

Market Operations Report

Rana Mukerji

SENIOR VICE PRESIDENT – MARKET STRUCTURES, NYISO

Business Issues Committee Meeting

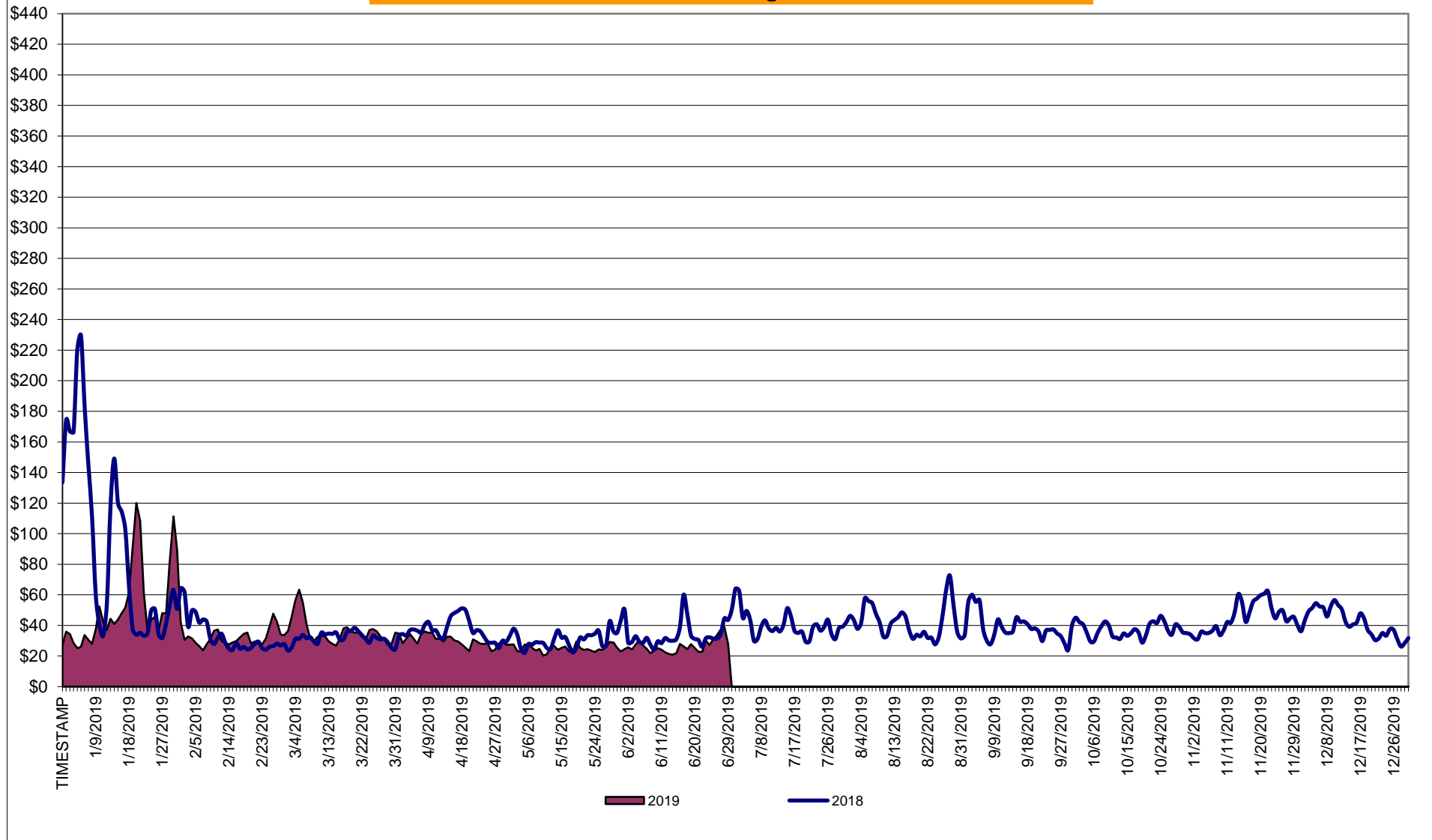
July 17, 2019 Rensselaer, NY

Market Performance Highlights

June 2019

- LBMP for June is \$24.43/MWh; higher than \$23.10/MWh in May 2019 and lower than \$32.53/MWh in June 2018.
 - Day Ahead and Real Time Load Weighted LBMPs are higher compared to May.
- June 2019 average year-to-date monthly cost of \$35.76/MWh is a 25% decrease from \$47.70/MWh in June 2018.
- Average daily sendout is 429 GWh/day in June; higher than 373 GWh/day in May 2019 and lower than 445 GWh/day in June 2018.
- Natural gas prices and distillate prices were lower compared to the previous month.
 - Natural Gas (Transco Z6 NY) was \$2.10/MMBtu, down from \$2.27/MMBtu in May.
 - Natural gas prices are down 14.1% year-over-year.
 - Jet Kerosene Gulf Coast was \$13.50/MMBtu, down from \$14.64/MMBtu in May.
 - Ultra Low Sulfur No.2 Diesel NY Harbor was \$13.23/MMBtu, down from \$14.54/MMBtu in May.
 - Distillate prices are down 13.2% year-over-year.
- Uplift per MWh is lower compared to the previous month.
 - Uplift (not including NYISO cost of operations) is \$0.07/MWh; lower than \$0.13/MWh in May.
 - Local Reliability Share is \$0.19/MWh, lower than \$0.23/MWh in May.
 - Statewide Share is (\$0.12)/MWh, lower than (\$0.11)/MWh in May.
 - TSA \$ per NYC MWh is \$0.77/MWh.
 - Total uplift costs (Schedule 1 components including NYISO Cost of Operations) are higher than May.

Daily NYISO Average Cost/MWh (Energy & Ancillary Services)*
2018 Annual Average \$44.92/MWh
June 2018 YTD Average \$47.70/MWh
June 2019 YTD Average \$35.76/MWh



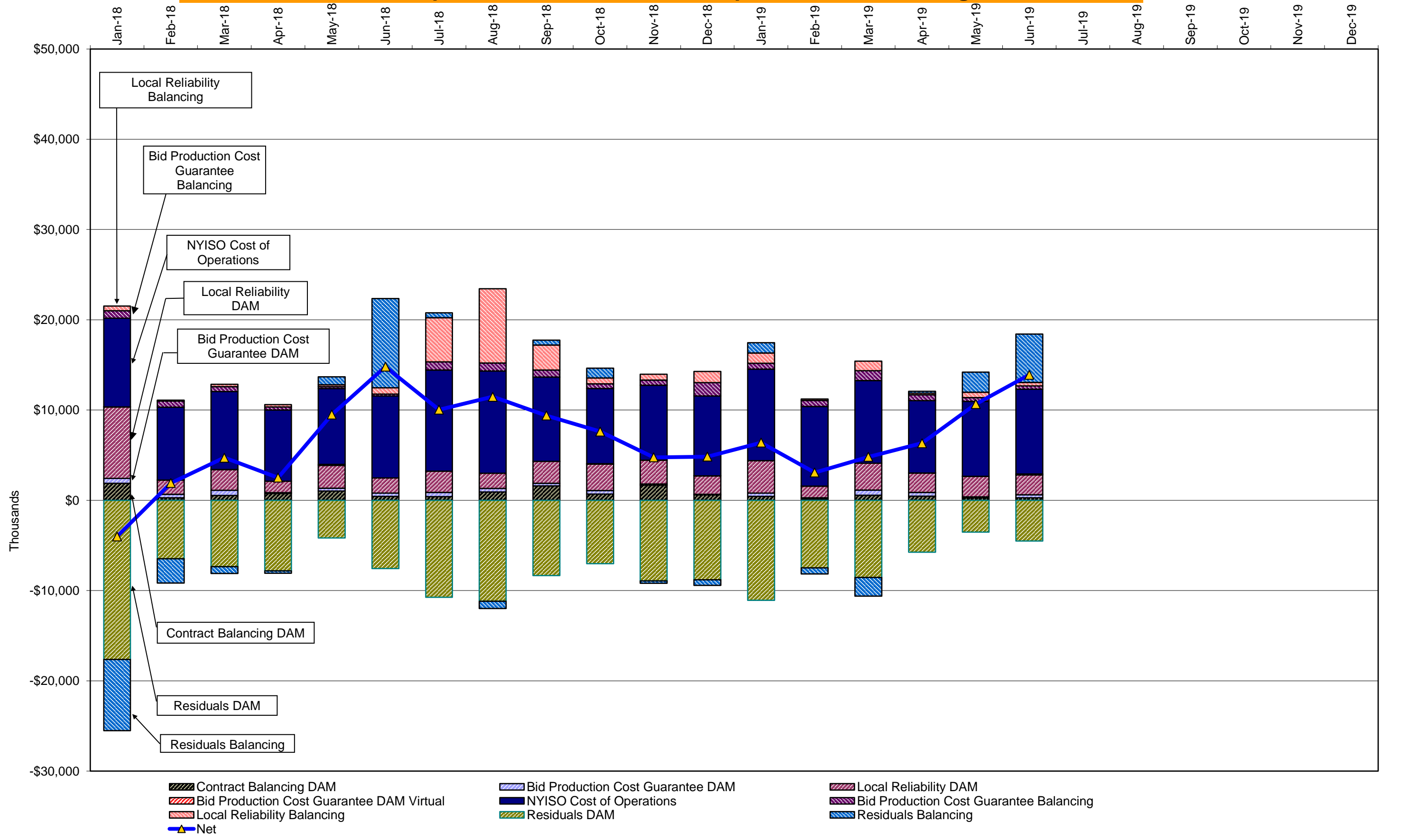
* Excludes ICAP payments.

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

2019	<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	50.93	33.51	34.91	28.01	23.10	24.43						
NTAC	0.51	0.69	0.98	1.16	0.72	1.08						
Reserve	0.54	0.51	0.55	0.63	0.63	0.50						
Regulation	0.13	0.11	0.10	0.33	0.13	0.09						
NYISO Cost of Operations	0.68	0.68	0.69	0.69	0.68	0.69						
FERC Fee Recovery	0.08	0.09	0.09	0.10	0.10	0.08						
Uplift	(0.25)	(0.44)	(0.33)	(0.15)	0.13	0.07						
Uplift: Local Reliability Share	0.32	0.11	0.31	0.20	0.23	0.19						
Uplift: Statewide Share	(0.57)	(0.55)	(0.64)	(0.35)	(0.11)	(0.12)						
Voltage Support and Black Start	0.37	0.37	0.38	0.38	0.38	0.38						
Avg Monthly Cost	52.99	35.51	37.38	31.16	25.88	27.32						
Avg YTD Cost	52.99	44.93	42.54	40.12	37.57	35.76						
TSA \$ per NYC MWh	0.00	0.00	0.01	0.01	0.19	0.77						
2018	<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	32.53	39.58	42.56	38.70	35.85	43.15	40.31
NTAC	0.71	0.58	0.88	1.09	0.88	1.00	0.93	0.72	0.40	0.36	1.18	0.93
Reserve	0.92	0.65	0.64	0.81	0.68	0.57	0.49	0.51	0.52	0.80	0.66	0.54
Regulation	0.15	0.15	0.16	0.12	0.14	0.16	0.09	0.09	0.09	0.16	0.17	0.17
NYISO Cost of Operations	0.65	0.65	0.66	0.65	0.66	0.67	0.67	0.66	0.66	0.63	0.63	0.63
FERC Fee Recovery	0.08	0.10	0.09	0.10	0.09	0.09	0.06	0.06	0.08	0.09	0.09	0.08
Uplift	(0.92)	(0.50)	(0.31)	(0.45)	0.05	0.30	(0.13)	(0.02)	(0.11)	(0.30)	(0.27)	(0.29)
Uplift: Local Reliability Share	0.59	0.14	0.19	0.12	0.22	0.18	0.44	0.59	0.37	0.27	0.25	0.23
Uplift: Statewide Share	(1.52)	(0.64)	(0.51)	(0.57)	(0.17)	0.12	(0.57)	(0.61)	(0.48)	(0.56)	(0.52)	(0.52)
Voltage Support and Black Start	0.40	0.41	0.42	0.41	0.42	0.42	0.42	0.42	0.42	0.40	0.40	0.40
Avg Monthly Cost	101.54	35.87	32.45	37.74	31.70	35.73	42.12	45.01	40.76	38.00	46.01	42.78
Avg YTD Cost	101.54	72.85	60.06	54.82	50.20	47.70	46.64	46.37	45.75	45.03	45.11	44.92
TSA \$ per NYC MWh	0.00	0.00	0.04	0.00	0.08	0.39	0.21	0.14	0.33	0.75	0.00	0.00

* Excludes ICAP payments.
Market Mitigation and Analysis
Prepared: 7/9/2019 2:19 PM

NYISO Dollar Flows - Uplift - OATT Schedule 1 components - Data through June 30, 2019



DAM Contract Balancing amounts are for payments made to generating units to make them whole for being dispatched below their Day-Ahead schedule, as a result of out-of-merit dispatches.

DAM Bid Production Cost Guarantees for Virtual Transactions are included in the chart and are shown from the inception of Virtual Transactions. These values are small and cannot be identified on the chart.

DAM residuals consist of both energy and loss revenue collections and payments. By design, there is a net over collection of revenues due to the difference between the marginal losses paid to generation and the average losses charged to loads.

NYISO Markets Transactions

2019	<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>
Day Ahead Market MWh	15,299,458	13,391,383	13,527,834	11,811,029	12,521,583	13,723,372						
DAM LSE Internal LBMP Energy Sales	57%	57%	59%	59%	57%	58%						
DAM External TC LBMP Energy Sales	6%	5%	3%	1%	3%	3%						
DAM Bilateral - Internal Bilaterals	29%	30%	30%	31%	32%	29%						
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	5%	6%	5%						
DAM Bilateral - Export/Non-LBMP Market Bilaterals	1%	1%	2%	2%	2%	2%						
DAM Bilateral - Wheel Through Bilaterals	2%	2%	2%	2%	1%	2%						
Balancing Energy Market MWh	-322,442	-323,188	-261,217	-218,482	-392,699	-102,044						
Balancing Energy LSE Internal LBMP Energy Sales	-120%	-126%	-138%	-178%	-150%	-264%						
Balancing Energy External TC LBMP Energy Sales	65%	67%	82%	113%	68%	233%						
Balancing Energy Bilateral - Internal Bilaterals	-4%	-1%	-3%	2%	1%	0%						
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	0%	0%	0%	0%	0%						
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	3%	7%	6%	7%	2%	8%						
Balancing Energy Bilateral - Wheel Through Bilaterals	-45%	-47%	-47%	-44%	-21%	-77%						
Transactions Summary												
LBMP	63%	62%	61%	60%	59%	62%						
Internal Bilaterals	29%	30%	30%	31%	33%	30%						
Import Bilaterals	5%	5%	6%	6%	6%	5%						
Export Bilaterals	1%	2%	2%	2%	2%	2%						
Wheels Through	1%	1%	1%	1%	0%	1%						
Market Share of Total Load												
Day Ahead Market	102.2%	102.5%	102.0%	101.9%	103.2%	100.7%						
Balancing Energy +	-2.2%	-2.5%	-2.0%	-1.9%	-3.2%	-0.7%						
Total MWh	14,977,016	13,068,195	13,266,617	11,592,547	12,128,884	13,621,328						
Average Daily Energy Sendout/Month GWh	449	436	411	371	373	429						

2018	<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>
Day Ahead Market MWh	15,153,751	12,643,854	13,521,386	12,158,686	12,721,073	13,983,384	16,839,994	17,195,447	14,432,632	13,548,828	13,506,134	14,450,460
DAM LSE Internal LBMP Energy Sales	59%	57%	58%	60%	61%	61%	65%	65%	61%	57%	58%	56%
DAM External TC LBMP Energy Sales	4%	3%	2%	2%	2%	1%	1%	2%	3%	6%	6%	6%
DAM Bilateral - Internal Bilaterals	29%	31%	32%	30%	29%	30%	26%	25%	28%	29%	30%	30%
DAM Bilateral - Import/Non-LBMP Market Bilaterals	5%	5%	5%	5%	5%	5%	4%	4%	5%	5%	2%	5%
DAM Bilateral - Export/Non-LBMP Market Bilaterals	2%	2%	2%	2%	2%	1%	1%	1%	1%	2%	2%	2%
DAM Bilateral - Wheel Through Bilaterals	1%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	2%
Balancing Energy Market MWh	-149,619	-299,377	-386,811	-72,862	-29,539	-354,112	-80,438	-44,732	-210,436	-314,885	-304,277	-428,748
Balancing Energy LSE Internal LBMP Energy Sales	-147%	-101%	-128%	-208%	-458%	-113%	-123%	-75%	-82%	-105%	-100%	-94%
Balancing Energy External TC LBMP Energy Sales	74%	24%	37%	189%	564%	29%	129%	209%	14%	30%	18%	27%
Balancing Energy Bilateral - Internal Bilaterals	9%	5%	0%	-11%	29%	5%	18%	23%	7%	2%	3%	3%
Balancing Energy Bilateral - Import/Non-LBMP Market Bilaterals	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%
Balancing Energy Bilateral - Export/Non-LBMP Market Bilaterals	22%	9%	6%	34%	51%	3%	14%	25%	3%	0%	0%	0%
Balancing Energy Bilateral - Wheel Through Bilaterals	-58%	-36%	-15%	-103%	-287%	-23%	-138%	-281%	-42%	-27%	-31%	-36%
Transactions Summary												
LBMP	63%	59%	59%	62%	63%	61%	66%	68%	64%	63%	64%	61%
Internal Bilaterals	30%	32%	33%	30%	29%	31%	27%	25%	28%	30%	31%	31%
Import Bilaterals	5%	5%	6%	5%	5%	5%	4%	4%	5%	5%	3%	5%
Export Bilaterals	2%	2%	2%	2%	2%	1%	1%	1%	1%	2%	2%	2%
Wheels Through	1%	1%	1%	1%	1%	2%	1%	1%	2%	1%	1%	1%
Market Share of Total Load												
Day Ahead Market	101.0%	102.4%	102.9%	100.6%	100.2%	102.6%	100.5%	100.3%	101.5%	102.4%	102.3%	103.1%
Balancing Energy +	-1.0%	-2.4%	-2.9%	-0.6%	-0.2%	-2.6%	-0.5%	-0.3%	-1.5%	-2.4%	-2.3%	-3.1%
Total MWh	15,004,132	12,344,477	13,134,575	12,085,824	12,691,534	13,629,272	16,759,556	17,150,715	14,222,196	13,233,943	13,201,857	14,021,712
Average Daily Energy Sendout/Month GWh	463	426	413	390	397	445	529	537	458	399	411	425

+ 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 2019 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>
<u>DAY AHEAD LBMP</u>												
Price *	\$45.01	\$30.66	\$32.34	\$25.97	\$21.16	\$21.79						
Standard Deviation	\$25.67	\$12.86	\$9.30	\$6.32	\$5.89	\$7.28						
Load Weighted Price **	\$46.88	\$31.53	\$33.14	\$26.57	\$21.89	\$23.04						
<u>RTC LBMP</u>												
Price *	\$40.86	\$29.74	\$31.04	\$25.07	\$21.88	\$25.67						
Standard Deviation	\$23.02	\$10.79	\$8.48	\$7.53	\$8.01	\$23.45						
Load Weighted Price **	\$42.39	\$30.32	\$31.62	\$25.54	\$22.44	\$27.64						
<u>REAL TIME LBMP</u>												
Price *	\$39.54	\$30.13	\$31.46	\$24.47	\$20.56	\$23.30						
Standard Deviation	\$26.03	\$13.77	\$12.54	\$17.27	\$10.35	\$17.49						
Load Weighted Price **	\$41.24	\$30.80	\$32.06	\$25.06	\$21.28	\$25.05						
Average Daily Energy Sendout/Month GWh	449	436	411	371	373	429						

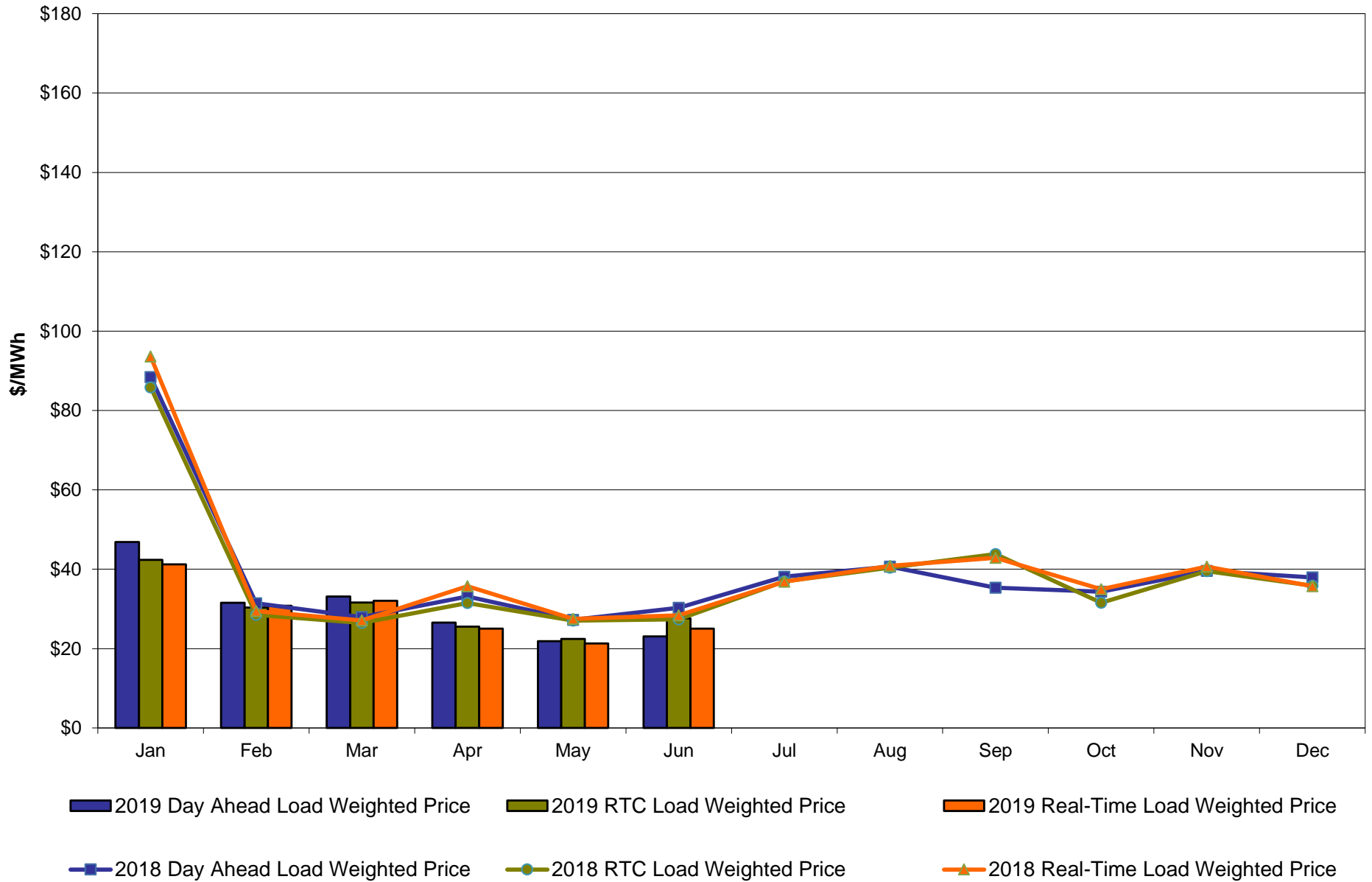
NYISO Markets 2018 Energy Statistics

	<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>
<u>DAY AHEAD LBMP</u>												
Price *	\$83.53	\$30.37	\$27.37	\$32.40	\$25.97	\$28.41	\$35.73	\$38.00	\$33.28	\$33.27	\$38.36	\$36.88
Standard Deviation	\$58.94	\$12.38	\$6.34	\$9.06	\$9.22	\$11.42	\$15.25	\$16.51	\$12.01	\$9.24	\$11.36	\$11.61
Load Weighted Price **	\$88.42	\$31.44	\$27.95	\$33.14	\$27.26	\$30.27	\$38.14	\$40.64	\$35.33	\$34.33	\$39.55	\$37.96
<u>RTC LBMP</u>												
Price *	\$81.65	\$27.73	\$25.99	\$30.80	\$25.40	\$26.06	\$34.65	\$38.13	\$39.52	\$30.92	\$38.37	\$35.01
Standard Deviation	\$60.83	\$11.96	\$8.99	\$14.30	\$20.37	\$12.78	\$17.44	\$20.05	\$61.50	\$13.43	\$17.24	\$12.27
Load Weighted Price **	\$85.85	\$28.54	\$26.46	\$31.47	\$27.08	\$27.35	\$36.93	\$40.40	\$43.83	\$31.55	\$39.53	\$35.84
<u>REAL TIME LBMP</u>												
Price *	\$87.94	\$28.50	\$26.49	\$34.53	\$25.57	\$26.31	\$34.34	\$38.07	\$38.15	\$33.88	\$39.18	\$34.74
Standard Deviation	\$87.41	\$17.36	\$12.25	\$26.57	\$23.49	\$24.34	\$18.44	\$27.21	\$46.81	\$37.42	\$26.15	\$17.44
Load Weighted Price **	\$93.59	\$29.49	\$27.09	\$35.72	\$27.47	\$28.38	\$36.84	\$40.87	\$42.87	\$34.94	\$40.63	\$35.70
Average Daily Energy Sendout/Month GWh	463	426	413	390	397	445	529	537	458	399	411	425

* Average zonal load weighted prices.

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

NYISO Monthly Average Internal LBMPs 2018- 2019

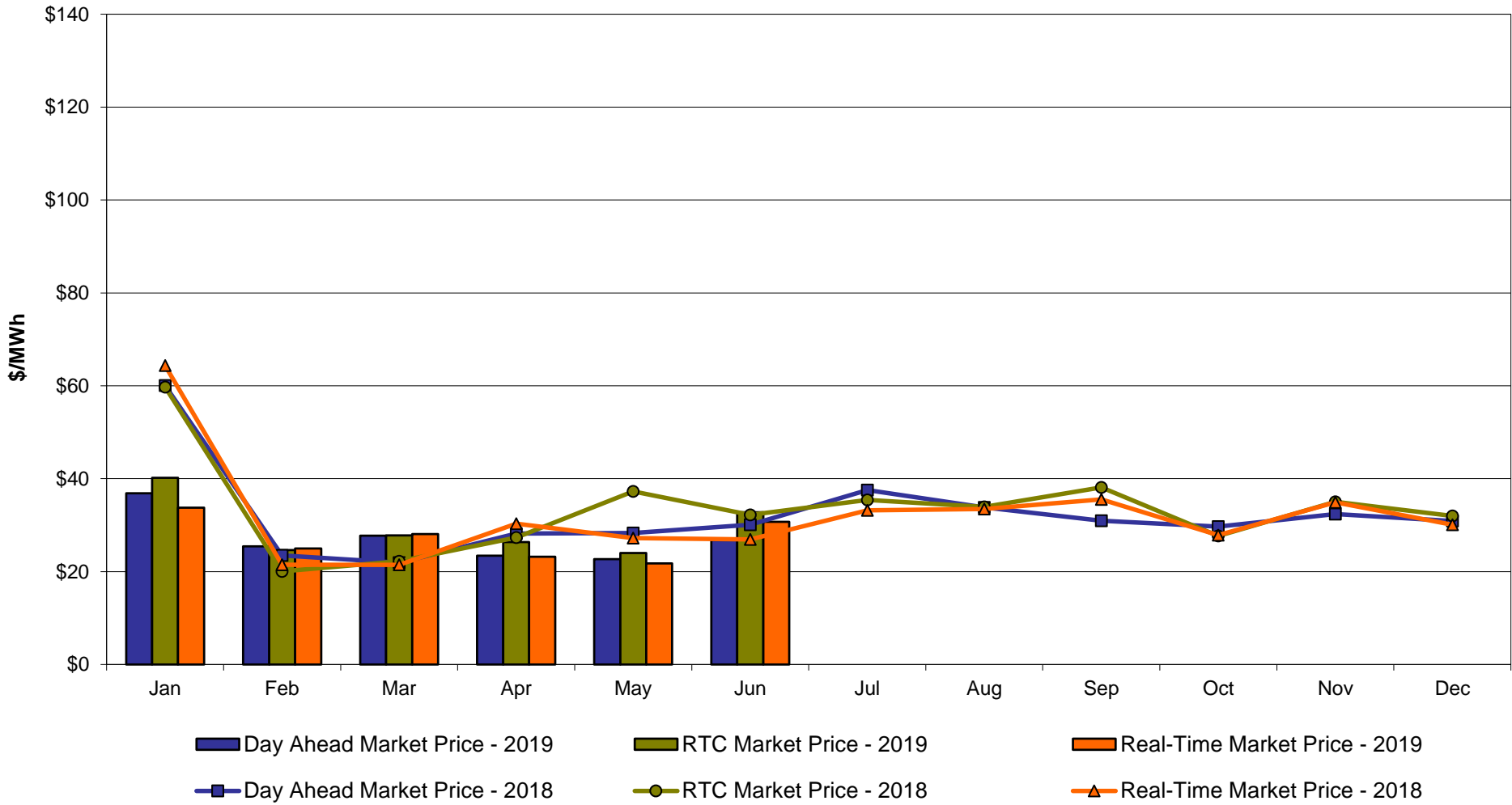


June 2019 Zonal LBMP Statistics for NYISO (\$/MWh)

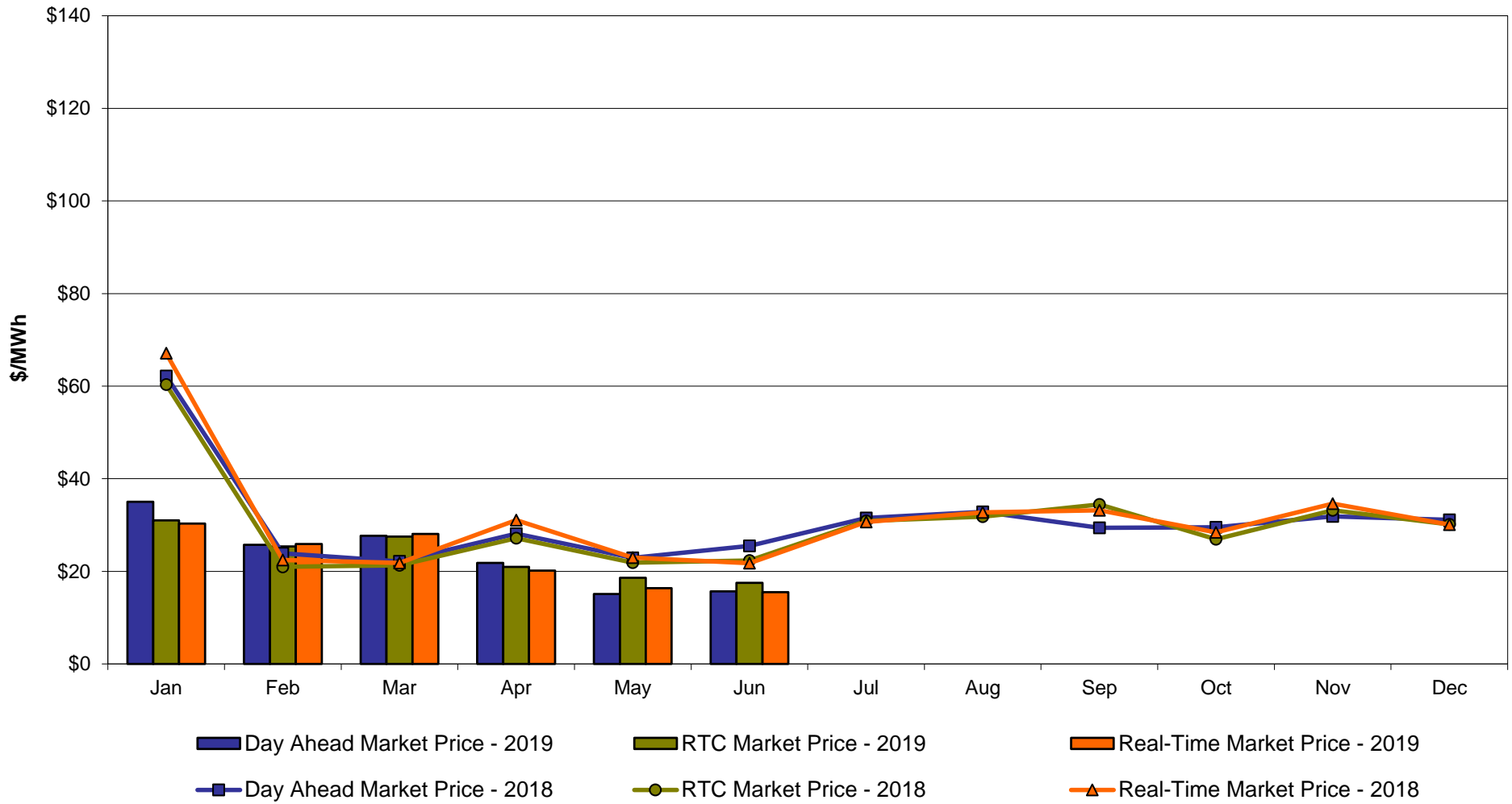
	<u>WEST Zone A</u>	<u>GENESEE Zone B</u>	<u>NORTH Zone D</u>	<u>CENTRAL Zone C</u>	<u>MOHAWK VALLEY Zone E</u>	<u>CAPITAL Zone F</u>	<u>HUDSON VALLEY Zone G</u>	<u>MILLWOOD Zone H</u>	<u>DUNWOODIE Zone I</u>	<u>NEW YORK CITY Zone J</u>	<u>LONG ISLAND Zone K</u>
<u>DAY AHEAD LBMP</u>											
Unweighted Price *	26.76	13.74	11.15	15.67	14.96	21.75	20.64	22.09	22.69	23.41	26.03
Standard Deviation	17.91	6.32	5.85	7.20	6.41	4.04	4.99	6.13	7.17	7.30	8.07
<u>RTC LBMP</u>											
Unweighted Price *	32.78	15.50	14.38	17.52	16.88	22.56	22.32	24.70	25.73	26.40	35.73
Standard Deviation	30.43	10.03	9.65	10.42	9.41	7.69	23.69	30.94	32.41	32.40	50.66
<u>REAL TIME LBMP</u>											
Unweighted Price *	30.72	13.59	12.53	15.51	14.77	21.16	19.61	22.41	23.74	24.74	31.04
Standard Deviation	36.81	11.21	10.95	11.79	10.85	9.12	20.85	20.96	22.75	22.94	31.83
	<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>
<u>DAY AHEAD LBMP</u>											
Unweighted Price *	11.26	12.47	12.47	20.07	21.68	25.28	23.78	24.84	23.20	23.18	10.94
Standard Deviation	4.39	5.70	5.70	7.20	4.51	7.86	6.01	7.79	7.06	7.14	5.64
<u>RTC LBMP</u>											
Unweighted Price *	12.83	13.40	13.40	22.59	23.26	34.66	32.29	34.06	24.36	26.16	14.41
Standard Deviation	10.26	12.89	12.89	21.58	11.34	50.27	39.27	50.24	17.96	34.05	11.63
<u>REAL TIME LBMP</u>											
Unweighted Price *	5.46	12.28	12.28	20.00	21.65	30.51	24.60	30.34	23.21	24.25	12.26
Standard Deviation	49.81	12.73	12.73	22.44	14.85	31.78	28.59	32.84	16.84	24.30	10.67

* Straight LBMP averages

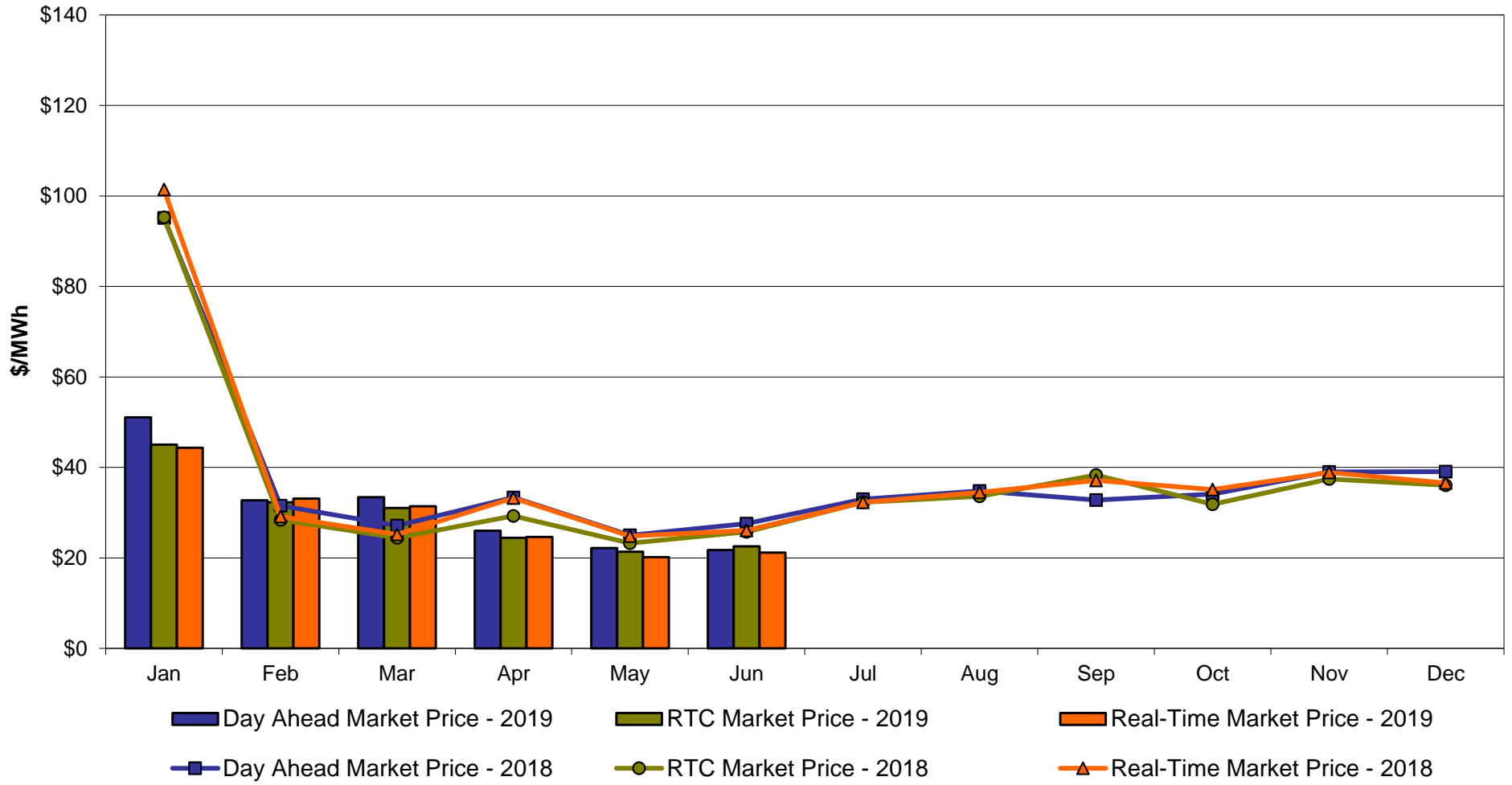
West Zone A
Monthly Average LBMP Prices 2018 - 2019



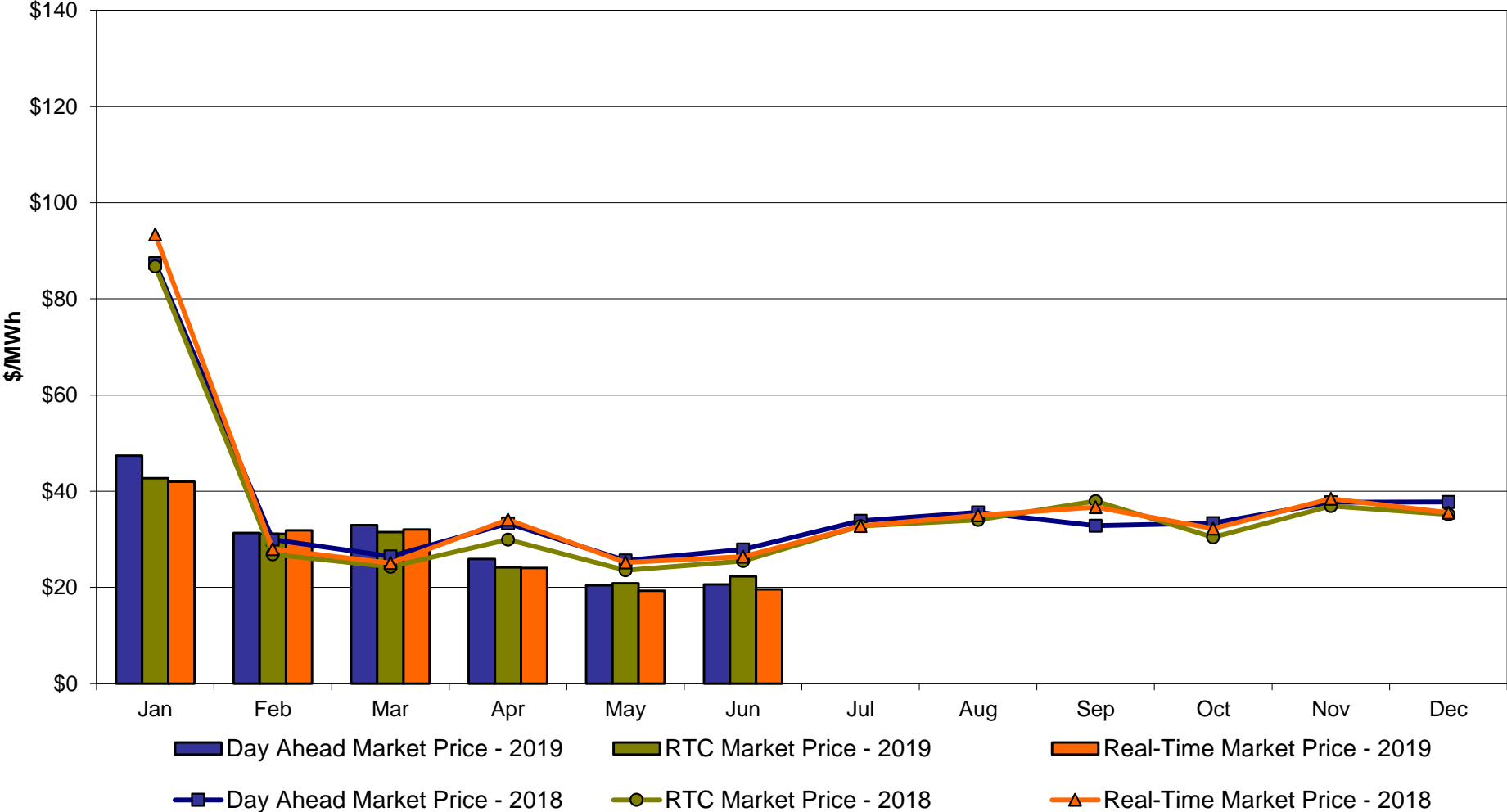
Central Zone C Monthly Average LBMP Prices 2018 - 2019



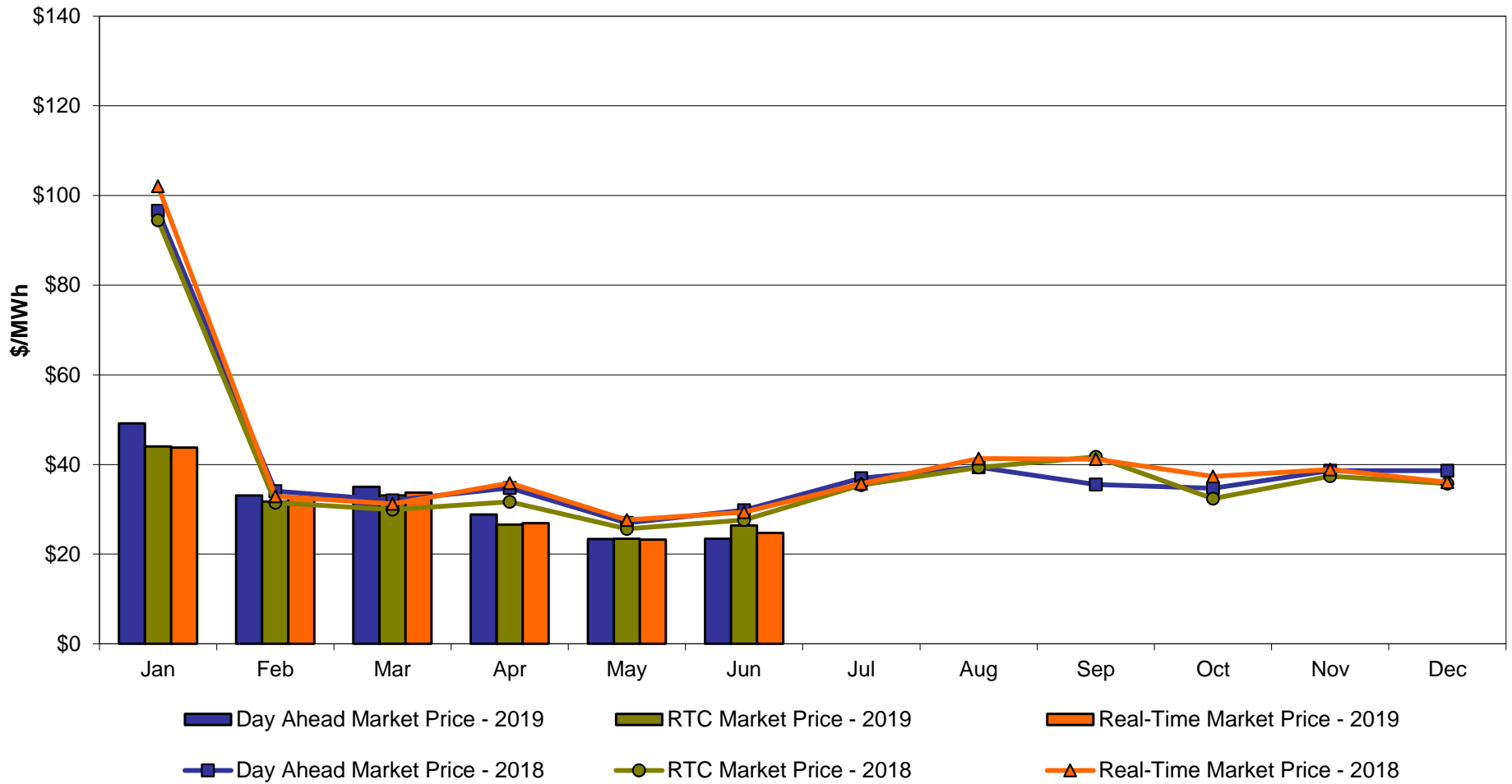
Capital Zone F Monthly Average LBMP Prices 2018 - 2019



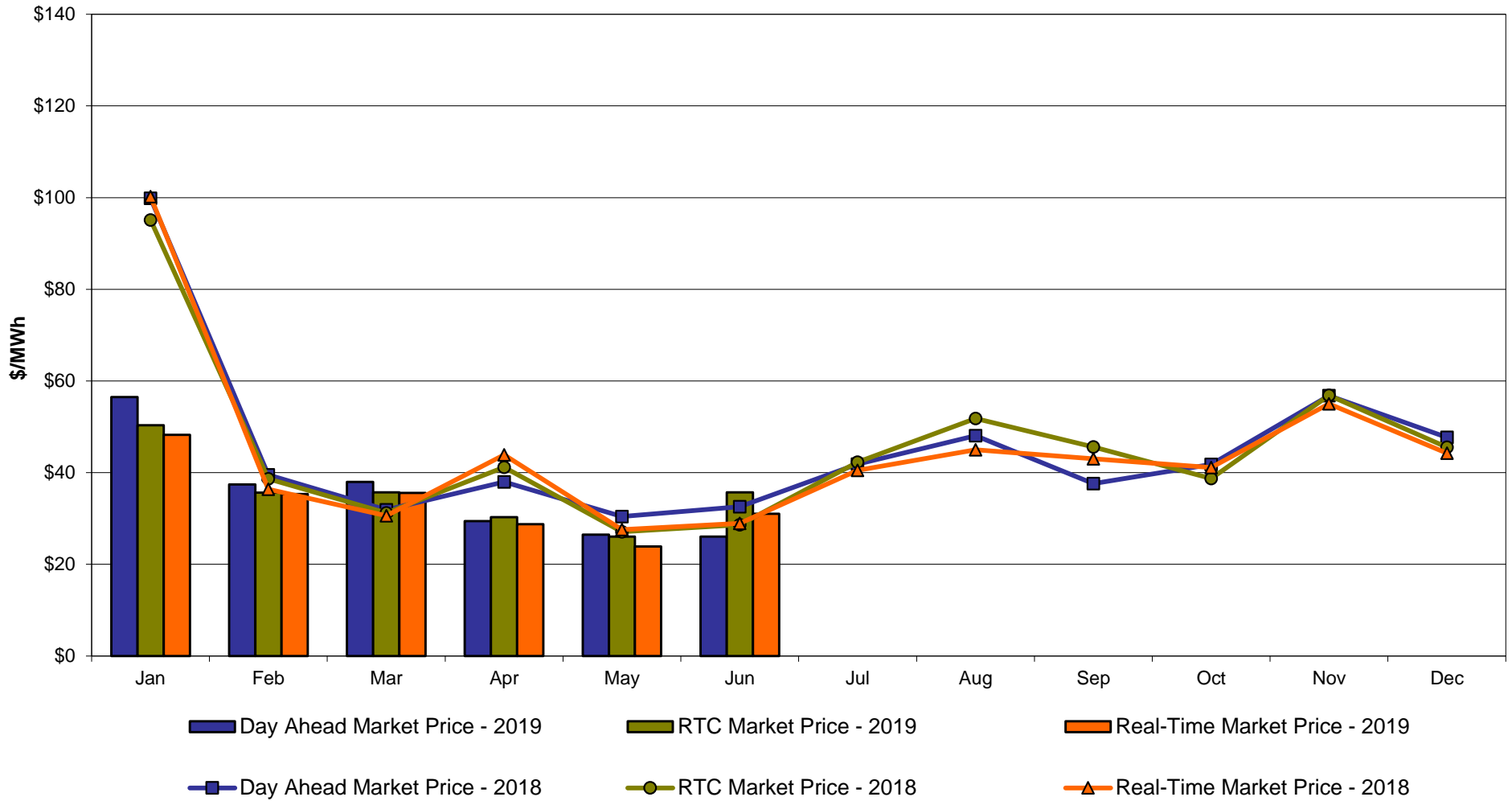
Hudson Valley Zone G Monthly Average LBMP Prices 2018 - 2019



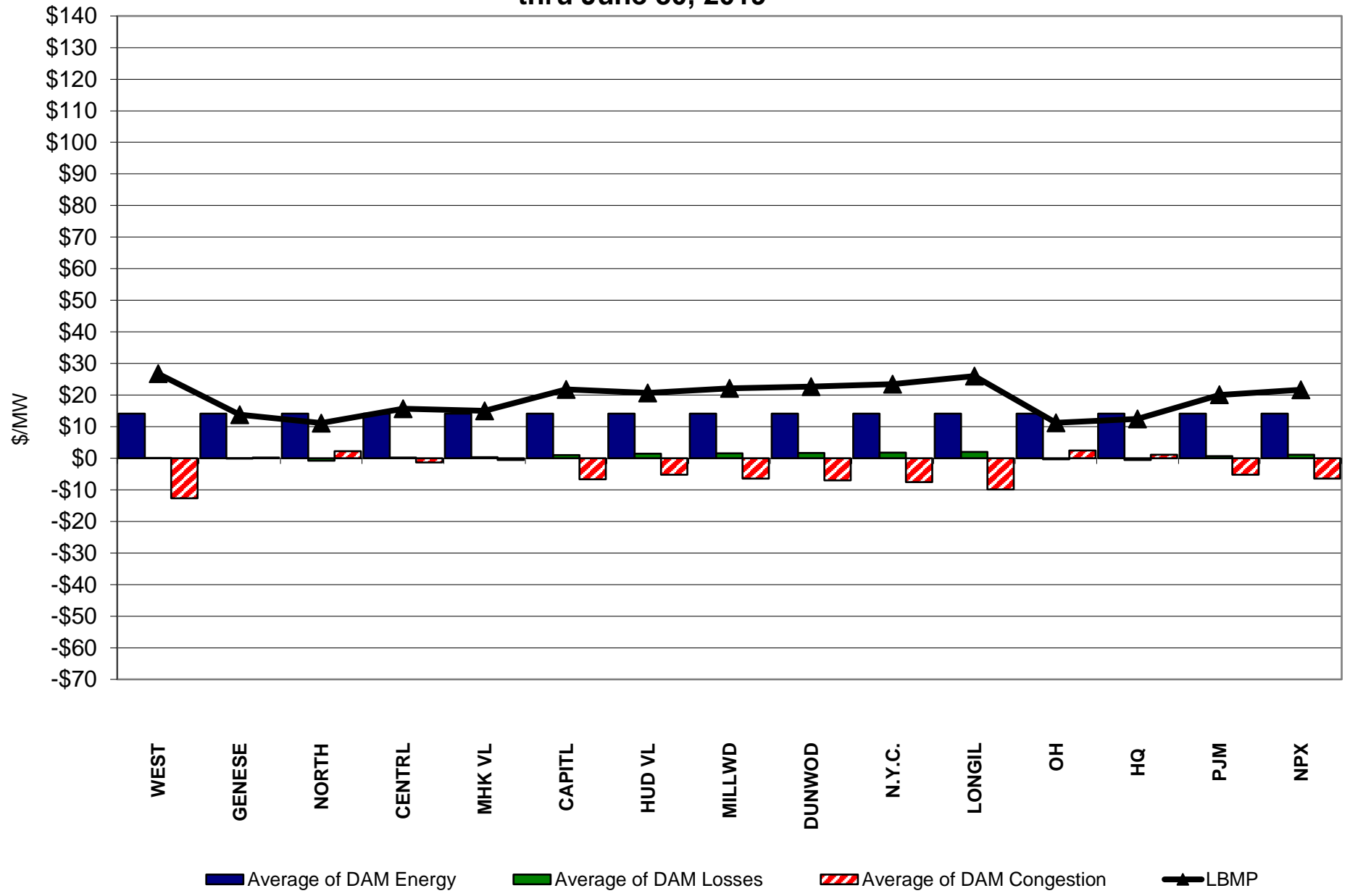
NYC Zone J Monthly Average LBMP Prices 2018 - 2019



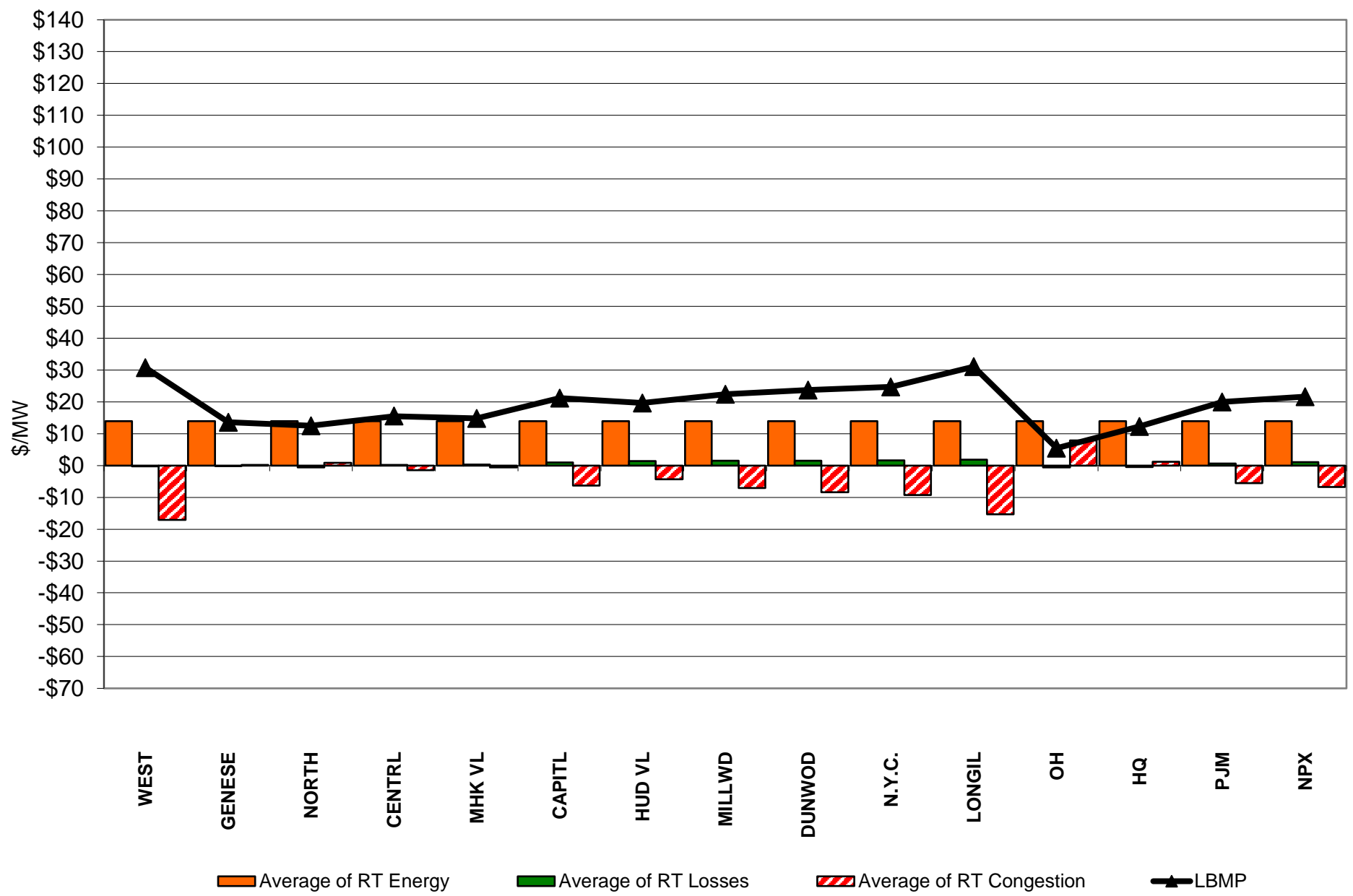
Long Island Zone K Monthly Average LBMP Prices 2018 - 2019



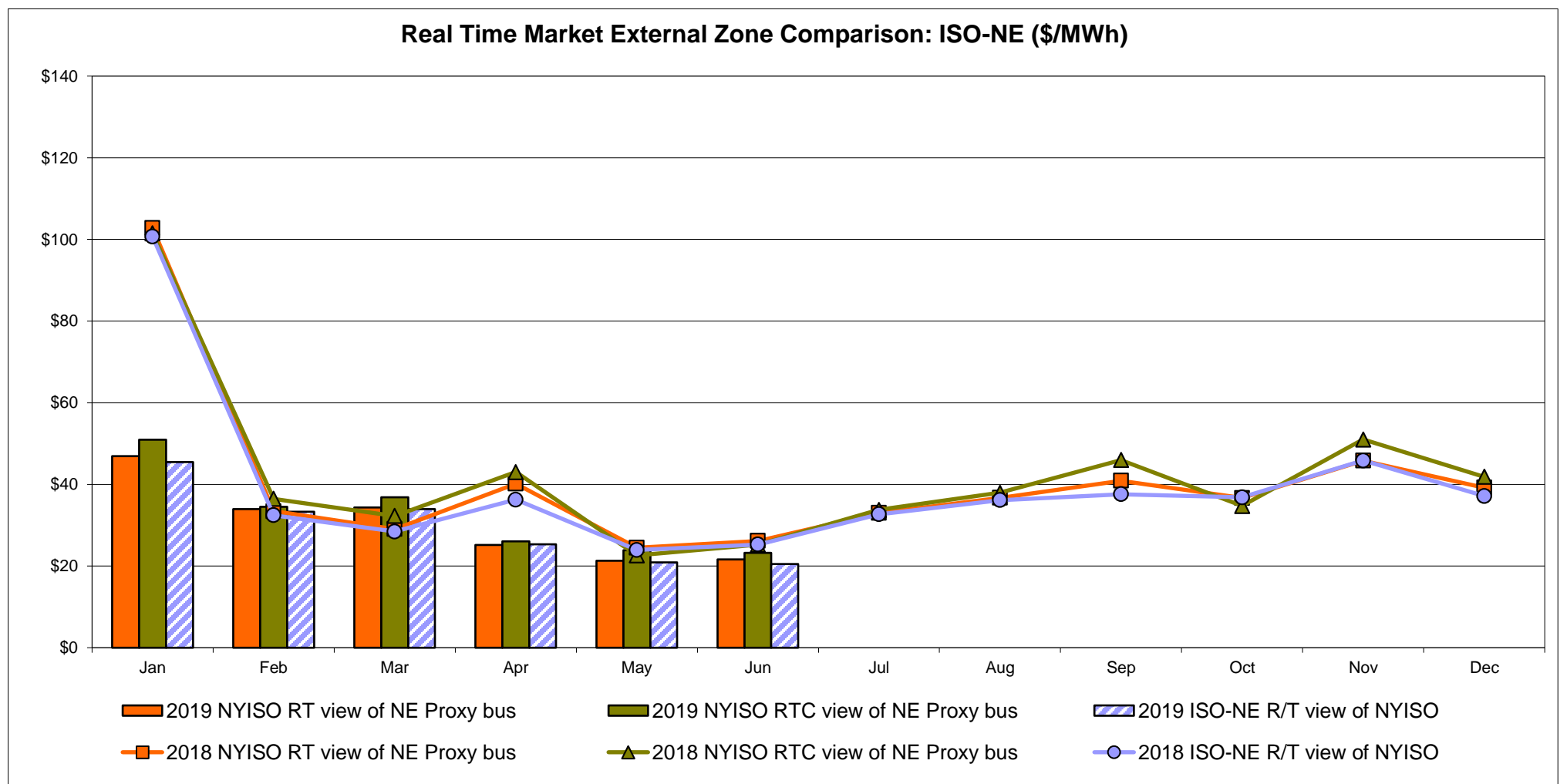
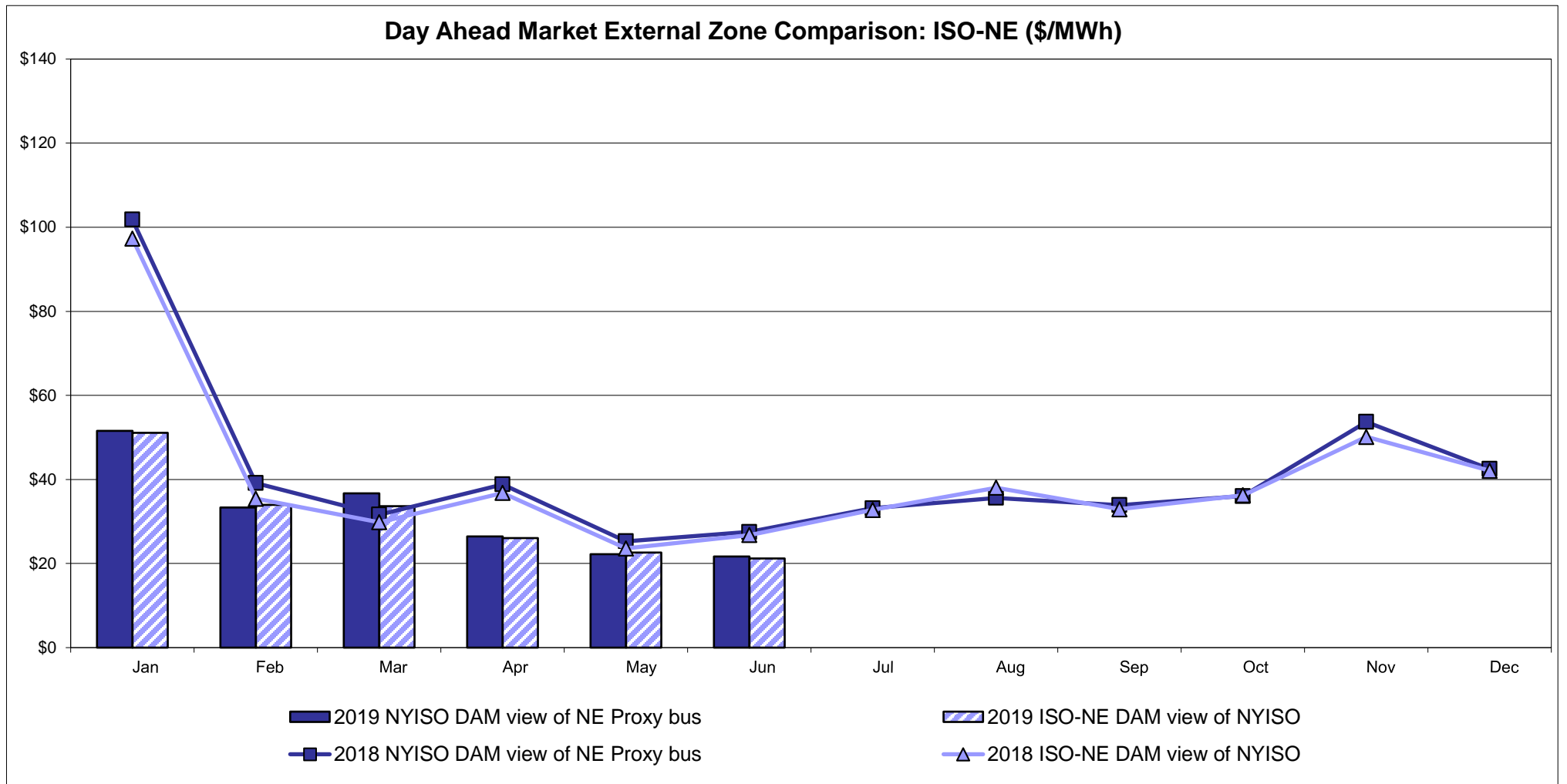
**DAM Zonal Unweighted Monthly Average LBMP Components
thru June 30, 2019**



**RT Zonal Unweighted Monthly Average LBMP Components
thru June 30, 2019**

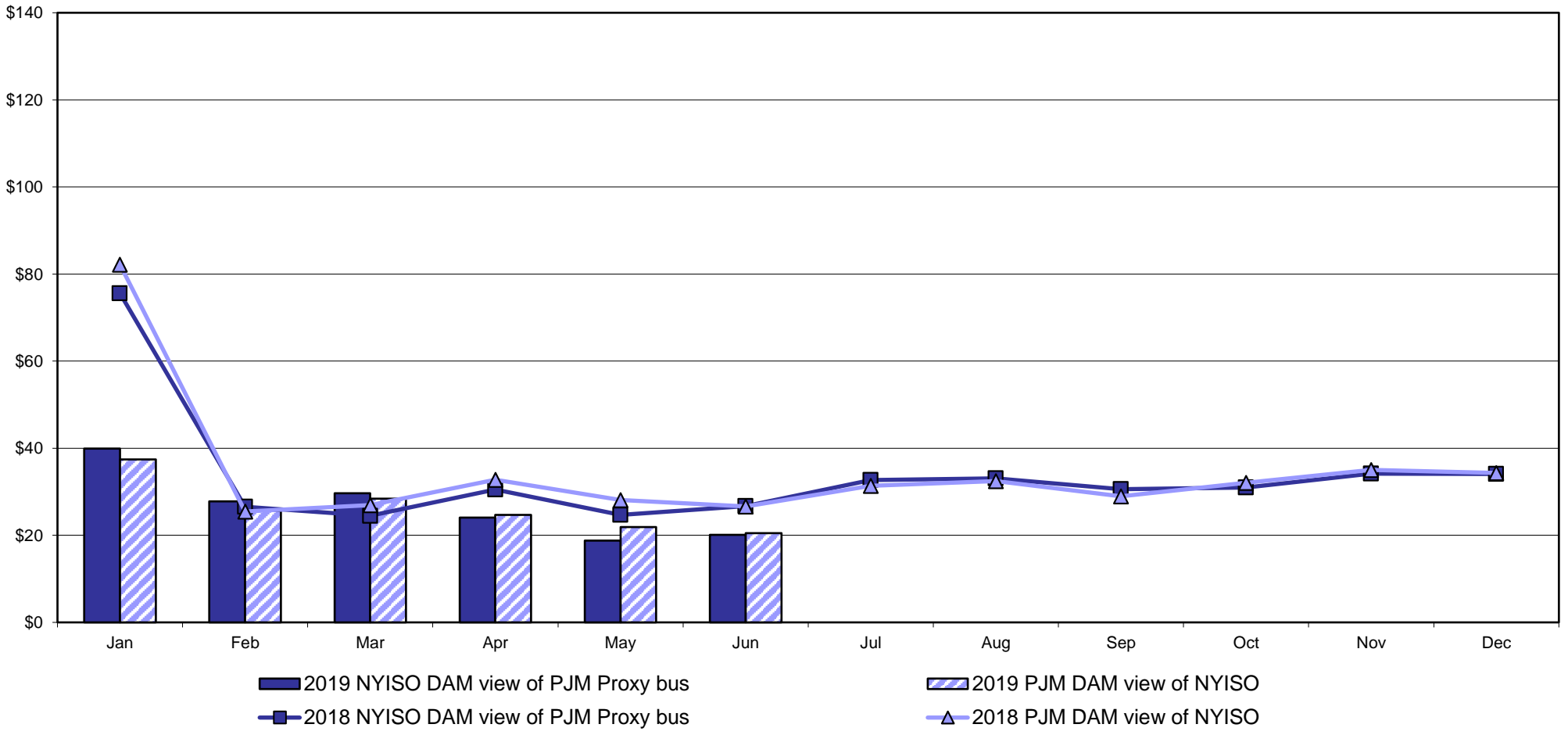


External Comparison ISO-New England

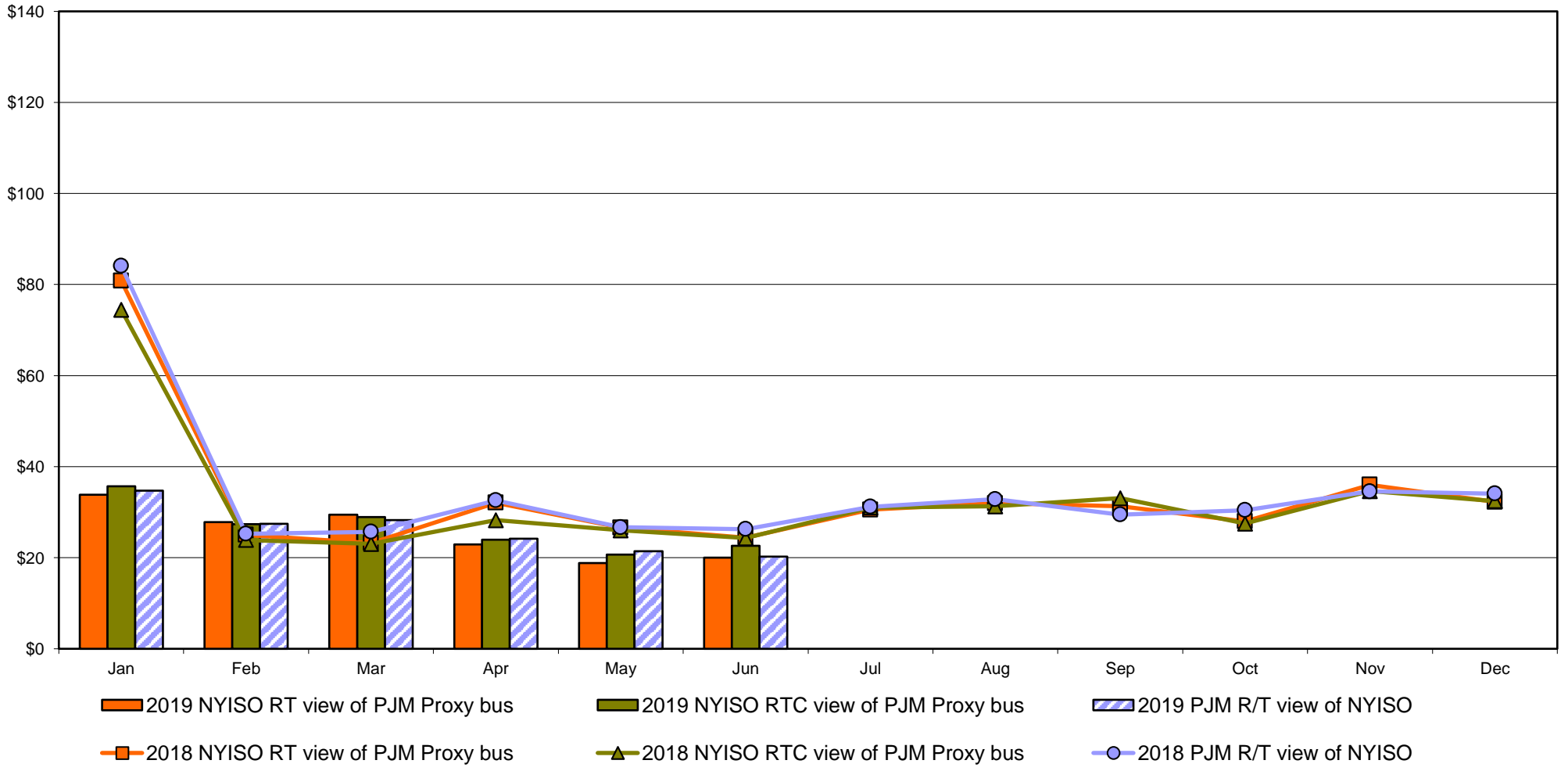


External Comparison PJM

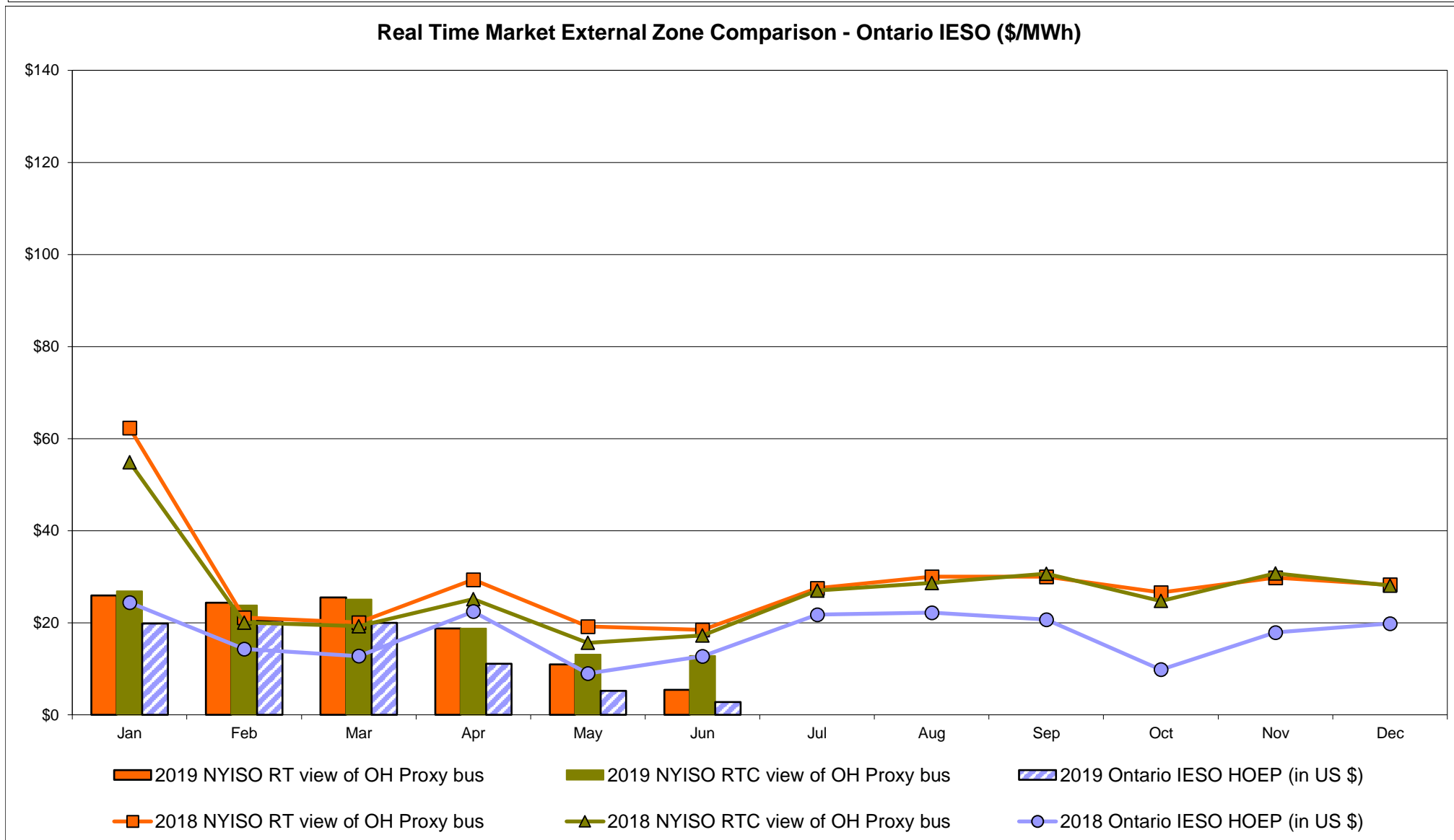
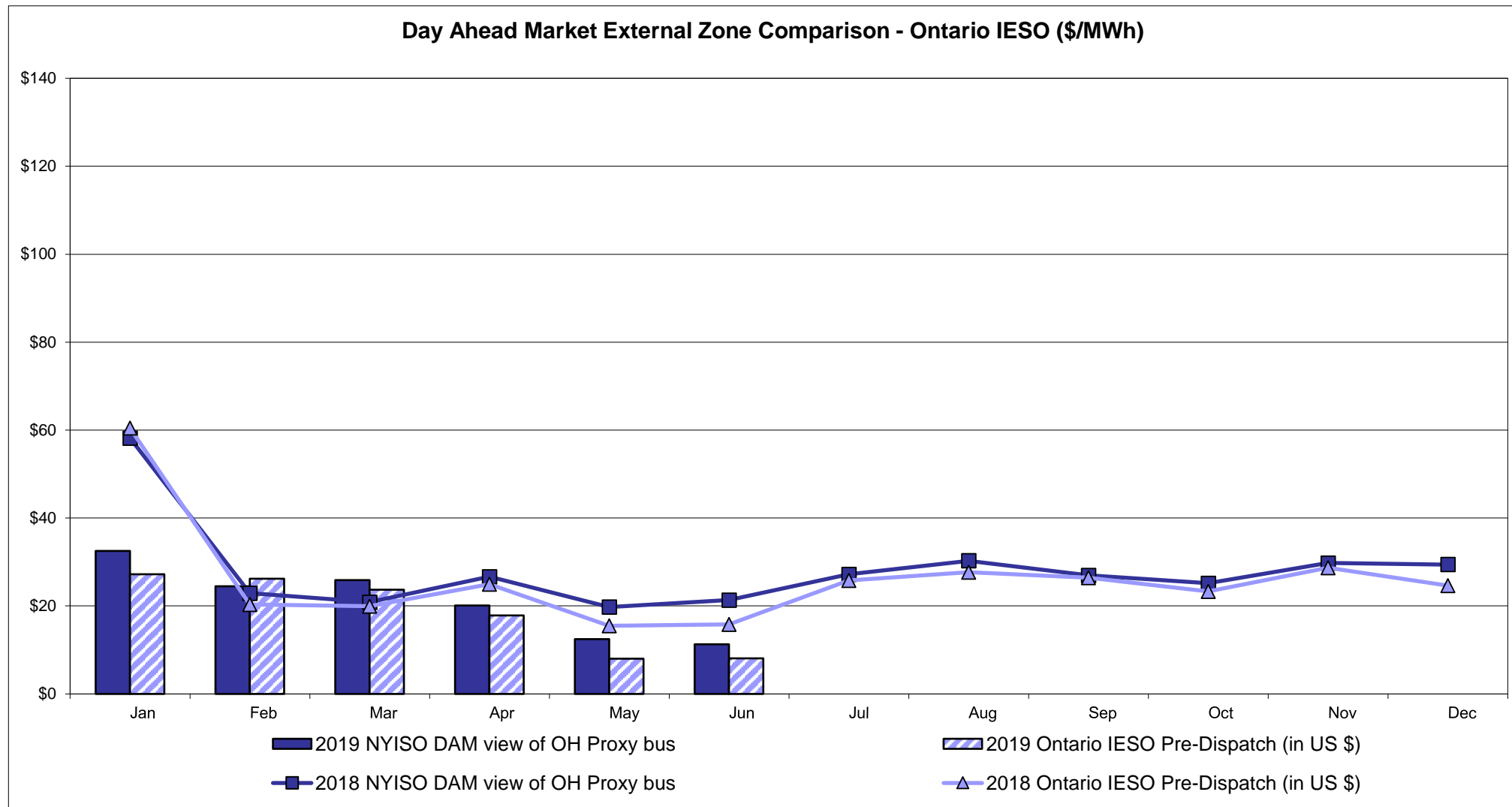
Day Ahead Market External Zone Comparison - PJM (\$/MWh)



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

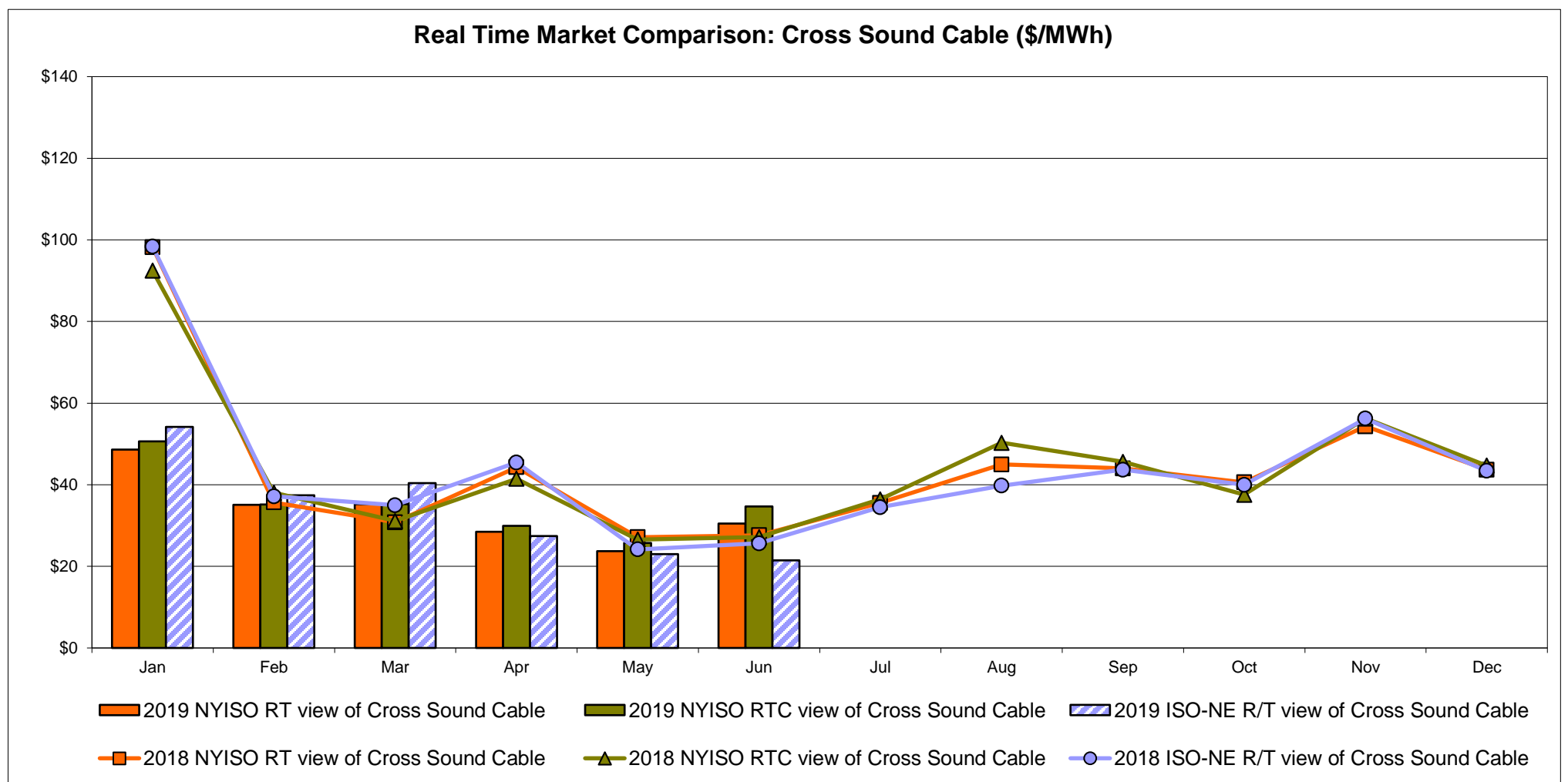
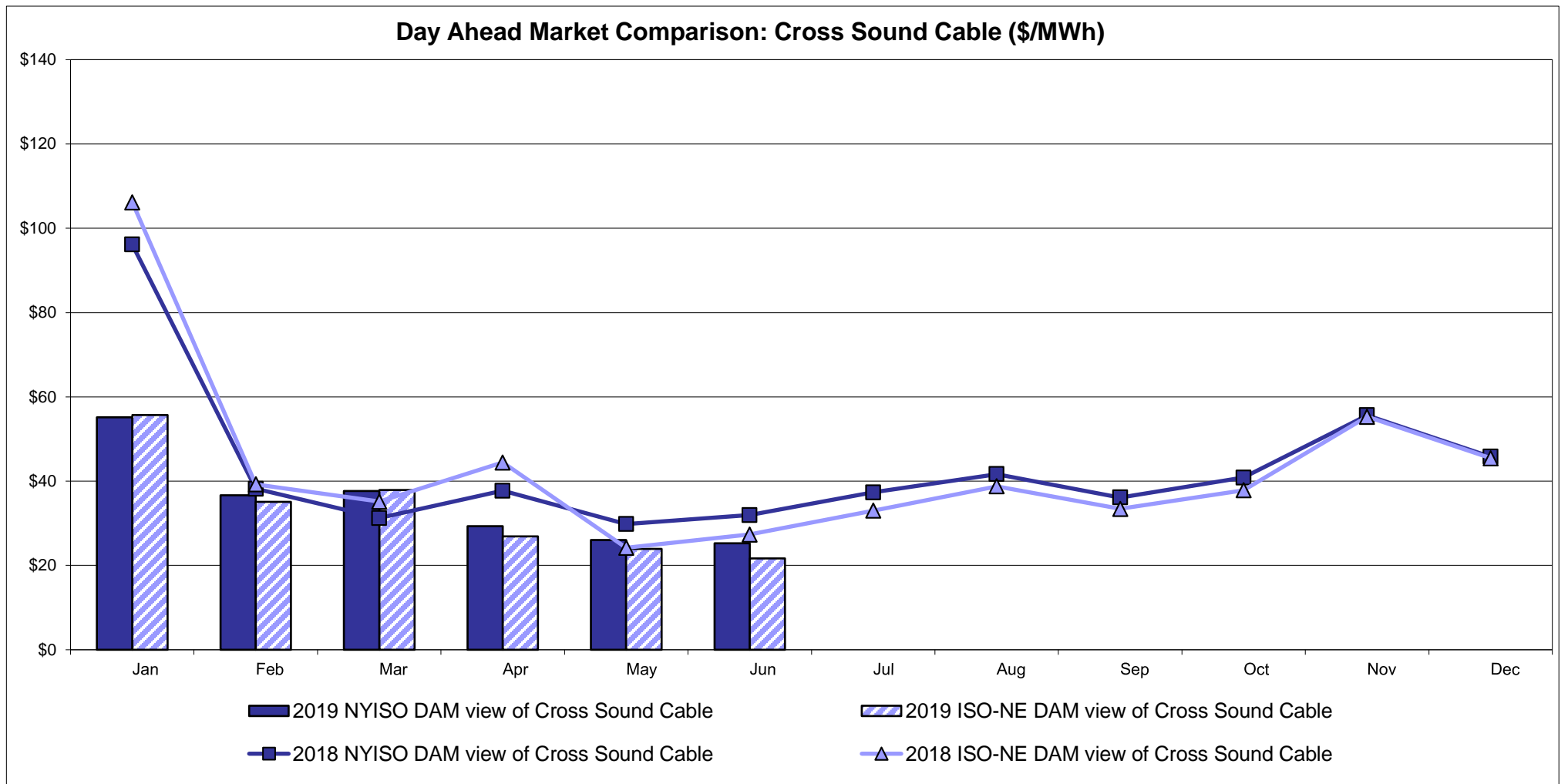


External Comparison Ontario IESO



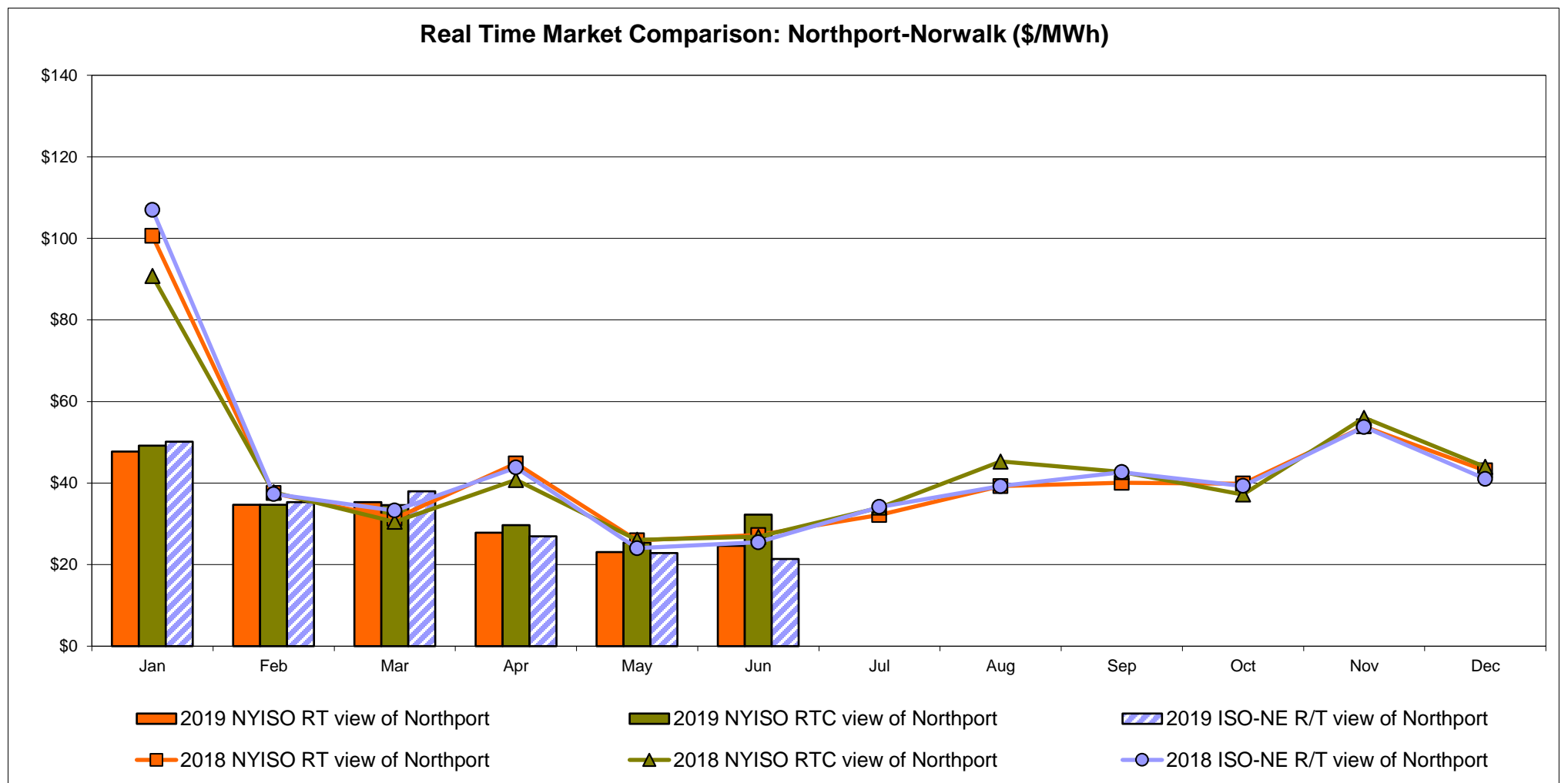
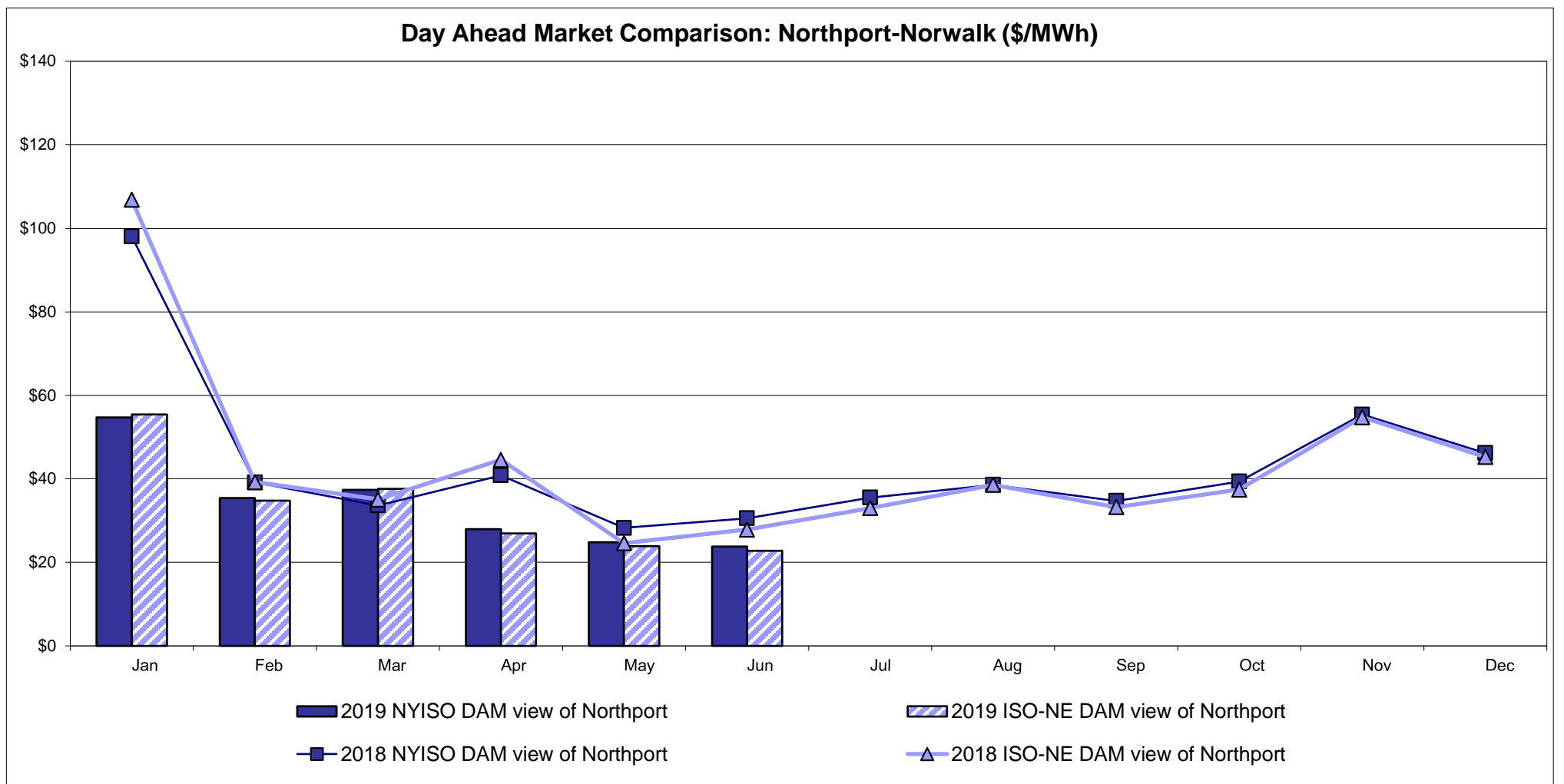
Notes: Exchange factor used for June 2019 was 0.752502069380691 to US
 HOEP: Hourly Ontario Energy Price
 Pre-Dispatch: Projected Energy Price

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.

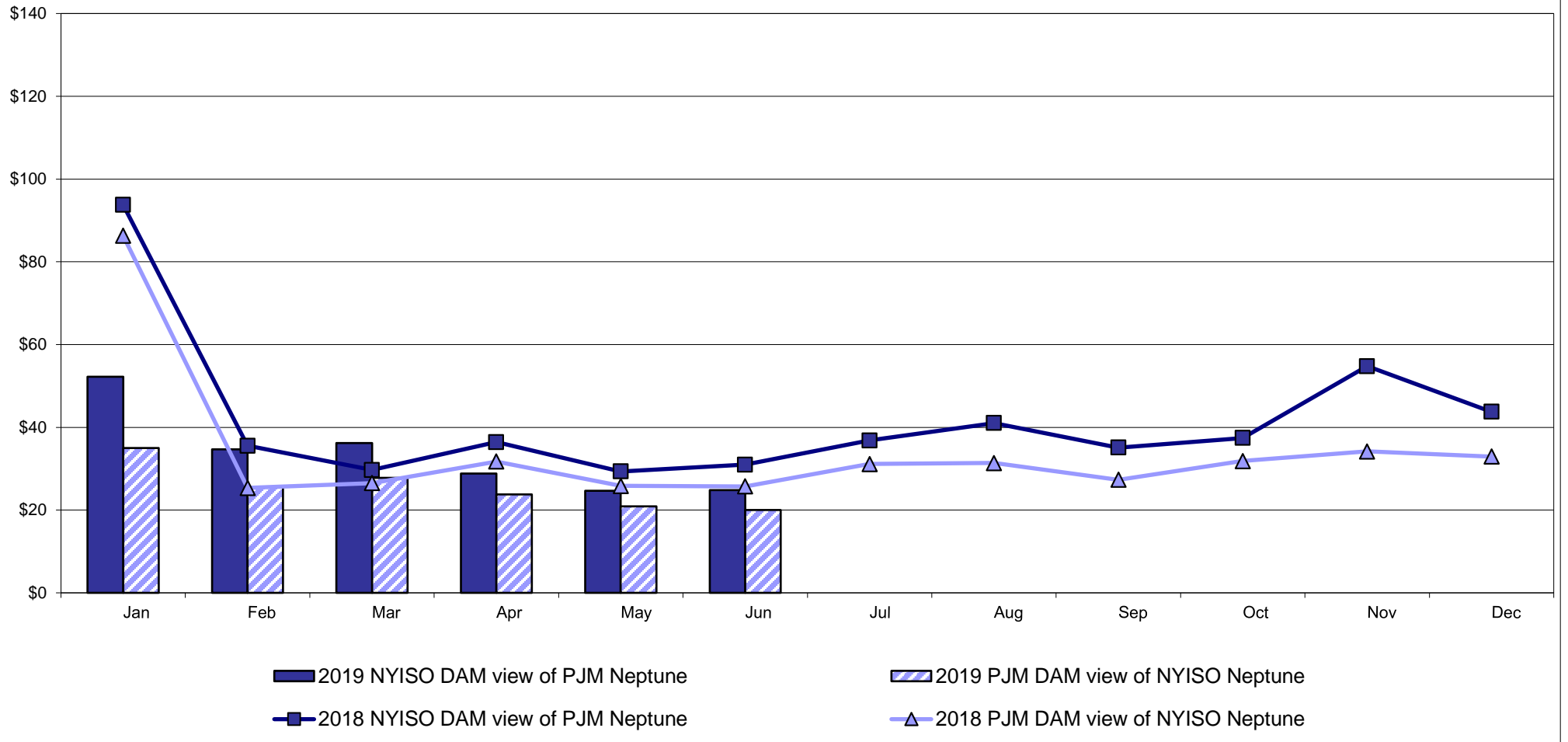
External Controllable Line: Northport - Norwalk (New England)



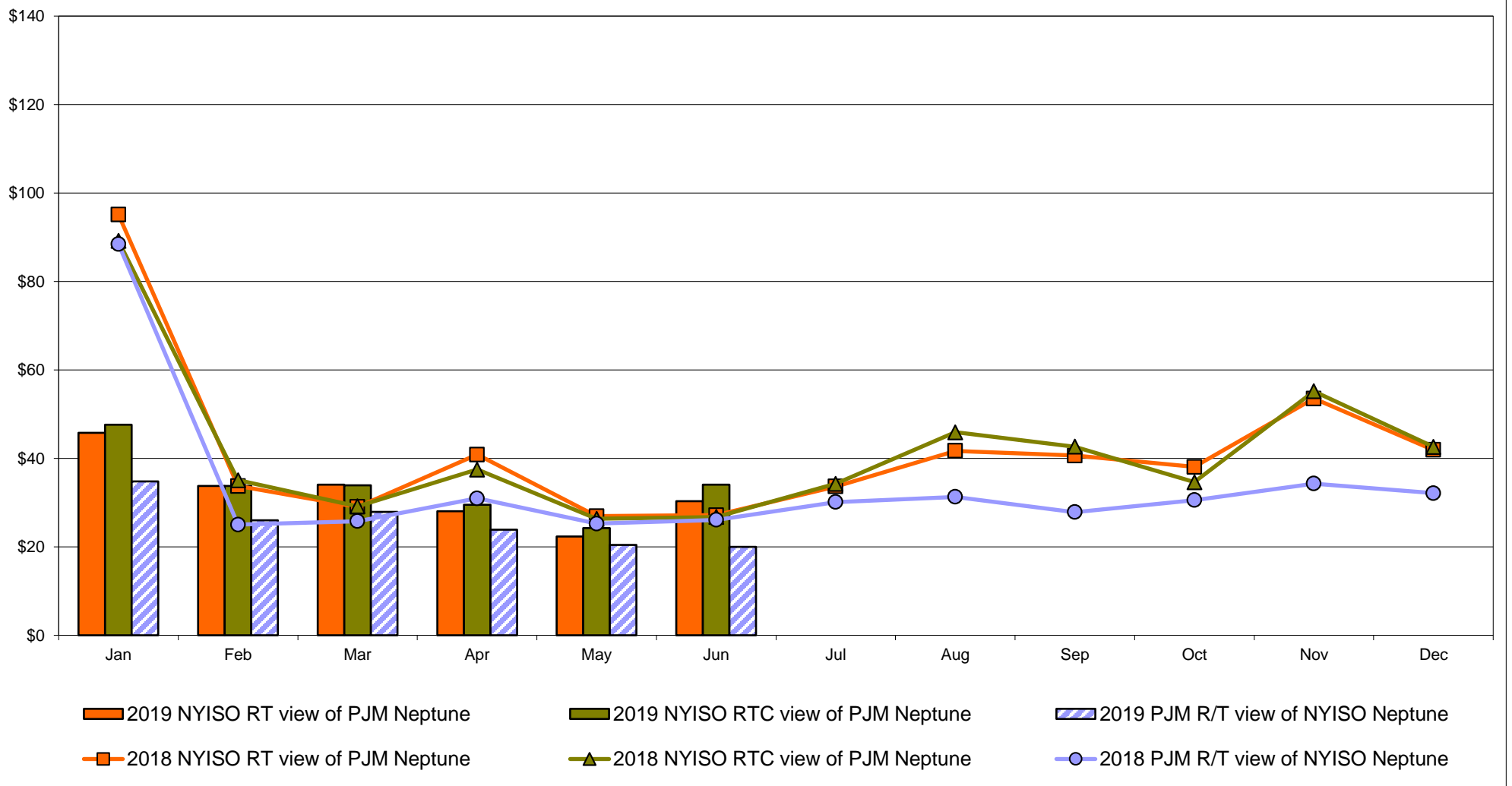
Note:
 ISO-NE Forecast is an advisory posting @ 18:00 day before.
 The DAM and R/T prices at the Northport 138 interface are used for ISO-NE.
 The DAM and R/T prices at the 1385 interface are used for NYISO.

External Controllable Line: Neptune (PJM)

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

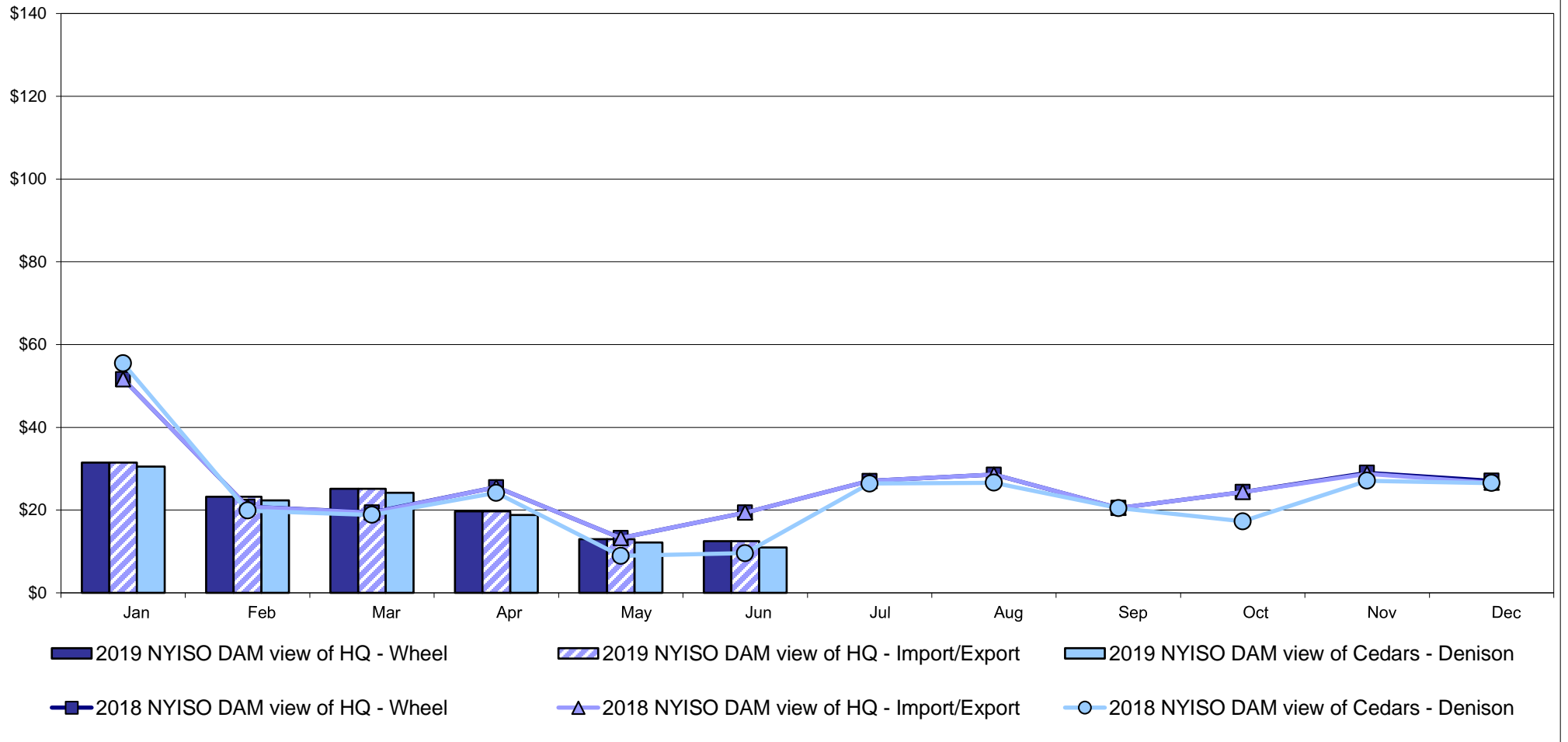


Real Time Market Comparison: Neptune (\$/MWh)

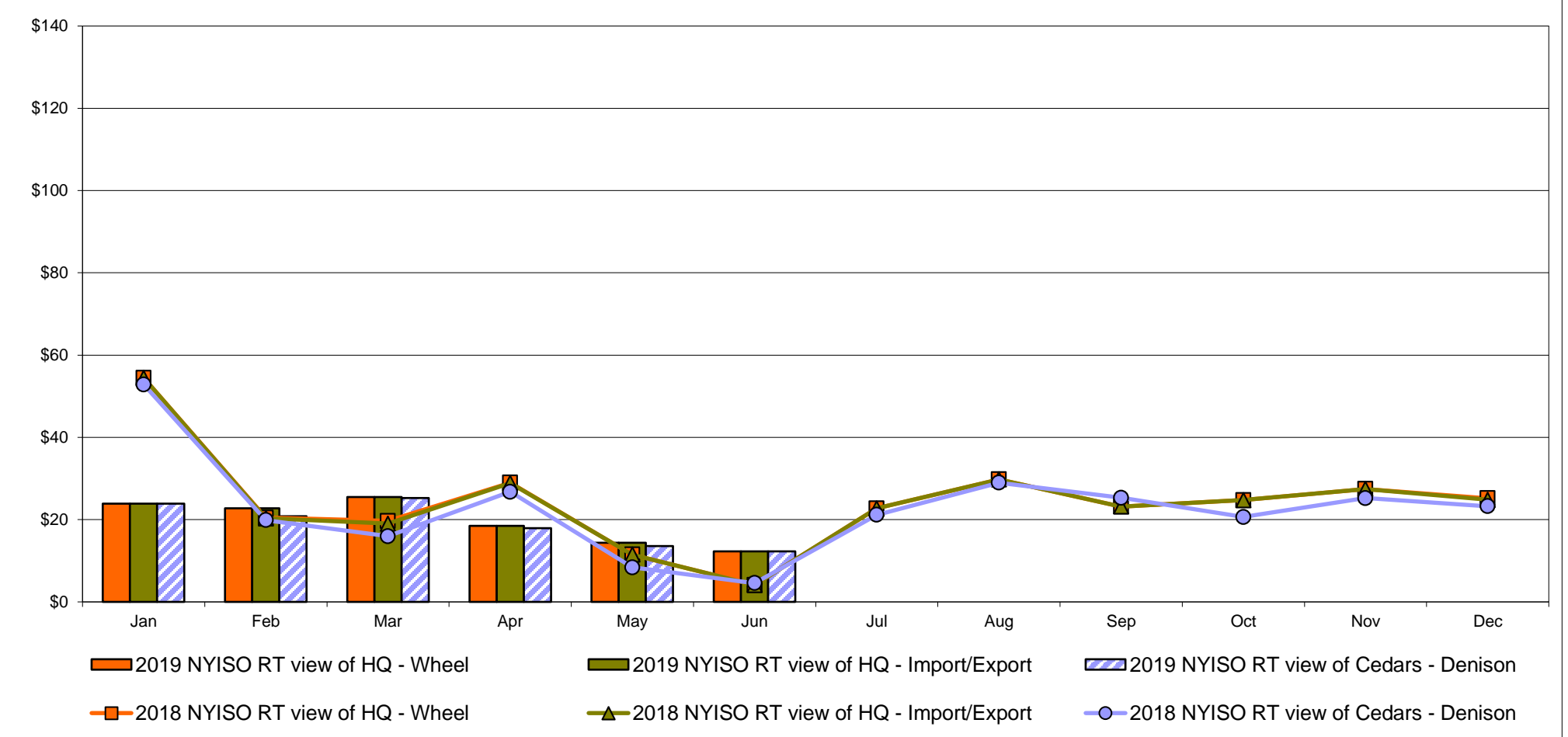


External Comparison Hydro-Quebec

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

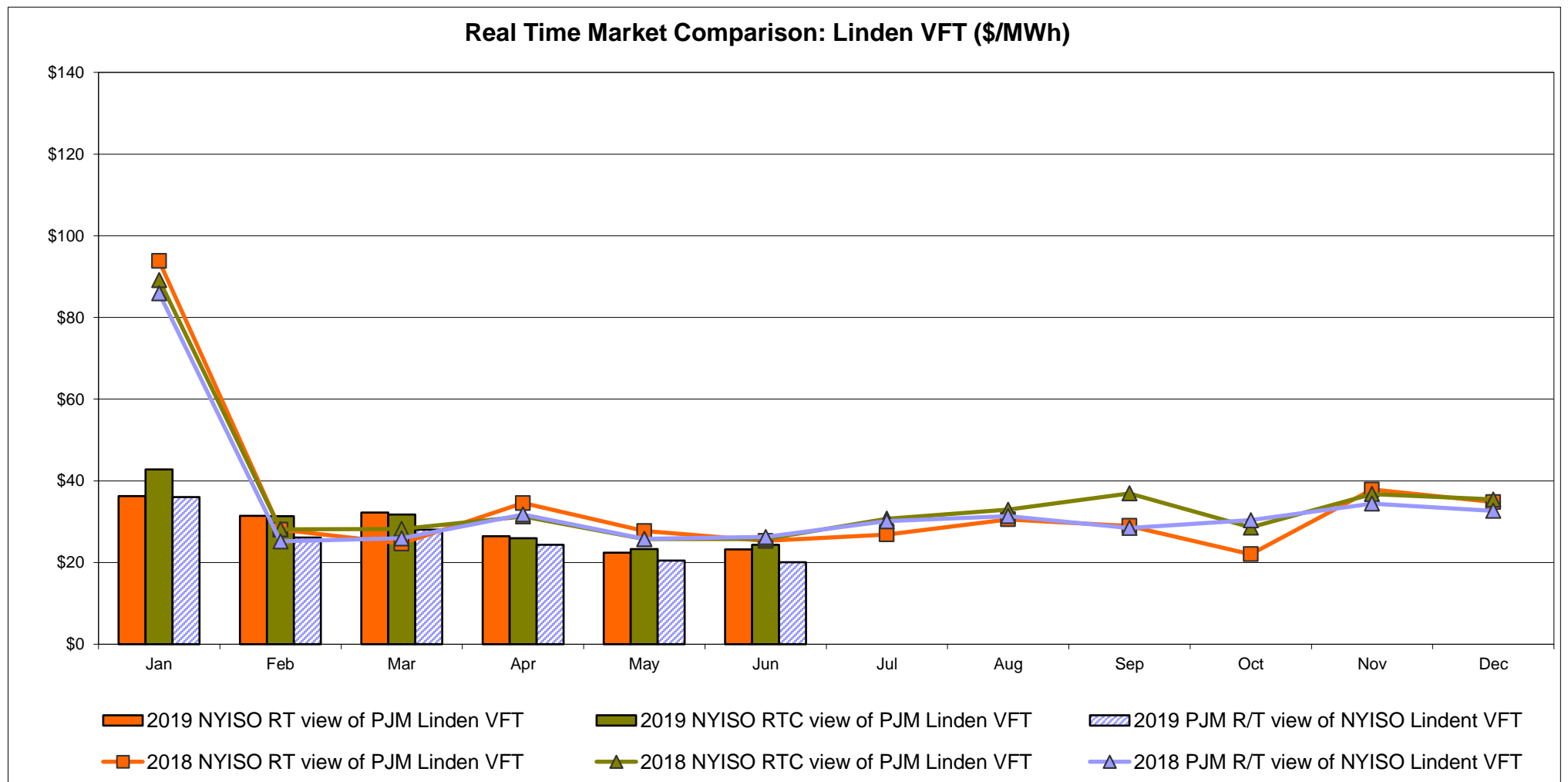
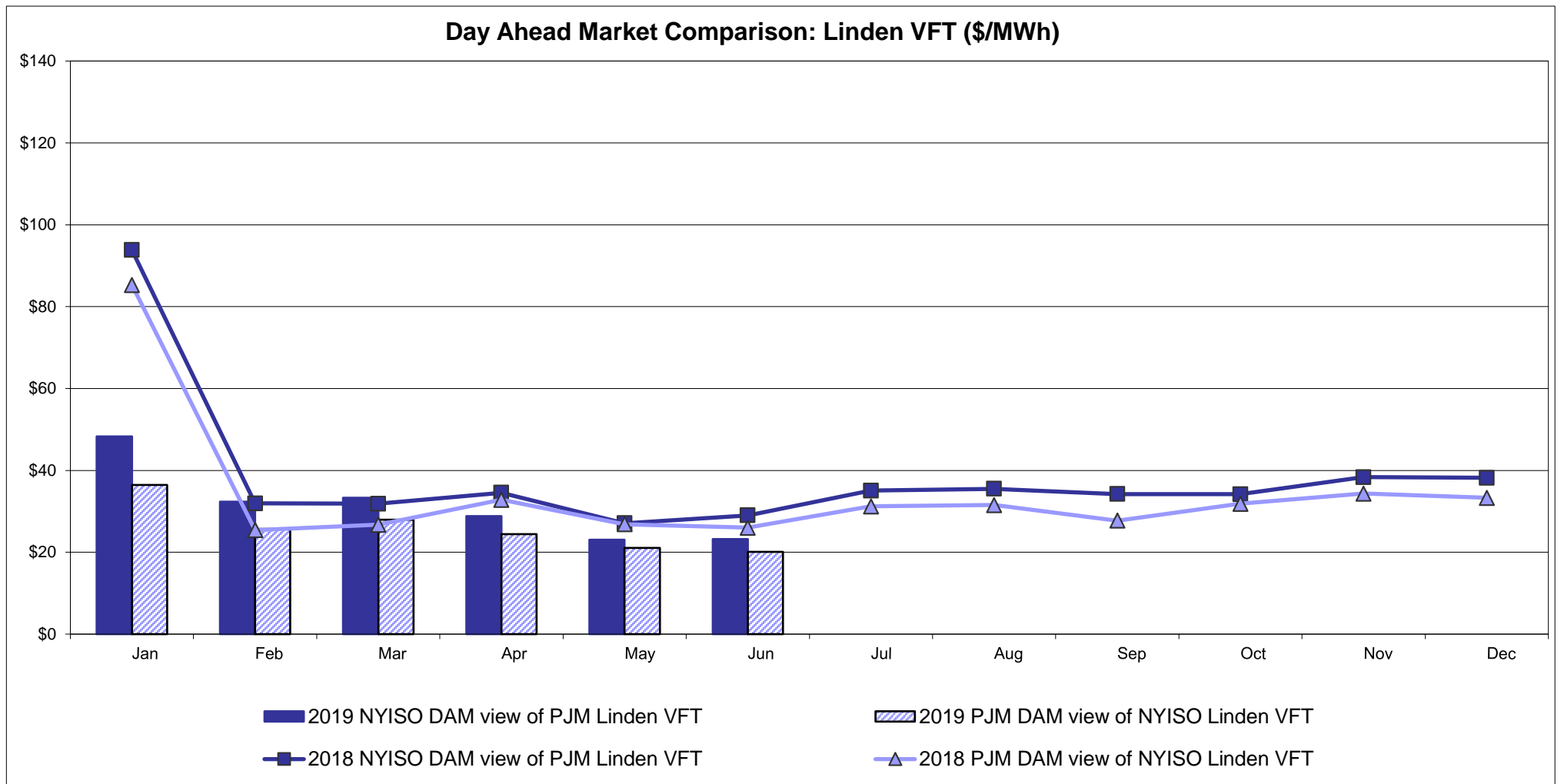


Real Time Market External Zone Comparison - HQ (\$/MWh)

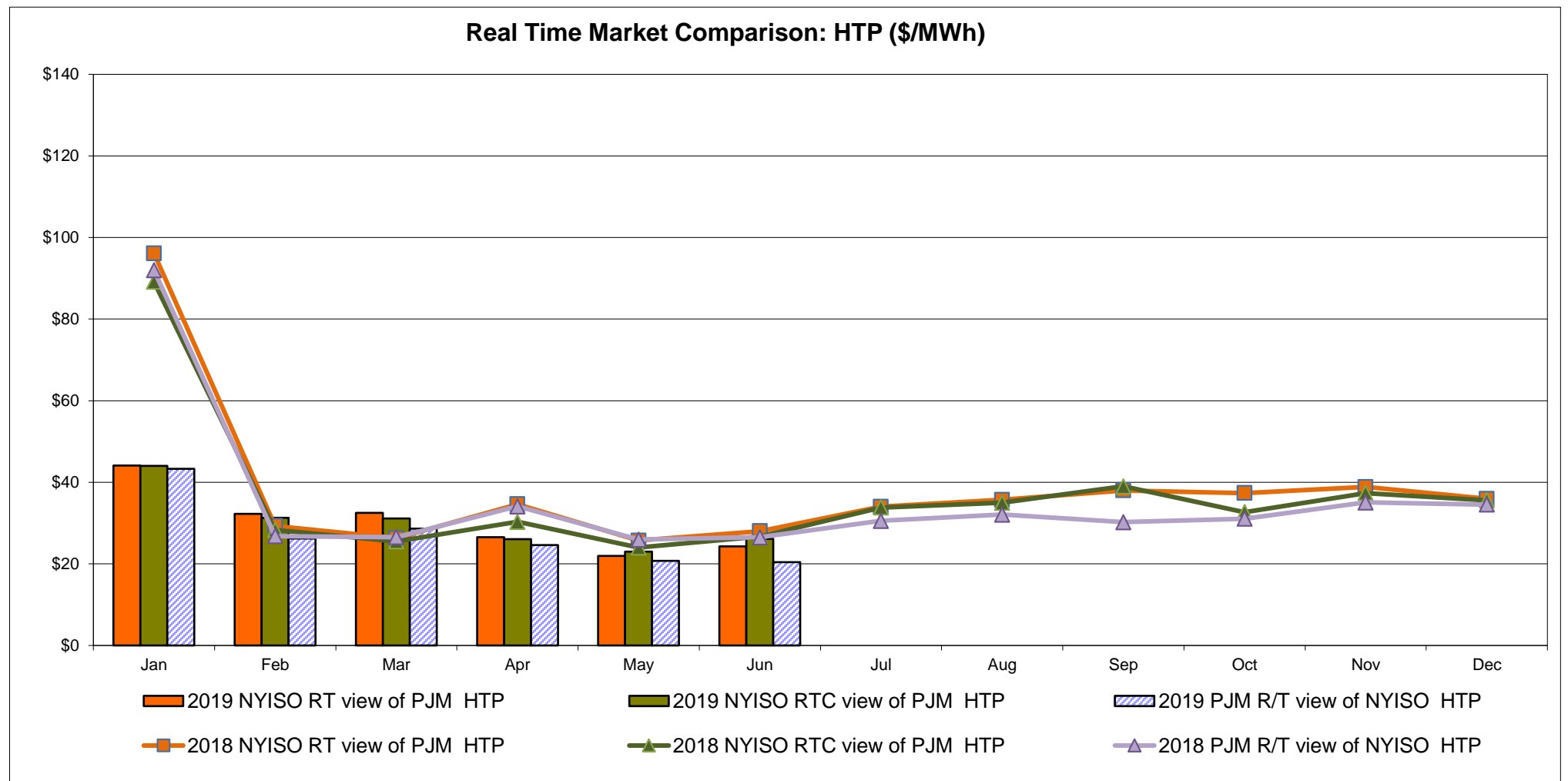
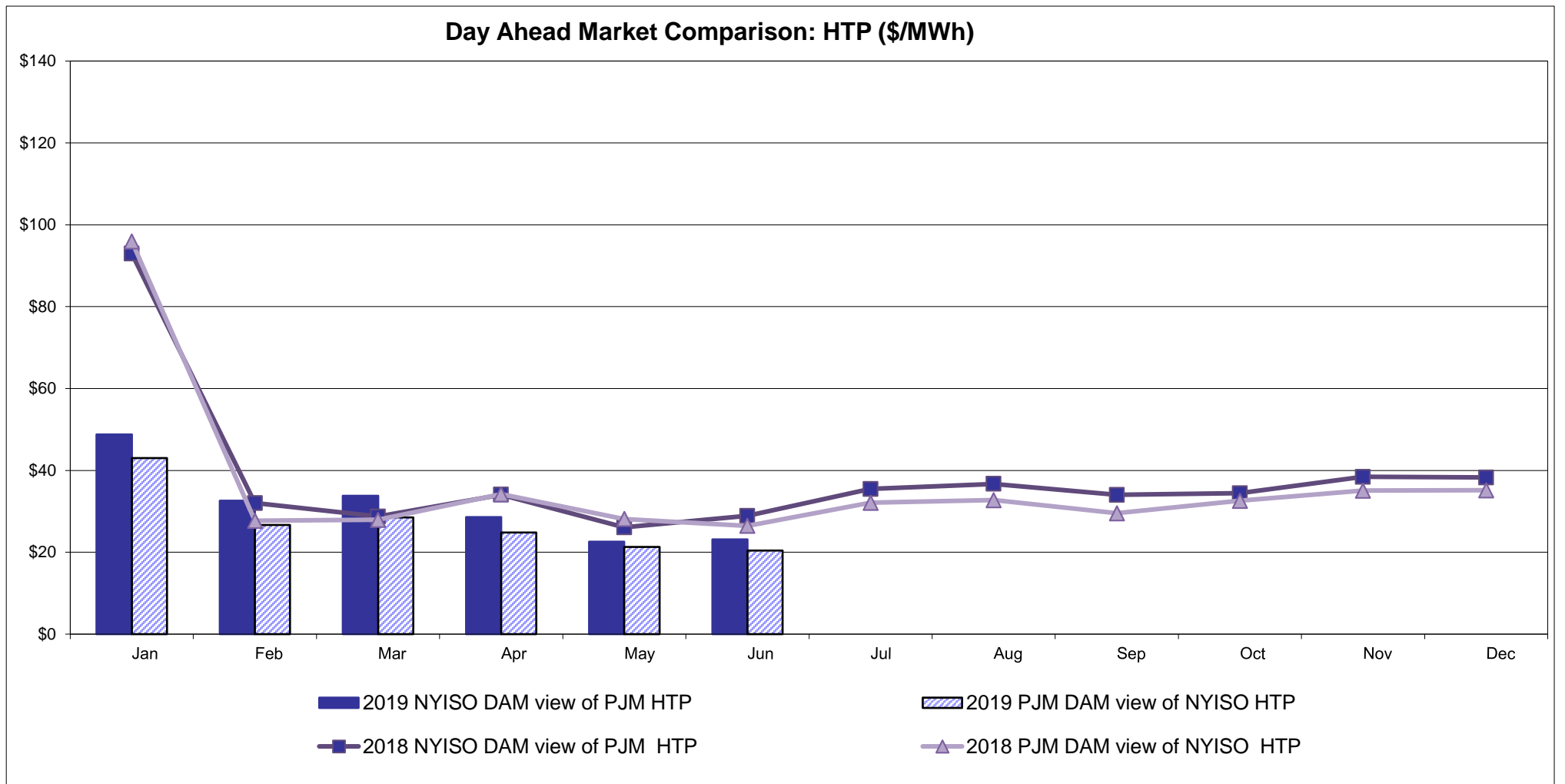


Note:
Hydro-Quebec Prices are unavailable.

External Controllable Line: Linden VFT (PJM)



External Controllable Line: Hudson (PJM)

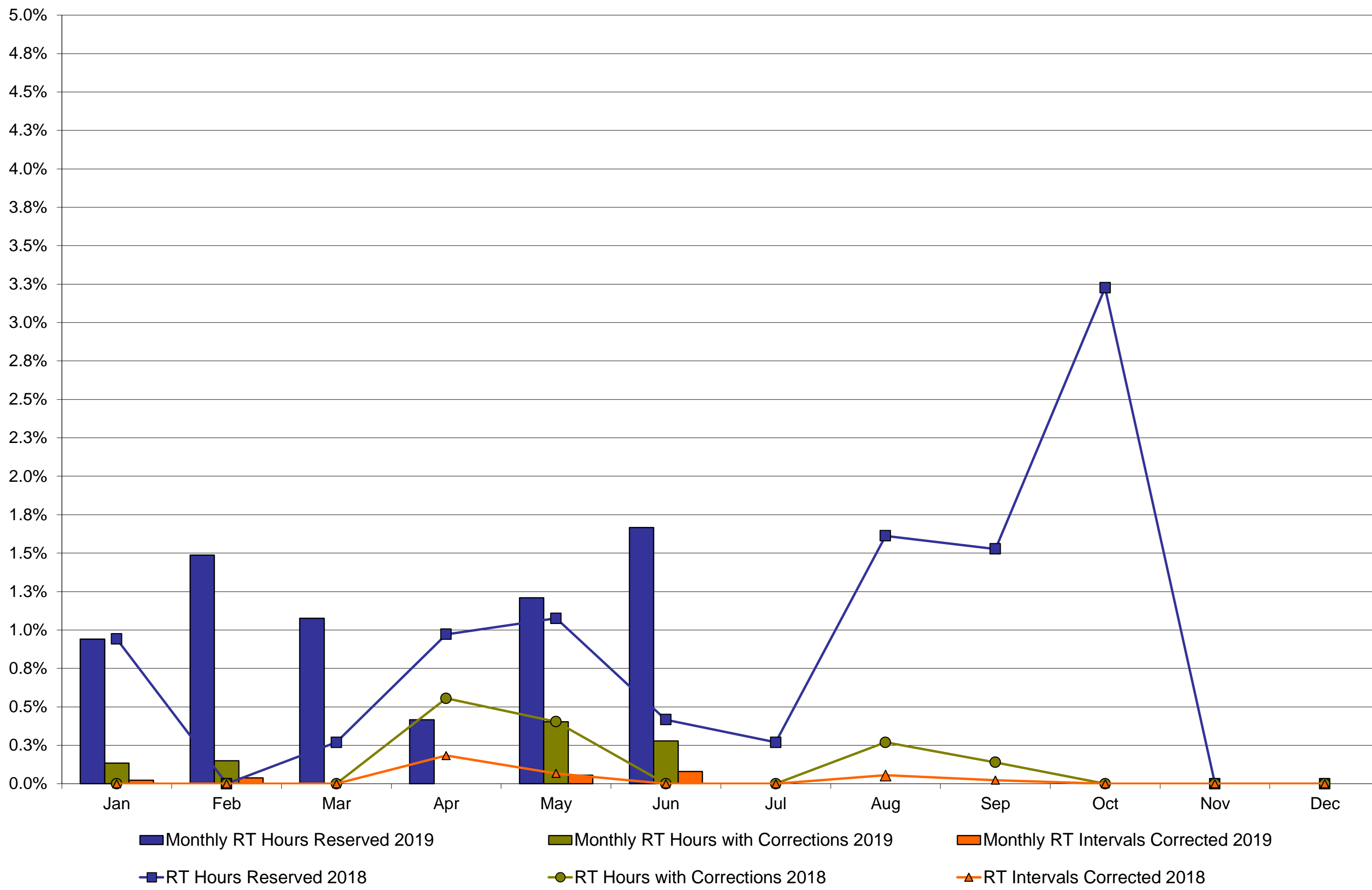


NYISO Real Time Price Correction Statistics

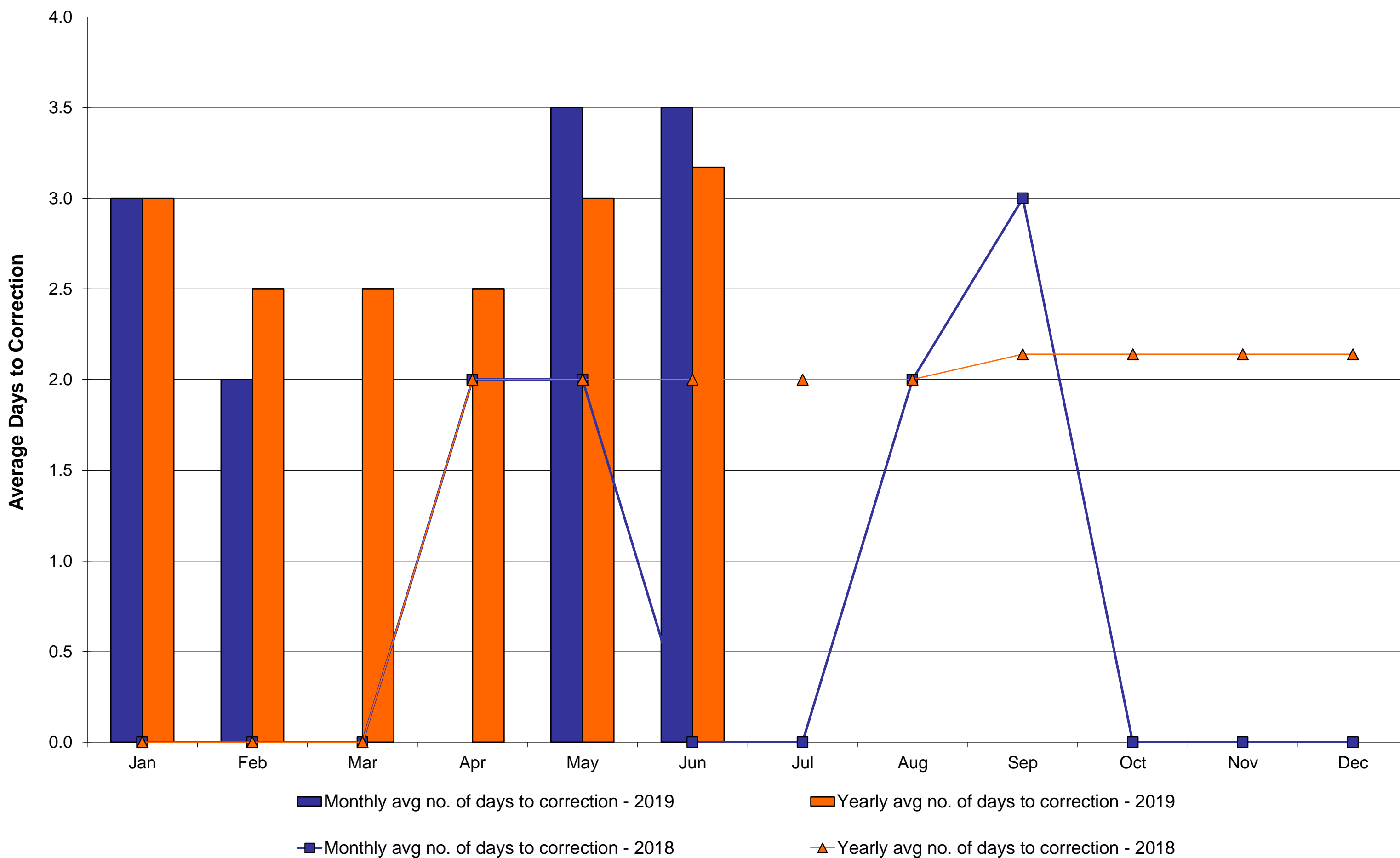
2019		January	February	March	April	May	June	July	August	September	October	November	December
Hour Corrections													
Number of hours with corrections	in the month	1	1	0	0	3	2						
Number of hours	in the month	744	672	743	720	744	720						
% of hours with corrections	in the month	0.13%	0.15%	0.00%	0.00%	0.40%	0.28%						
% of hours with corrections	year-to-date	0.13%	0.14%	0.09%	0.07%	0.14%	0.16%						
Interval Corrections													
Number of intervals corrected	in the month	2	3	0	0	5	7						
Number of intervals	in the month	9,071	8,131	9,008	8,750	9,033	8,863						
% of intervals corrected	in the month	0.02%	0.04%	0.00%	0.00%	0.06%	0.08%						
% of intervals corrected	year-to-date	0.02%	0.03%	0.02%	0.01%	0.02%	0.03%						
Hours Reserved													
Number of hours reserved	in the month	7	10	8	3	9	12						
Number of hours	in the month	744	672	743	720	744	720						
% of hours reserved	in the month	0.94%	1.49%	1.08%	0.42%	1.21%	1.67%						
% of hours reserved	year-to-date	0.94%	1.20%	1.16%	0.97%	1.02%	1.13%						
Days to Correction *													
Avg. number of days to correction	in the month	3.00	2.00	0.00	0.00	3.50	3.50						
Avg. number of days to correction	year-to-date	3.00	2.50	2.50	2.50	3.00	3.17						
Days Without Corrections													
Days without corrections	in the month	30	27	31	30	29	28						
Days without corrections	year-to-date	30	57	88	118	147	175						
2018		January	February	March	April	May	June	July	August	September	October	November	December
Hour Corrections													
Number of hours with corrections	in the month	0	0	0	4	3	0	0	2	1	0	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	0.00%	0.00%	0.00%	0.56%	0.40%	0.00%	0.00%	0.27%	0.14%	0.00%	0.00%	0.00%
% of hours with corrections	year-to-date	0.00%	0.00%	0.00%	0.14%	0.19%	0.16%	0.14%	0.15%	0.15%	0.14%	0.12%	0.11%
Interval Corrections													
Number of intervals corrected	in the month	0	0	0	16	6	0	0	5	2	0	0	0
Number of intervals	in the month	9,021	8,112	9,002	8,717	9,033	8,723	9,021	9,071	8,723	8,990	8,763	8,993
% of intervals corrected	in the month	0.00%	0.00%	0.00%	0.18%	0.07%	0.00%	0.00%	0.06%	0.02%	0.00%	0.00%	0.00%
% of intervals corrected	year-to-date	0.00%	0.00%	0.00%	0.05%	0.05%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%
Hours Reserved													
Number of hours reserved	in the month	7	0	2	7	8	3	2	12	11	24	0	0
Number of hours	in the month	744	672	743	720	744	720	744	744	720	744	721	744
% of hours reserved	in the month	0.94%	0.00%	0.27%	0.97%	1.08%	0.42%	0.27%	1.61%	1.53%	3.23%	0.00%	0.00%
% of hours reserved	year-to-date	0.94%	0.49%	0.42%	0.56%	0.66%	0.62%	0.57%	0.70%	0.79%	1.04%	0.95%	0.87%
Days to Correction *													
Avg. number of days to correction	in the month	0.00	0.00	0.00	2.00	2.00	0.00	0.00	2.00	3.00	0.00	0.00	0.00
Avg. number of days to correction	year-to-date	0.00	0.00	0.00	2.00	2.00	2.00	2.00	2.00	2.14	2.14	2.14	2.14
Days Without Corrections													
Days without corrections	in the month	31	28	31	28	28	30	31	30	29	31	30	31
Days without corrections	year-to-date	31	59	90	118	146	176	207	237	266	297	327	358

*Calendar days from reservation date; for June 2018 forward, business days from market date

Percentage of Real-Time Corrections

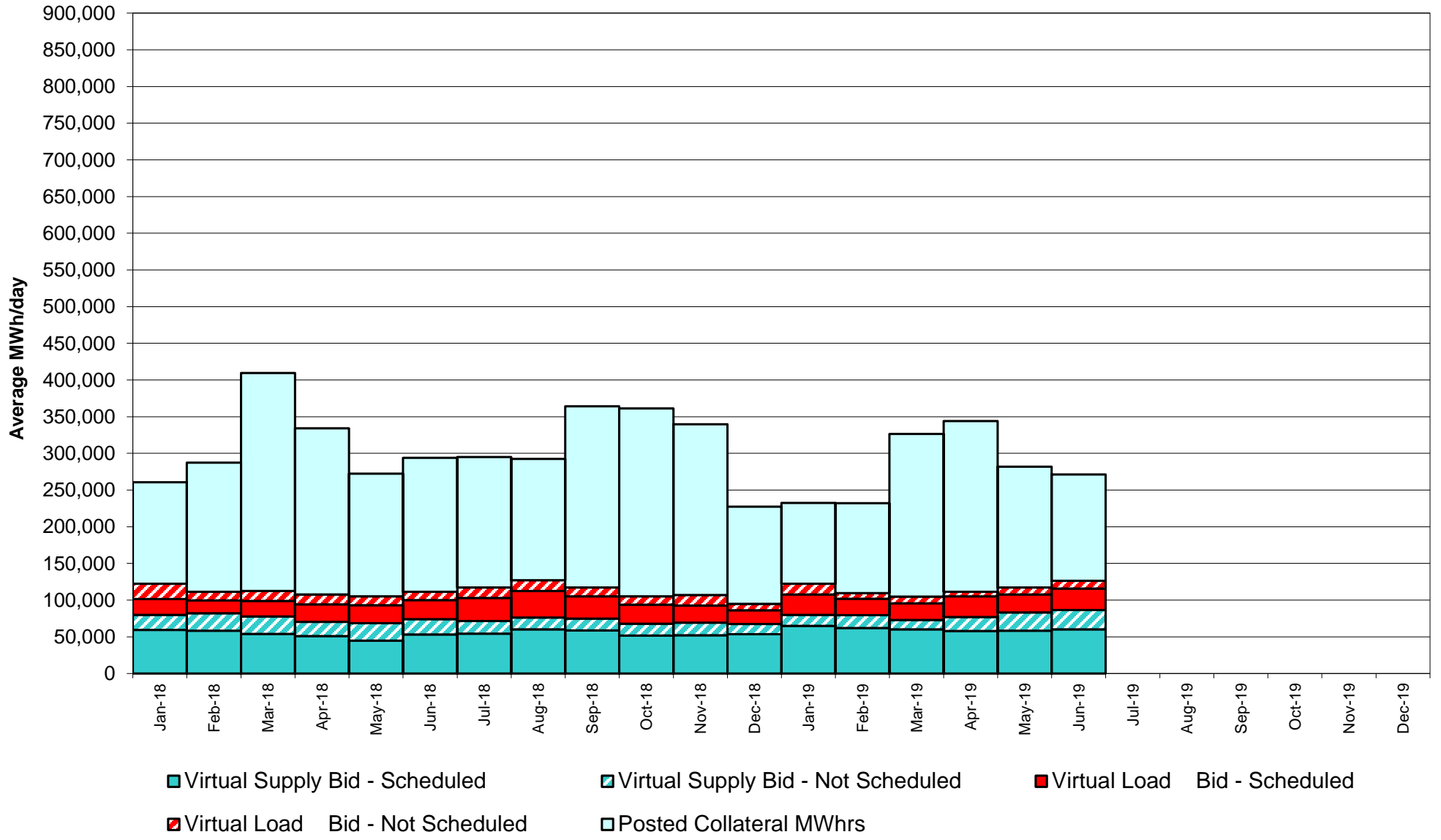


Annual average time period for making Price Corrections (from reservation date) *

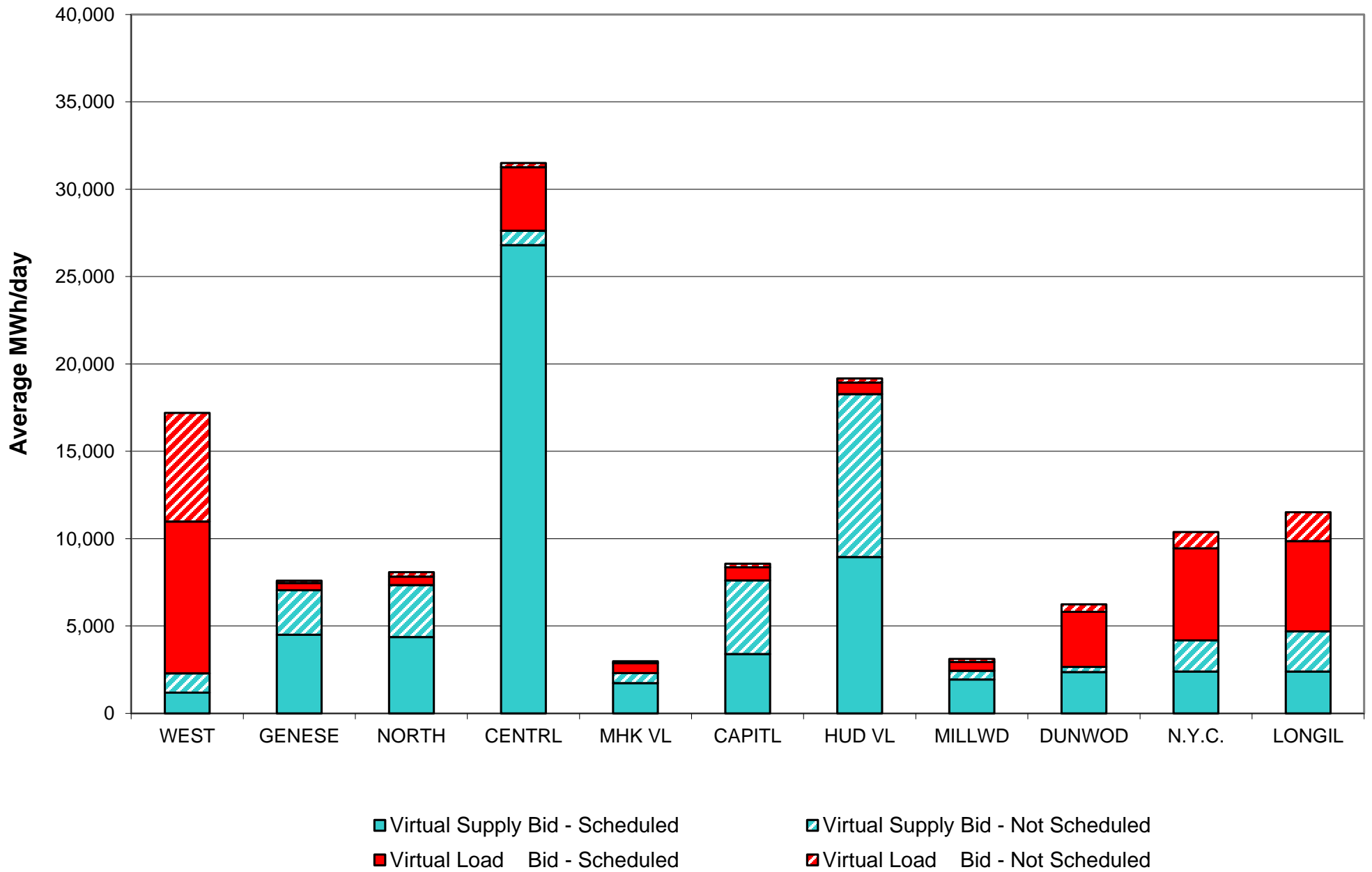


*Calendar days from reservation date; for June 2018 forward, business days from market date

NYISO Virtual Trading Average MWh per day



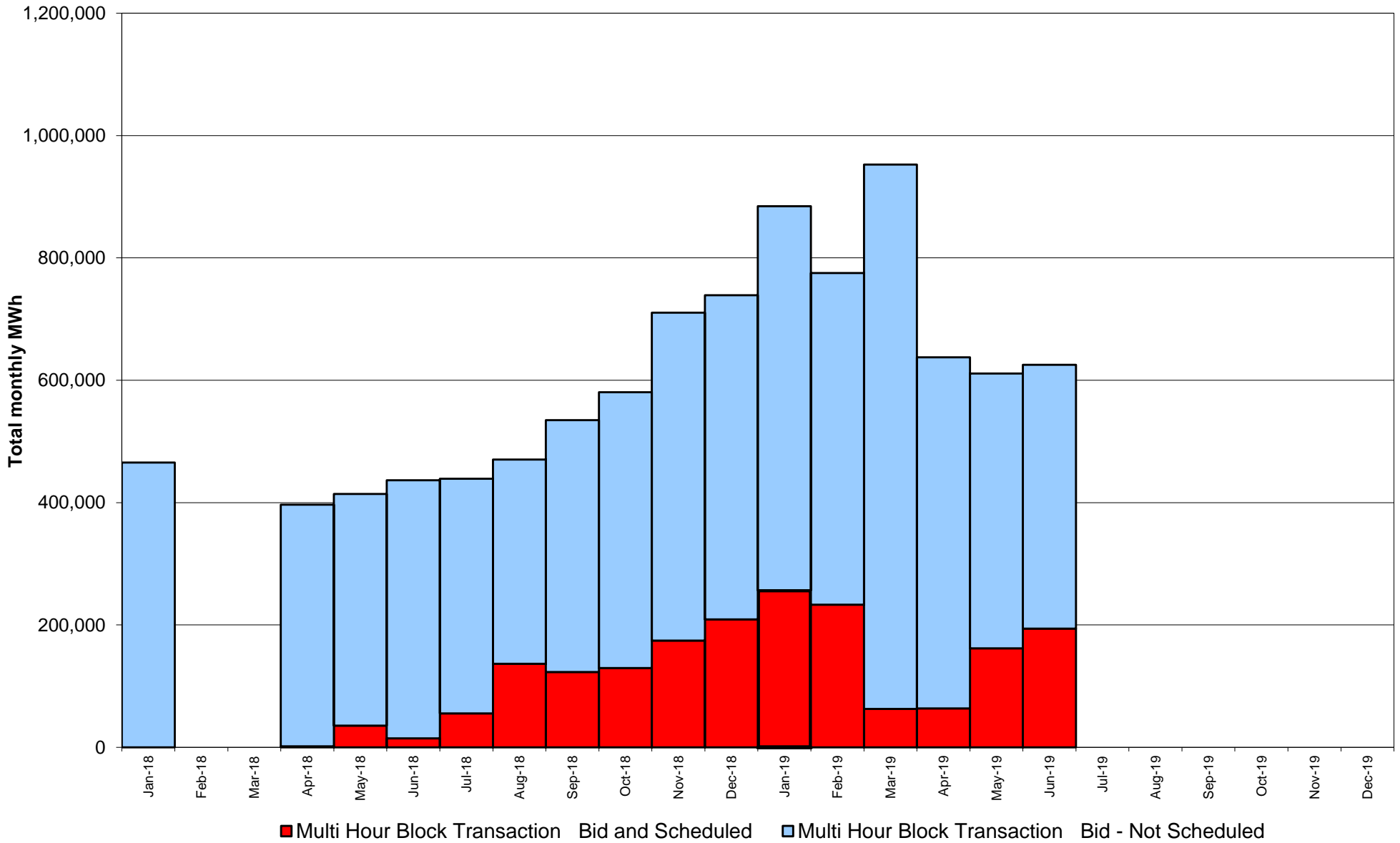
Virtual Load and Supply Zonal Statistics through June 30, 2019



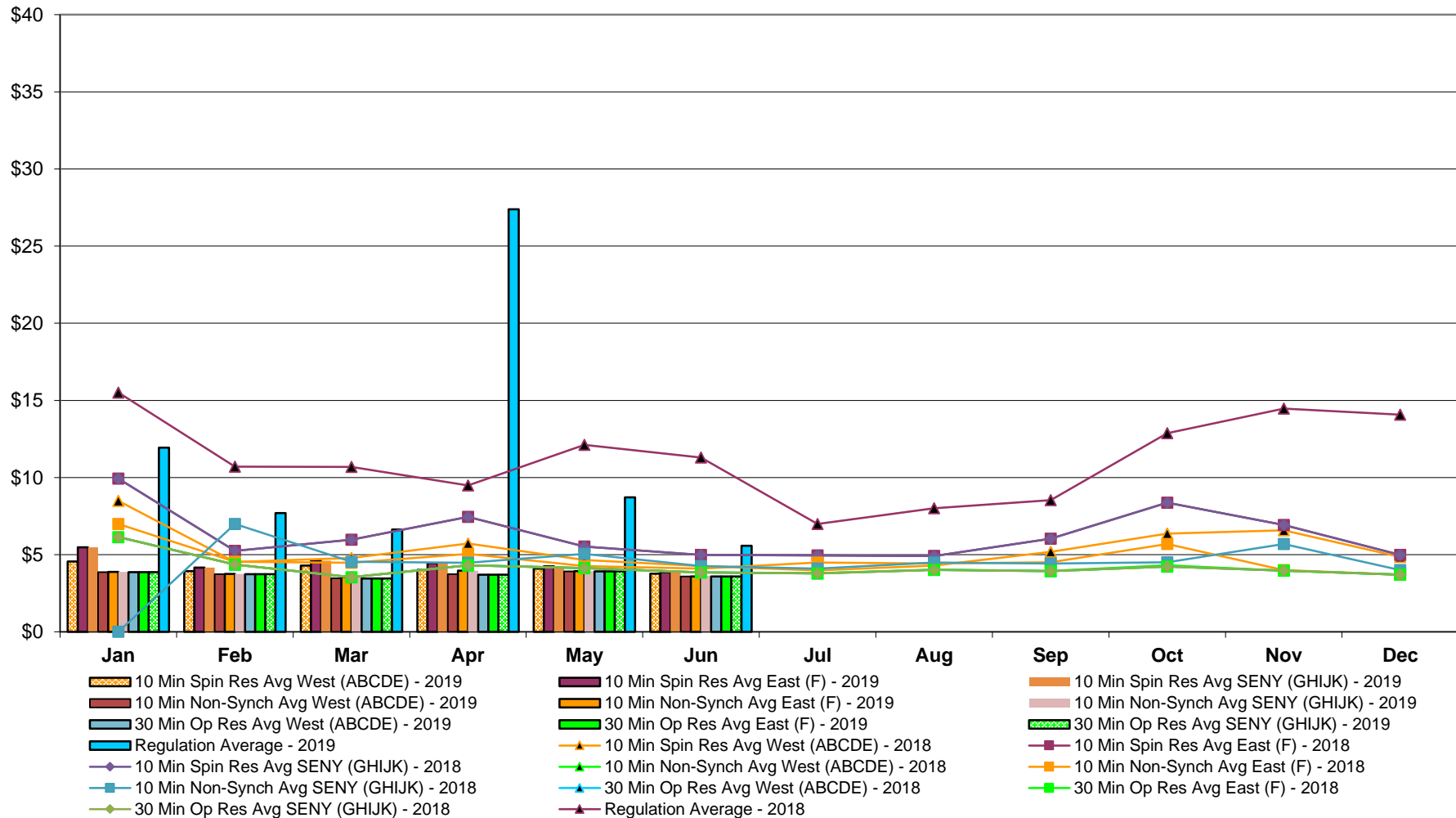
Virtual Load and Supply Zonal Statistics (Average MWh/day) - 2019

		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
WEST	Jan-19	9,007	5,211	1,609	797	MHK VL	Jan-19	1,171	117	1,965	471	DUNWOD	Jan-19	1,370	798	2,651	203
	Feb-19	6,628	2,000	1,397	921		Feb-19	872	75	1,709	596		Feb-19	1,064	494	3,273	259
	Mar-19	5,264	2,548	1,107	569		Mar-19	1,275	113	2,208	386		Mar-19	1,159	471	3,571	199
	Apr-19	9,744	2,589	721	461		Apr-19	843	43	1,904	331		Apr-19	1,446	125	3,278	228
	May-19	7,022	5,165	818	783		May-19	527	32	2,337	489		May-19	1,459	153	2,999	255
	Jun-19	8,695	6,210	1,183	1,106		Jun-19	577	98	1,731	582		Jun-19	3,157	426	2,365	290
	Jul-19						Jul-19						Jul-19				
	Aug-19						Aug-19						Aug-19				
	Sep-19						Sep-19						Sep-19				
	Oct-19						Oct-19						Oct-19				
	Nov-19						Nov-19						Nov-19				
	Dec-19						Dec-19						Dec-19				
GENESE	Jan-19	527	153	3,560	529	CAPITL	Jan-19	3,042	962	1,550	1,424	N.Y.C.	Jan-19	3,665	3,061	2,599	1,366
	Feb-19	896	66	3,776	520		Feb-19	2,591	485	1,851	1,756		Feb-19	2,545	2,025	2,248	1,648
	Mar-19	987	241	3,224	432		Mar-19	2,012	383	2,004	1,666		Mar-19	3,746	1,774	2,432	968
	Apr-19	808	83	4,479	475		Apr-19	1,585	232	2,102	1,111		Apr-19	3,431	656	2,869	4,012
	May-19	343	171	2,680	1,446		May-19	1,438	362	3,006	2,580		May-19	4,207	977	3,304	4,320
	Jun-19	407	146	4,498	2,552		Jun-19	741	206	3,393	4,222		Jun-19	5,271	930	2,404	1,778
	Jul-19						Jul-19						Jul-19				
	Aug-19						Aug-19						Aug-19				
	Sep-19						Sep-19						Sep-19				
	Oct-19						Oct-19						Oct-19				
	Nov-19						Nov-19						Nov-19				
	Dec-19						Dec-19						Dec-19				
NORTH	Jan-19	484	540	6,406	1,553	HUD VL	Jan-19	856	980	9,176	7,130	LONGIL	Jan-19	3,362	2,135	3,091	1,056
	Feb-19	431	359	6,559	1,743		Feb-19	977	843	7,408	7,858		Feb-19	2,514	1,297	3,446	1,425
	Mar-19	349	419	6,855	1,845		Mar-19	1,460	1,425	8,787	4,948		Mar-19	2,752	1,198	3,372	1,025
	Apr-19	284	186	7,243	1,823		Apr-19	1,011	487	7,962	8,845		Apr-19	4,934	1,386	3,096	697
	May-19	498	446	4,995	2,954		May-19	1,064	457	6,634	9,871		May-19	3,869	1,430	3,396	1,359
	Jun-19	481	256	4,364	2,986		Jun-19	658	249	8,949	9,323		Jun-19	5,177	1,639	2,391	2,303
	Jul-19						Jul-19						Jul-19				
	Aug-19						Aug-19						Aug-19				
	Sep-19						Sep-19						Sep-19				
	Oct-19						Oct-19						Oct-19				
	Nov-19						Nov-19						Nov-19				
	Dec-19						Dec-19						Dec-19				
CENTRL	Jan-19	3,795	374	30,145	507	MILLWD	Jan-19	405	386	2,051	169	NYISO	Jan-19	27,683	14,720	64,802	15,203
	Feb-19	3,059	123	29,111	609		Feb-19	540	138	1,311	247		Feb-19	22,118	7,905	62,089	17,582
	Mar-19	3,411	332	25,195	542		Mar-19	505	89	1,404	155		Mar-19	22,918	8,993	60,159	12,736
	Apr-19	3,475	150	22,748	453		Apr-19	686	215	1,636	371		Apr-19	28,247	6,153	58,038	18,807
	May-19	3,220	195	26,474	474		May-19	613	226	1,687	505		May-19	24,261	9,615	58,331	25,035
	Jun-19	3,635	241	26,799	832		Jun-19	495	182	1,940	506		Jun-19	29,295	10,583	60,017	26,481
	Jul-19						Jul-19						Jul-19				
	Aug-19						Aug-19						Aug-19				
	Sep-19						Sep-19						Sep-19				
	Oct-19						Oct-19						Oct-19				
	Nov-19						Nov-19						Nov-19				
	Dec-19						Dec-19						Dec-19				

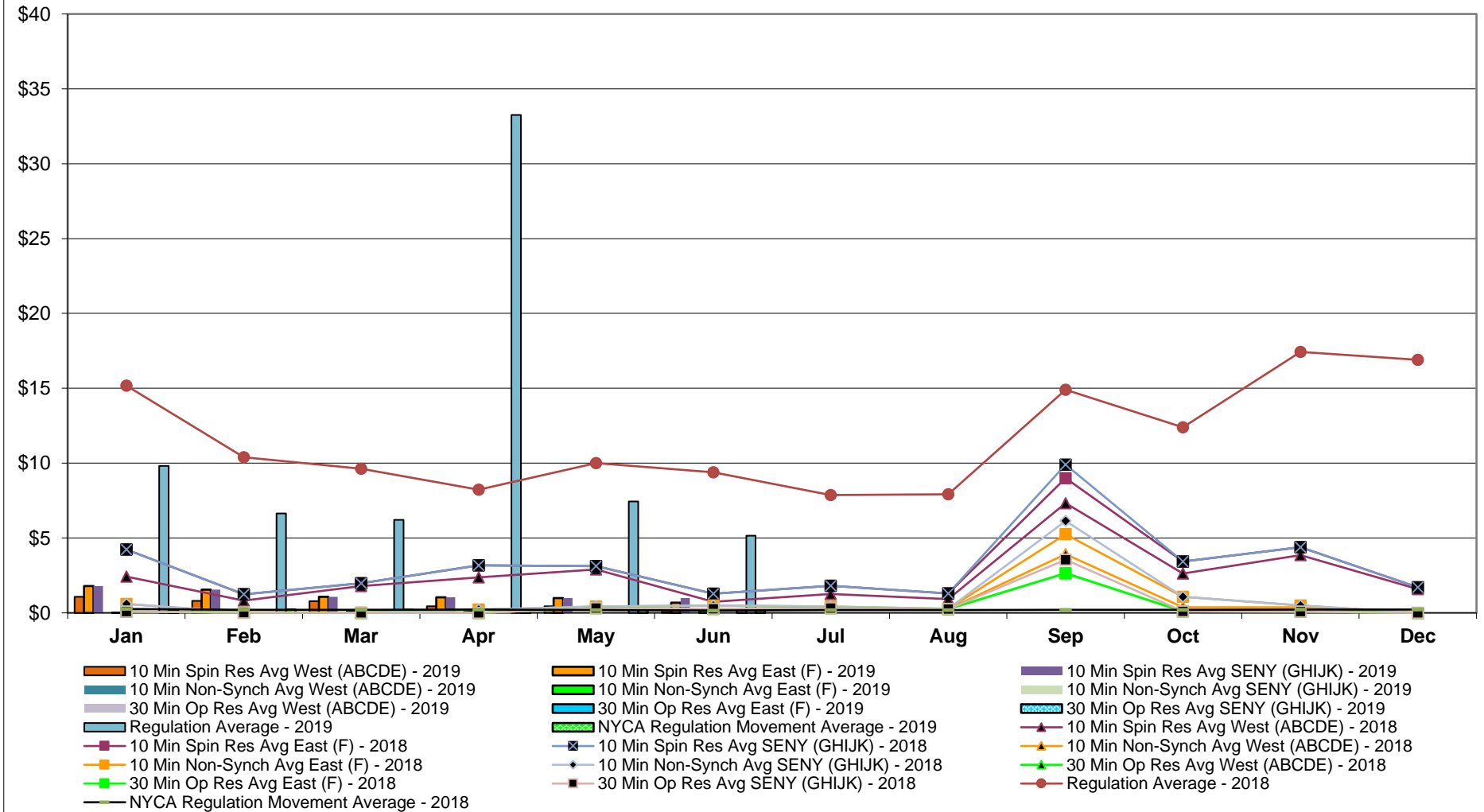
NYISO Multi Hour Block Transactions Monthly Total MWh



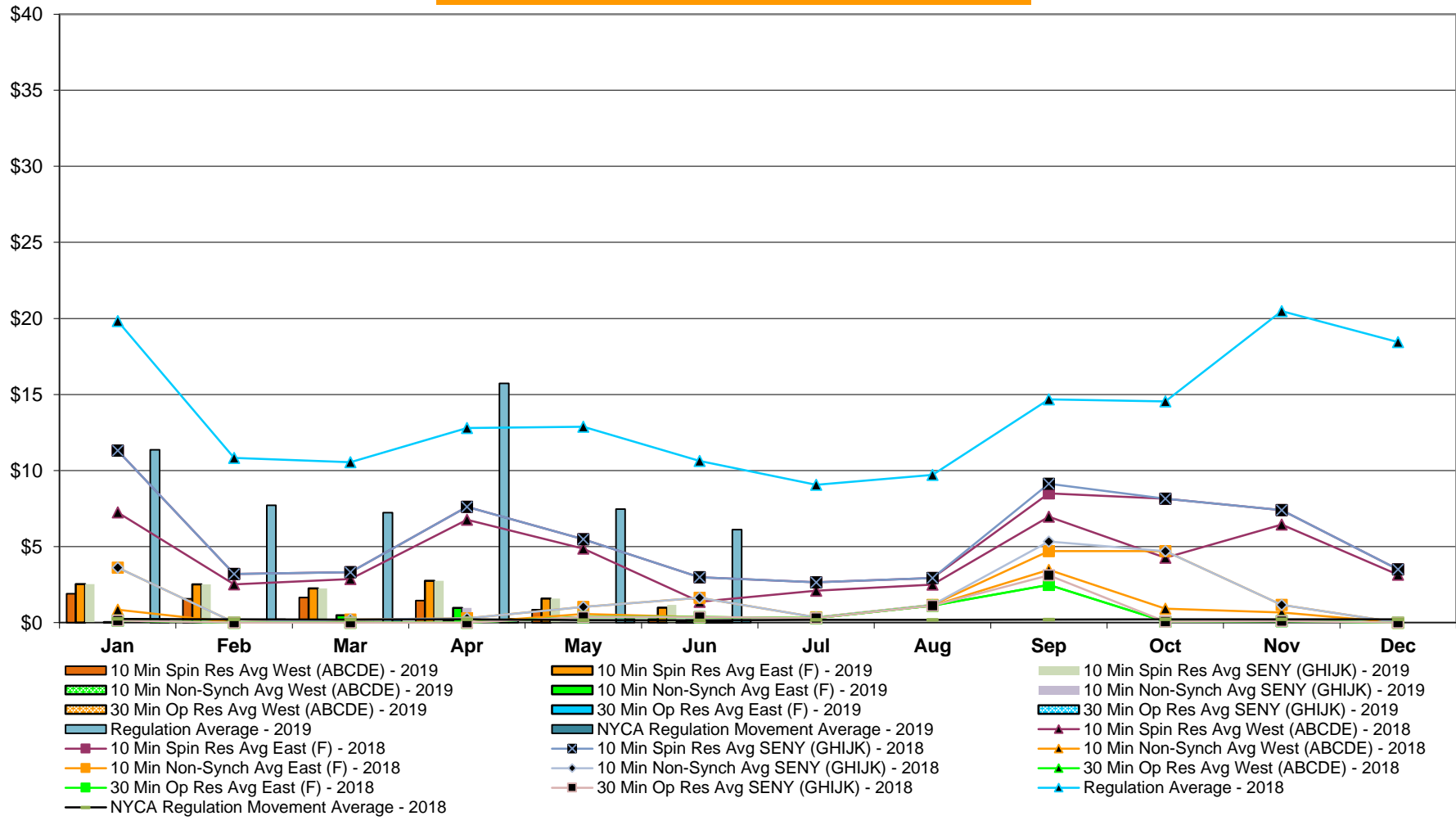
NYISO Monthly Average Ancillary Service Prices Day Ahead Market 2018 - 2019



NYISO Monthly Average Ancillary Service Prices RTC Market 2018 - 2019



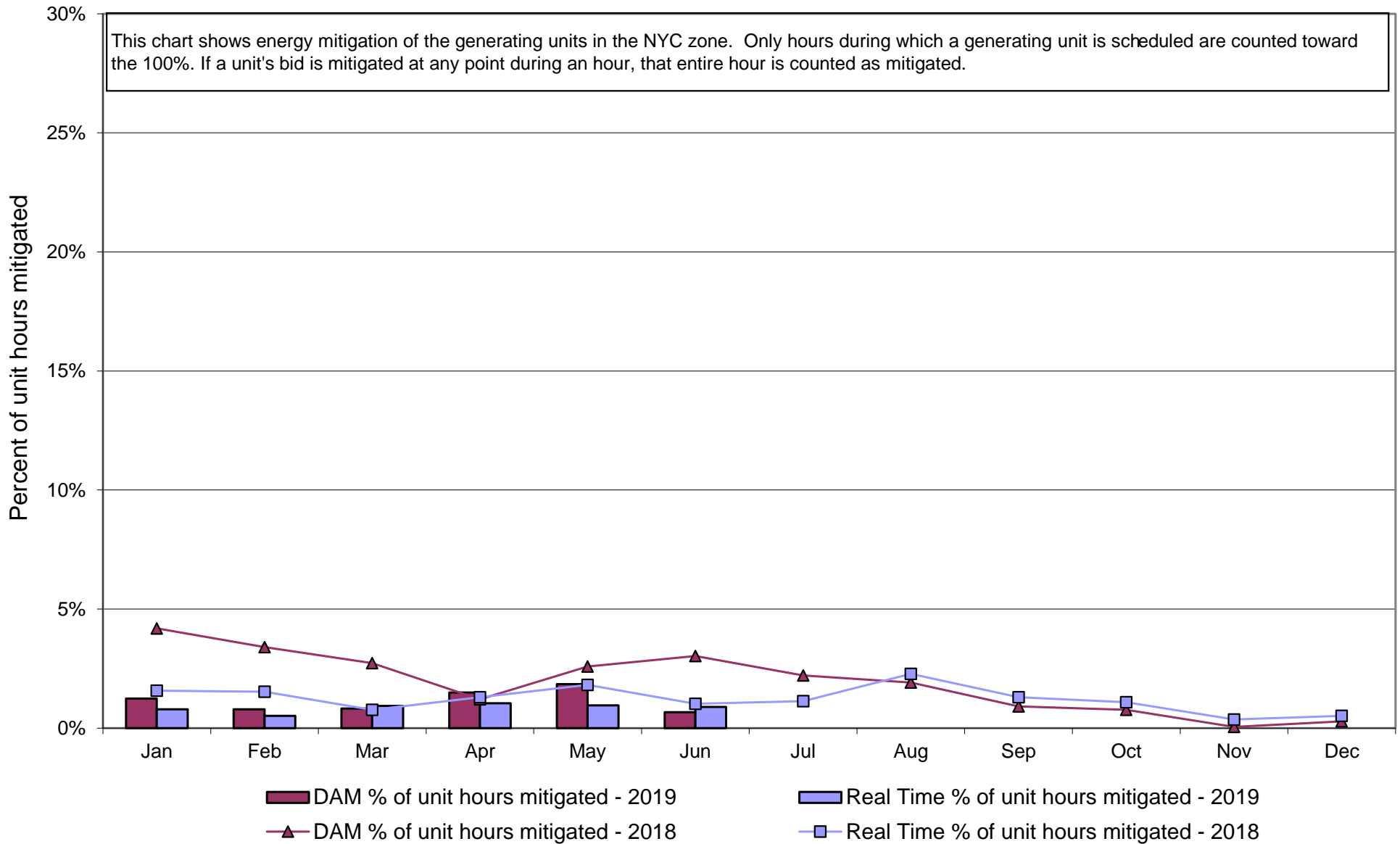
NYISO Monthly Average Ancillary Service Prices Real Time Market 2018 - 2019



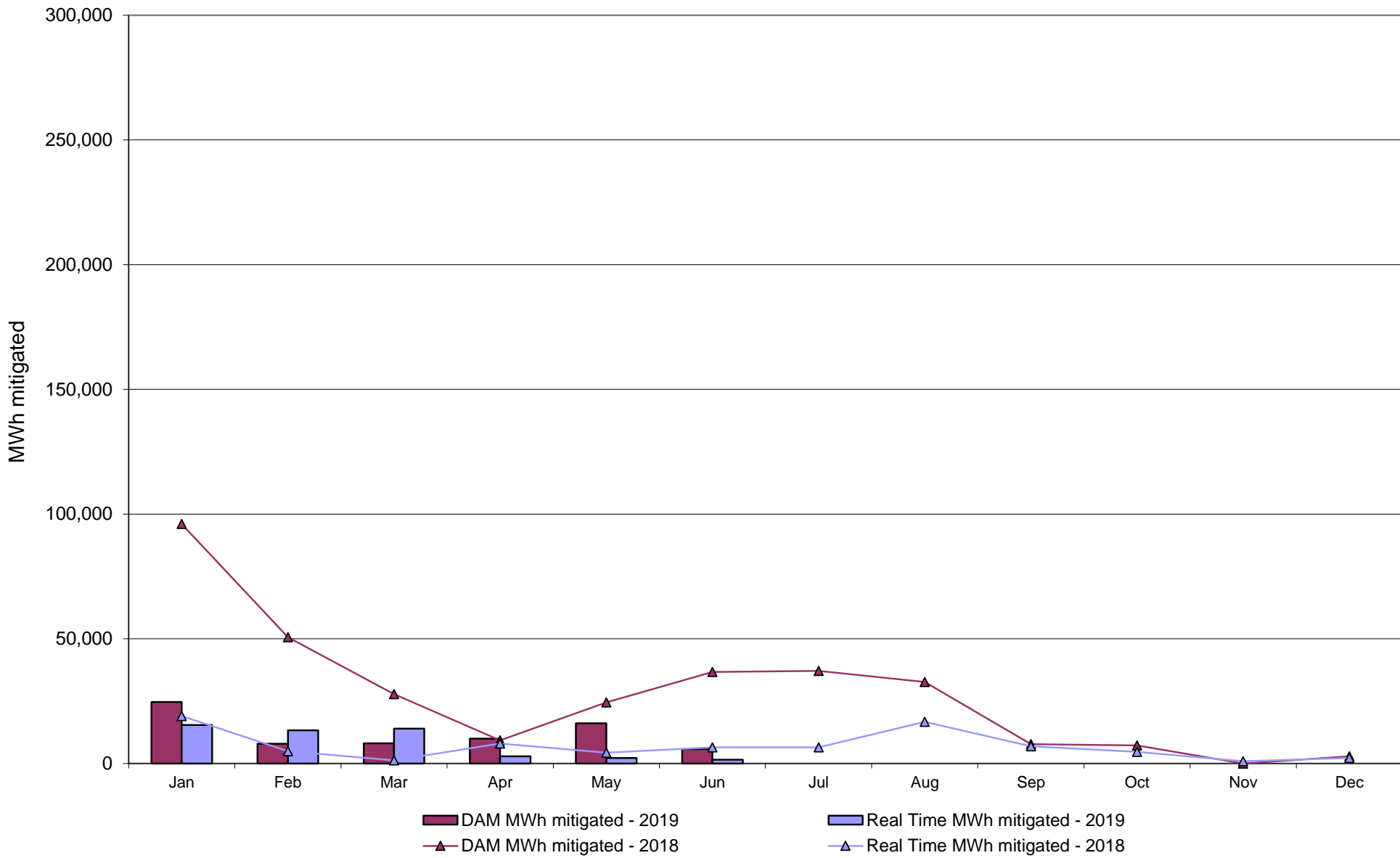
NYISO Markets Ancillary Services Statistics - Unweighted Price (\$/MWH)

2019	January	February	March	April	May	June	July	August	September	October	November	December
Day Ahead Market												
10 Min Spin SENEY (GHIJK)	5.47	4.17	4.61	4.46	4.25	3.90						
10 Min Spin East (F)	5.47	4.17	4.61	4.46	4.25	3.86						
10 Min Spin West (ABCDE)	4.56	3.94	4.30	4.01	4.09	3.77						
10 Min Non Synch SENEY (GHIJK)	3.88	3.75	3.57	3.96	3.94	3.63						
10 Min Non Synch East (F)	3.88	3.75	3.57	3.96	3.94	3.59						
10 Min Non Synch West (ABCDE)	3.86	3.74	3.47	3.73	3.91	3.58						
30 Min SENEY (GHIJK)	3.86	3.74	3.46	3.71	3.91	3.58						
30 Min East (F)	3.86	3.74	3.46	3.71	3.91	3.58						
30 Min West (ABCDE)	3.86	3.74	3.46	3.71	3.91	3.58						
Regulation	11.94	7.69	6.62	27.38	8.71	5.57						
RTC Market												
10 Min Spin SENEY (GHIJK)	1.80	1.55	1.08	1.04	0.99	0.99						
10 Min Spin East (F)	1.80	1.55	1.08	1.04	0.99	0.69						
10 Min Spin West (ABCDE)	1.08	0.80	0.79	0.44	0.44	0.05						
10 Min Non Synch SENEY (GHIJK)	0.01	0.08	0.11	0.13	0.00	0.52						
10 Min Non Synch East (F)	0.01	0.08	0.11	0.13	0.00	0.22						
10 Min Non Synch West (ABCDE)	0.00	0.01	0.01	0.00	0.00	0.00						
30 Min SENEY (GHIJK)	0.00	0.01	0.01	0.00	0.00	0.24						
30 Min East (F)	0.00	0.01	0.01	0.00	0.00	0.00						
30 Min West (ABCDE)	0.00	0.01	0.01	0.00	0.00	0.00						
Regulation	9.81	6.64	6.21	33.26	7.45	5.16						
NYCA Regulation Movement	0.23	0.22	0.21	0.25	0.24	0.18						
Real Time Market												
10 Min Spin SENEY (GHIJK)	2.53	2.51	2.24	2.75	1.58	1.17						
10 Min Spin East (F)	2.53	2.51	2.24	2.75	1.58	0.98						
10 Min Spin West (ABCDE)	1.89	1.57	1.64	1.45	0.85	0.23						
10 Min Non Synch SENEY (GHIJK)	0.03	0.18	0.48	0.96	0.00	0.33						
10 Min Non Synch East (F)	0.03	0.18	0.48	0.96	0.00	0.15						
10 Min Non Synch West (ABCDE)	0.00	0.01	0.09	0.17	0.00	0.02						
30 Min SENEY (GHIJK)	0.00	0.01	0.03	0.00	0.00	0.13						
30 Min East (F)	0.00	0.01	0.03	0.00	0.00	0.02						
30 Min West (ABCDE)	0.00	0.01	0.03	0.00	0.00	0.02						
Regulation	11.36	7.72	7.23	15.73	7.47	6.11						
NYCA Regulation Movement	0.22	0.22	0.20	0.25	0.23	0.17						
2018												
Day Ahead Market												
10 Min Spin SENEY (GHIJK)	9.93	5.24	5.97	7.45	5.52	4.98	4.95	4.91	6.04	8.37	6.93	4.99
10 Min Spin East (F)	9.93	5.24	5.97	7.45	5.52	4.98	4.95	4.91	6.04	8.37	6.93	4.99
10 Min Spin West (ABCDE)	8.49	4.53	4.78	5.73	4.65	4.26	3.98	4.30	5.18	6.36	6.57	4.86
10 Min Non Synch SENEY (GHIJK)	6.99	4.54	4.48	5.05	4.26	4.09	4.49	4.43	4.51	5.69	4.00	3.71
10 Min Non Synch East (F)	6.99	4.54	4.48	5.05	4.26	4.09	4.49	4.43	4.51	5.69	4.00	3.71
10 Min Non Synch West (ABCDE)	6.15	4.36	3.54	4.31	4.13	3.85	3.80	4.03	3.95	4.31	3.97	3.70
30 Min SENEY (GHIJK)	6.14	4.36	3.54	4.31	4.13	3.85	3.79	4.02	3.94	4.22	3.97	3.70
30 Min East (F)	6.14	4.36	3.54	4.31	4.13	3.85	3.79	4.02	3.94	4.22	3.97	3.70
30 Min West (ABCDE)	6.14	4.36	3.54	4.31	4.13	3.85	3.79	4.02	3.94	4.22	3.97	3.70
Regulation	15.51	10.70	10.68	9.49	12.11	11.30	6.99	8.00	8.54	12.88	14.47	14.07
RTC Market												
10 Min Spin SENEY (GHIJK)	4.23	1.24	1.98	3.17	3.13	1.28	1.81	1.29	9.90	3.43	4.39	1.71
10 Min Spin East (F)	4.23	1.24	1.98	3.17	3.13	1.28	1.81	1.29	9.00	3.43	4.39	1.71
10 Min Spin West (ABCDE)	2.43	0.82	1.79	2.38	2.91	0.74	1.27	0.93	7.33	2.63	3.85	1.58
10 Min Non Synch SENEY (GHIJK)	0.59	0.03	0.01	0.22	0.42	0.49	0.42	0.27	6.14	1.07	0.50	0.00
10 Min Non Synch East (F)	0.59	0.03	0.01	0.22	0.42	0.49	0.42	0.27	5.25	1.07	0.50	0.00
10 Min Non Synch West (ABCDE)	0.08	0.02	0.00	0.00	0.33	0.27	0.33	0.25	3.92	0.38	0.38	0.00
30 Min SENEY (GHIJK)	0.08	0.02	0.00	0.00	0.32	0.27	0.33	0.25	3.55	0.11	0.09	0.00
30 Min East (F)	0.08	0.02	0.00	0.00	0.32	0.27	0.33	0.25	2.65	0.11	0.09	0.00
30 Min West (ABCDE)	0.08	0.02	0.00	0.00	0.32	0.27	0.33	0.25	2.65	0.11	0.09	0.00
Regulation	15.17	10.40	9.63	8.22	10.01	9.39	7.87	7.92	14.90	12.40	17.43	16.90
NYCA Regulation Movement	0.26	0.21	0.20	0.22	0.19	0.16	0.19	0.19	0.20	0.21	0.22	0.22
Real Time Market												
10 Min Spin SENEY (GHIJK)	11.31	3.19	3.31	7.62	5.48	2.98	2.65	2.93	9.13	8.14	7.39	3.49
10 Min Spin East (F)	11.31	3.19	3.31	7.62	5.48	2.98	2.65	2.93	8.50	8.14	7.39	3.49
10 Min Spin West (ABCDE)	7.24	2.52	2.86	6.77	4.86	1.37	2.10	2.50	6.96	4.26	6.45	3.15
10 Min Non Synch SENEY (GHIJK)	3.61	0.01	0.19	0.28	1.03	1.63	0.35	1.16	5.33	4.70	1.16	0.00
10 Min Non Synch East (F)	3.61	0.01	0.19	0.28	1.03	1.63	0.35	1.16	4.70	4.70	1.16	0.00
10 Min Non Synch West (ABCDE)	0.85	0.00	0.00	0.00	0.57	0.37	0.29	1.12	3.47	0.92	0.67	0.00
30 Min SENEY (GHIJK)	0.13	0.00	0.00	0.00	0.37	0.37	0.29	1.12	3.11	0.06	0.10	0.00
30 Min East (F)	0.13	0.00	0.00	0.00	0.37	0.37	0.29	1.12	2.48	0.06	0.10	0.00
30 Min West (ABCDE)	0.13	0.00	0.00	0.00	0.37	0.37	0.29	1.12	2.48	0.06	0.10	0.00
Regulation	19.82	10.82	10.54	12.80	12.88	10.62	9.06	9.71	14.67	14.54	20.48	18.44
NYCA Regulation Movement	0.24	0.21	0.20	0.21	0.17	0.15	0.18	0.18	0.20	0.21	0.22	0.21

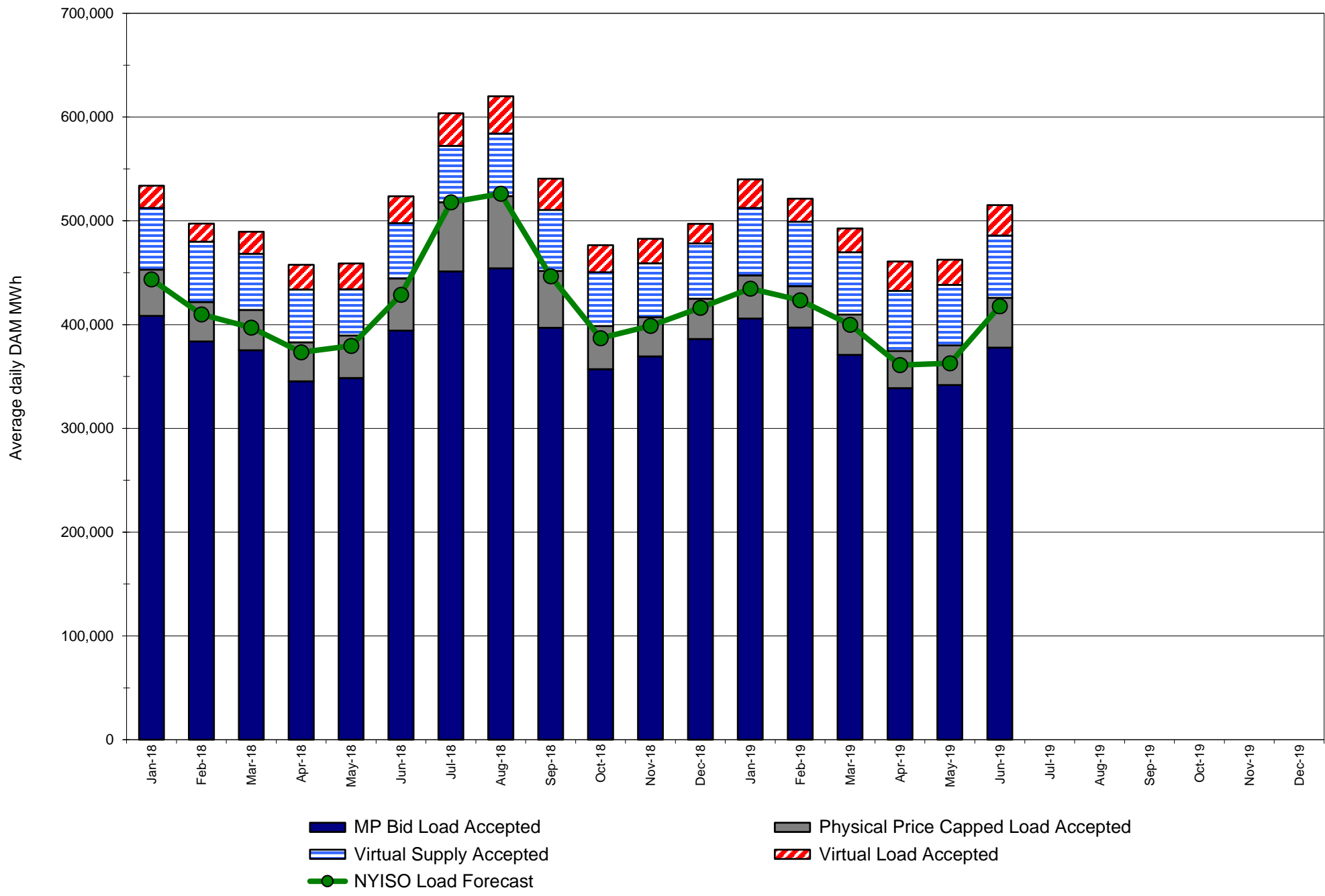
NYISO In City Energy Mitigation - AMP (NYC Zone) 2018 - 2019 Percentage of committed unit-hours mitigated



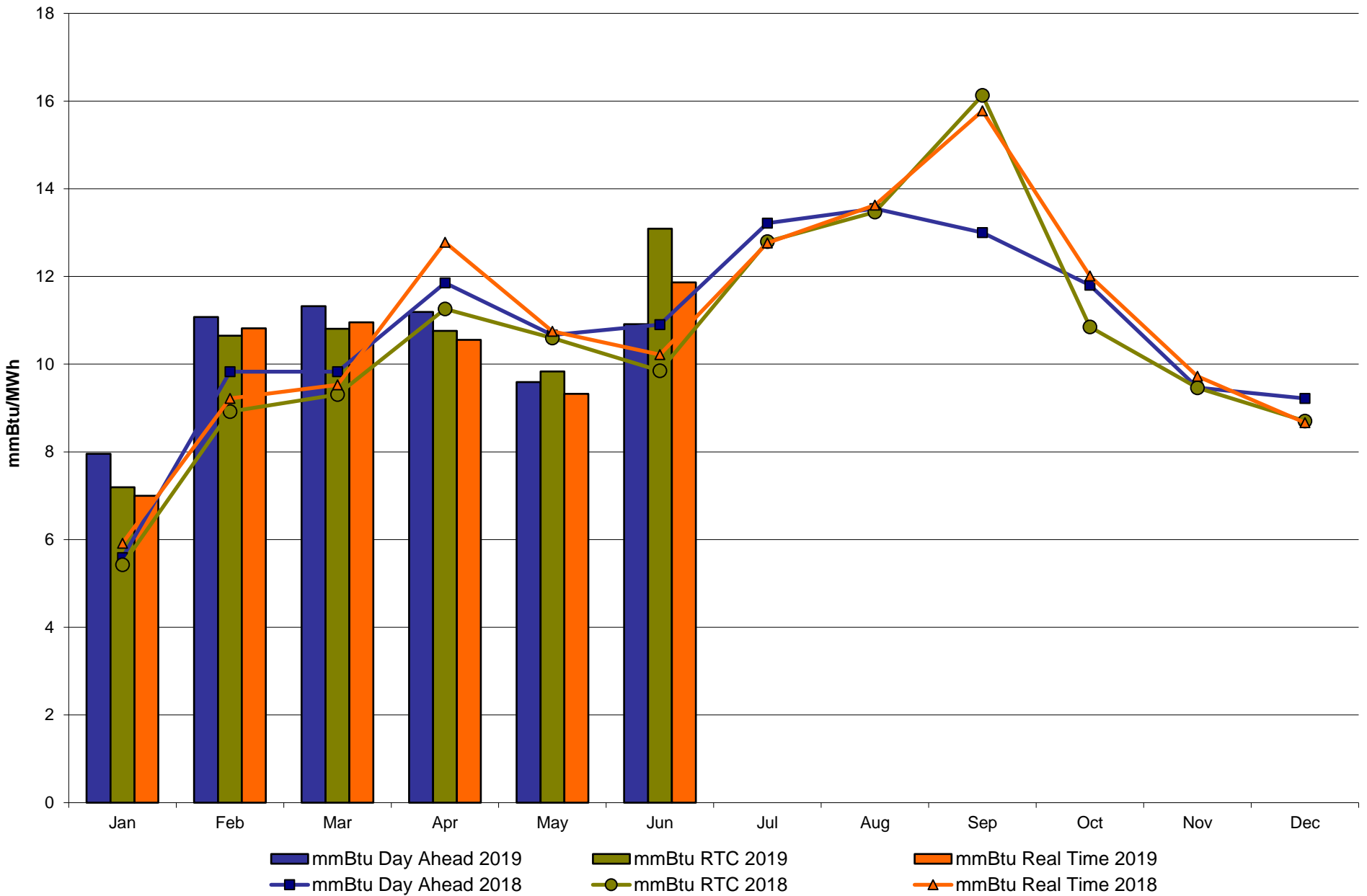
NYISO In City Energy Mitigation (NYC Zone) 2018 - 2019
Monthly megawatt hours mitigated



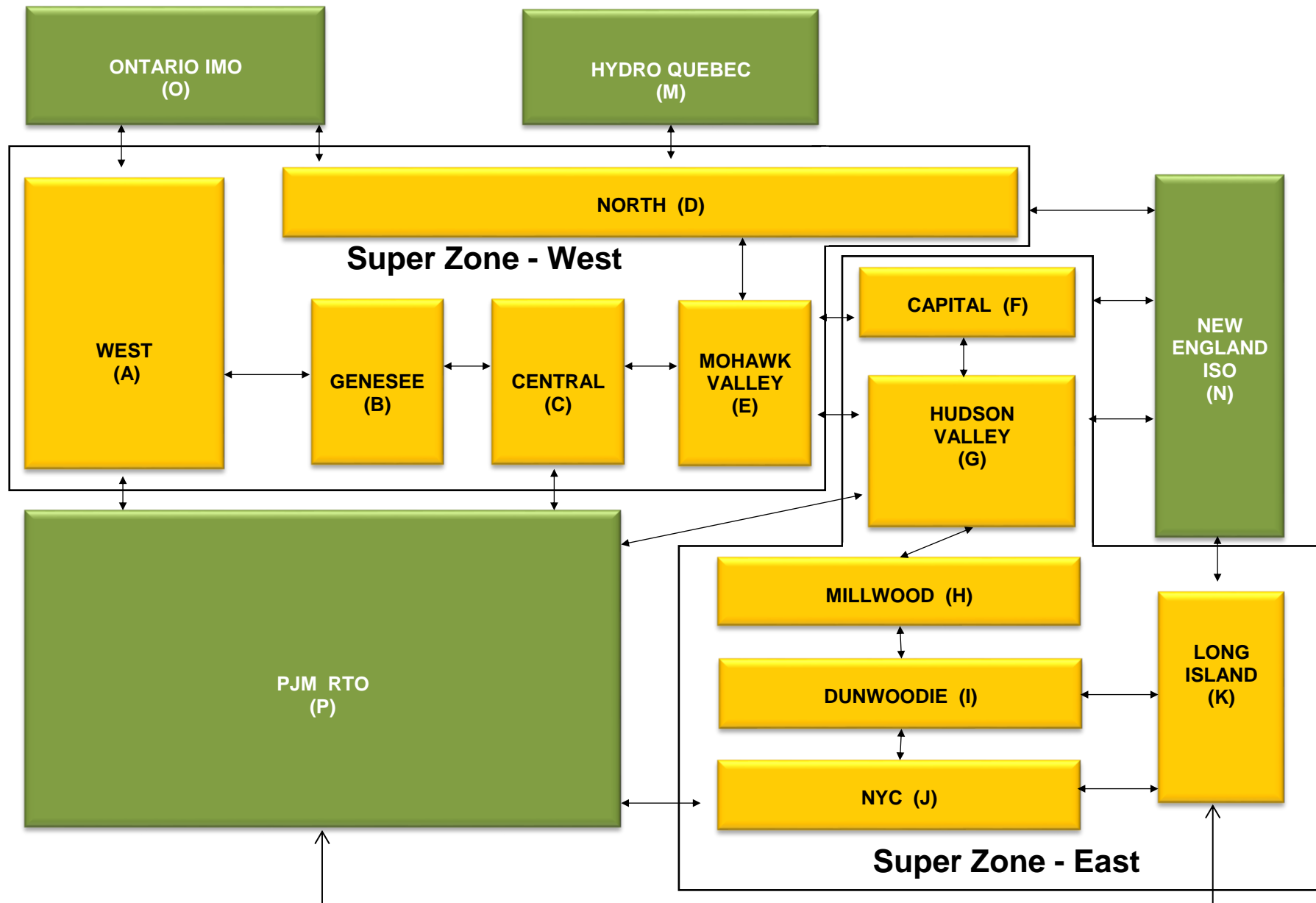
NYISO Average Daily DAM Load Bid Summary



Monthly Implied Heat Rate 2018-2019



NYISO LBMP ZONES



Billing Codes for Chart C

Chart - C Category Name	Billing Code	Billing Category Name
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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