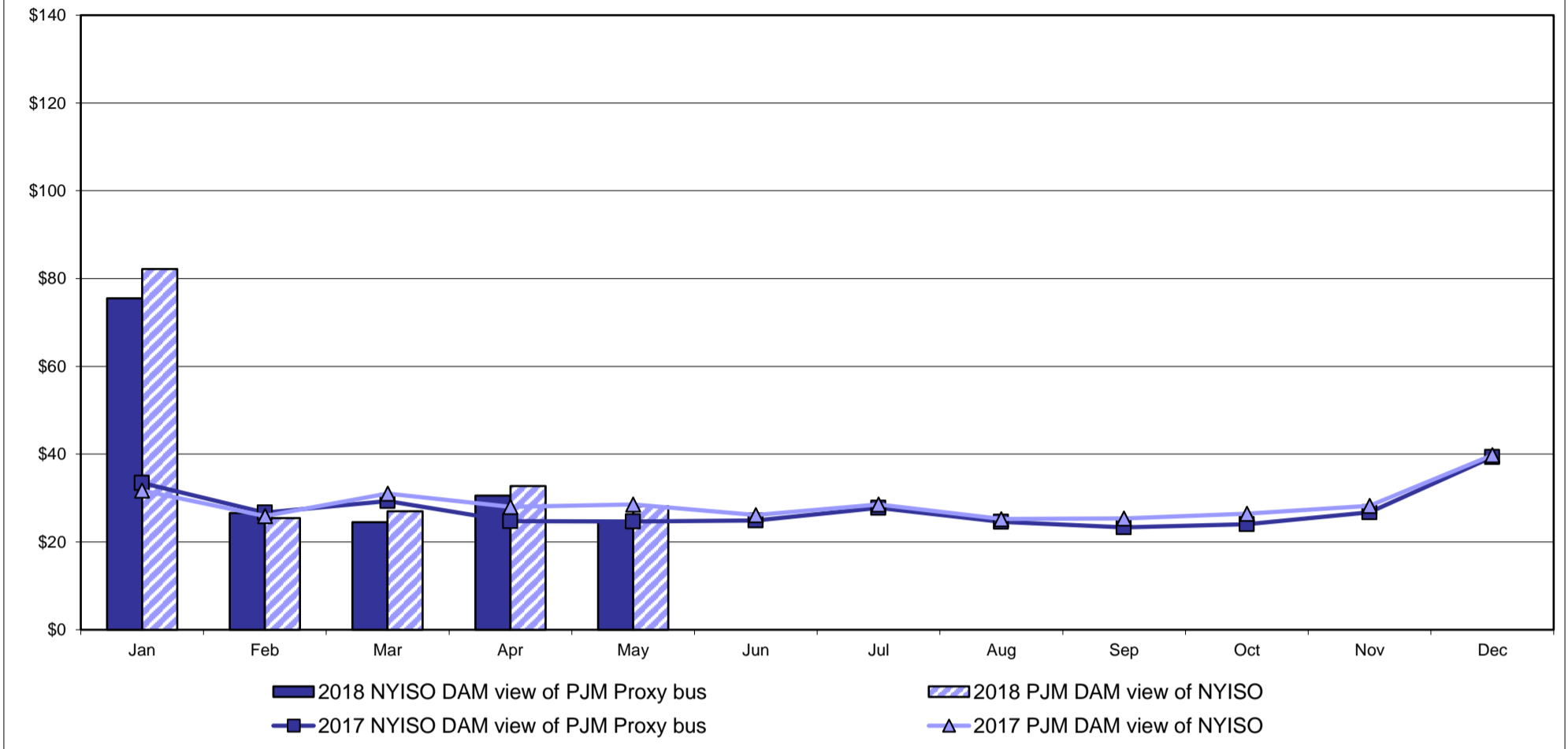


# External Comparison ISO-New England

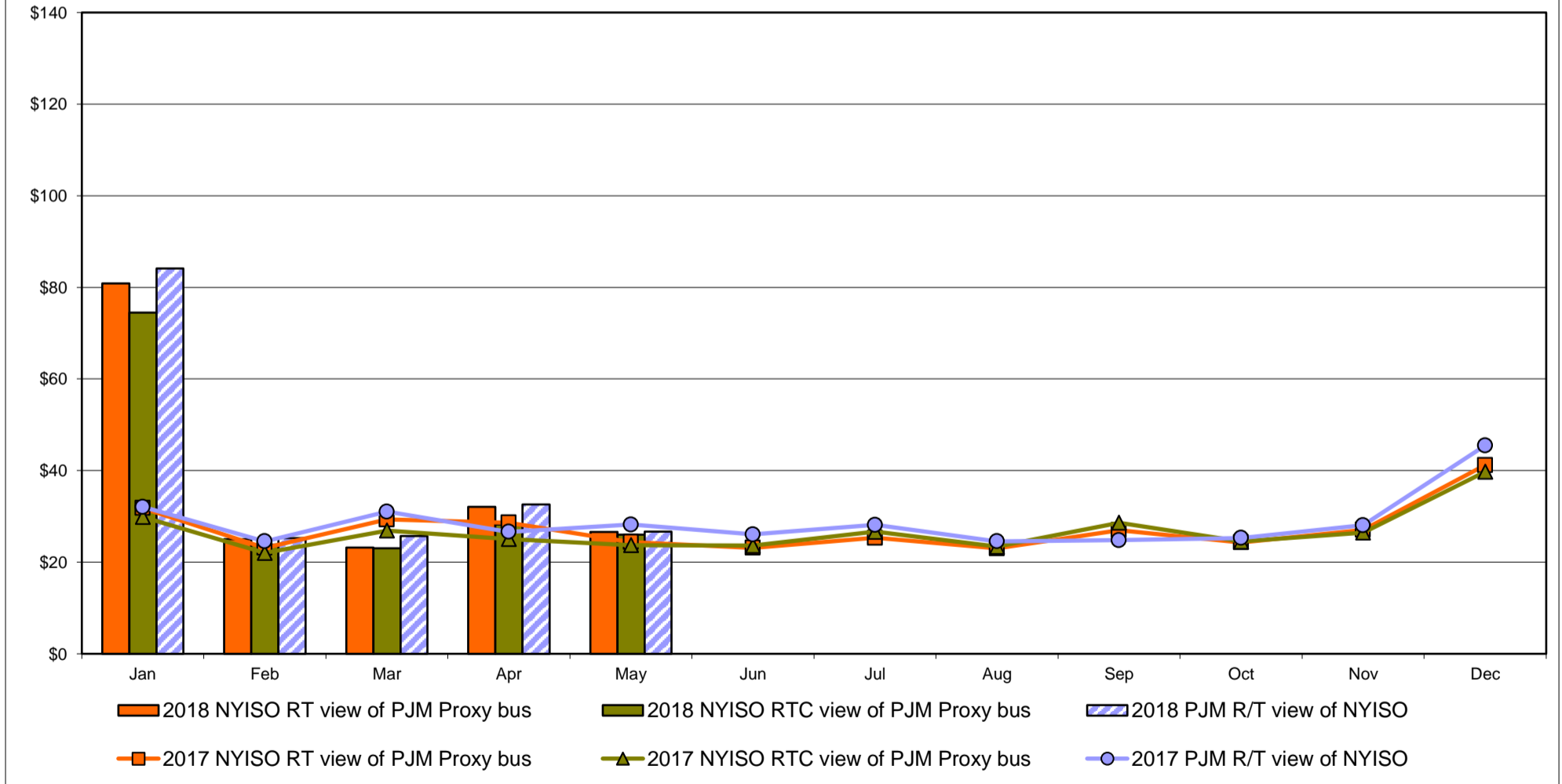


# External Comparison PJM

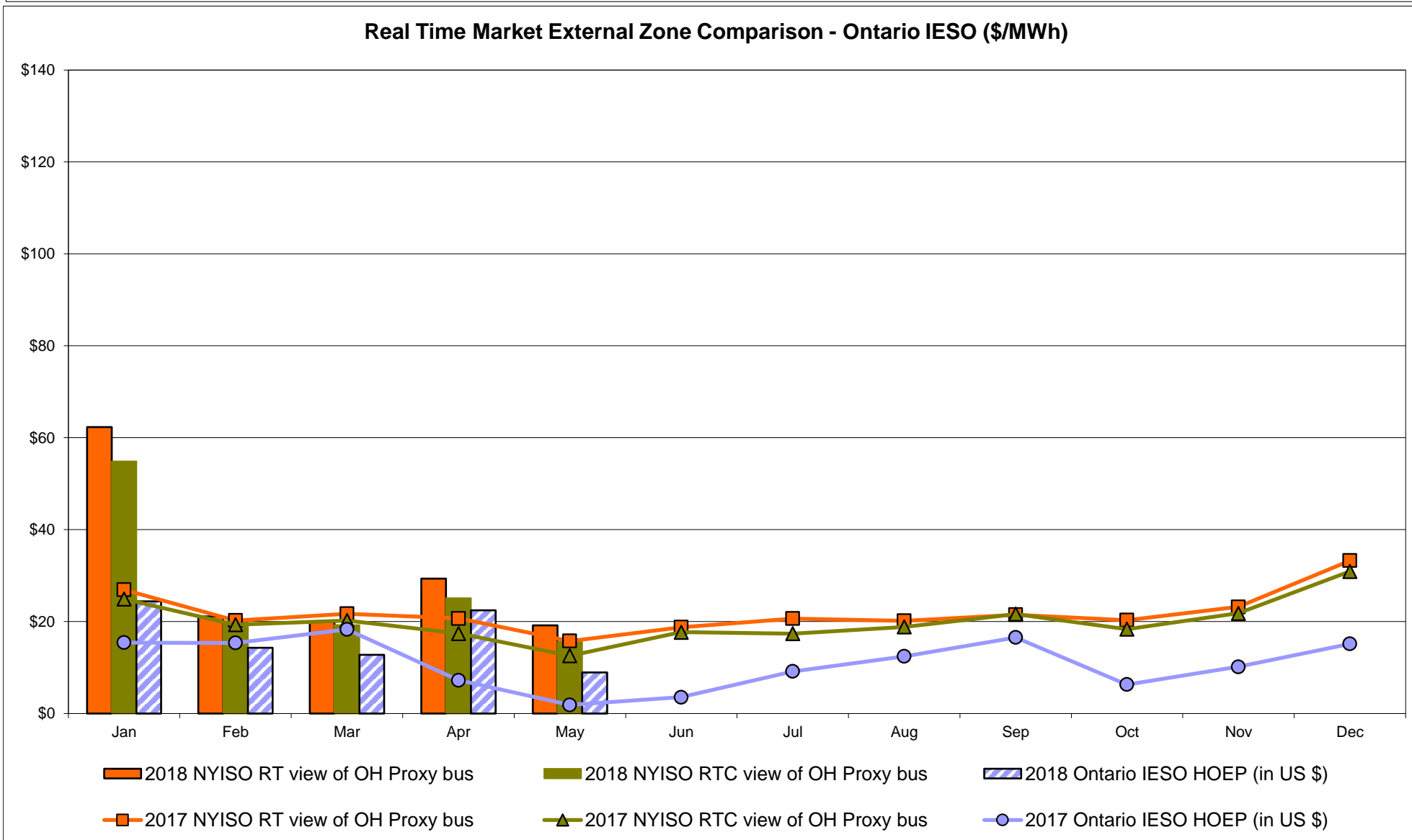
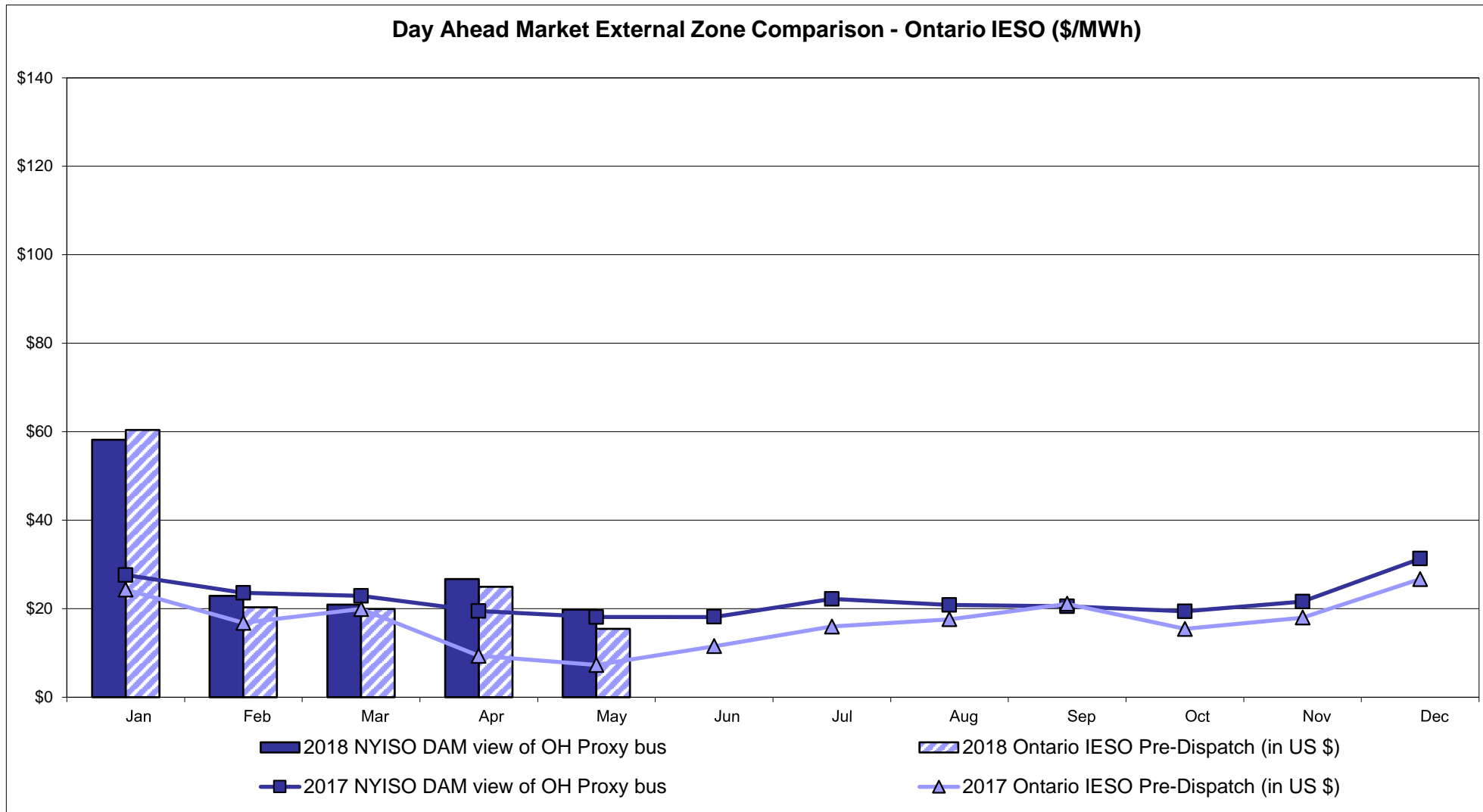
### Day Ahead Market External Zone Comparison - PJM (\$/MWh)



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

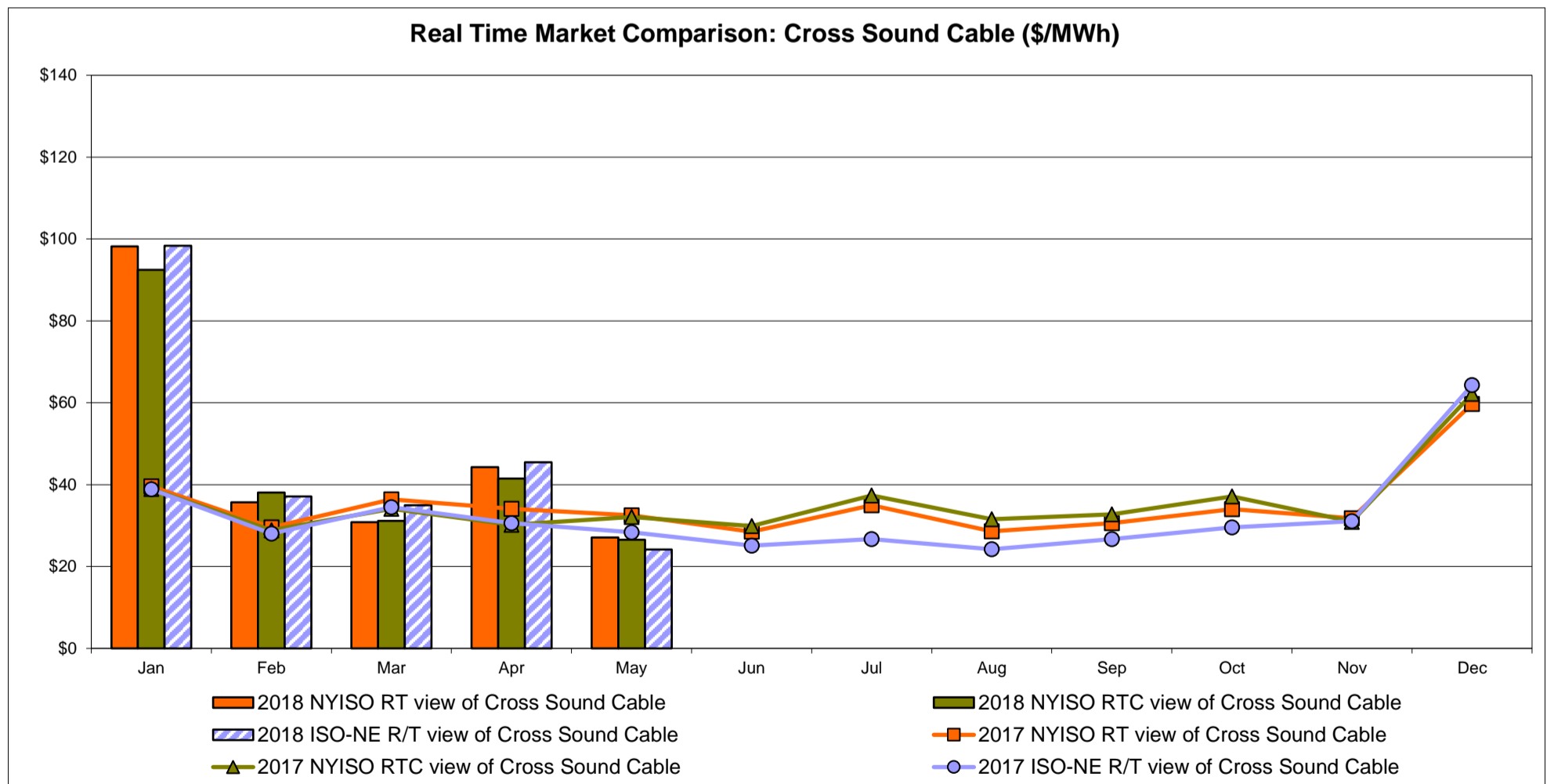
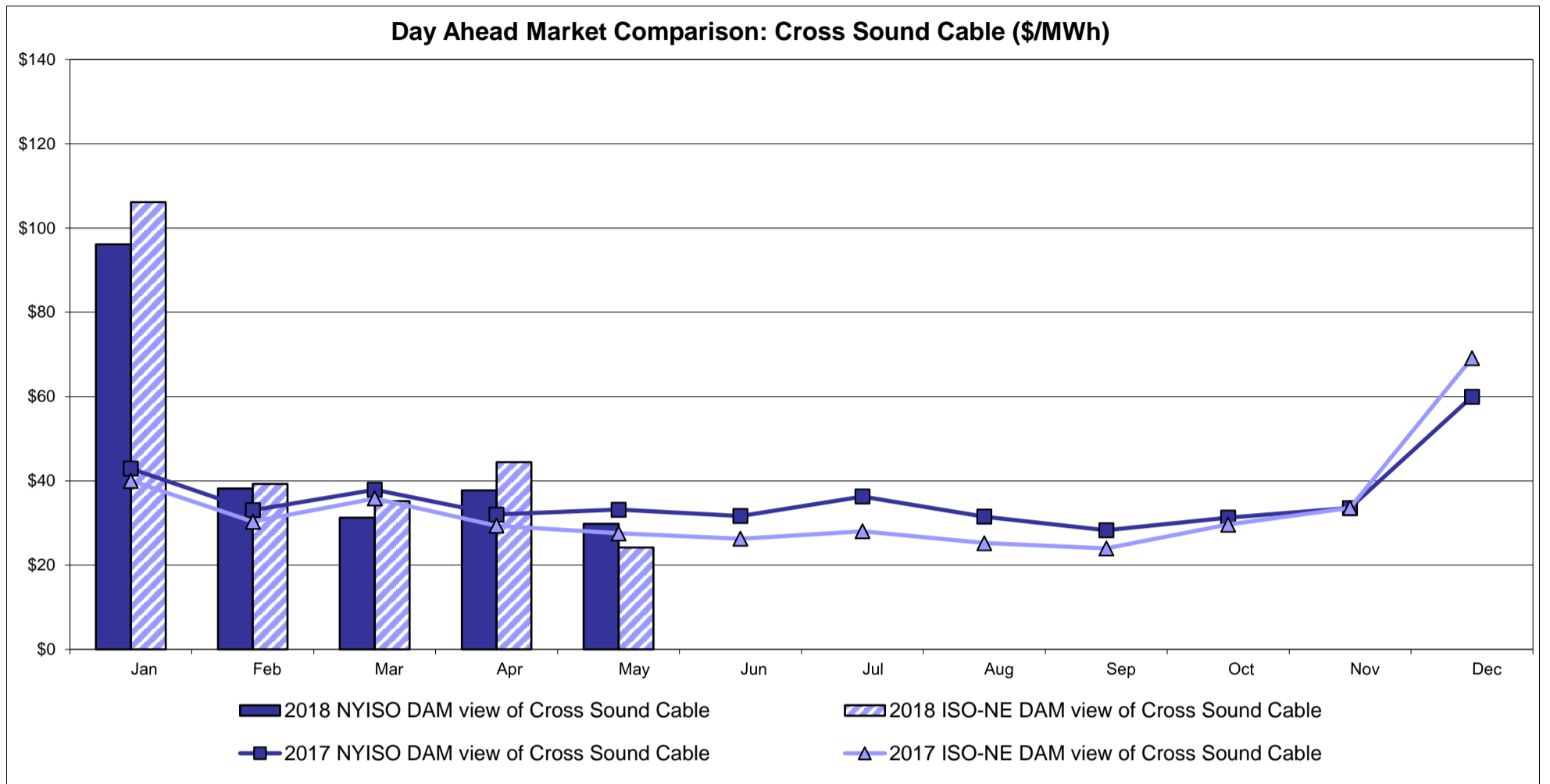


# External Comparison Ontario IESO



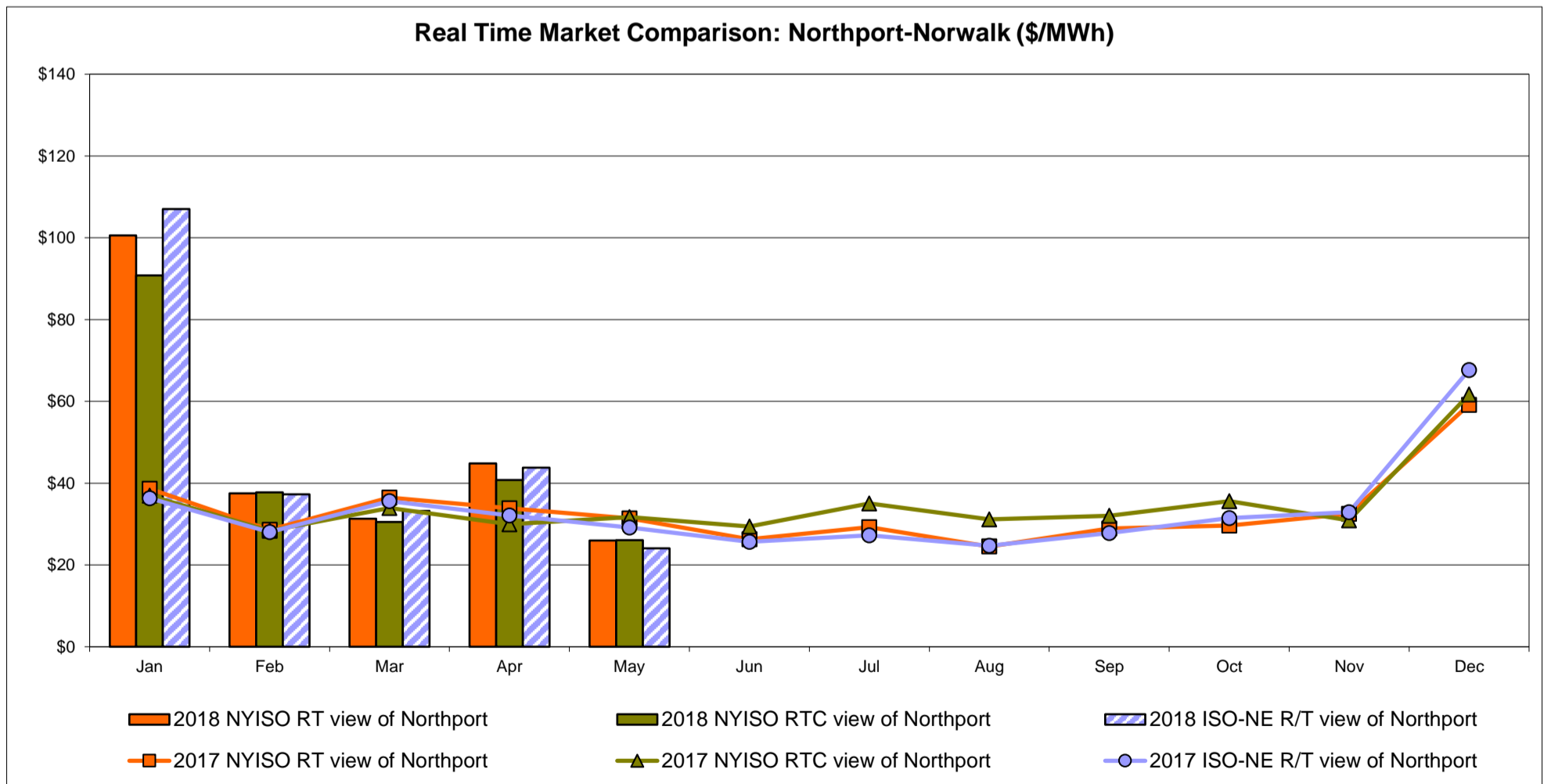
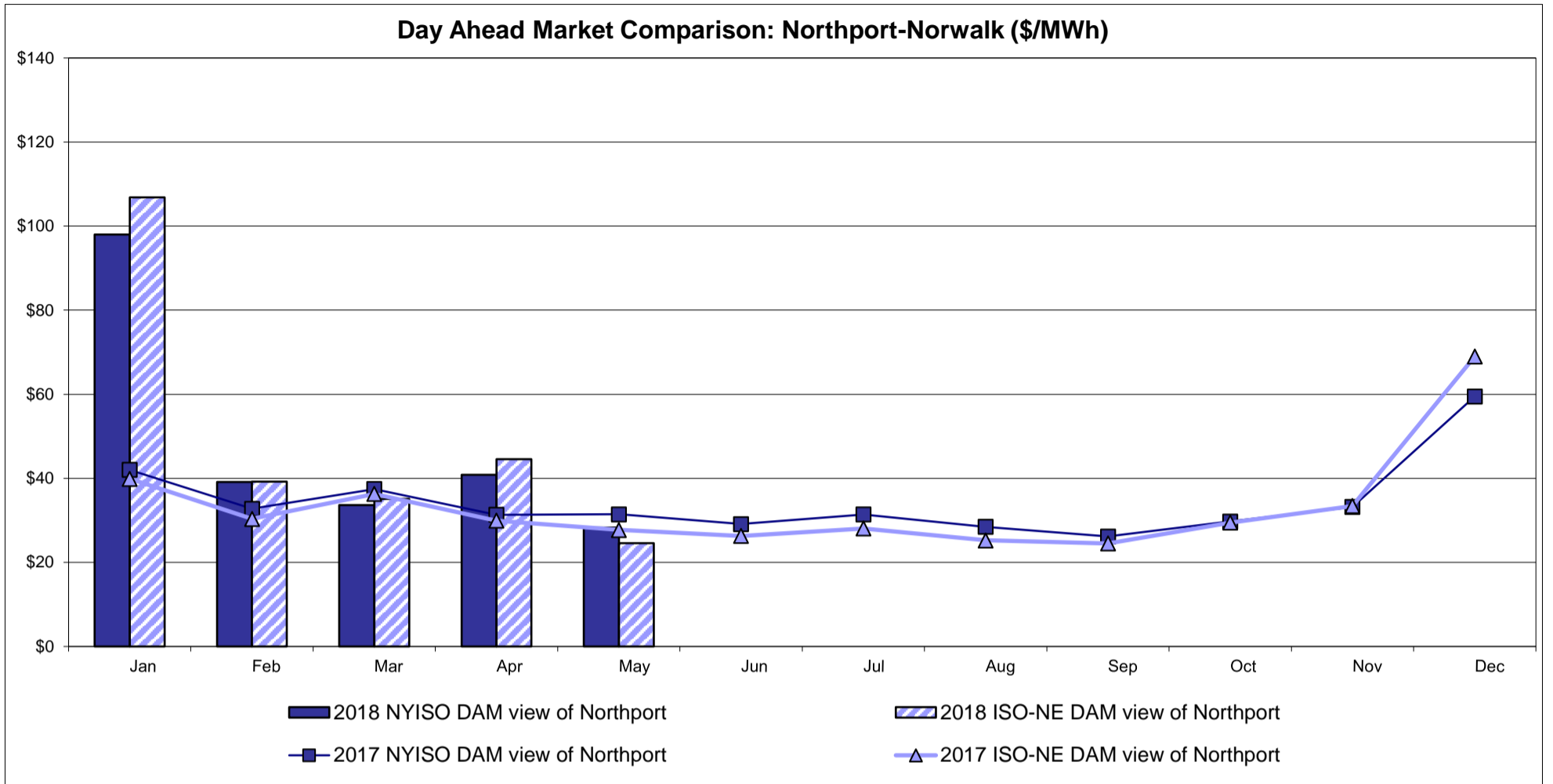
Notes: Exchange factor used for May 2018 was 0.77724234416291 to US  
 HOEP: Hourly Ontario Energy Price  
 Pre-Dispatch: Projected Energy Price

# 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.

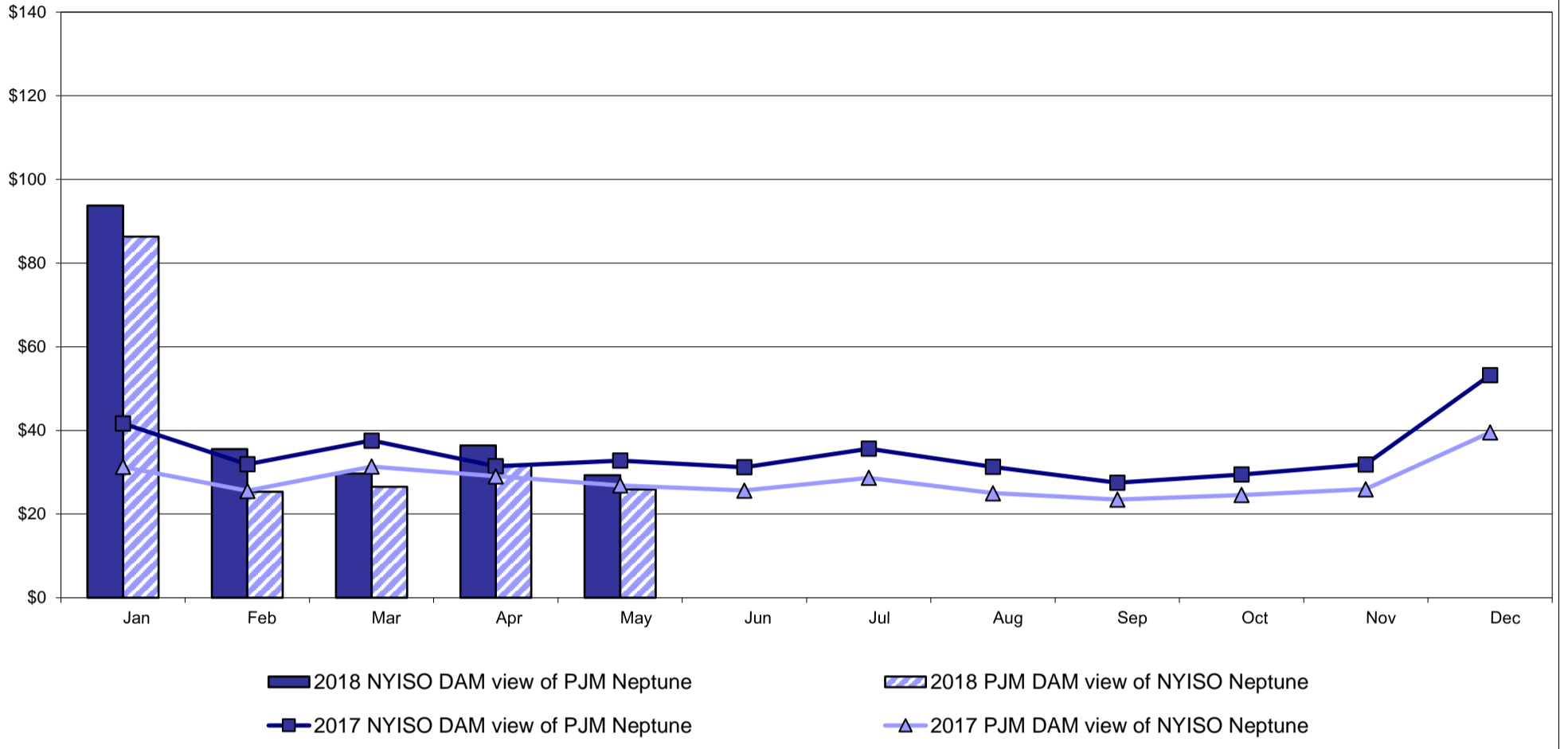
# External Controllable Line: Northport - Norwalk (New England)



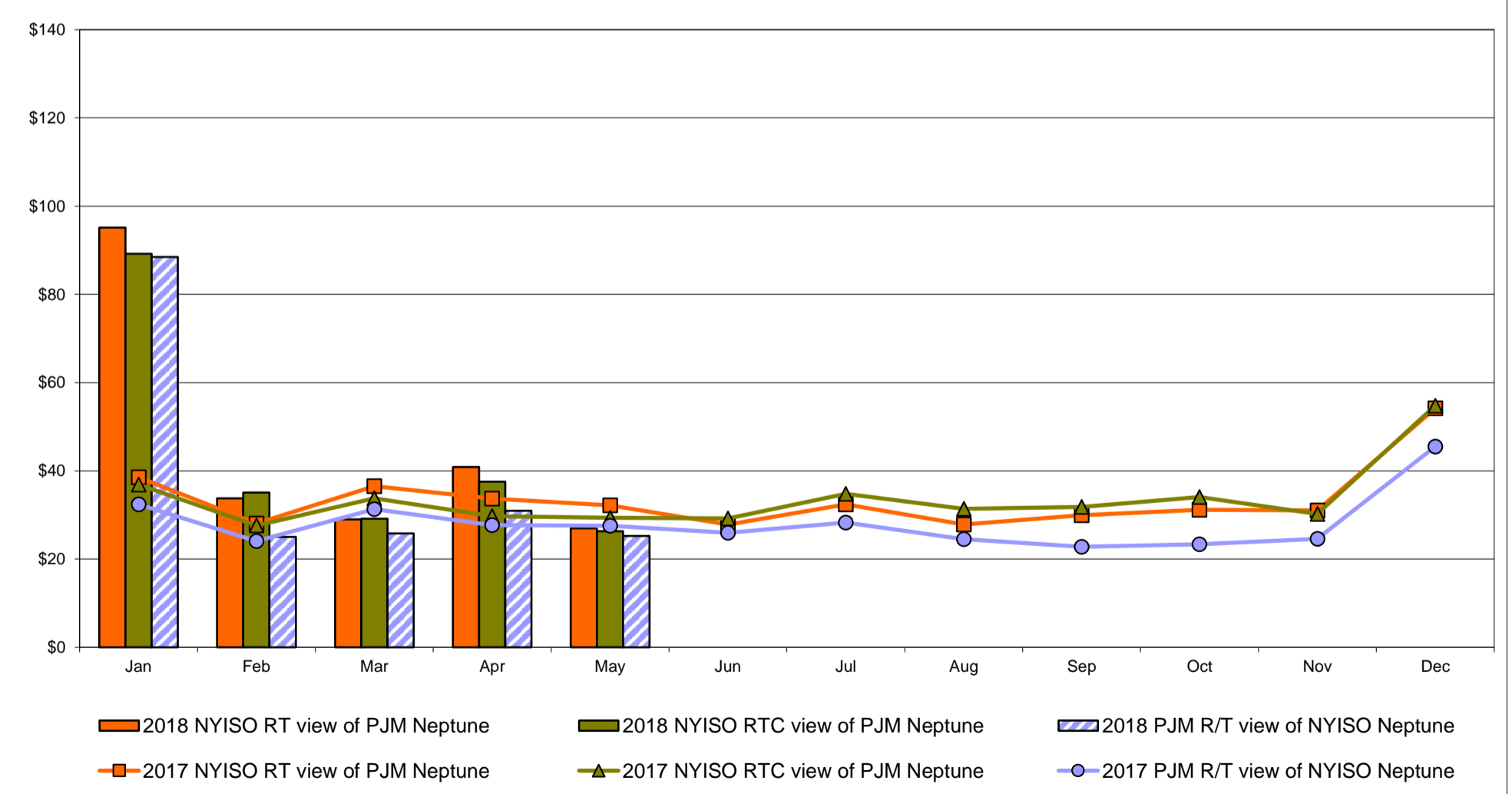
Note:  
 ISO-NE Forecast is an advisory posting @ 18:00 day before.  
 The DAM and R/T prices at the Northport 138 interface are used for ISO-NE.  
 The DAM and R/T prices at the 1385 interface are used for NYISO.

# External Controllable Line: Neptune (PJM)

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

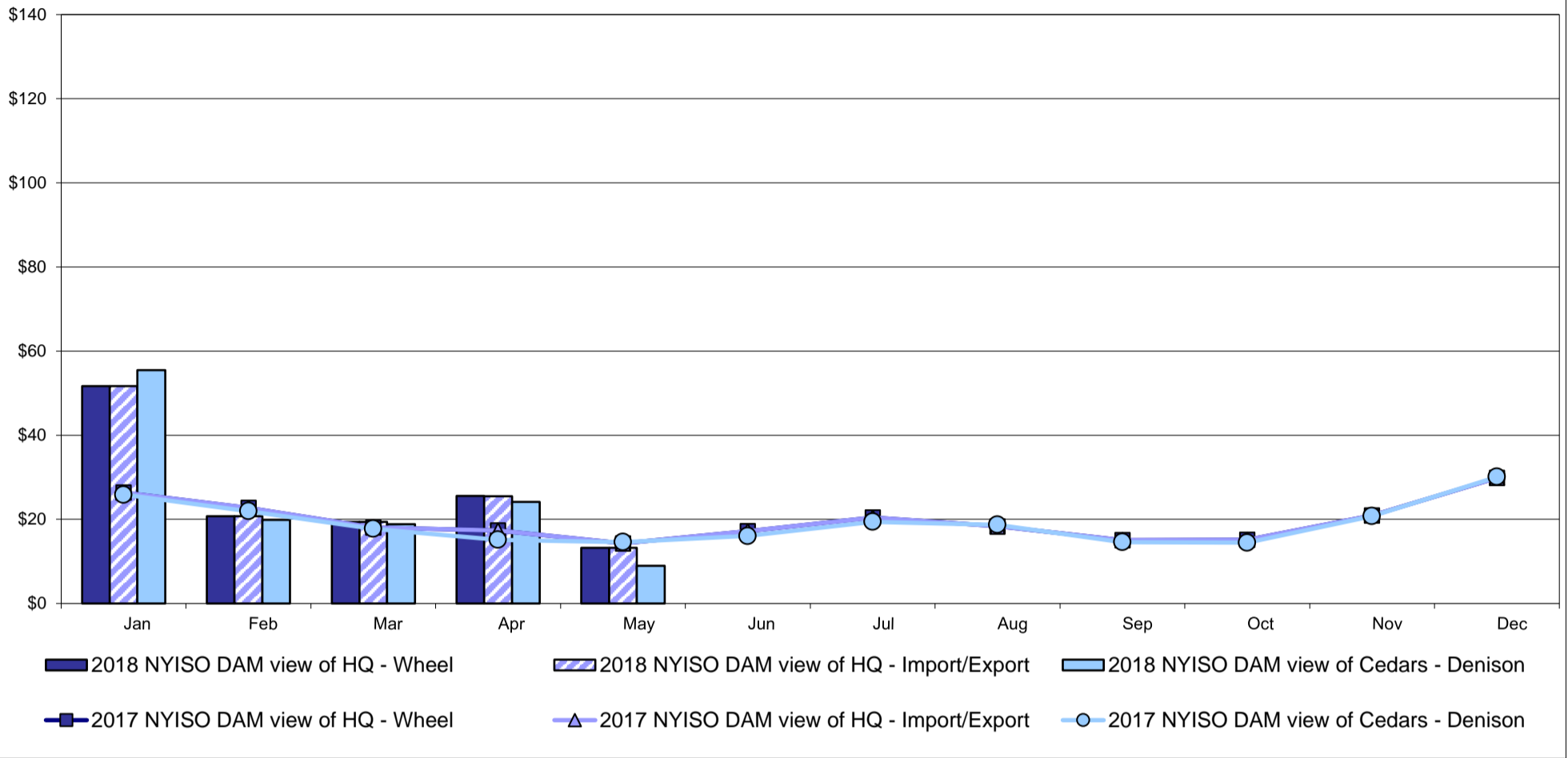


## Real Time Market Comparison: Neptune (\$/MWh)

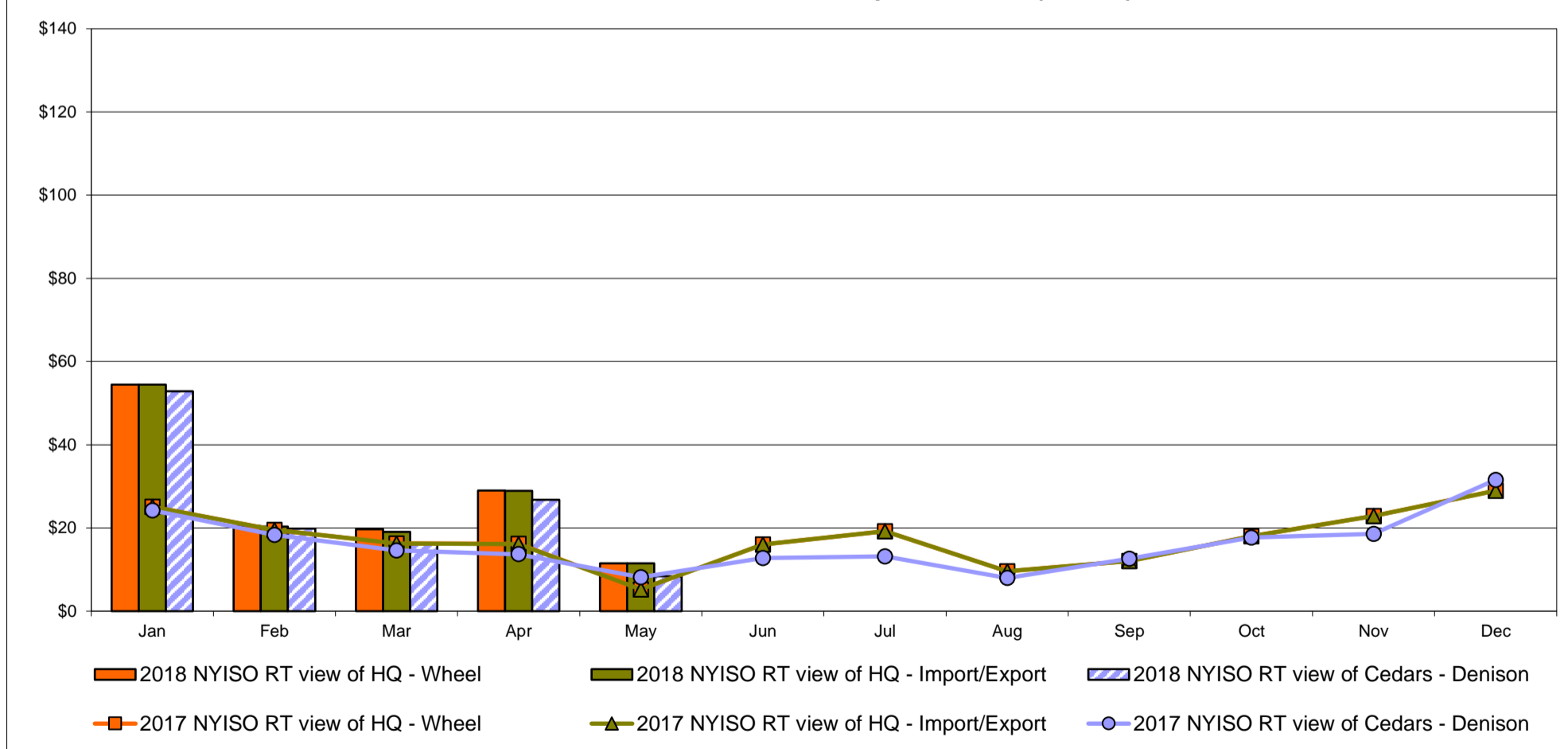


# External Comparison Hydro-Quebec

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

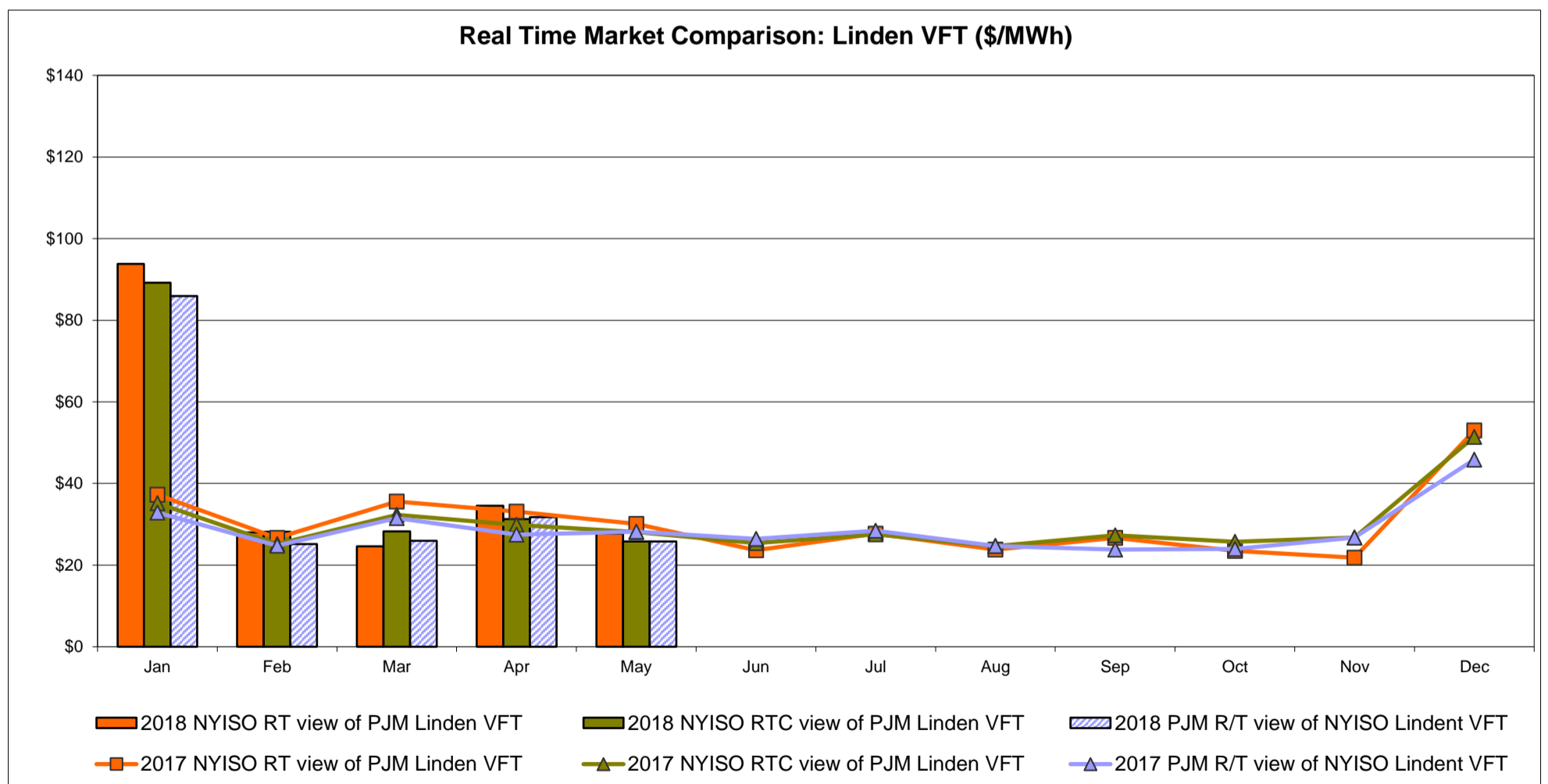
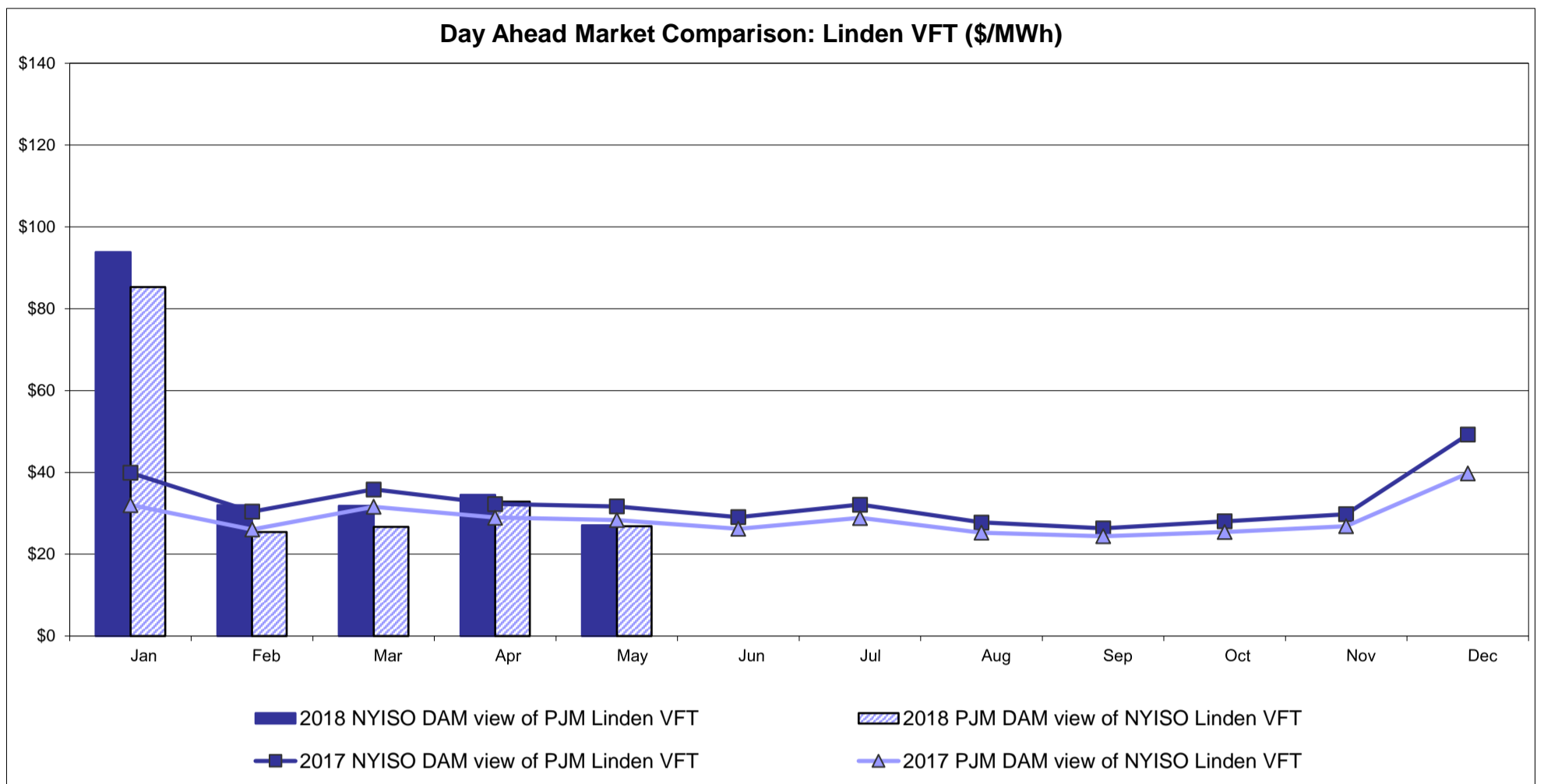


### Real Time Market External Zone Comparison - HQ (\$/MWh)



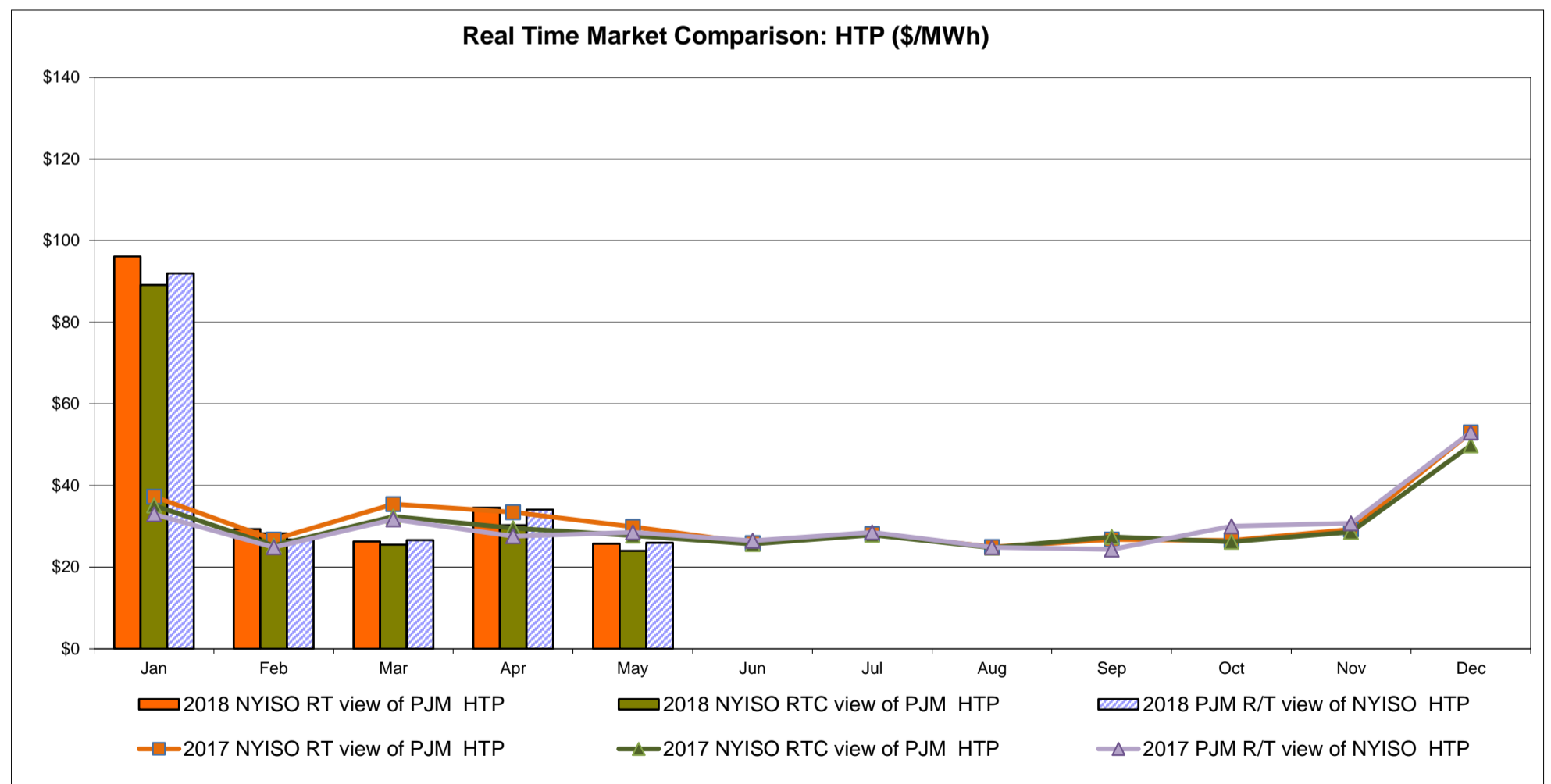
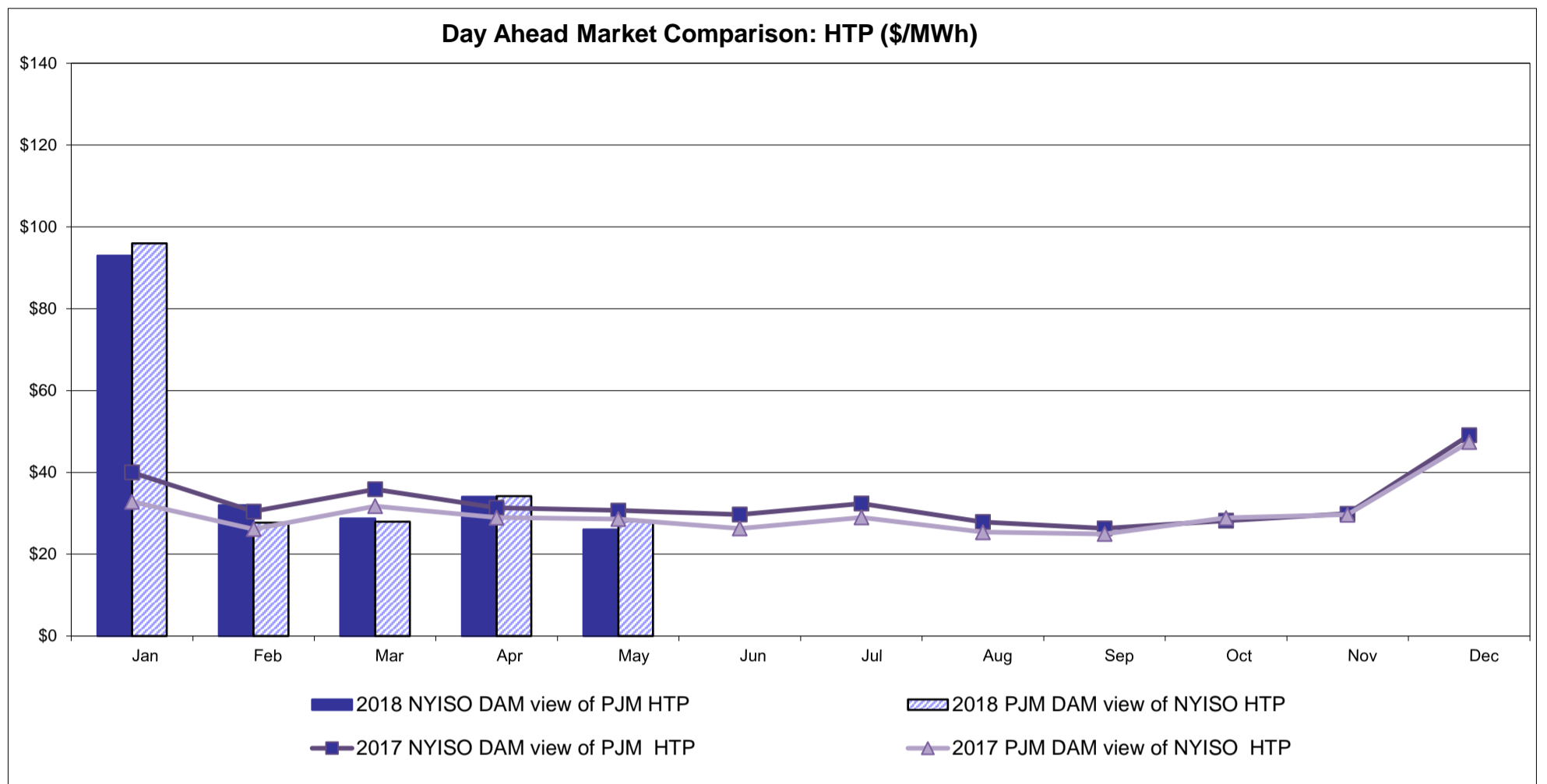
Note:  
Hydro-Quebec Prices are unavailable.

# External Controllable Line: Linden VFT (PJM)





# External Controllable Line: Hudson (PJM)

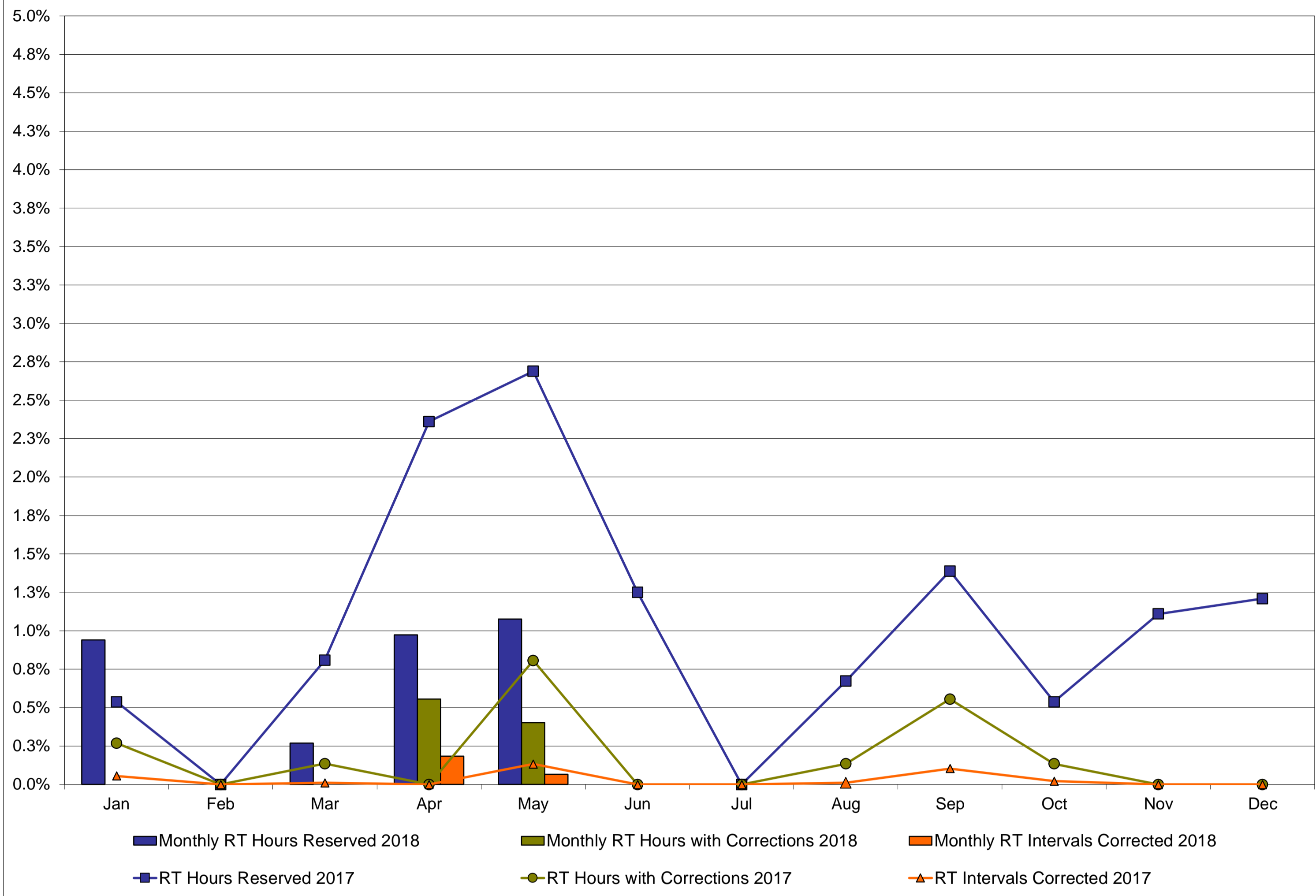


## NYISO Real Time Price Correction Statistics

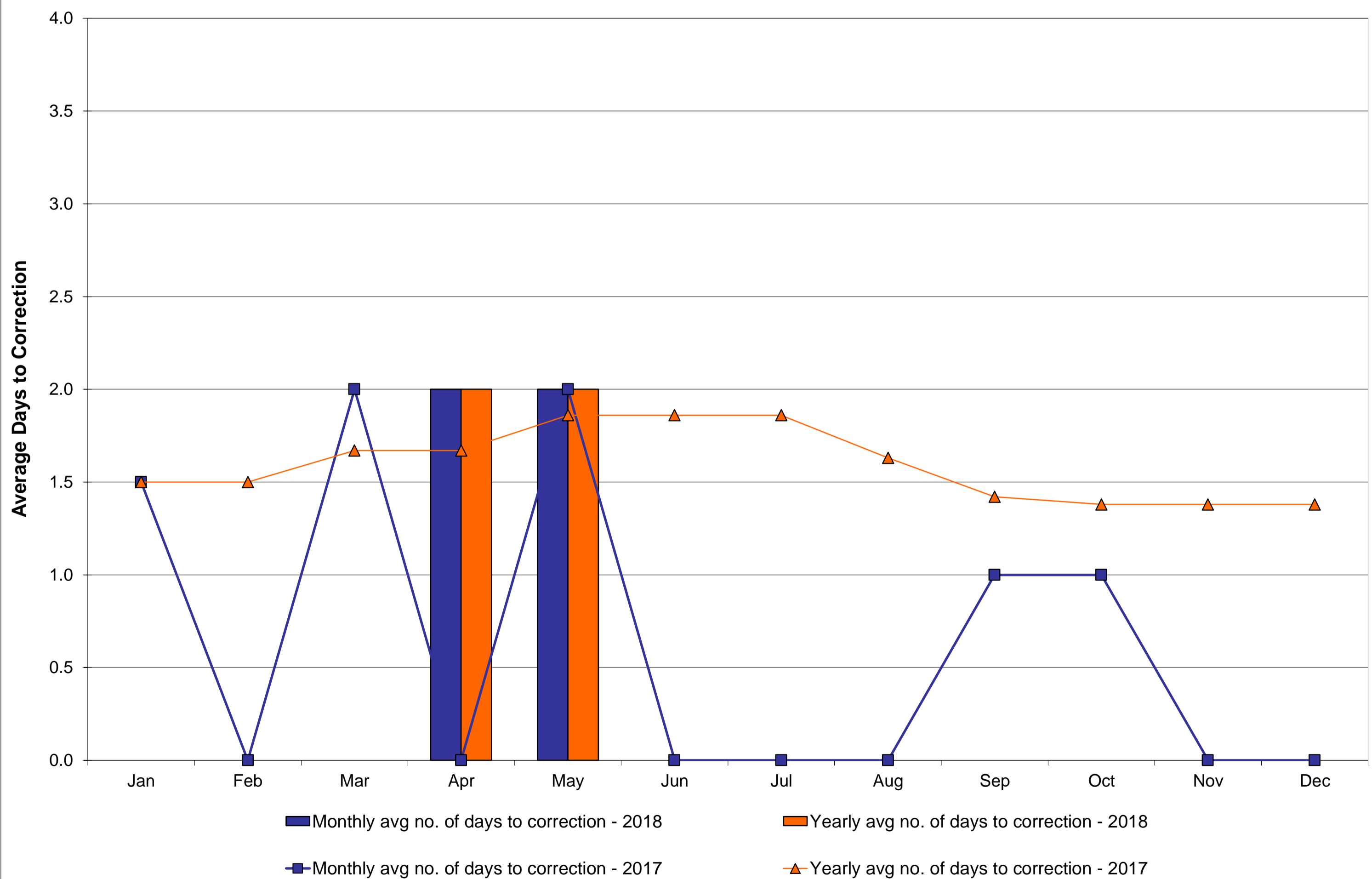
<b>2018</b>		<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b>Hour Corrections</b>													
Number of hours with corrections	in the month	0	0	0	4	3							
Number of hours	in the month	744	672	743	720	744							
% of hours with corrections	in the month	0.00%	0.00%	0.00%	0.56%	0.40%							
% of hours with corrections	year-to-date	0.00%	0.00%	0.00%	0.14%	0.19%							
<b>Interval Corrections</b>													
Number of intervals corrected	in the month	0	0	0	16	6							
Number of intervals	in the month	9,021	8,112	9,002	8,717	9,033							
% of intervals corrected	in the month	0.00%	0.00%	0.00%	0.18%	0.07%							
% of intervals corrected	year-to-date	0.00%	0.00%	0.00%	0.05%	0.05%							
<b>Hours Reserved</b>													
Number of hours reserved	in the month	7	0	2	7	8							
Number of hours	in the month	744	672	743	720	744							
% of hours reserved	in the month	0.94%	0.00%	0.27%	0.97%	1.08%							
% of hours reserved	year-to-date	0.94%	0.49%	0.42%	0.56%	0.66%							
<b>Days to Correction *</b>													
Avg. number of days to correction	in the month	0.00	0.00	0.00	2.00	2.00							
Avg. number of days to correction	year-to-date	0.00	0.00	0.00	2.00	2.00							
<b>Days Without Corrections</b>													
Days without corrections	in the month	31	28	31	28	28							
Days without corrections	year-to-date	31	59	90	118	146							
<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

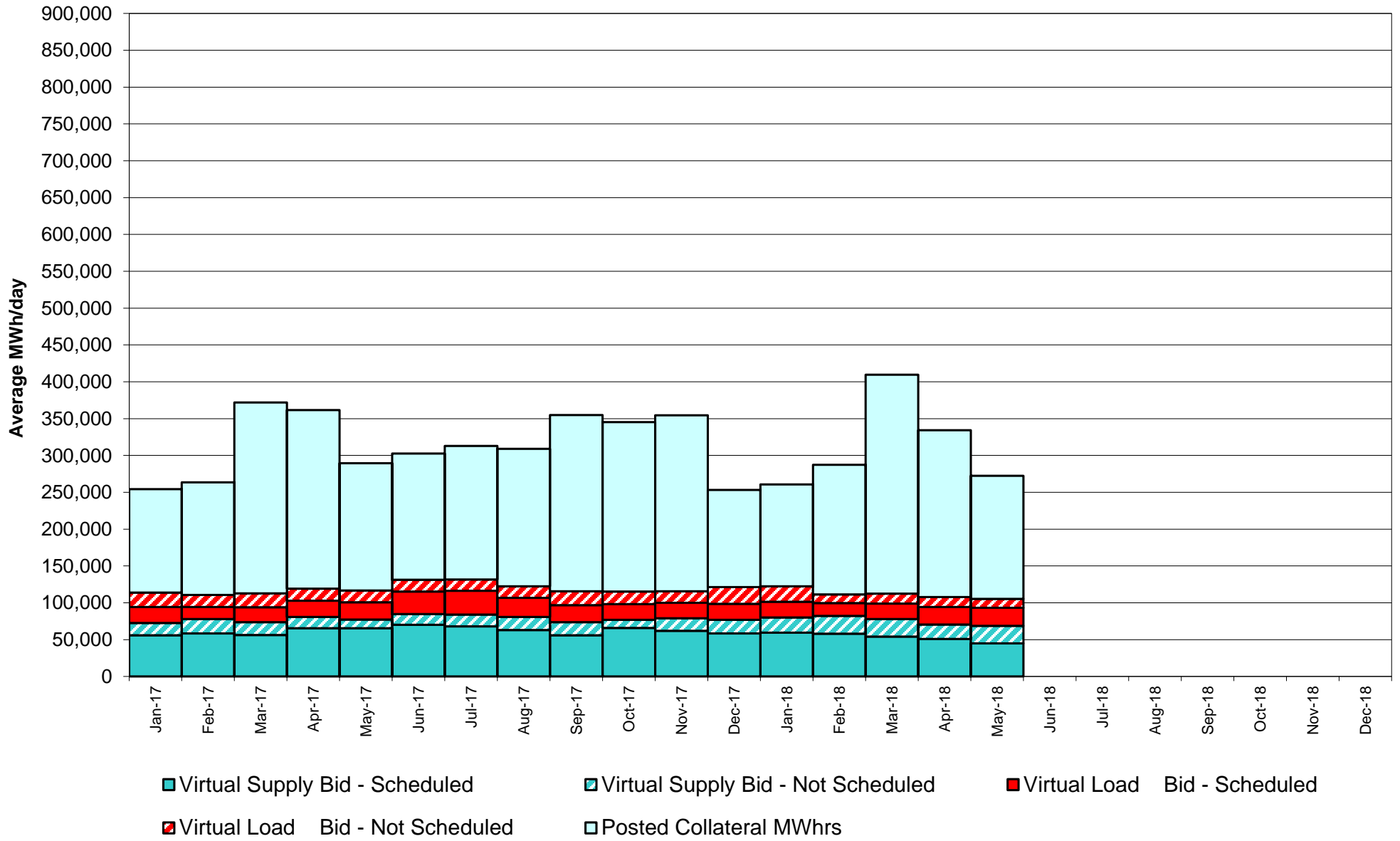


### Annual average time period for making Price Corrections (from reservation date) \*

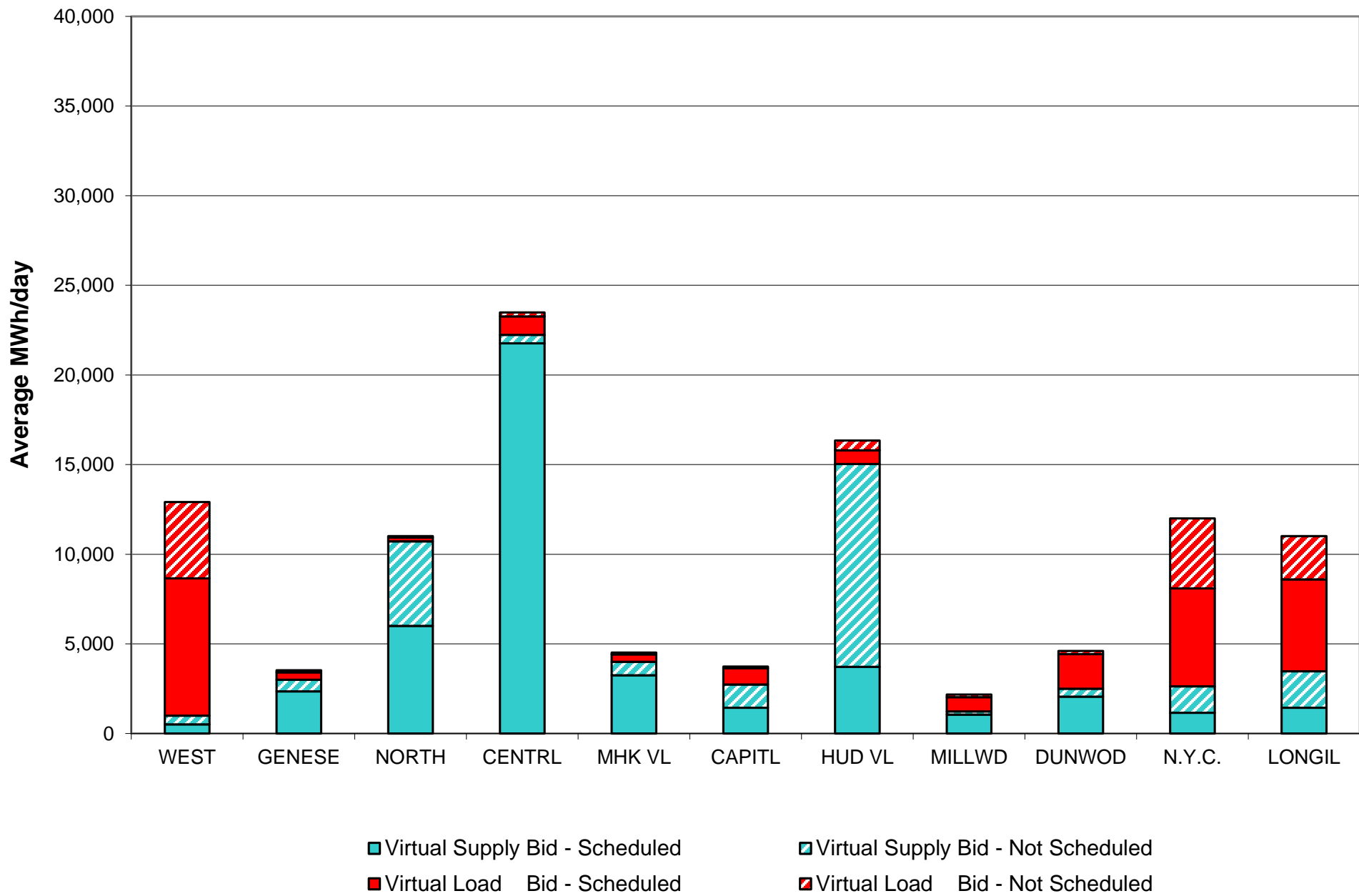


\* Calendar days from reservation date.

## NYISO Virtual Trading Average MWh per day



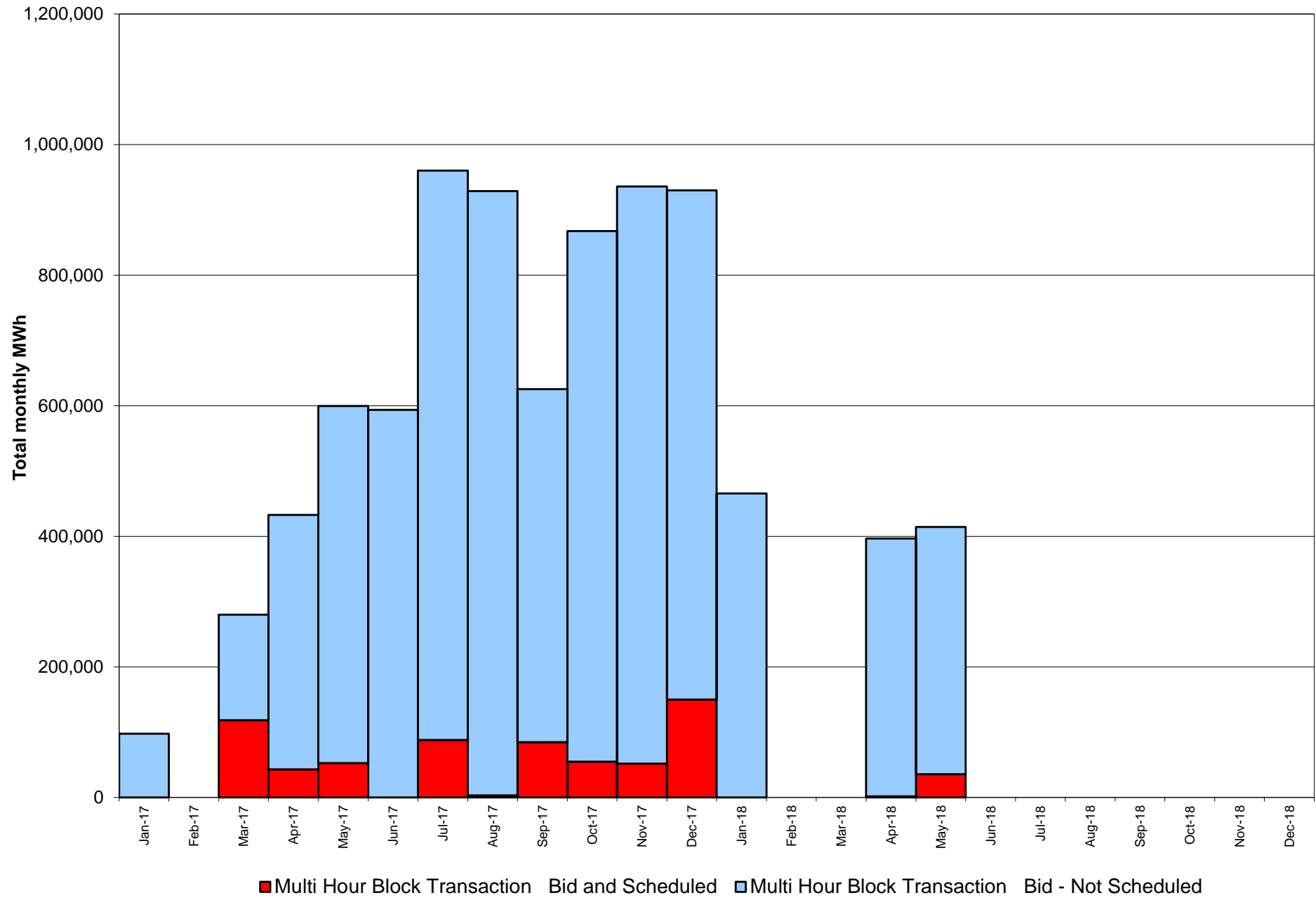
## Virtual Load and Supply Zonal Statistics through May 31, 2018



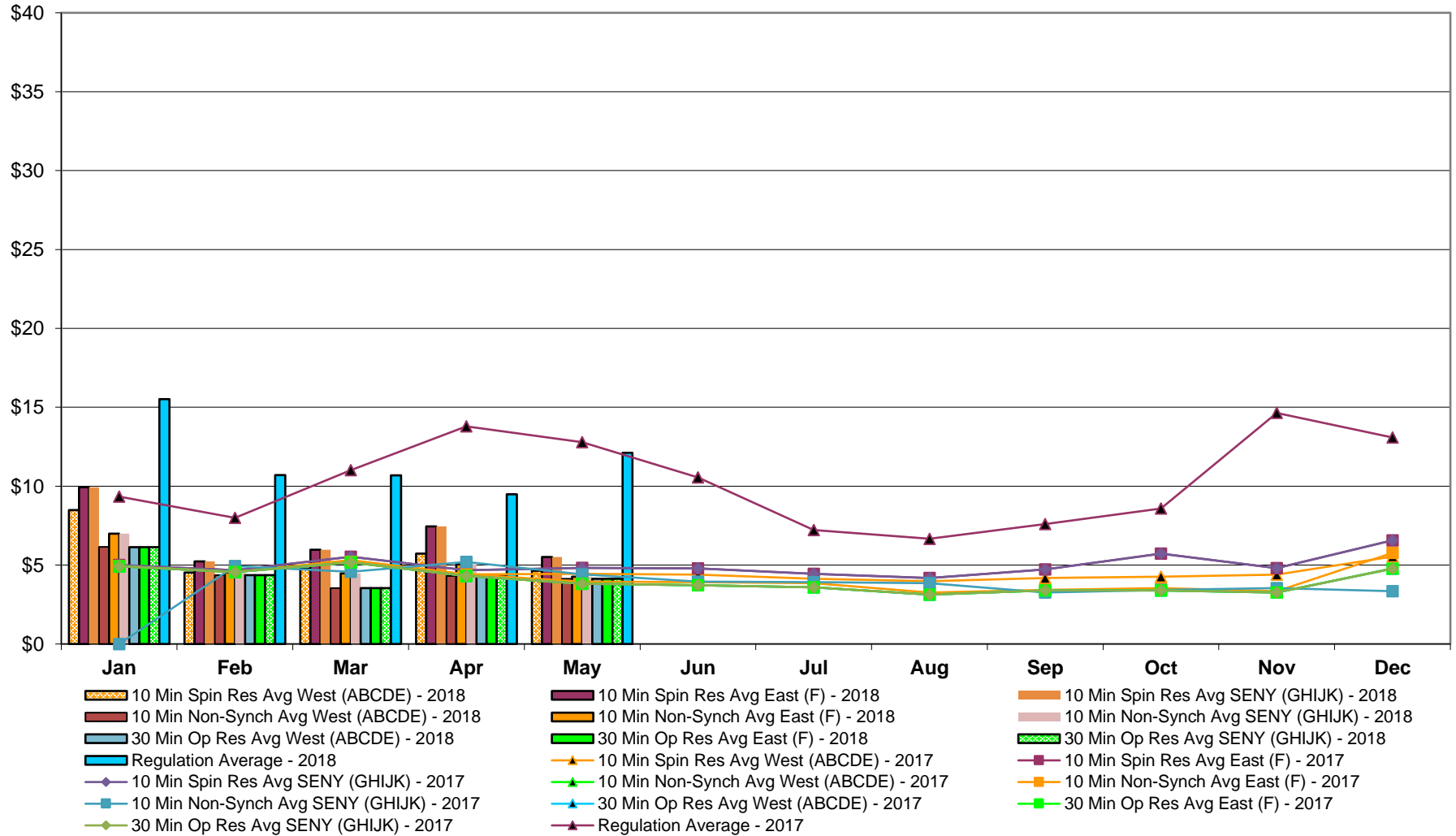
**Virtual Load and Supply Zonal Statistics (Average MWh/day) - 2018**

		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	3,058	1,941	1,478	603		Feb-18	512	130	1,910	269		Feb-18	742	658	5,891	824
	Mar-18	7,263	2,535	860	659		Mar-18	569	139	1,896	309		Mar-18	1,367	755	3,530	487
	Apr-18	8,154	3,433	926	393		Apr-18	670	173	1,986	470		Apr-18	1,781	1,047	2,395	333
	May-18	7,658	4,266	516	478		May-18	413	95	3,242	758		May-18	1,933	183	2,052	440
	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	525	172	1,723	2,671		Feb-18	1,822	269	1,331	2,799		Feb-18	5,644	4,187	1,181	1,086
	Mar-18	537	143	1,381	2,488		Mar-18	1,731	156	1,330	2,851		Mar-18	2,346	4,931	1,727	1,285
	Apr-18	587	234	1,818	1,047		Apr-18	1,743	263	2,032	1,826		Apr-18	3,190	2,460	2,212	1,376
	May-18	405	123	2,353	649		May-18	911	95	1,430	1,303		May-18	5,464	3,912	1,152	1,476
	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	352	369	7,449	2,777		Feb-18	888	740	4,703	8,761		Feb-18	2,800	2,591	3,061	2,605
	Mar-18	249	367	6,995	2,136		Mar-18	845	1,098	5,169	10,837		Mar-18	3,613	3,021	3,308	1,768
	Apr-18	189	269	7,479	1,848		Apr-18	639	973	5,990	9,863		Apr-18	4,649	3,620	2,505	1,620
	May-18	215	79	6,001	4,717		May-18	773	539	3,727	11,304		May-18	5,128	2,420	1,436	2,031
	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	595	215	28,161	483		Feb-18	486	337	1,284	1,197		Feb-18	17,423	11,608	58,172	24,075
	Mar-18	1,977	208	26,643	614		Mar-18	720	141	1,144	421		Mar-18	21,217	13,494	53,984	23,855
	Apr-18	1,753	334	22,490	677		Apr-18	466	526	1,031	163		Apr-18	23,821	13,330	50,864	19,613
	May-18	1,033	221	21,769	470		May-18	790	140	1,050	188		May-18	24,723	12,074	44,726	23,814
	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

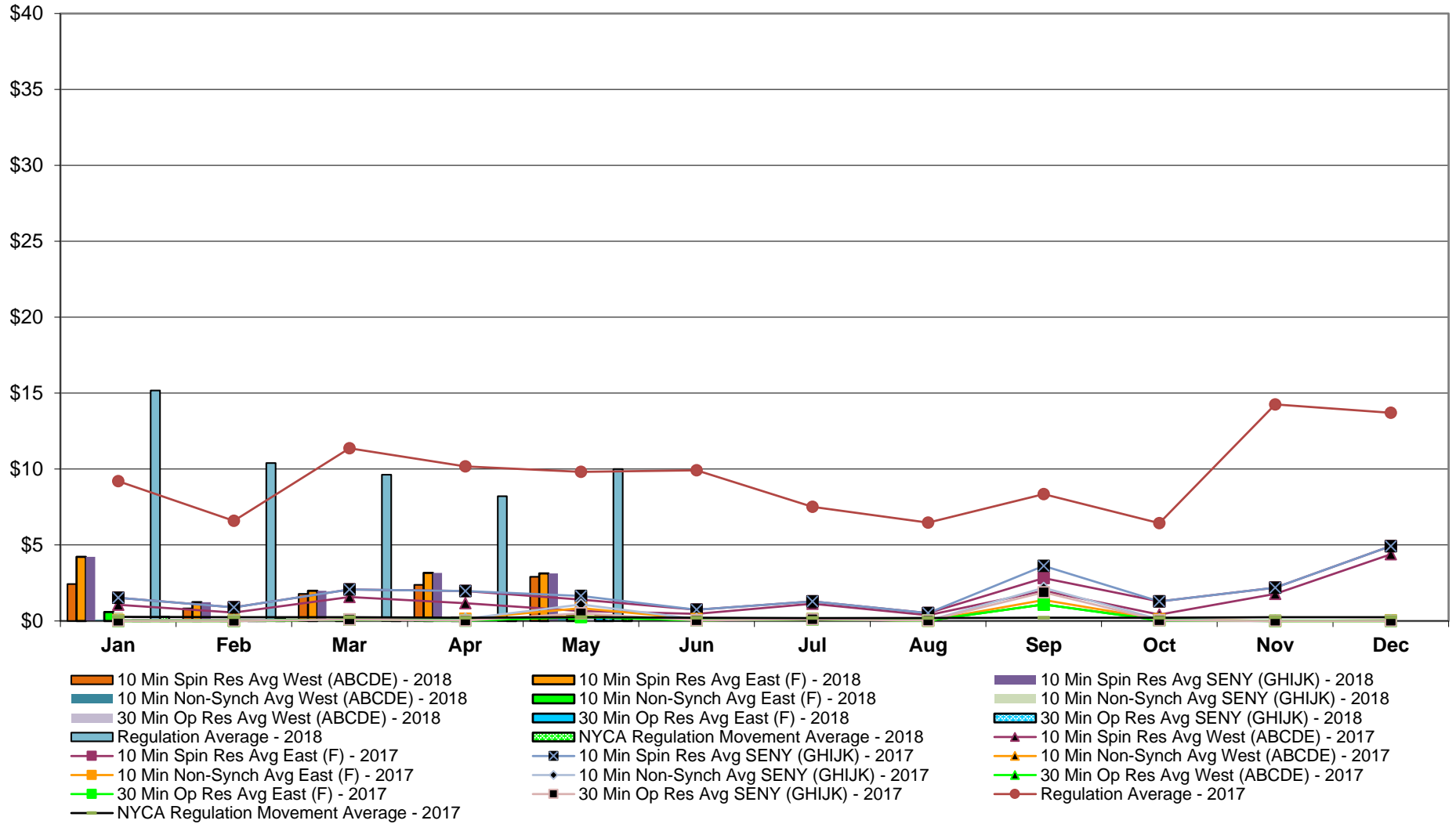


## NYISO Monthly Average Ancillary Service Prices Day Ahead Market 2017 - 2018

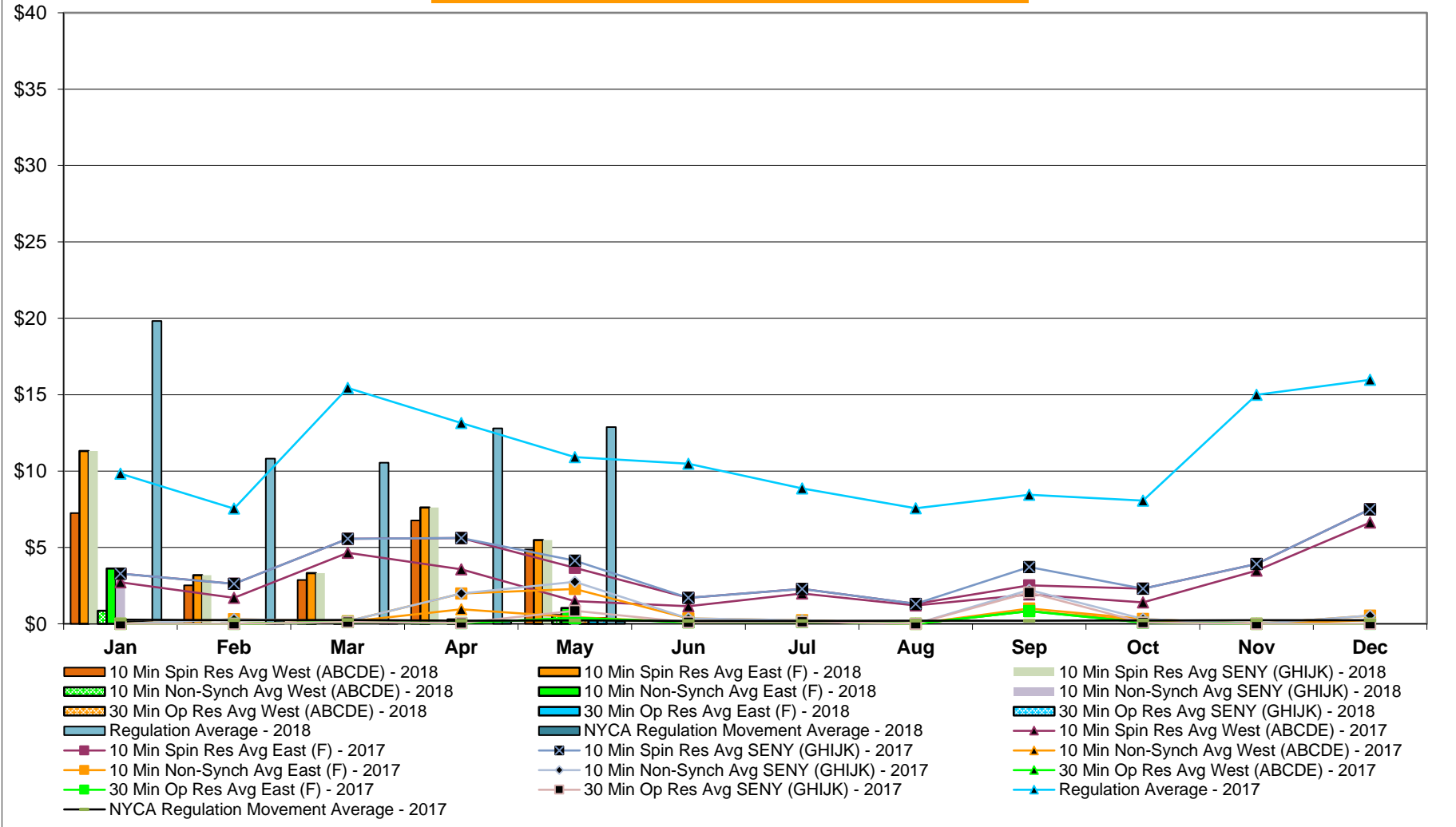




## NYISO Monthly Average Ancillary Service Prices RTC Market 2017 - 2018



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

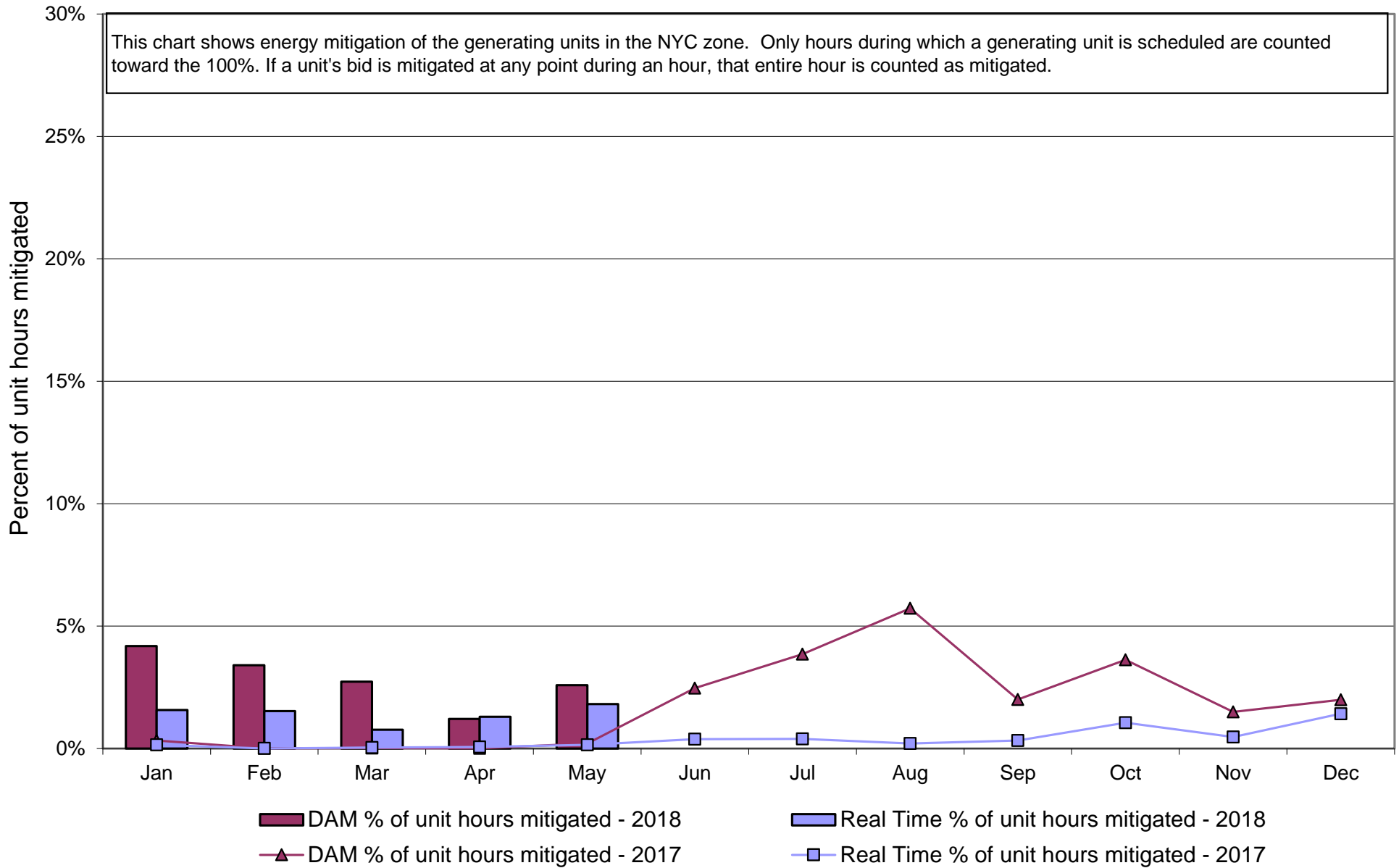


## NYISO Markets Ancillary Services Statistics - Unweighted Price (\$/MWH)

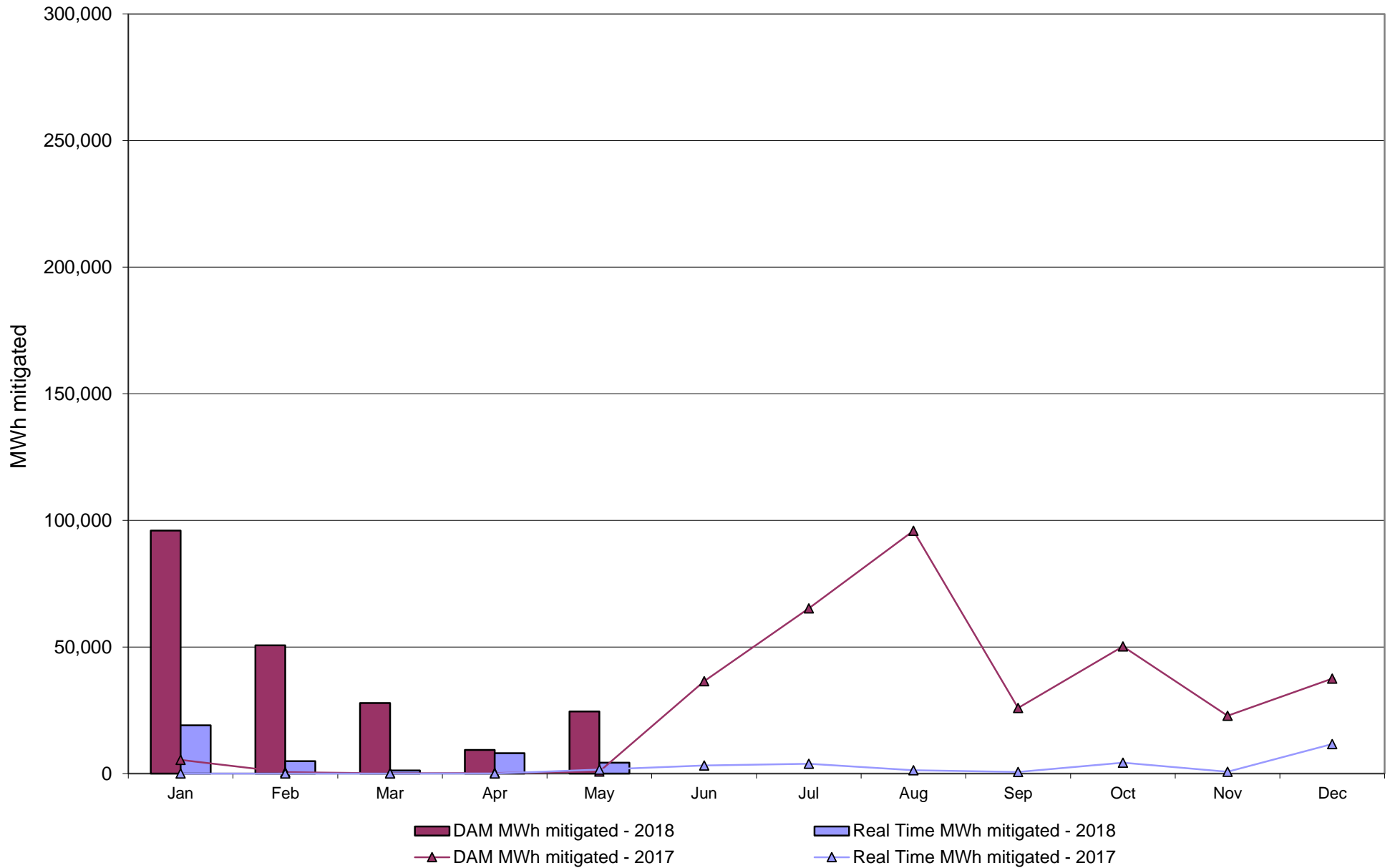
2018	January	February	March	April	May	June	July	August	September	October	November	December
<b>Day Ahead Market</b>												
10 Min Spin SENY (GHIJK)	9.93	5.24	5.97	7.45	5.52							
10 Min Spin East (F)	9.93	5.24	5.97	7.45	5.52							
10 Min Spin West (ABCDE)	8.49	4.53	4.78	5.73	4.65							
10 Min Non Synch SENY (GHIJK)	6.99	4.54	4.48	5.05	4.26							
10 Min Non Synch East (F)	6.99	4.54	4.48	5.05	4.26							
10 Min Non Synch West (ABCDE)	6.15	4.36	3.54	4.31	4.13							
30 Min SENY (GHIJK)	6.14	4.36	3.54	4.31	4.13							
30 Min East (F)	6.14	4.36	3.54	4.31	4.13							
30 Min West (ABCDE)	6.14	4.36	3.54	4.31	4.13							
Regulation	15.51	10.70	10.68	9.49	12.11							
<b>RTC Market</b>												
10 Min Spin SENY (GHIJK)	4.23	1.24	1.98	3.17	3.13							
10 Min Spin East (F)	4.23	1.24	1.98	3.17	3.13							
10 Min Spin West (ABCDE)	2.43	0.82	1.79	2.38	2.91							
10 Min Non Synch SENY (GHIJK)	0.59	0.03	0.01	0.22	0.42							
10 Min Non Synch East (F)	0.59	0.03	0.01	0.22	0.42							
10 Min Non Synch West (ABCDE)	0.08	0.02	0.00	0.00	0.33							
30 Min SENY (GHIJK)	0.08	0.02	0.00	0.00	0.32							
30 Min East (F)	0.08	0.02	0.00	0.00	0.32							
30 Min West (ABCDE)	0.08	0.02	0.00	0.00	0.32							
Regulation	15.17	10.40	9.63	8.22	10.01							
NYCA Regulation Movement	0.26	0.21	0.20	0.22	0.19							
<b>Real Time Market</b>												
10 Min Spin SENY (GHIJK)	11.31	3.19	3.31	7.62	5.48							
10 Min Spin East (F)	11.31	3.19	3.31	7.62	5.48							
10 Min Spin West (ABCDE)	7.24	2.52	2.86	6.77	4.86							
10 Min Non Synch SENY (GHIJK)	3.61	0.01	0.19	0.28	1.03							
10 Min Non Synch East (F)	3.61	0.01	0.19	0.28	1.03							
10 Min Non Synch West (ABCDE)	0.85	0.00	0.00	0.00	0.57							
30 Min SENY (GHIJK)	0.13	0.00	0.00	0.00	0.37							
30 Min East (F)	0.13	0.00	0.00	0.00	0.37							
30 Min West (ABCDE)	0.13	0.00	0.00	0.00	0.37							
Regulation	19.82	10.82	10.54	12.80	12.88							
NYCA Regulation Movement	0.24	0.21	0.20	0.21	0.17							
2017	January	February	March	April	May	June	July	August	September	October	November	December
<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

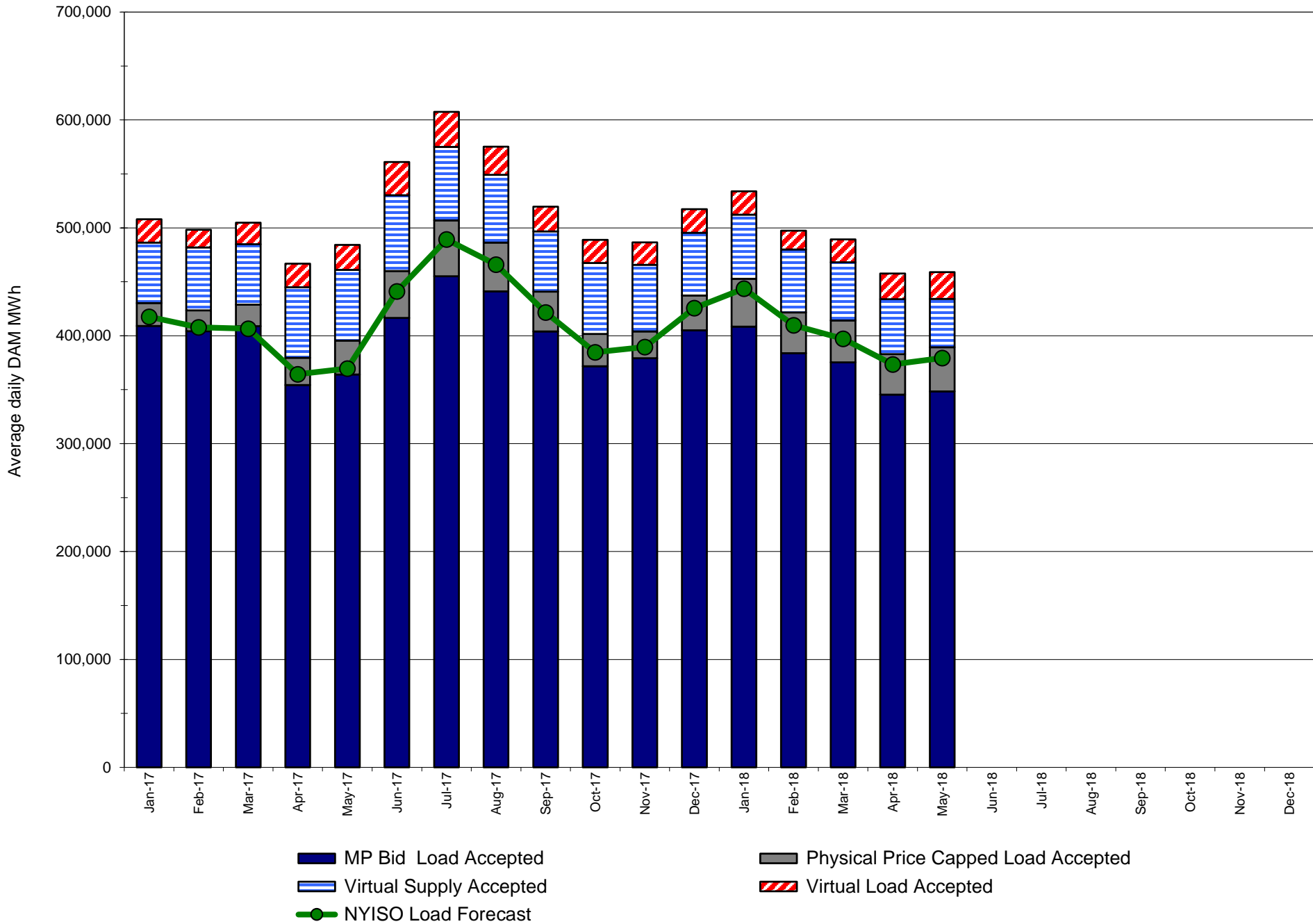
### Percentage of committed unit-hours mitigated



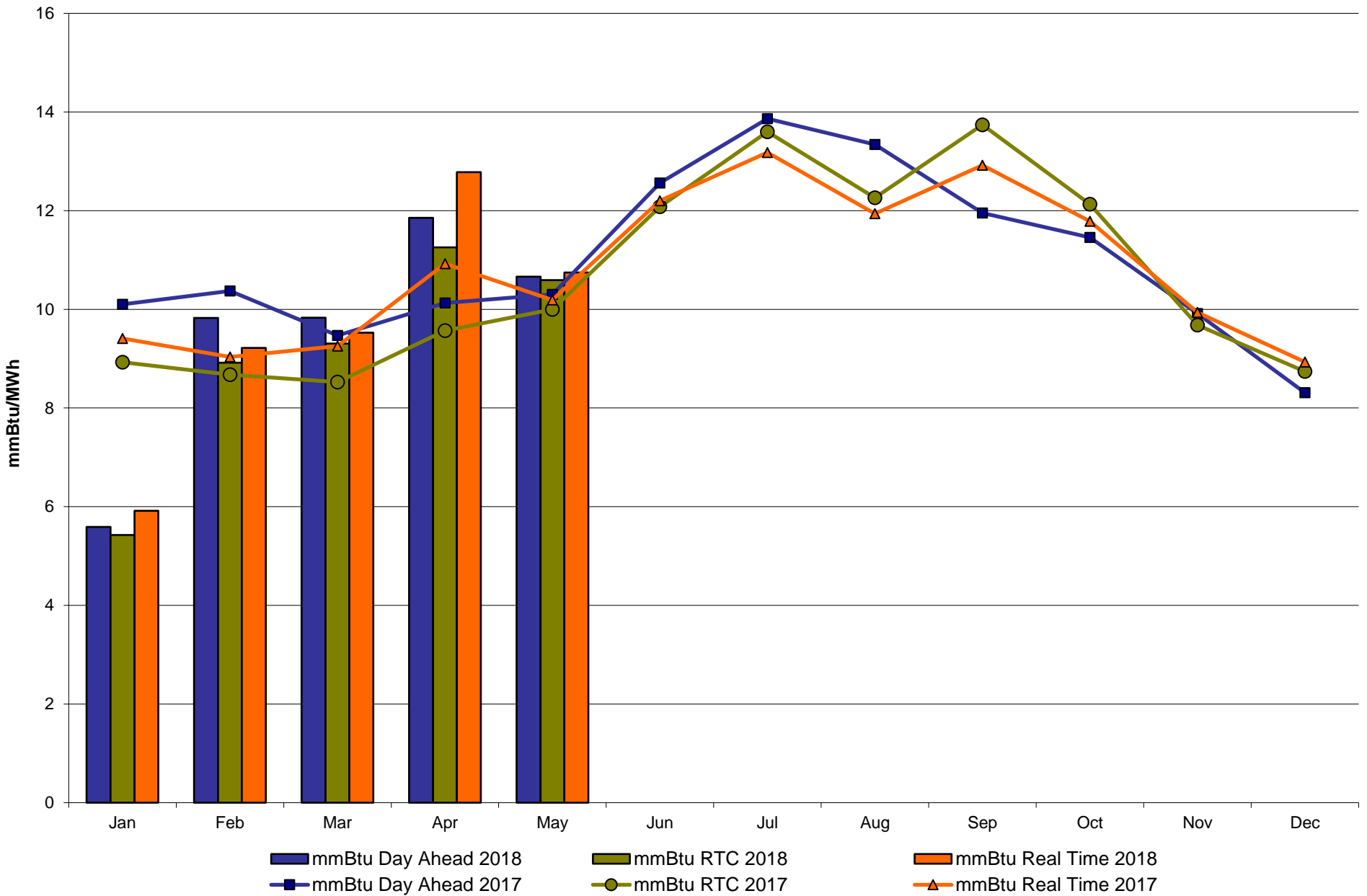
**NYISO In City Energy Mitigation (NYC Zone) 2017 - 2018  
Monthly megawatt hours mitigated**



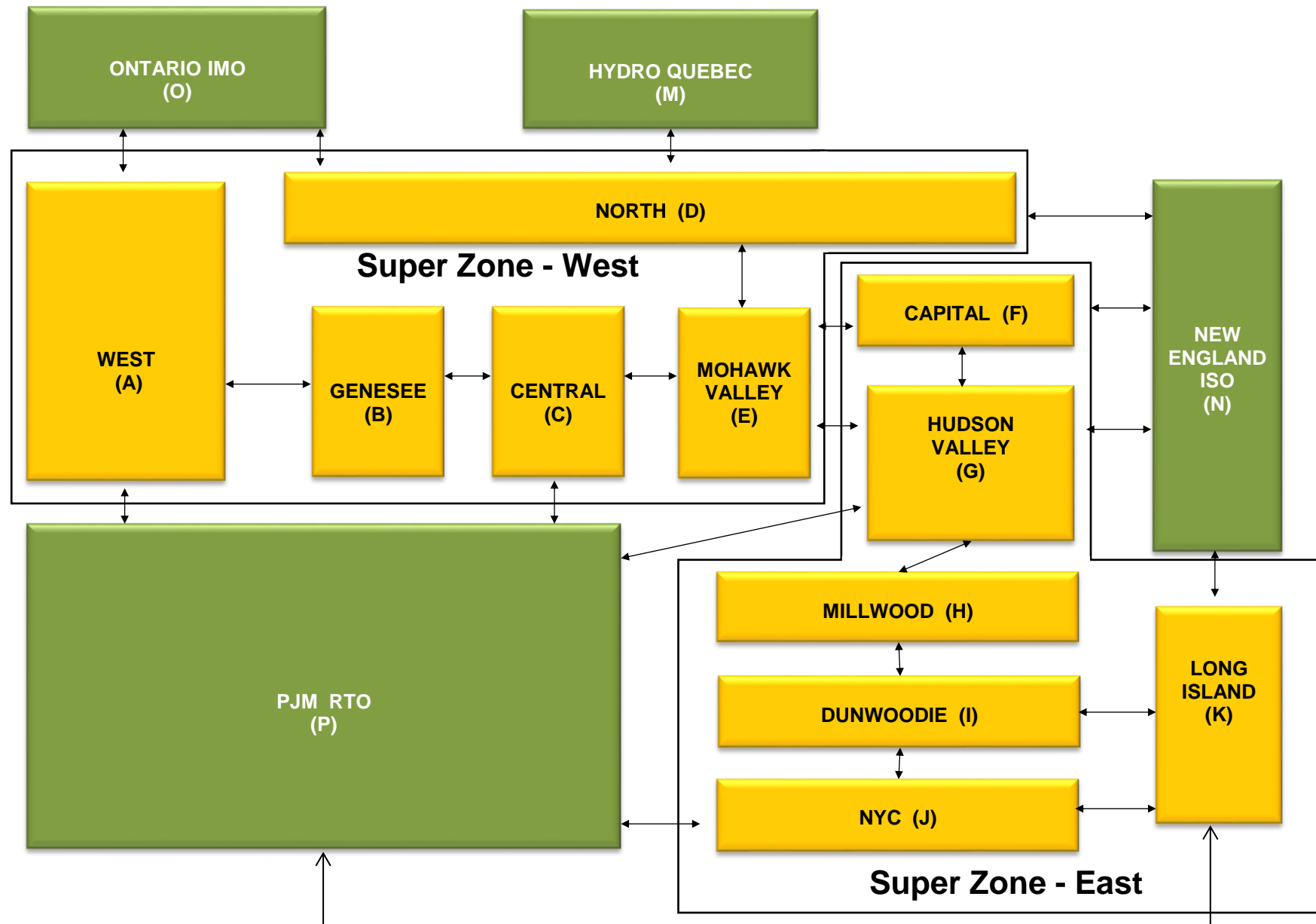
### NYISO Average Daily DAM Load Bid Summary



## Monthly Implied Heat Rate 2017-2018



# NYISO LBMP ZONES





**Billing Codes for Chart C**

<b><u>Chart - C Category Name</u></b>	<b><u>Billing Code</u></b>	<b><u>Billing Category Name</u></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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