

# Market Monitor Report

MC Webinar

December 19, 2022

IMM



Monitoring Analytics

# Reserve Market Implementation

- **New reserve market design implemented on October 1, 2022**
- **Summary results for October and November**
- **Observations**
  - **Differences in day-head and real-time clearing**
  - **Some resource types clear more in one market than the other.**
  - **Day-ahead prices are higher than real-time prices.**
    - Average synchronized reserve price is \$0.93 per MWh for day-ahead and \$0.55 per MWh for real-time.

# RTO Real-Time and Day-Ahead Cleared MW

- **Real-time market clearing**

Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
Oct	1,832	956	2,788	1,847	4,635
Nov	1,822	1,012	2,834	1,334	4,168

- **Day-ahead market clearing**

Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
Oct	2,077	1,651	3,728	8,266	11,994
Nov	2,128	1,080	3,208	8,867	12,075

# MAD Real-Time and Day-Ahead Cleared MW

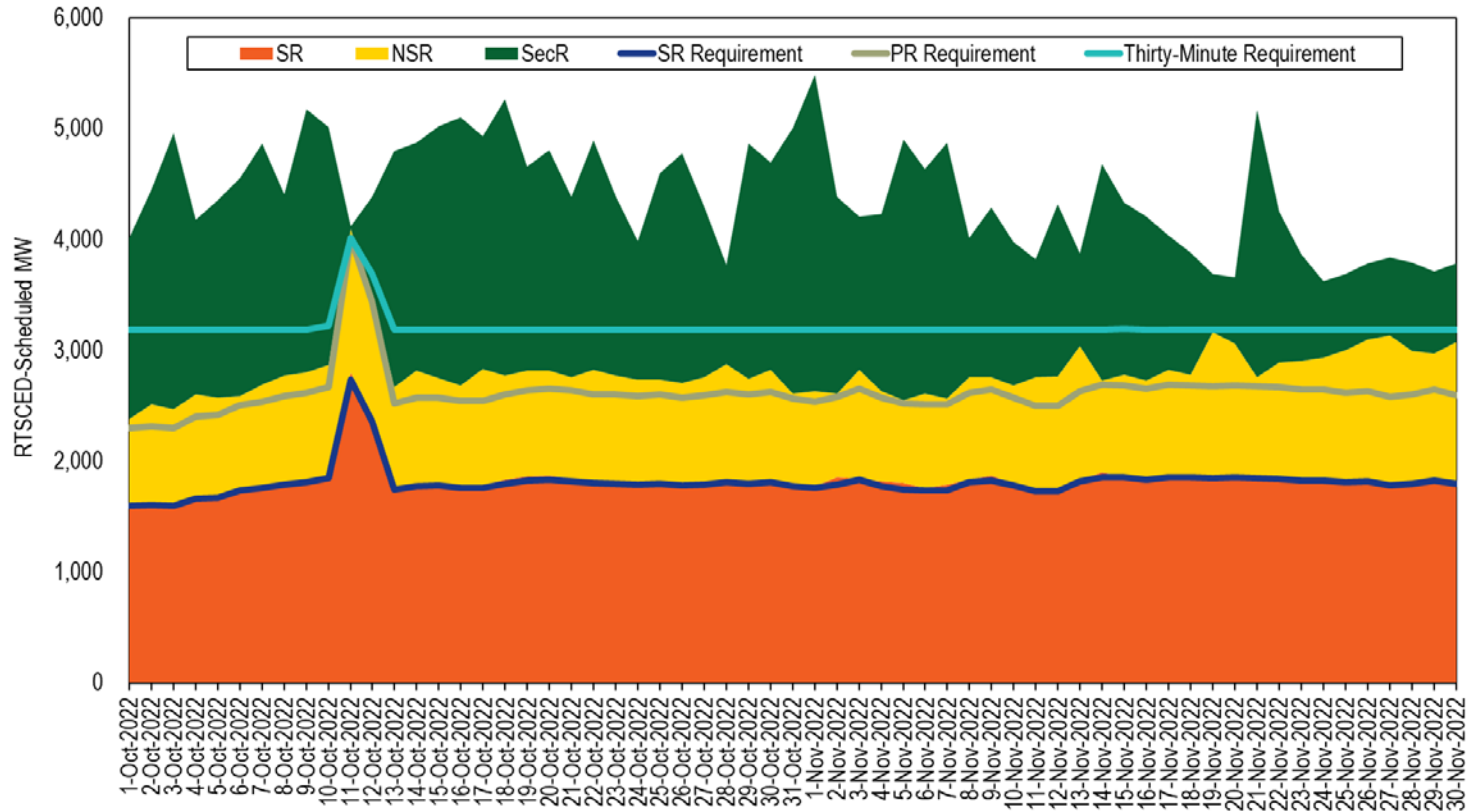
- **Real-time market clearing**

Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
Oct	1,831	811	2,642	NA	NA
Nov	1,820	857	2,677	NA	NA

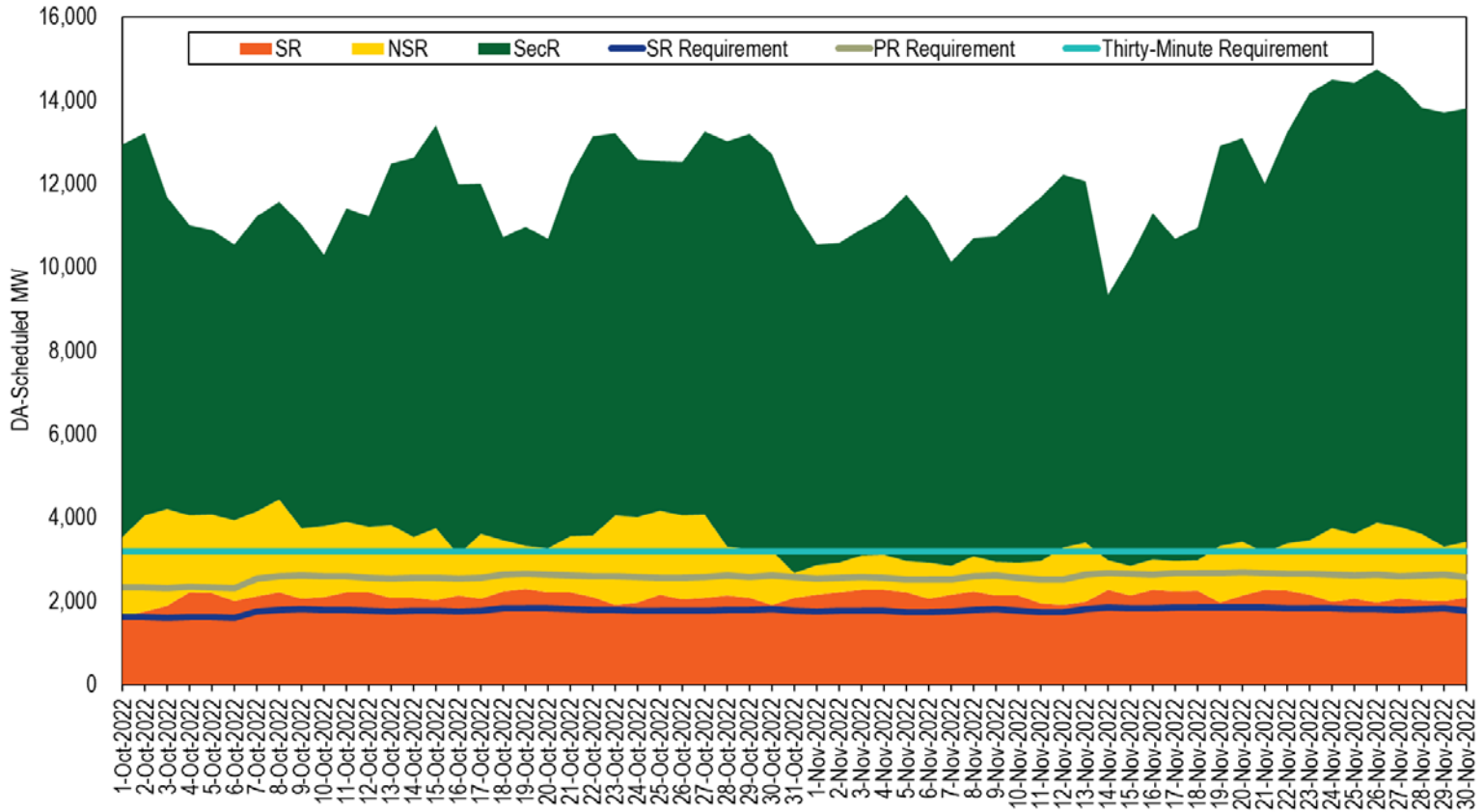
- **Day-ahead market clearing**

Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
Oct	2,077	1,651	3,728	NA	NA
Nov	2,128	1,080	3,208	NA	NA

# Real-Time Reserves and Requirements



# Day-Ahead Reserves and Requirements



# Synchronized Reserves by Resource Type

Resource / Fuel Type	Percent of Total Credits	Percent of RT Capped MWh	Percent of DA Credits	Percent of DA MWh
CT - Natural Gas	48.2%	27.4%	24.1%	22.5%
Combined Cycle	25.8%	36.3%	41.4%	52.1%
Steam - Coal	10.5%	16.2%	11.6%	5.3%
Hydro - Pumped Storage	5.0%	3.6%	9.6%	6.9%
DSR	3.7%	9.1%	3.8%	1.0%
CT - Oil	2.5%	1.0%	0.4%	0.6%
Steam - Natural Gas	1.7%	1.9%	2.2%	1.3%
Hydro - Run of River	1.1%	3.9%	4.2%	7.9%
RICE - Other	1.1%	0.3%	2.4%	2.3%
Steam - Other	0.4%	0.1%	0.1%	0.1%
RICE - Natural Gas	0.1%	0.1%	0.1%	0.0%
Steam - Oil	0.0%	0.0%	0.0%	0.0%
RICE - Oil	0.0%	0.0%	0.0%	0.0%
CT - Other	0.0%	0.0%	0.0%	0.0%
Battery	0.0%	0.0%	0.0%	0.0%
Distributed Gen	0.0%	0.0%	0.0%	0.0%
Fuel Cell	0.0%	0.0%	0.0%	0.0%
Nuclear	0.0%	0.0%	0.0%	0.0%
Solar	0.0%	0.0%	0.0%	0.0%
Solar + Storage	0.0%	0.0%	0.0%	0.0%
Solar + Wind	0.0%	0.0%	0.0%	0.0%
Wind	0.0%	0.0%	0.0%	0.0%
Wind + Storage	0.0%	0.0%	0.0%	0.0%

# Nonsynchronized Reserves by Resource Type

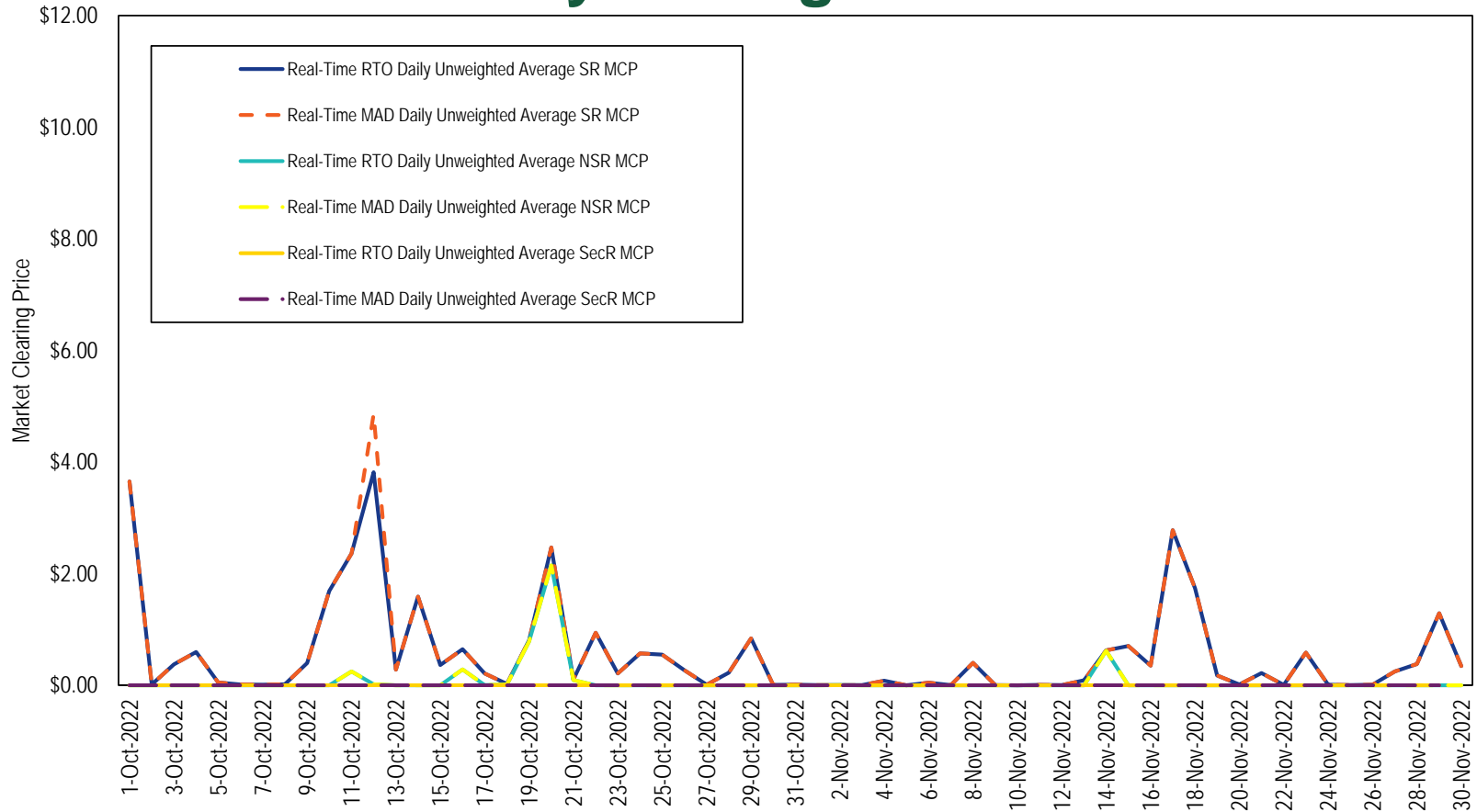
Resource / Fuel Type	Percent of Total Credits	Percent of RT MWh	Percent of DA Credits	Percent of DA MWh
CT - Oil	68.3%	8.1%	66.9%	20.9%
CT - Natural Gas	31.9%	33.3%	32.1%	31.2%
CT - Other	0.7%	0.1%	0.6%	0.2%
RICE - Oil	0.4%	0.0%	0.4%	0.1%
Hydro - Run of River	0.1%	26.2%	0.0%	0.0%
Hydro - Pumped Storage	0.0%	32.3%	0.0%	47.5%
RICE - Other	0.0%	0.0%	0.0%	0.0%
Battery	0.0%	0.0%	0.0%	0.0%
Combined Cycle	0.0%	0.0%	0.0%	0.0%
Distributed Gen	0.0%	0.0%	0.0%	0.0%
Fuel Cell	0.0%	0.0%	0.0%	0.0%
Nuclear	0.0%	0.0%	0.0%	0.0%
RICE - Natural Gas	0.0%	0.0%	0.0%	0.0%
Solar	0.0%	0.0%	0.0%	0.0%
Solar + Storage	0.0%	0.0%	0.0%	0.0%
Solar + Wind	0.0%	0.0%	0.0%	0.0%
Steam - Coal	0.0%	0.0%	0.0%	0.0%
Steam - Natural Gas	0.0%	0.0%	0.0%	0.0%
Steam - Oil	0.0%	0.0%	0.0%	0.0%
Steam - Other	0.0%	0.0%	0.0%	0.0%
Wind	0.0%	0.0%	0.0%	0.0%
Wind + Storage	0.0%	0.0%	0.0%	0.0%



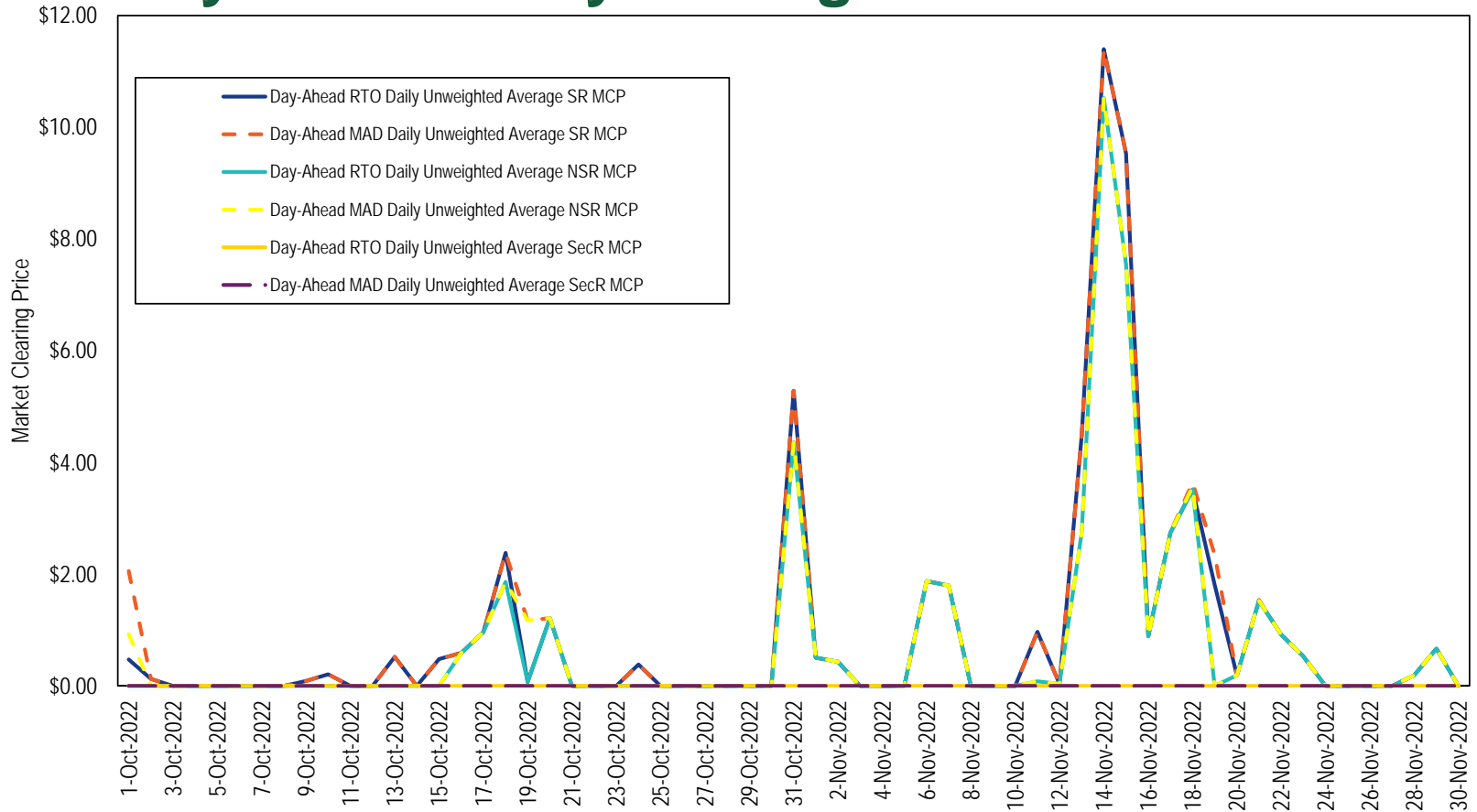
## Secondary Reserves by Resource Type

Resource / Fuel Type	Percent of Total Credits	Percent of RT Capped MWh	Percent of DA Credits	Percent of DA MWh
CT - Natural Gas	52.8%	88.7%	NA	90.0%
CT - Oil	37.2%	10.3%	NA	8.8%
Combined Cycle	7.6%	0.1%	NA	0.1%
Steam - Coal	1.0%	0.1%	NA	0.0%
RICE - Oil	0.7%	0.1%	NA	0.2%
RICE - Natural Gas	0.2%	0.3%	NA	0.8%
Steam - Other	0.2%	0.0%	NA	0.0%
Steam - Natural Gas	0.2%	0.0%	NA	0.0%
RICE - Other	0.1%	0.0%	NA	0.0%
Hydro - Run of River	0.0%	0.2%	NA	0.0%
Hydro - Pumped Storage	0.0%	0.0%	NA	0.0%
CT - Other	0.0%	0.0%	NA	0.0%
Battery	0.0%	0.0%	NA	0.0%
Distributed Gen	0.0%	0.0%	NA	0.0%
Fuel Cell	0.0%	0.0%	NA	0.0%
Nuclear	0.0%	0.0%	NA	0.0%
Solar	0.0%	0.0%	NA	0.0%
Solar + Storage	0.0%	0.0%	NA	0.0%
Solar + Wind	0.0%	0.0%	NA	0.0%
Steam - Oil	0.0%	0.0%	NA	0.0%
Wind	0.0%	0.0%	NA	0.0%
Wind + Storage	0.0%	0.0%	NA	0.0%

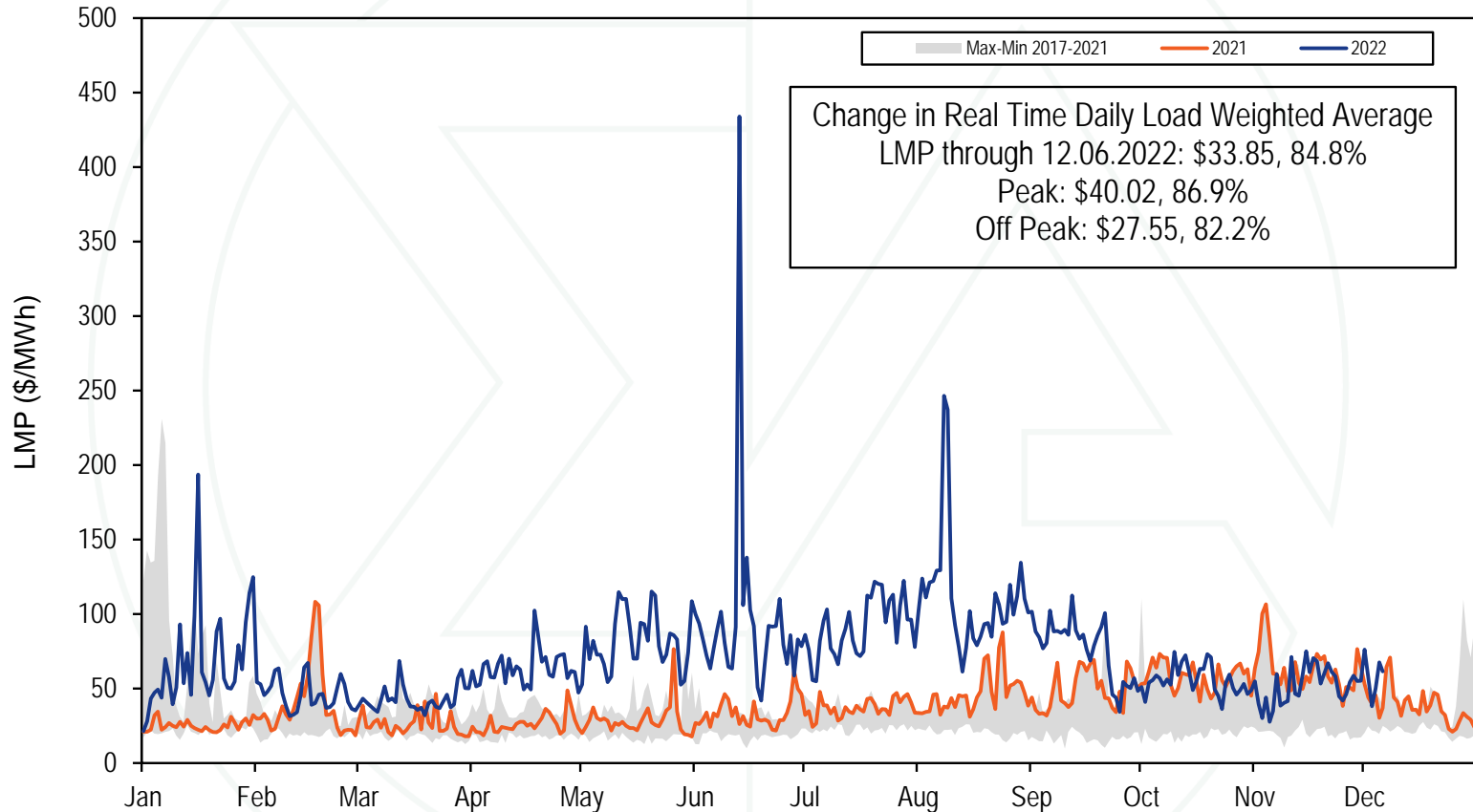
# Real-Time Daily Average Reserve Prices



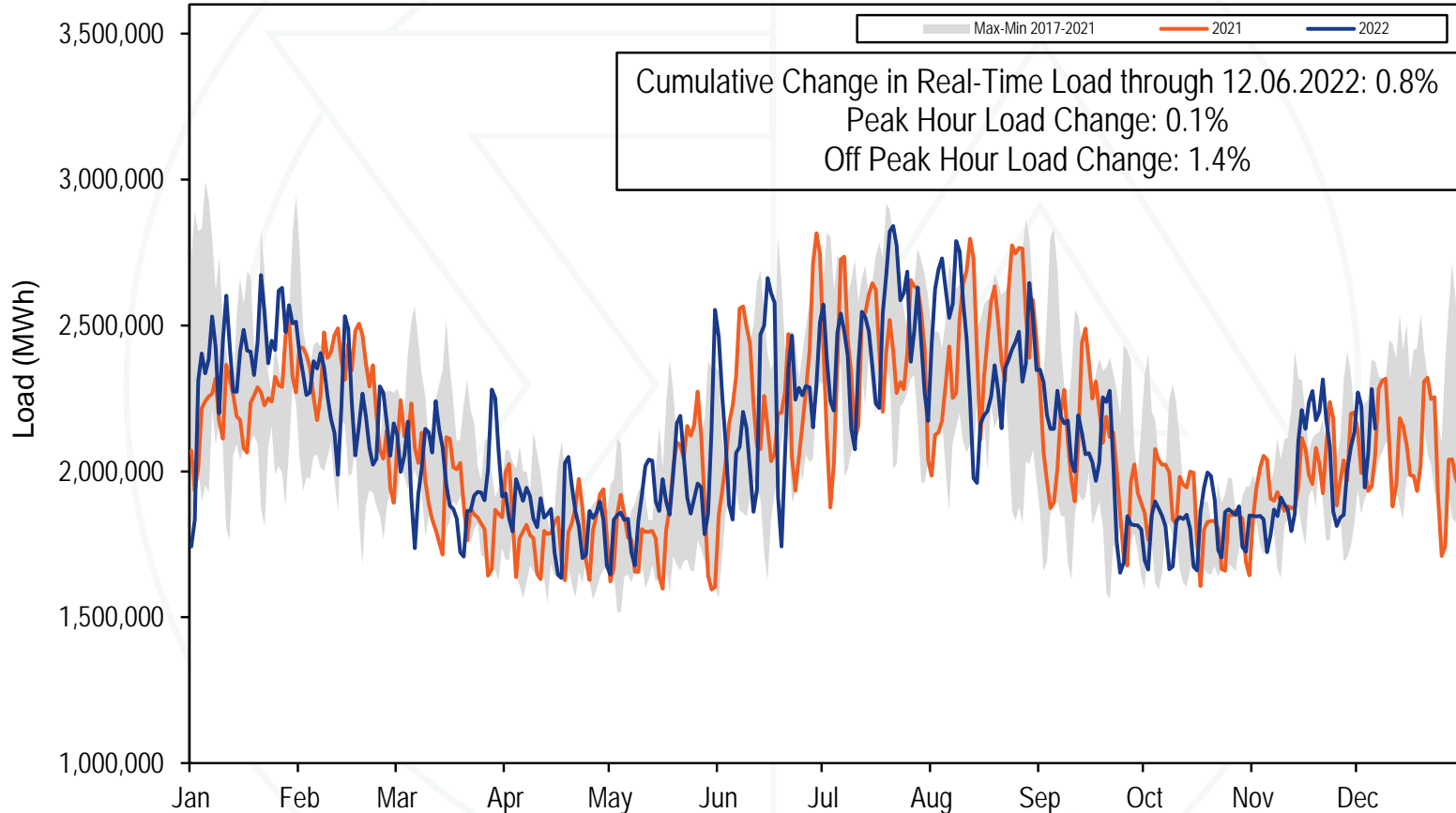
# Day-Ahead Daily Average Reserve Prices



# 2022 YTD PJM Real-Time Daily LMP



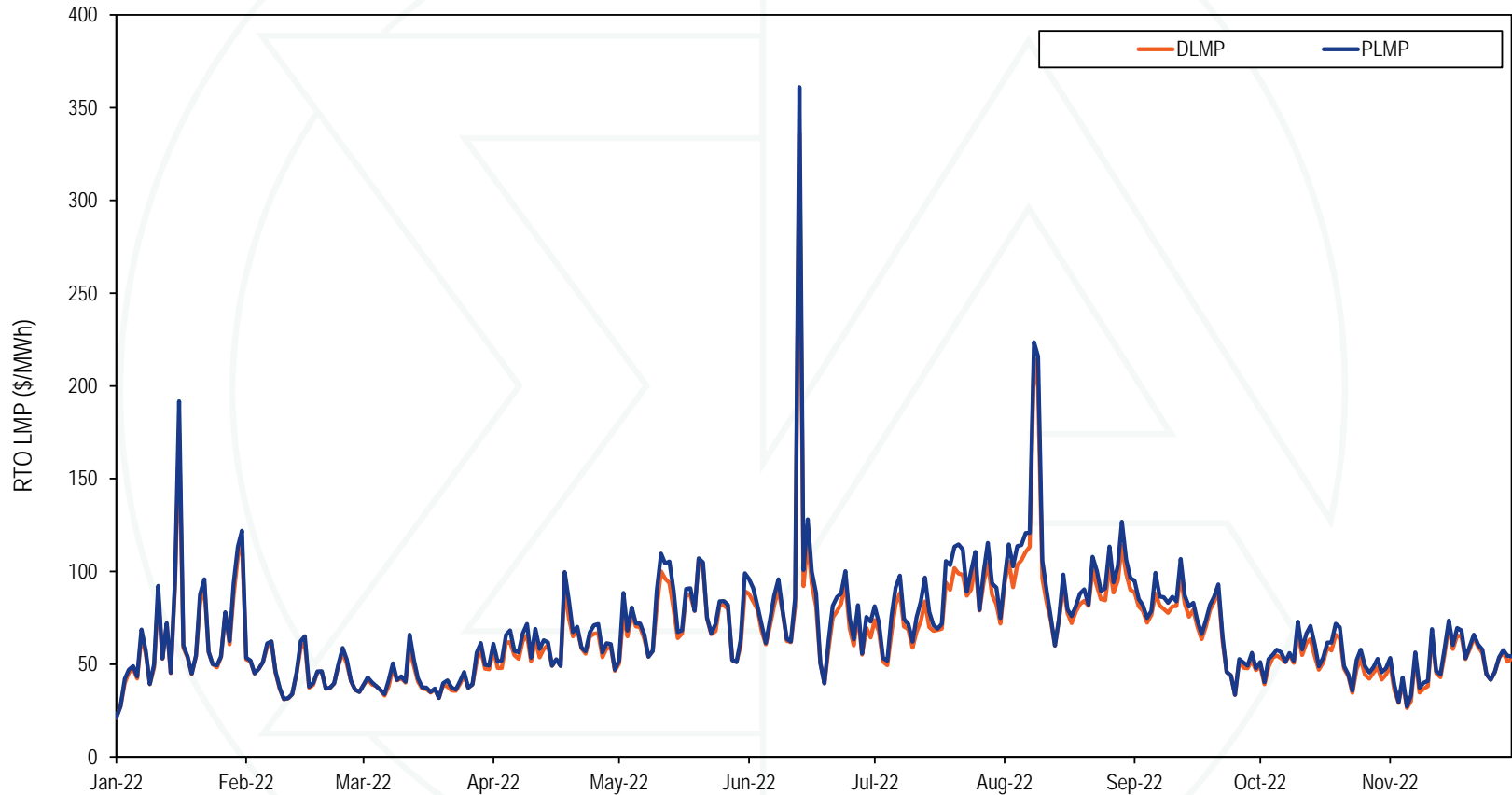
# 2022 YTD PJM Real-Time Daily Load



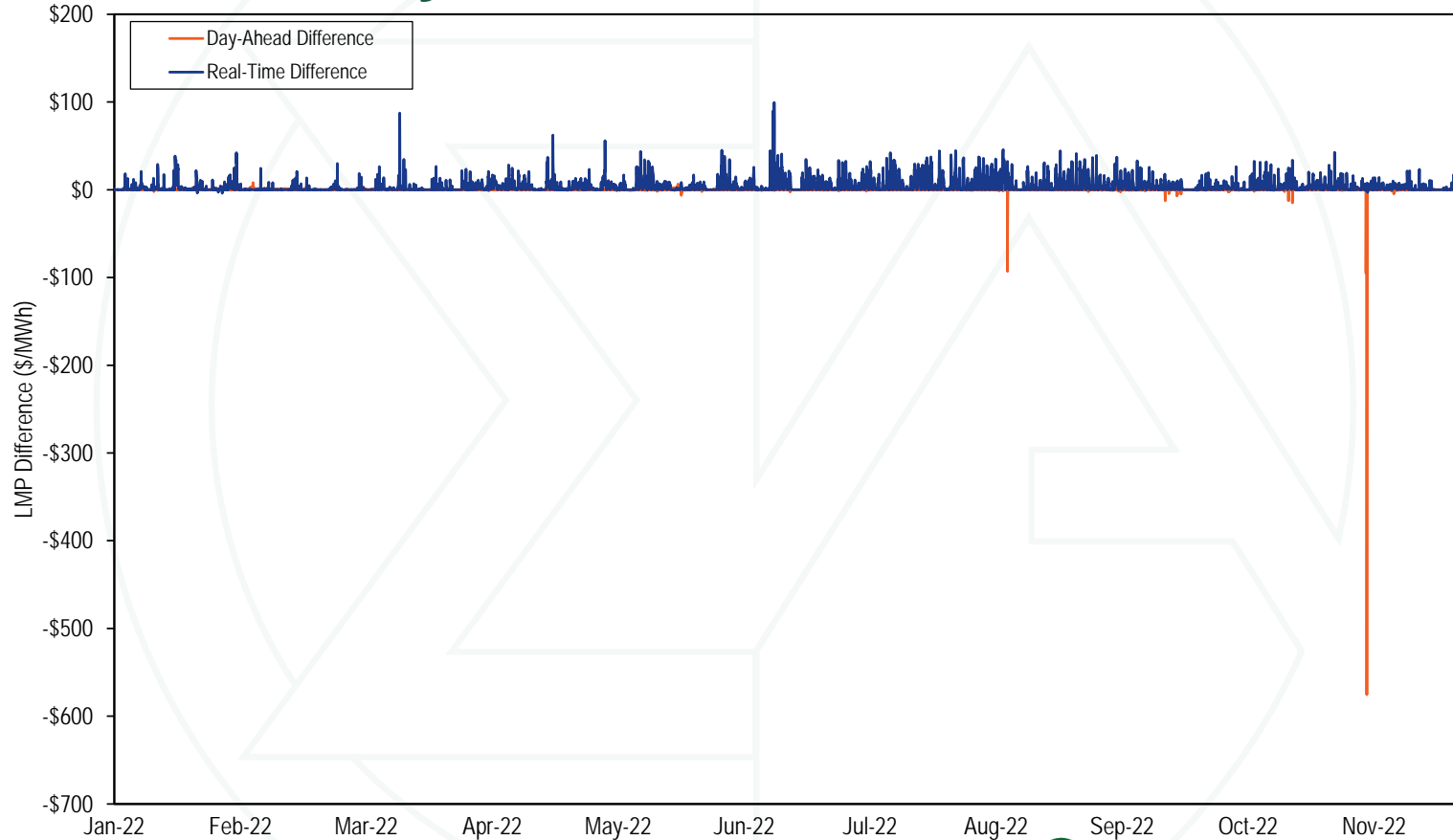
# Monthly Average Load-Weighted DLMP and PLMP

Year	Month	Day-Ahead Load-Weighted Average				Real-Time Load-Weighted Average			
		DLMP	PLMP	Difference	Percent Difference	DLMP	PLMP	Difference	Percent Difference
2021	Sep	\$46.00	\$46.14	\$0.13	0.3%	\$47.73	\$49.63	\$1.90	4.0%
2021	Oct	\$57.86	\$57.98	\$0.12	0.2%	\$54.53	\$58.42	\$3.89	7.1%
2021	Nov	\$60.76	\$61.00	\$0.24	0.4%	\$59.27	\$63.01	\$3.74	6.3%
2021	Dec	\$37.74	\$37.85	\$0.11	0.3%	\$37.37	\$38.92	\$1.55	4.2%
2021	Sep - Dec	\$50.30	\$50.46	\$0.15	0.3%	\$49.47	\$52.20	\$2.73	5.5%
2022	Jan	\$64.57	\$64.80	\$0.22	0.3%	\$66.43	\$69.06	\$2.64	4.0%
2022	Feb	\$49.96	\$50.35	\$0.39	0.8%	\$45.93	\$46.76	\$0.83	1.8%
2022	Mar	\$45.25	\$45.50	\$0.25	0.6%	\$41.83	\$43.56	\$1.73	4.1%
2022	Apr	\$64.10	\$64.18	\$0.08	0.1%	\$60.38	\$63.91	\$3.52	5.8%
2022	May	\$83.17	\$83.24	\$0.06	0.1%	\$79.04	\$83.16	\$4.12	5.2%
2022	Jun	\$90.24	\$90.54	\$0.29	0.3%	\$91.44	\$97.89	\$6.46	7.1%
2022	Jul	\$96.07	\$96.38	\$0.32	0.3%	\$84.03	\$92.48	\$8.45	10.1%
2022	Aug	\$106.18	\$106.07	-\$0.10	(0.1%)	\$105.68	\$113.74	\$8.06	7.6%
2022	Sep	\$82.86	\$82.80	-\$0.06	(0.1%)	\$74.08	\$78.29	\$4.22	5.7%
2022	Oct	\$58.30	\$58.37	\$0.07	0.1%	\$52.27	\$55.90	\$3.63	6.9%
2022	Nov	\$56.29	\$55.24	-\$1.05	(1.9%)	\$50.86	\$52.93	\$2.07	4.1%
2022	Jan - Nov	\$73.63	\$73.68	\$0.05	0.1%	\$69.69	\$74.01	\$4.32	6.2%

# Daily Average Real-Time DLMP and PLMP



# Hourly Difference: PLMP – DLMP





# Fast Start Units as a Percent of Marginal Units

Month	Dispatch Run				Pricing Run			
	CT	Diesel	Wind	All Fast Start Units	CT	Diesel	Wind	All Fast Start Units
Sep	1.3%	0.3%	0.2%	1.8%	5.0%	0.9%	0.2%	6.2%
Oct	0.6%	0.2%	0.3%	1.2%	3.3%	0.5%	0.3%	4.0%
Nov	0.5%	0.2%	0.4%	1.1%	3.5%	0.5%	0.4%	4.4%
Dec	0.9%	0.1%	0.1%	1.2%	4.6%	0.3%	0.1%	5.0%
Jan	1.3%	0.3%	0.2%	1.8%	4.9%	0.9%	0.2%	6.2%
Feb	0.6%	0.2%	0.3%	1.1%	3.2%	0.5%	0.3%	4.0%
Mar	0.5%	0.2%	0.4%	1.1%	3.4%	0.5%	0.4%	4.4%
Apr	0.8%	0.1%	0.1%	1.2%	4.4%	0.3%	0.1%	5.0%
May	1.4%	0.7%	0.1%	2.4%	6.6%	1.2%	0.1%	8.1%
Jun	2.3%	0.3%	0.1%	2.6%	9.3%	0.8%	0.1%	10.2%
Jul	2.7%	0.6%	0.1%	3.3%	16.3%	1.4%	0.0%	17.7%
Aug	2.0%	0.4%	0.0%	2.4%	12.0%	1.3%	0.0%	13.3%
Sep	0.8%	0.3%	0.1%	1.2%	5.6%	1.0%	0.1%	6.7%
Oct	2.2%	0.2%	0.3%	2.6%	6.6%	0.9%	0.2%	7.7%
Nov	1.3%	0.2%	0.2%	1.7%	5.1%	0.9%	0.2%	6.1%



# Fast Start Impacts: Zonal Average Differences

Zone	2022 (Jan-Nov)							
	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
ACEC	\$60.54	\$60.68	\$0.14	0.2%	\$58.30	\$61.22	\$2.93	5.0%
AEP	\$68.66	\$68.80	\$0.13	0.2%	\$63.76	\$67.42	\$3.66	5.7%
APS	\$69.54	\$69.75	\$0.21	0.3%	\$64.45	\$68.20	\$3.75	5.8%
ATSI	\$67.94	\$68.10	\$0.17	0.2%	\$62.48	\$66.10	\$3.62	5.8%
BGE	\$79.91	\$80.08	\$0.17	0.2%	\$75.17	\$79.67	\$4.49	6.0%
COMED	\$60.02	\$60.14	\$0.12	0.2%	\$54.96	\$58.34	\$3.38	6.1%
DAY	\$71.16	\$71.29	\$0.14	0.2%	\$65.88	\$69.66	\$3.78	5.7%
DUKE	\$69.93	\$70.07	\$0.14	0.2%	\$64.44	\$68.17	\$3.73	5.8%
DOM	\$82.24	\$81.60	-\$0.64	(0.8%)	\$80.35	\$84.31	\$3.96	4.9%
DPL	\$64.74	\$64.90	\$0.16	0.2%	\$62.76	\$66.56	\$3.80	6.1%
DUQ	\$66.79	\$66.96	\$0.17	0.2%	\$61.56	\$65.14	\$3.59	5.8%
EKPC	\$69.02	\$69.14	\$0.13	0.2%	\$64.31	\$67.98	\$3.67	5.7%
JCPLC	\$61.81	\$61.96	\$0.15	0.2%	\$59.45	\$62.52	\$3.07	5.2%
MEC	\$71.23	\$71.36	\$0.14	0.2%	\$66.75	\$70.31	\$3.56	5.3%
OVEC	\$67.41	\$67.54	\$0.13	0.2%	\$62.48	\$66.07	\$3.59	5.7%
PECO	\$59.43	\$59.57	\$0.14	0.2%	\$57.20	\$60.04	\$2.84	5.0%
PE	\$67.05	\$67.22	\$0.17	0.3%	\$61.95	\$65.41	\$3.46	5.6%
PEPCO	\$77.08	\$77.24	\$0.16	0.2%	\$72.44	\$76.72	\$4.28	5.9%
PPL	\$65.55	\$65.69	\$0.15	0.2%	\$61.68	\$64.94	\$3.26	5.3%
PSEG	\$62.65	\$62.80	\$0.15	0.2%	\$60.52	\$63.63	\$3.11	5.1%
REC	\$64.87	\$65.02	\$0.15	0.2%	\$62.22	\$65.48	\$3.26	5.2%

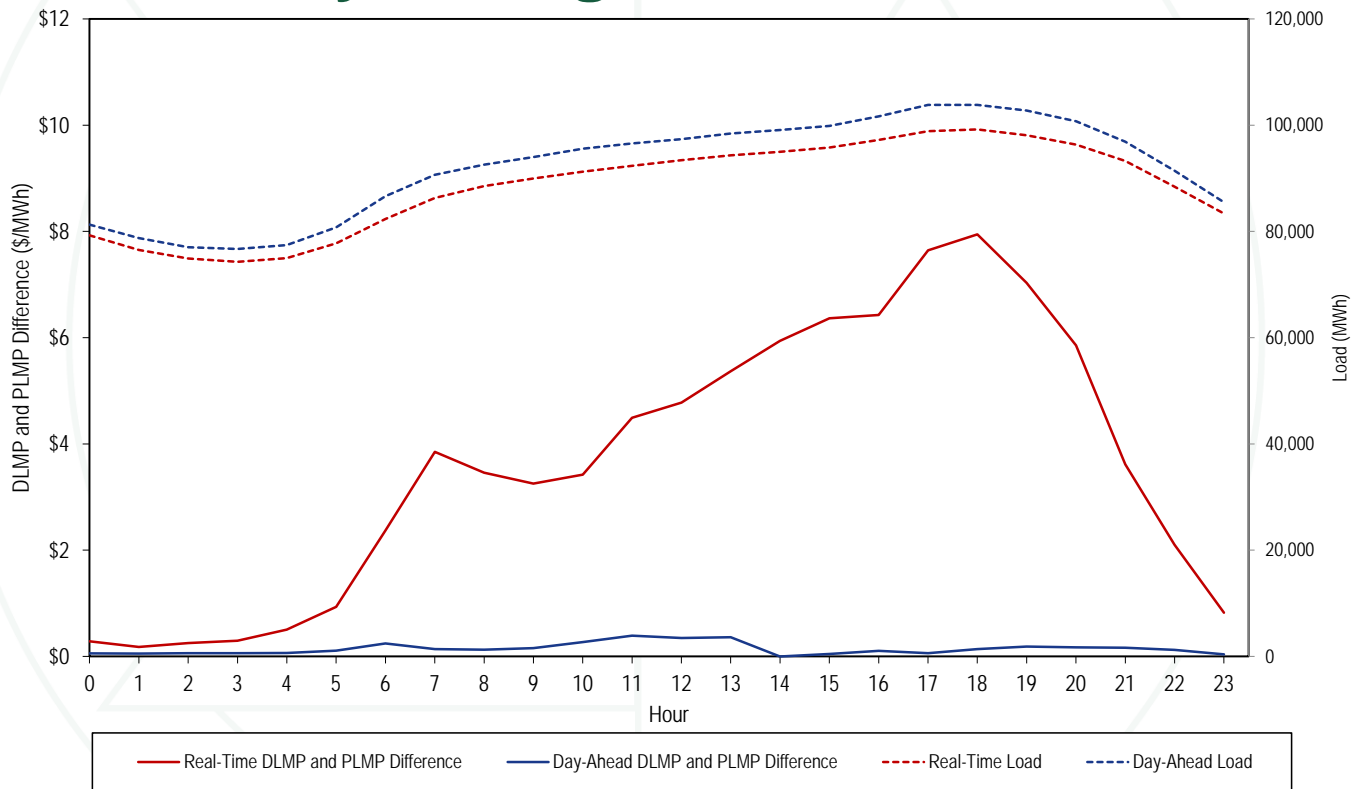
# Fast Start Impacts: Hub Average Differences

Hub	2022 (Jan-Nov)							
	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
AEP GEN HUB	\$66.77	\$66.91	\$0.14	0.2%	\$61.68	\$65.21	\$3.53	5.7%
AEP-DAYTON HUB	\$68.08	\$68.22	\$0.14	0.2%	\$62.94	\$66.56	\$3.62	5.8%
ATSI GEN HUB	\$66.62	\$66.79	\$0.17	0.3%	\$61.06	\$64.60	\$3.54	5.8%
CHICAGO GEN HUB	\$59.09	\$59.21	\$0.12	0.2%	\$53.93	\$57.28	\$3.35	6.2%
CHICAGO HUB	\$60.29	\$60.40	\$0.12	0.2%	\$55.16	\$58.56	\$3.40	6.2%
DOMINION HUB	\$74.63	\$74.63	\$0.00	0.0%	\$70.32	\$74.22	\$3.90	5.5%
EASTERN HUB	\$64.86	\$65.03	\$0.17	0.3%	\$62.20	\$65.92	\$3.73	6.0%
N ILLINOIS HUB	\$59.81	\$59.93	\$0.12	0.2%	\$54.80	\$58.16	\$3.36	6.1%
NEW JERSEY HUB	\$61.94	\$62.09	\$0.15	0.2%	\$59.70	\$62.76	\$3.06	5.1%
OHIO HUB	\$68.00	\$68.14	\$0.14	0.2%	\$62.83	\$66.45	\$3.62	5.8%
WEST INT HUB	\$69.52	\$69.60	\$0.07	0.1%	\$64.43	\$68.11	\$3.68	5.7%
WESTERN HUB	\$71.36	\$71.52	\$0.17	0.2%	\$65.85	\$69.65	\$3.80	5.8%

# Zonal PLMP-DLMP Difference Frequency

Zone	2022 (Jan-Nov)									
	< (\$50)	(\$50) to (\$10)	(\$10) to \$0	\$0	\$0 to \$10	\$10 to \$20	\$20 to \$50	\$50 to \$100	\$100 to \$200	>= \$200
PJM-RTO	0.0%	0.0%	0.6%	49.0%	38.6%	7.0%	4.4%	0.4%	0.0%	0.0%
AECO	0.0%	0.2%	6.7%	49.3%	34.5%	5.1%	3.7%	0.4%	0.1%	0.0%
AEP	0.0%	0.0%	0.7%	49.2%	38.1%	7.1%	4.4%	0.4%	0.0%	0.0%
APS	0.0%	0.0%	0.7%	49.2%	38.0%	7.1%	4.6%	0.4%	0.0%	0.0%
ATSI	0.0%	0.0%	0.8%	49.1%	38.5%	6.8%	4.4%	0.4%	0.0%	0.0%
BGE	0.0%	0.1%	2.6%	49.0%	34.3%	7.3%	5.5%	1.0%	0.1%	0.0%
COMED	0.0%	0.1%	1.7%	49.3%	37.9%	6.5%	4.0%	0.4%	0.0%	0.0%
DAY	0.0%	0.0%	0.7%	49.2%	37.8%	7.1%	4.7%	0.4%	0.1%	0.0%
DEOK	0.0%	0.0%	0.9%	49.2%	37.8%	7.2%	4.5%	0.4%	0.1%	0.0%
DOM	0.1%	0.3%	1.9%	49.1%	35.7%	7.0%	5.1%	0.7%	0.1%	0.0%
DPL	0.0%	0.2%	11.1%	49.3%	29.4%	4.8%	3.5%	1.3%	0.4%	0.0%
DUQ	0.0%	0.0%	0.8%	49.2%	38.5%	6.8%	4.2%	0.4%	0.1%	0.0%
EKPC	0.0%	0.0%	0.9%	49.2%	37.9%	7.1%	4.4%	0.4%	0.0%	0.0%
JCPL	0.0%	0.1%	3.2%	49.3%	37.9%	5.2%	3.8%	0.4%	0.1%	0.0%
METED	0.0%	0.3%	2.0%	49.0%	37.5%	6.3%	4.1%	0.6%	0.1%	0.0%
OVEC	0.0%	0.0%	0.9%	49.2%	38.1%	7.0%	4.2%	0.4%	0.0%	0.0%
PECO	0.0%	0.1%	9.9%	49.2%	31.6%	5.0%	3.6%	0.4%	0.1%	0.0%
PENELEC	0.0%	0.1%	0.7%	48.9%	39.1%	6.8%	4.0%	0.4%	0.0%	0.0%
PEPCO	0.0%	0.1%	2.2%	49.1%	35.1%	7.2%	5.3%	0.8%	0.1%	0.0%
PPL	0.0%	0.1%	2.0%	49.0%	38.6%	6.0%	3.7%	0.5%	0.0%	0.0%
PSEG	0.0%	0.0%	2.9%	49.3%	38.1%	5.4%	3.8%	0.4%	0.1%	0.0%
RECO	0.0%	0.1%	1.6%	49.1%	39.1%	5.6%	3.9%	0.5%	0.1%	0.0%

# Hourly Average Load and LMP Difference: January through November 2022



# Real-Time Monthly Average On Peak and Off Peak Load-Weighted LMP

	2021				2022			
	Off Peak	On Peak	Difference	Percent Difference	Off Peak	On Peak	Difference	Percent Difference
Jan	\$23.53	\$27.45	\$3.91	16.6%	\$74.99	\$62.54	(\$12.46)	(16.6%)
Feb	\$35.40	\$46.40	\$11.01	31.1%	\$45.70	\$47.86	\$2.16	4.7%
Mar	\$23.98	\$28.43	\$4.45	18.6%	\$41.58	\$45.41	\$3.83	9.2%
Apr	\$22.60	\$30.45	\$7.86	34.8%	\$55.93	\$71.89	\$15.96	28.5%
May	\$22.58	\$36.80	\$14.23	63.0%	\$66.12	\$100.85	\$34.73	52.5%
Jun	\$27.50	\$39.88	\$12.38	45.0%	\$61.63	\$126.83	\$65.20	105.8%
Jul	\$31.52	\$42.83	\$11.31	35.9%	\$71.83	\$114.14	\$42.31	58.9%
Aug	\$36.74	\$56.71	\$19.97	54.4%	\$85.89	\$136.31	\$50.42	58.7%
Sep	\$39.47	\$59.03	\$19.56	49.6%	\$66.36	\$89.76	\$23.40	35.3%
Oct	\$49.53	\$67.34	\$17.81	36.0%	\$47.61	\$64.50	\$16.90	35.5%
Nov	\$55.73	\$70.49	\$14.76	26.5%	\$45.48	\$60.50	\$15.01	33.0%
Dec	\$34.83	\$42.56	\$7.73	22.2%				

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