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.

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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

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# 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

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Real-Time Reserves and Requirements

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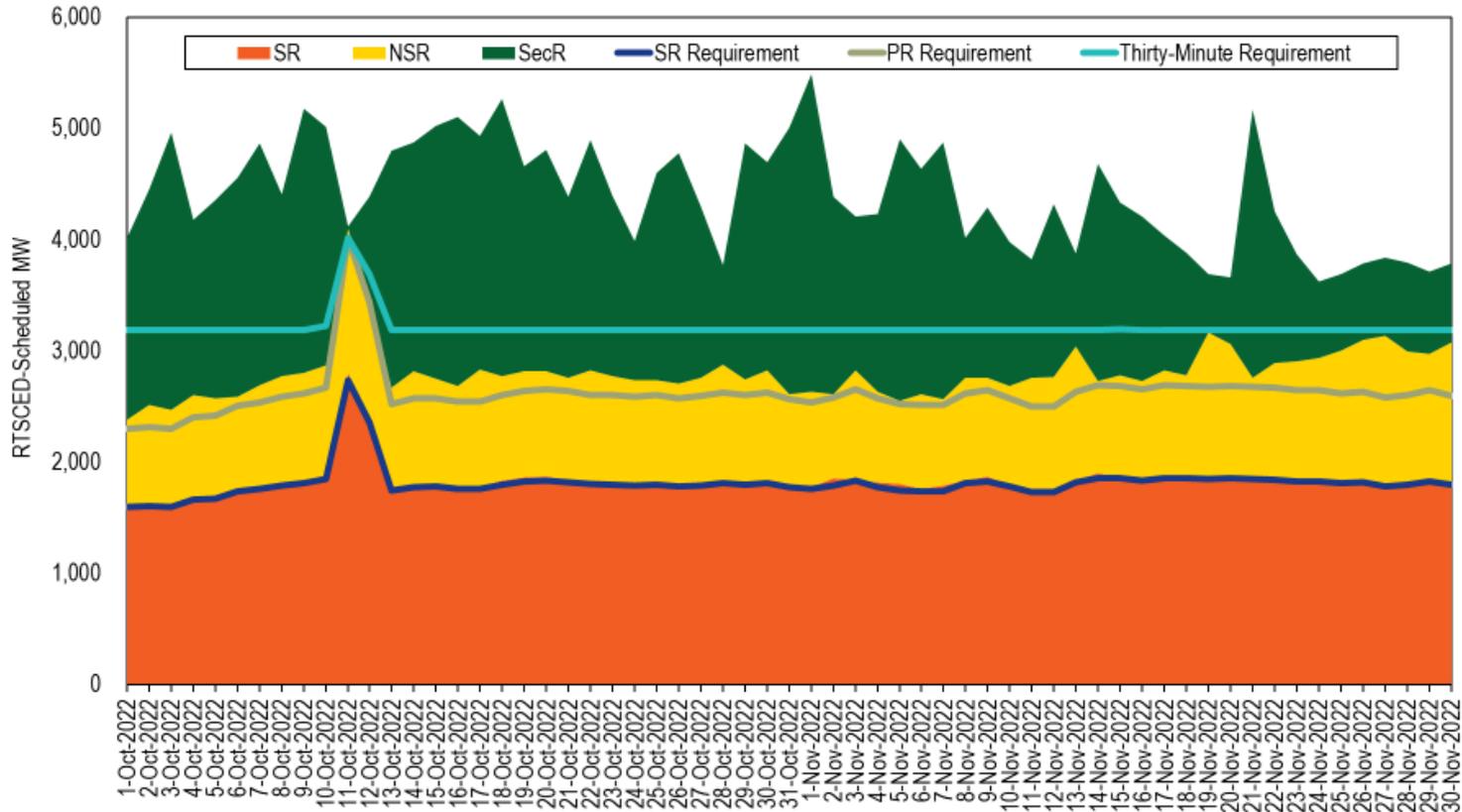
Day-Ahead Reserves and Requirements
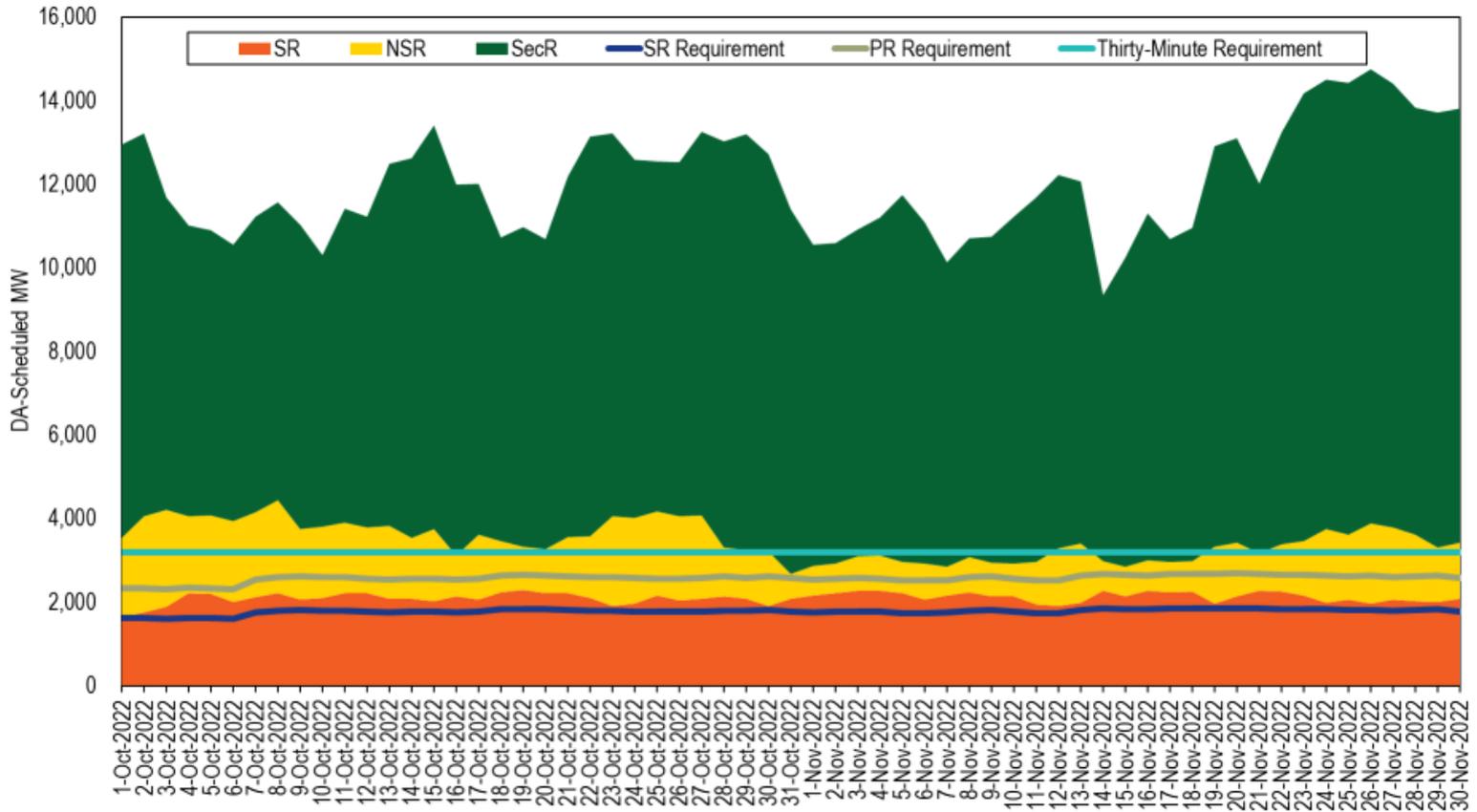
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Synchronized Reserves by Resource Type

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%

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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%

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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%

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Real-Time Daily Average Reserve Prices
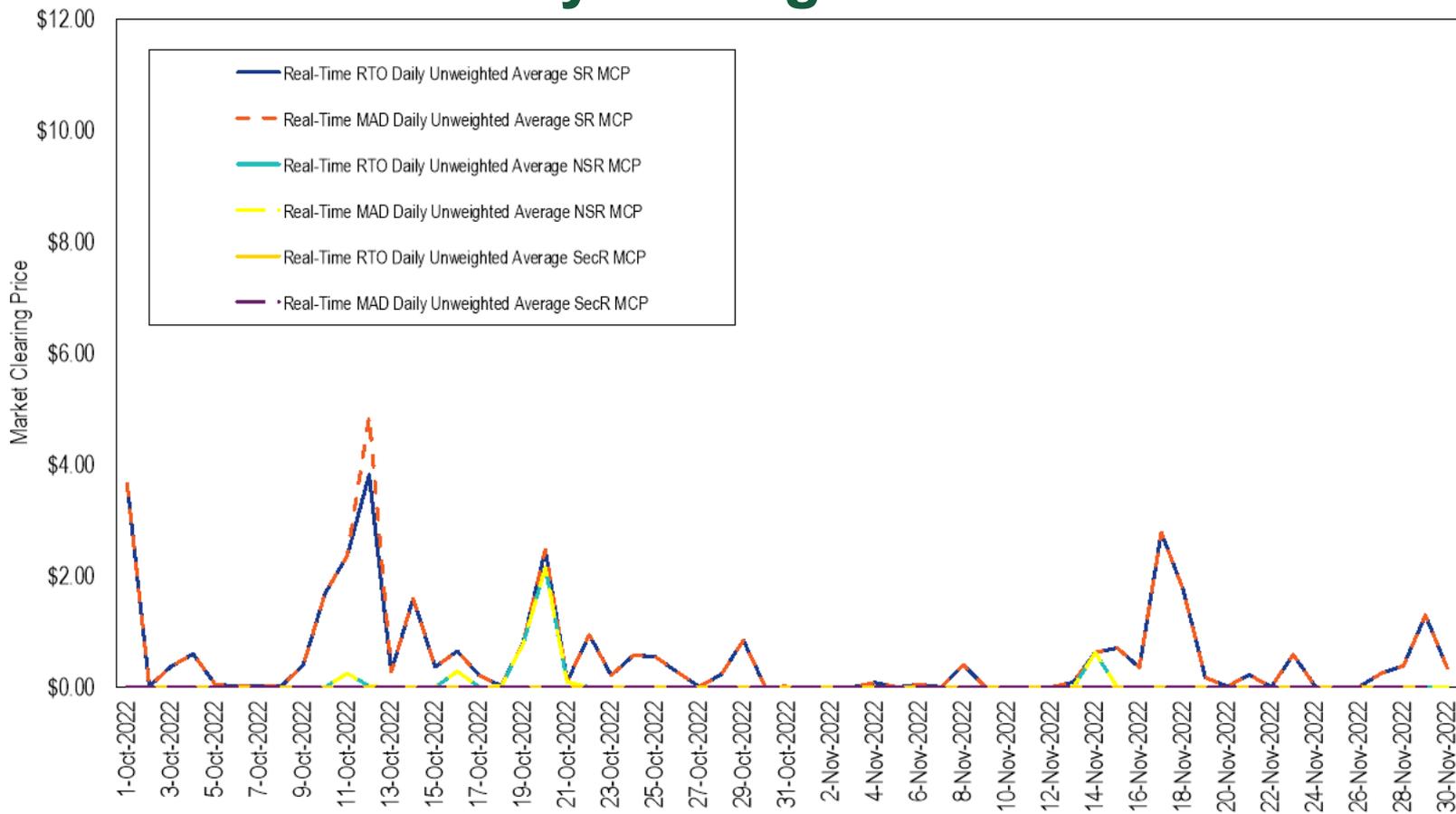
# Day-Ahead Daily Average Reserve Prices

# 2022 YTD PJM Real-Time Daily LMP

Change in Real Time Daily Load Weighted Average
LMP through 12.06.2022: $33.85, 84.8%
Peak: $40.02, 86.9%
Off Peak: $27.55, 82.2%

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2022 YTD PJM Real-Time Daily Load

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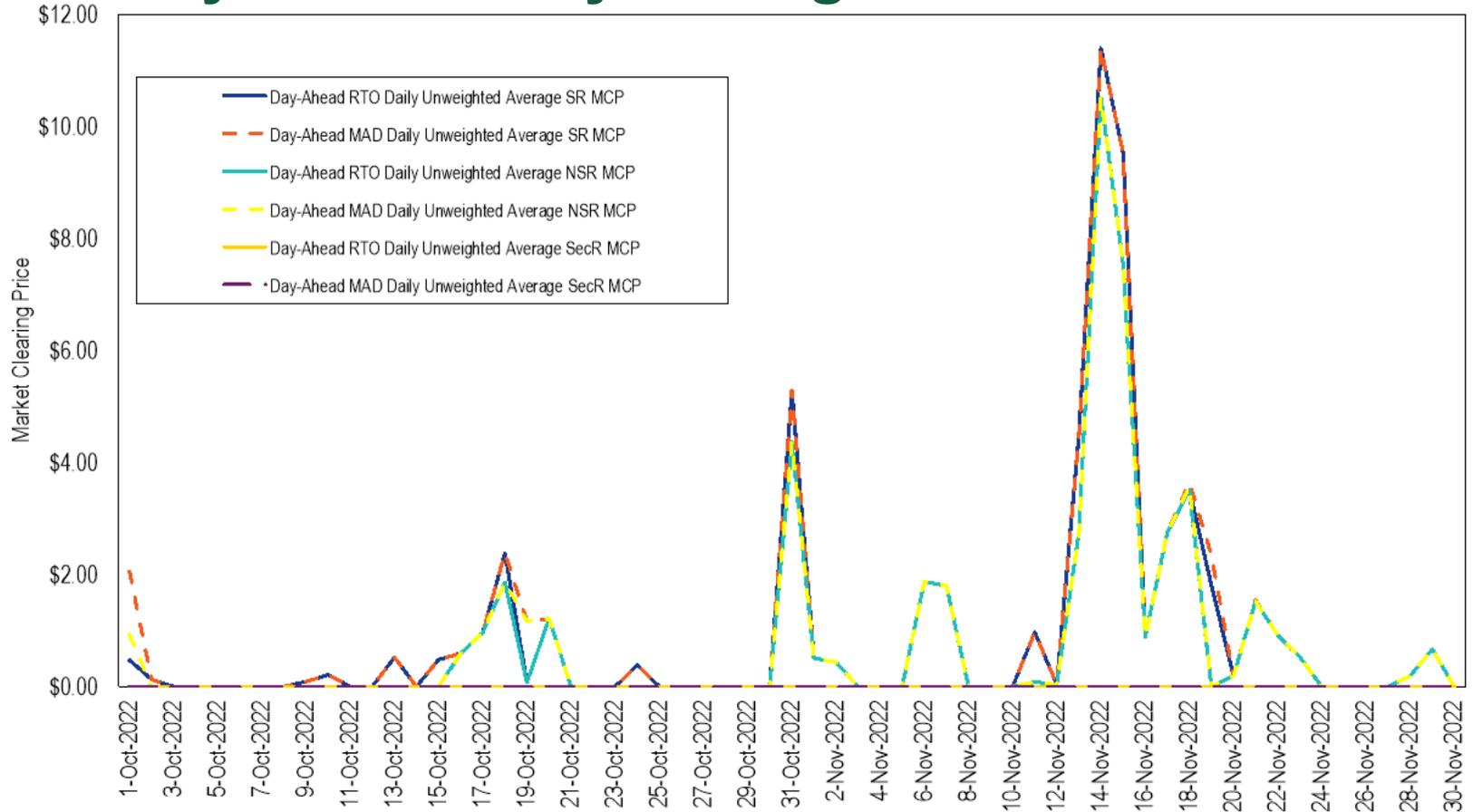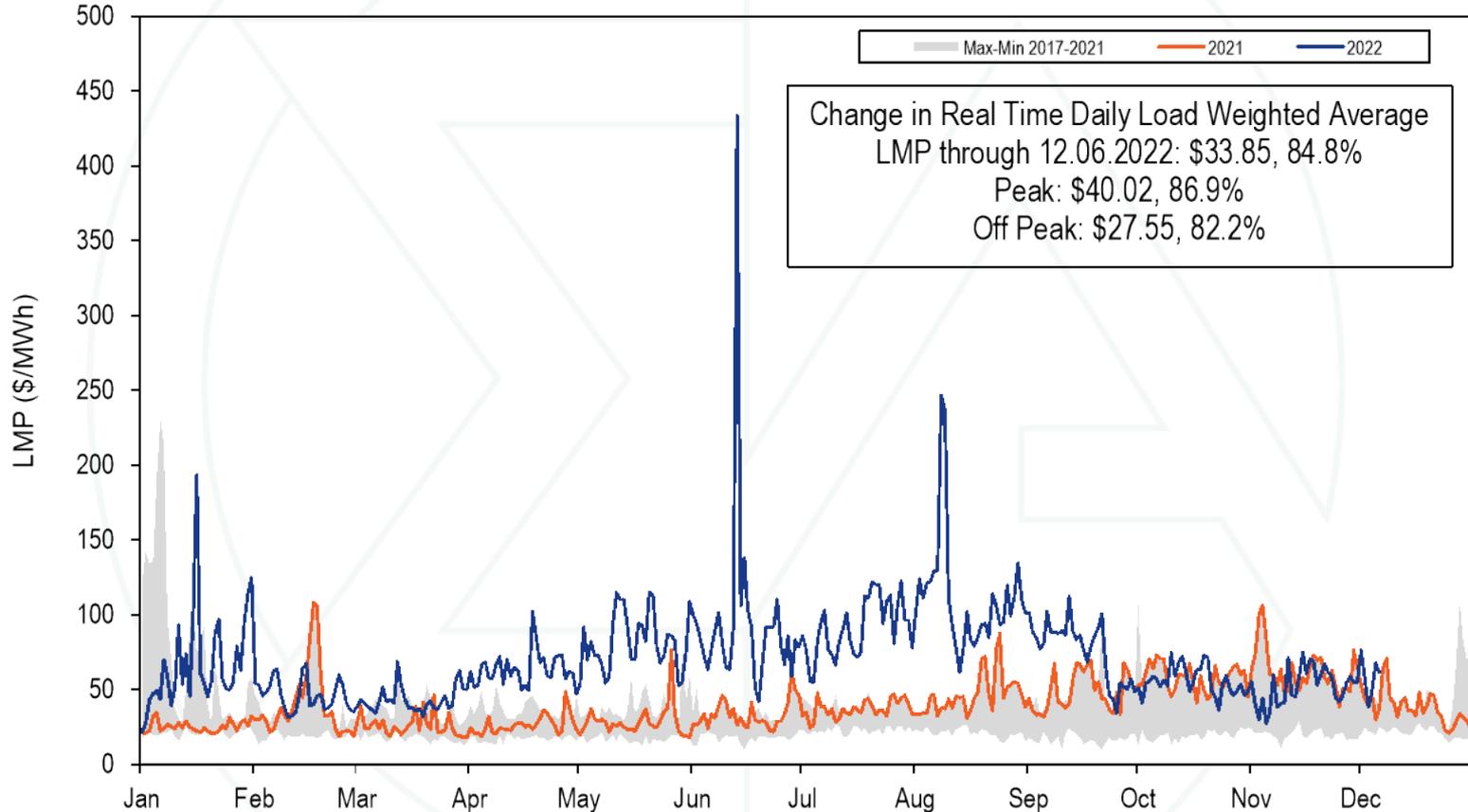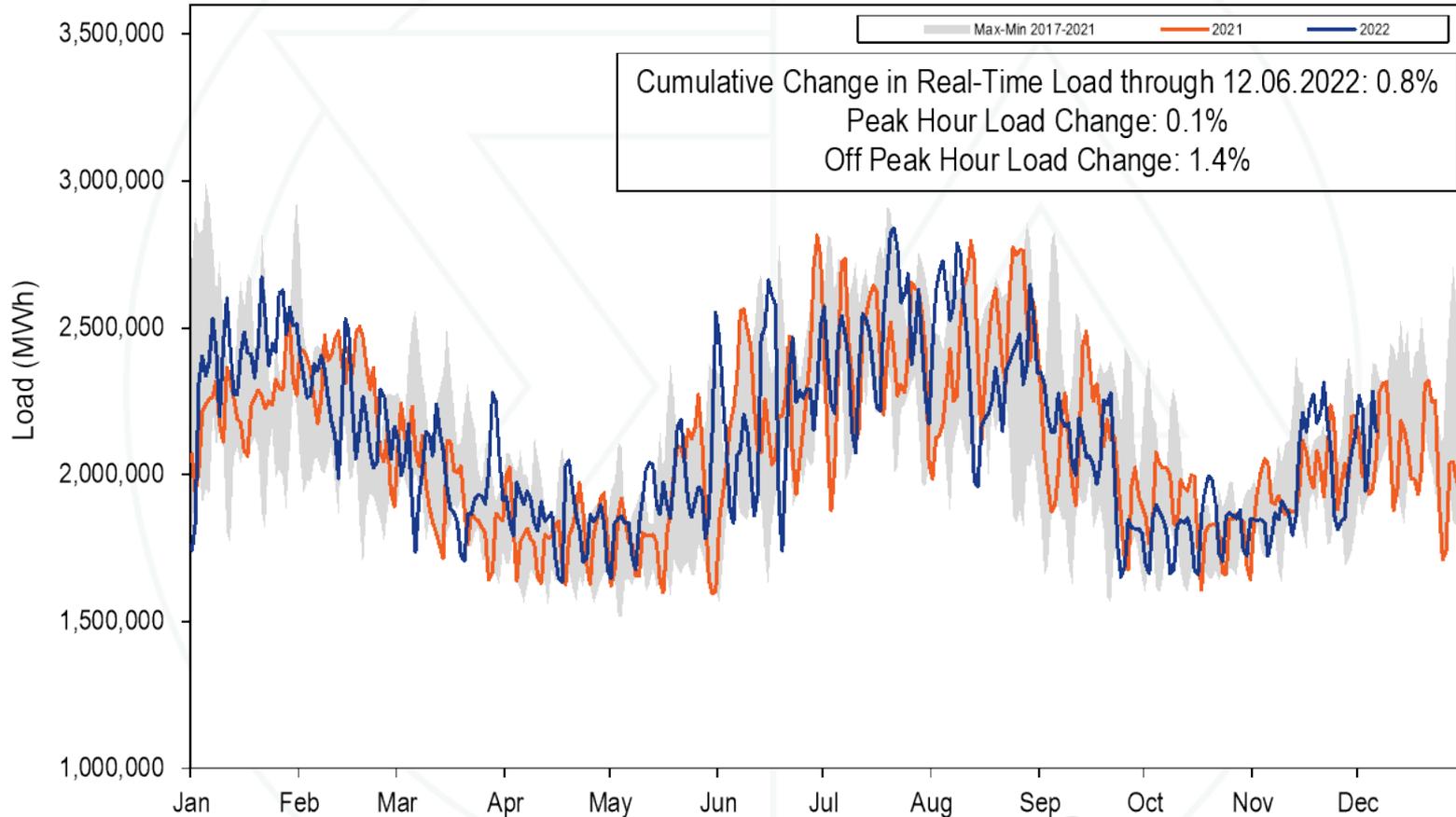
Monthly Average Load-Weighted DLMP and PLMP

		Day-Ahead Load-Weighted Average				Real-Time Load-Weighted Average			
Year	Month	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%

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Daily Average Real-Time DLMP and PLMP
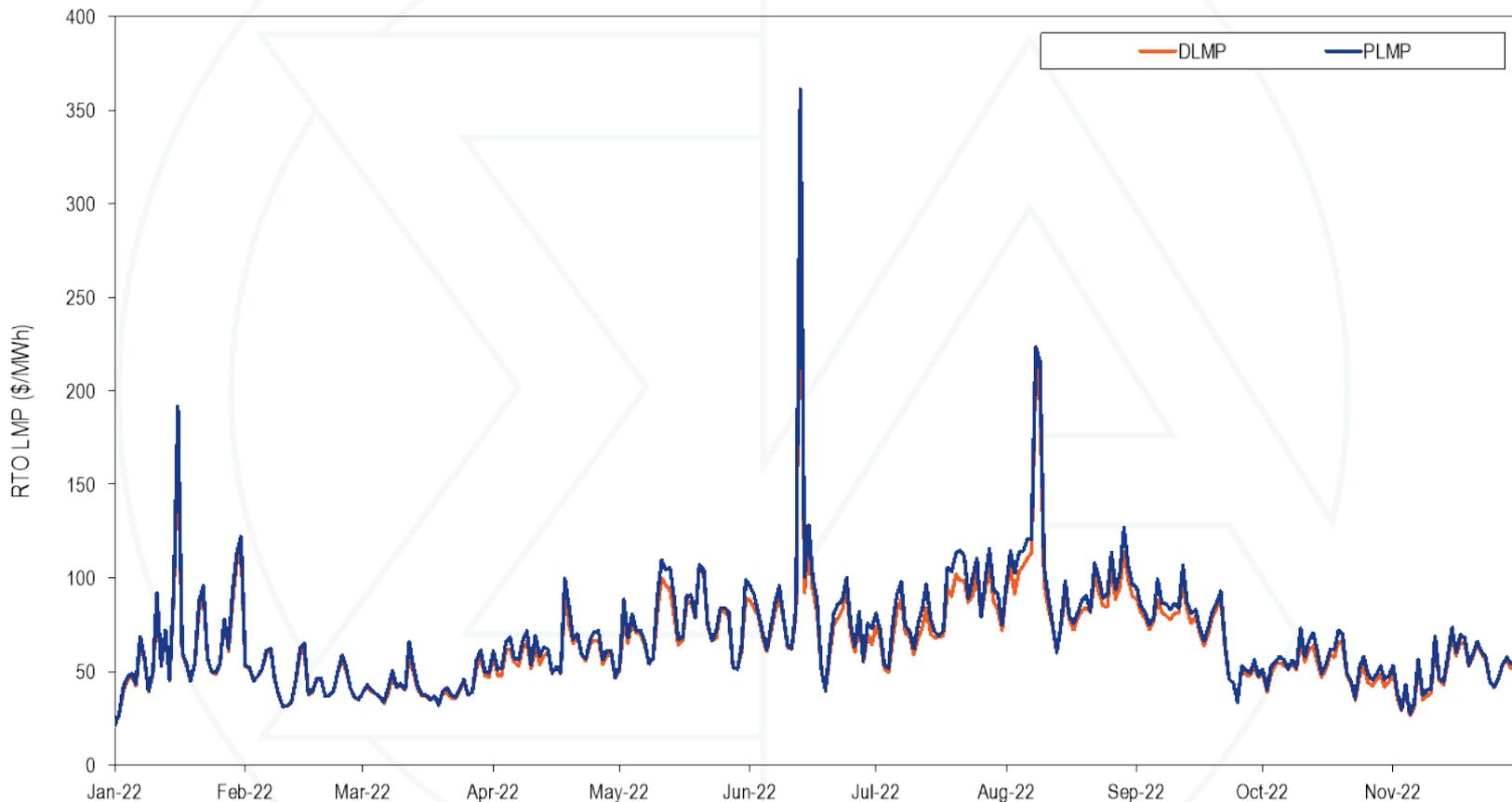
Hourly Difference: PLMP – DLMP

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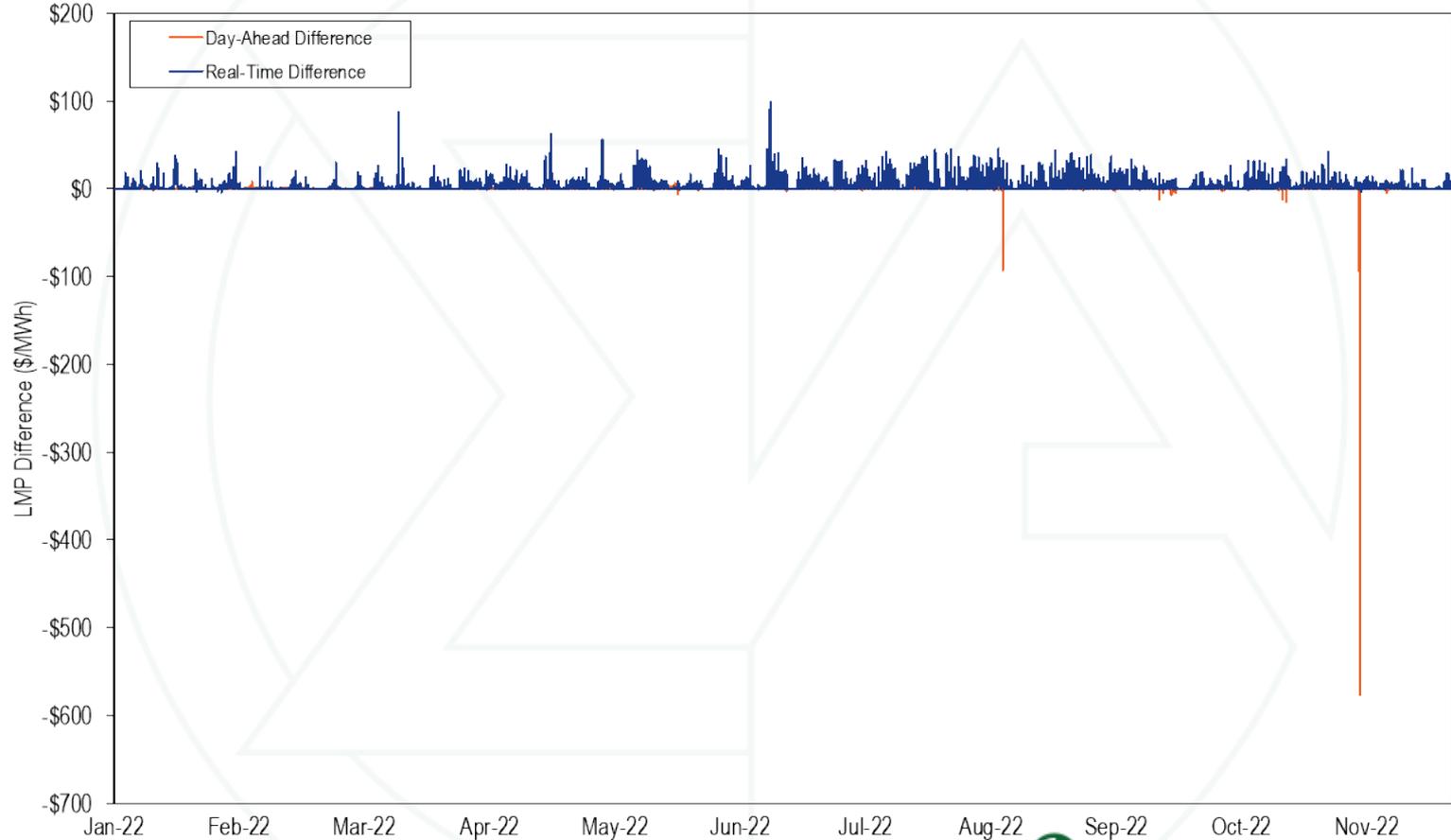
Fast Start Units as a Percent of Marginal Units

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%

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Fast Start Impacts: Zonal Average Differences

	2022 (Jan-Nov)							
	Day-Ahead				Real-Time			
Zone	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%

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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%

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Zonal PLMP-DLMP Difference Frequency

Zone	< ($50)	($50) to ($10)	($10) to $0	$0	$0 to $10	$10 to $20	$20 to $50	$50 to $100	$100 to $200	>= $200
				2022 (Jan-Nov)						
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%

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Hourly Average Load and LMP Difference: January through November 2022
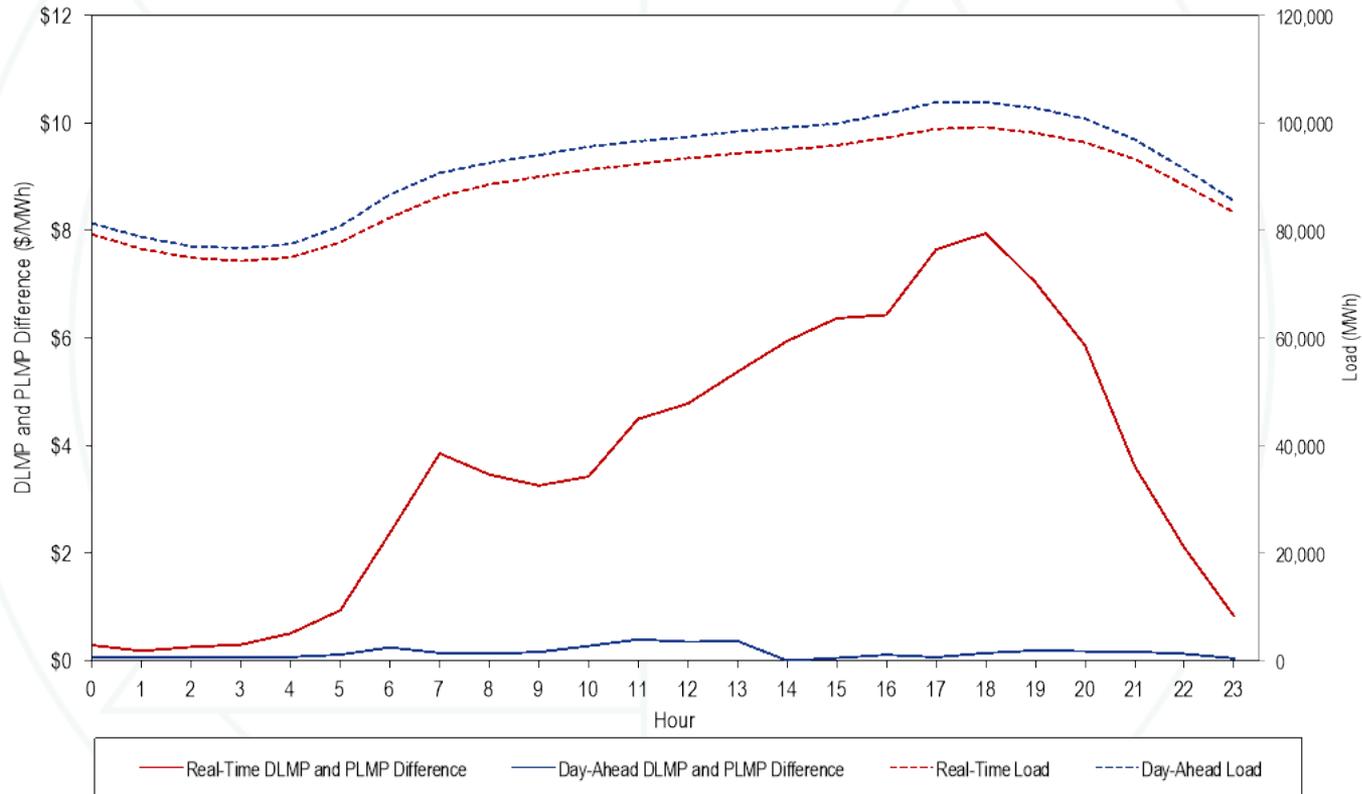
Real-Time Monthly Average
On Peak and Off Peak Load-Weighted LMP

	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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