

Market Monitor Report

MC Webinar
July 24, 2023

IMM



Monitoring Analytics

Reserve Market ORDC Extension

- **On May 12, 2023, PJM took unilateral action to increase reserve requirements without stakeholder or FERC approval.**
 - **Stakeholders had rejected the proposed change.**
 - **Prior changes have only occurred during emergency and alert conditions.**
- **The initial change was a doubling of the synchronized reserve requirement. A revised change set the requirement to a 30 percent increase.**

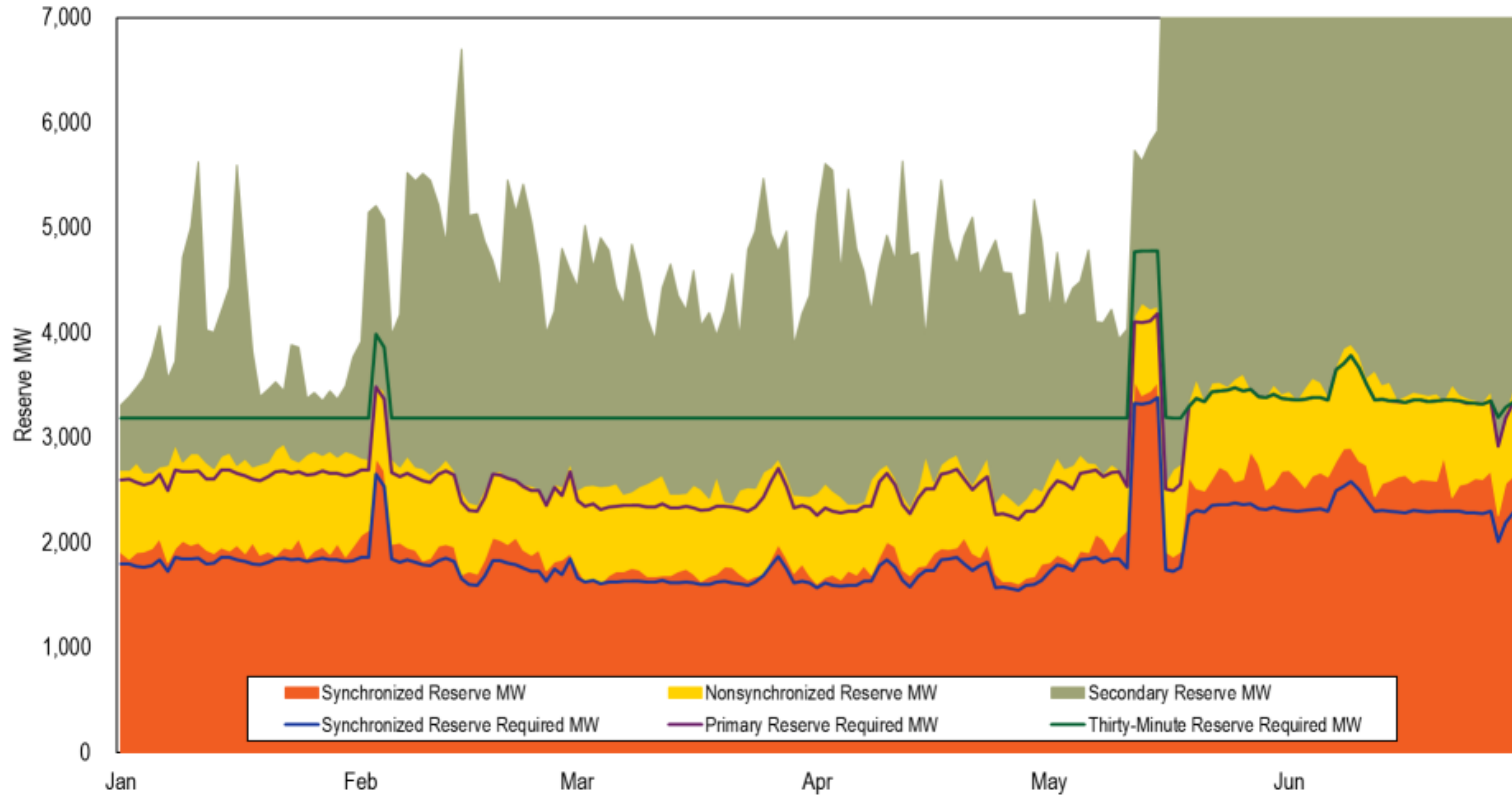
Reserve Market ORDC Extension

- **Between synchronized reserves and primary reserves, shortage pricing occurred in 35 intervals on May 12, 15, and 26, mostly during the overnight hours.**
- **Total credits for synchronized reserves increased to \$9.0 million in May and \$4.4 million in June.**

Offline Reserves Measurement

- **Since October 2022, PJM has undercounted offline reserves when the price is zero.**
- **In June 2023, PJM corrected the measurement of offline reserves.**
- **The result is an increased quantity of nonsynchronized reserves and secondary reserves.**

Real-Time Reserves and Requirements



RTO Reserve MW

- **Real-time market clearing**

Year	Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
2023	Jan	1,935	861	2,796	1,100	3,895
2023	Feb	1,975	718	2,693	2,295	4,988
2023	Mar	1,722	812	2,535	1,964	4,498
2023	Apr	1,788	771	2,559	2,266	4,825
2023	May	2,425	804	3,229	9,635	12,864
2023	Jun	2,628	848	3,476	17,101	20,578

- **Day-ahead market clearing**

Year	Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
2023	Jan	1,904	1,404	3,309	11,941	15,249
2023	Feb	1,889	1,311	3,200	16,793	19,993
2023	Mar	1,682	1,179	2,861	15,073	17,934
2023	Apr	1,766	968	2,734	10,955	13,689
2023	May	2,399	1,094	3,493	12,489	15,983
2023	Jun	2,848	987	3,835	13,484	17,319

MAD Reserve MW

- Real-time market clearing**

Year	Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
2023	Jan	1,933	792	2,725	NA	NA
2023	Feb	1,955	673	2,628	NA	NA
2023	Mar	1,696	678	2,374	NA	NA
2023	Apr	1,664	615	2,279	NA	NA
2023	May	1,940	685	2,625	NA	NA
2023	Jun	1,973	688	2,661	NA	NA

- Day-ahead market clearing**

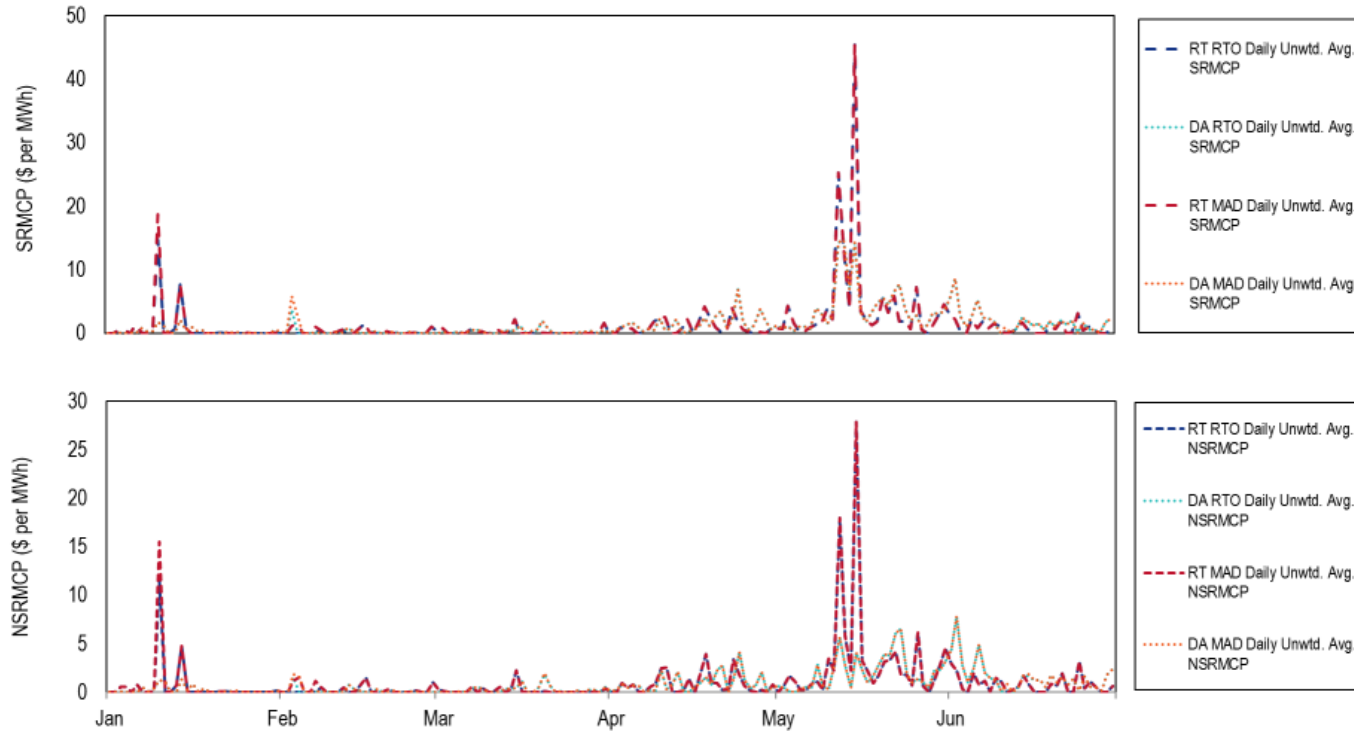
Year	Month	Synchronized Reserve MW	Nonsynchronized Reserve MW	Total Primary Reserve MW	Secondary Reserve MW	Total Thirty-Minute Reserve MW
2023	Jan	1,891	1,119	3,009	NA	NA
2023	Feb	1,874	992	2,866	NA	NA
2023	Mar	1,671	839	2,510	NA	NA
2023	Apr	1,690	684	2,374	NA	NA
2023	May	1,937	847	2,784	NA	NA
2023	Jun	2,023	817	2,839	NA	NA

Reserve Settlements by Month

Product	Year	Month	Total Day-Ahead	Total Balancing	Total LOC	Total Shortfall	Total
			Credits	MCP Credits	Credits	Charges	Credits
Synchronized Reserve	2023	Jan	\$505,419	(\$114,061)	\$980,107	\$336,246	\$1,035,219
	2023	Feb	\$735,351	\$99,577	\$493,827	\$0	\$1,328,755
	2023	Mar	\$439,364	(\$5,106)	\$744,883	\$0	\$1,179,141
	2023	Apr	\$2,088,876	\$55,121	\$701,874	\$0	\$2,845,871
	2023	May	\$8,590,787	(\$1,102,233)	\$1,523,214	\$0	\$9,011,767
	2023	Jun	\$4,061,466	(\$136,555)	\$503,423	\$0	\$4,428,335
Nonsynchronized Reserve	2023	Jan	\$73,610	(\$155,466)	\$4,850	NA	(\$77,007)
	2023	Feb	\$72,133	(\$113,200)	\$31,094	NA	(\$9,973)
	2023	Mar	\$72,194	(\$37,214)	\$3,368	NA	\$38,348
	2023	Apr	\$220,075	(\$112,776)	\$59,662	NA	\$166,961
	2023	May	\$764,690	(\$597,158)	\$477,365	NA	\$644,897
	2023	Jun	\$648,961	(\$134,616)	\$48,934	NA	\$563,279
Secondary Reserve	2023	Jan	\$0	\$0	\$5,114	\$0	\$5,114
	2023	Feb	\$0	\$0	\$34,129	\$0	\$34,129
	2023	Mar	\$0	\$0	\$12,363	\$0	\$12,363
	2023	Apr	\$0	\$0	\$15,125	\$0	\$15,125
	2023	May	\$0	\$0	\$64,711	\$0	\$64,711
	2023	Jun	\$0	\$0	\$137,270	\$0	\$137,270

- For secondary reserve, the shortfall charge is part of the balancing MCP credit. For synchronized reserve, it is separate.
- The only spin events that were 10 minutes or longer happened in January, so only January has SR shortfall charges.

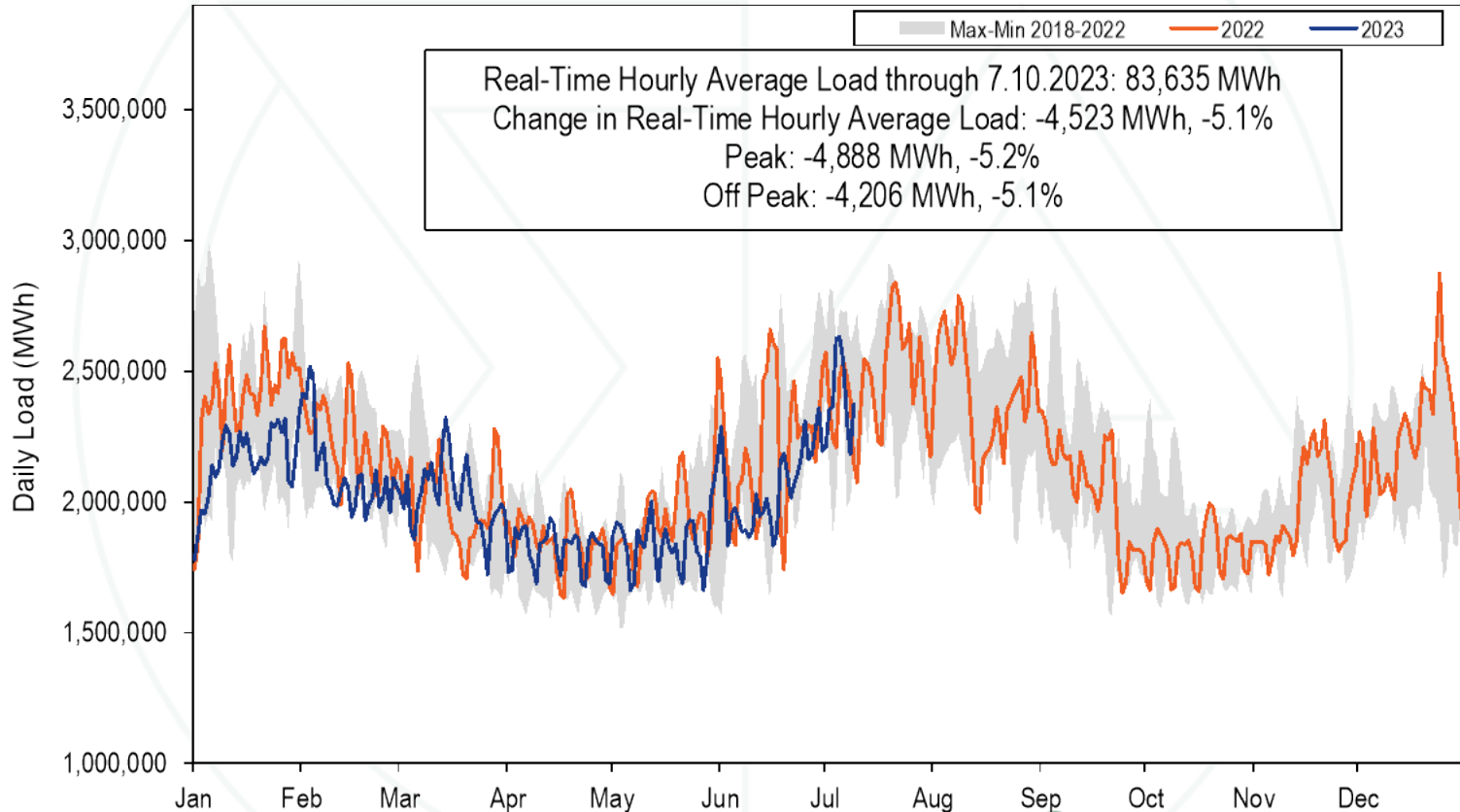
Reserve Prices



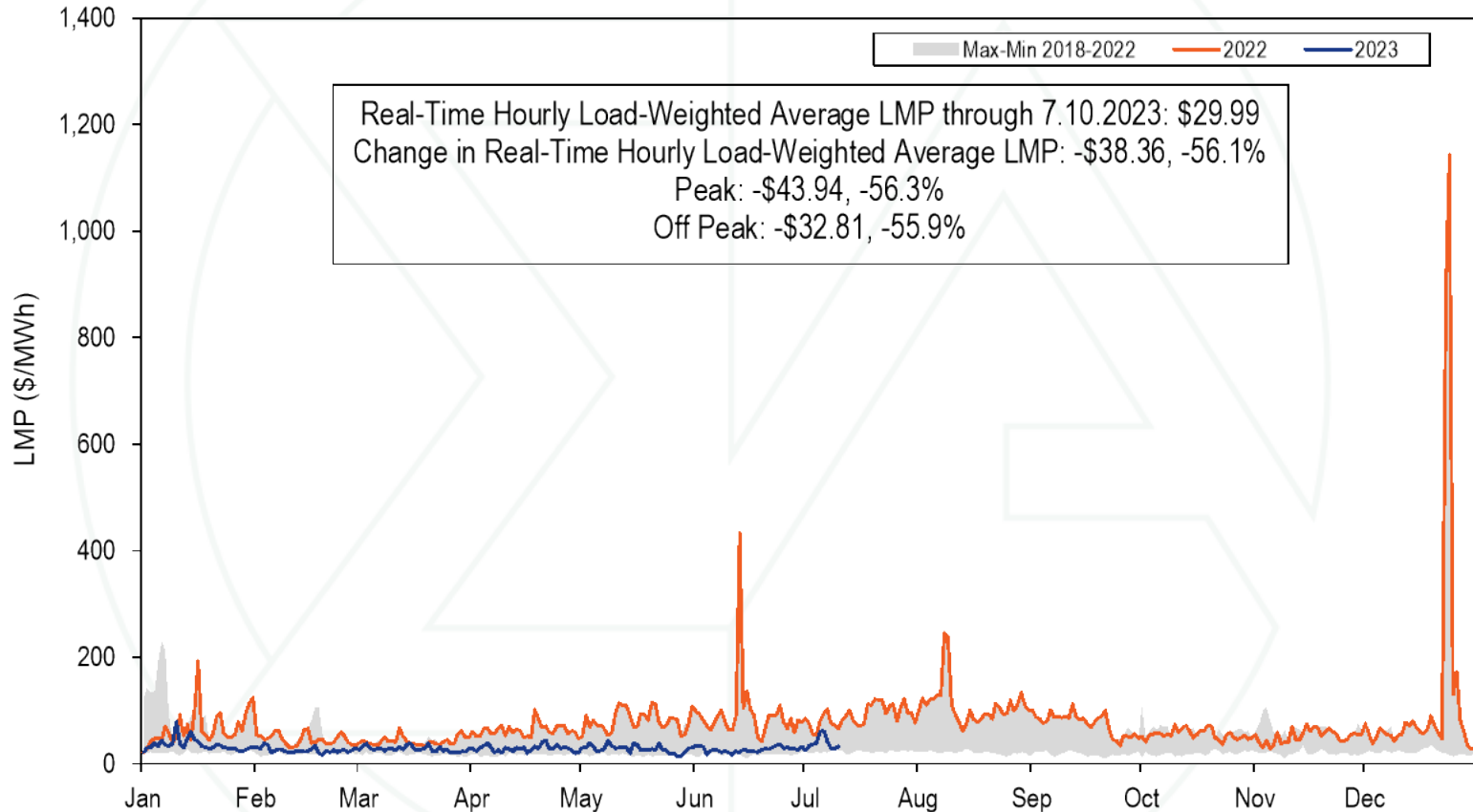
- SecRMCP always \$0 per MWh, so far in 2023.
- Spikes on May 12th & 15th due to increased requirements.

- Spikes on Jan. 10th due to shortage pricing.
- Spikes on Feb. 3rd & 4th due to conservative operations.

2023 YTD PJM Real-Time Daily Load



2023 YTD PJM Real-Time Daily LMP

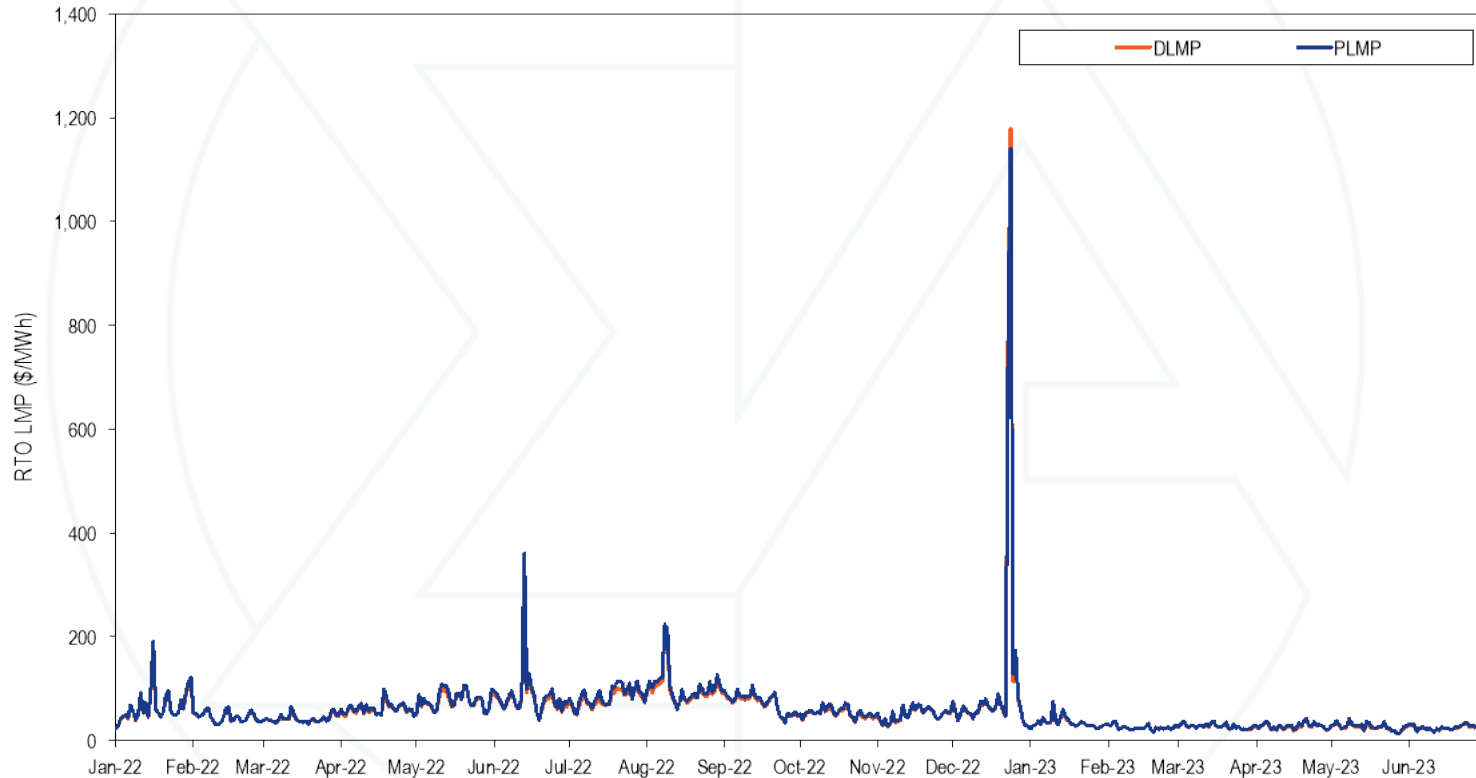


Real-Time Hourly Load-Weighted Average LMP through 7.10.2023: \$29.99
Change in Real-Time Hourly Load-Weighted Average LMP: -\$38.36, -56.1%
Peak: -\$43.94, -56.3%
Off Peak: -\$32.81, -55.9%

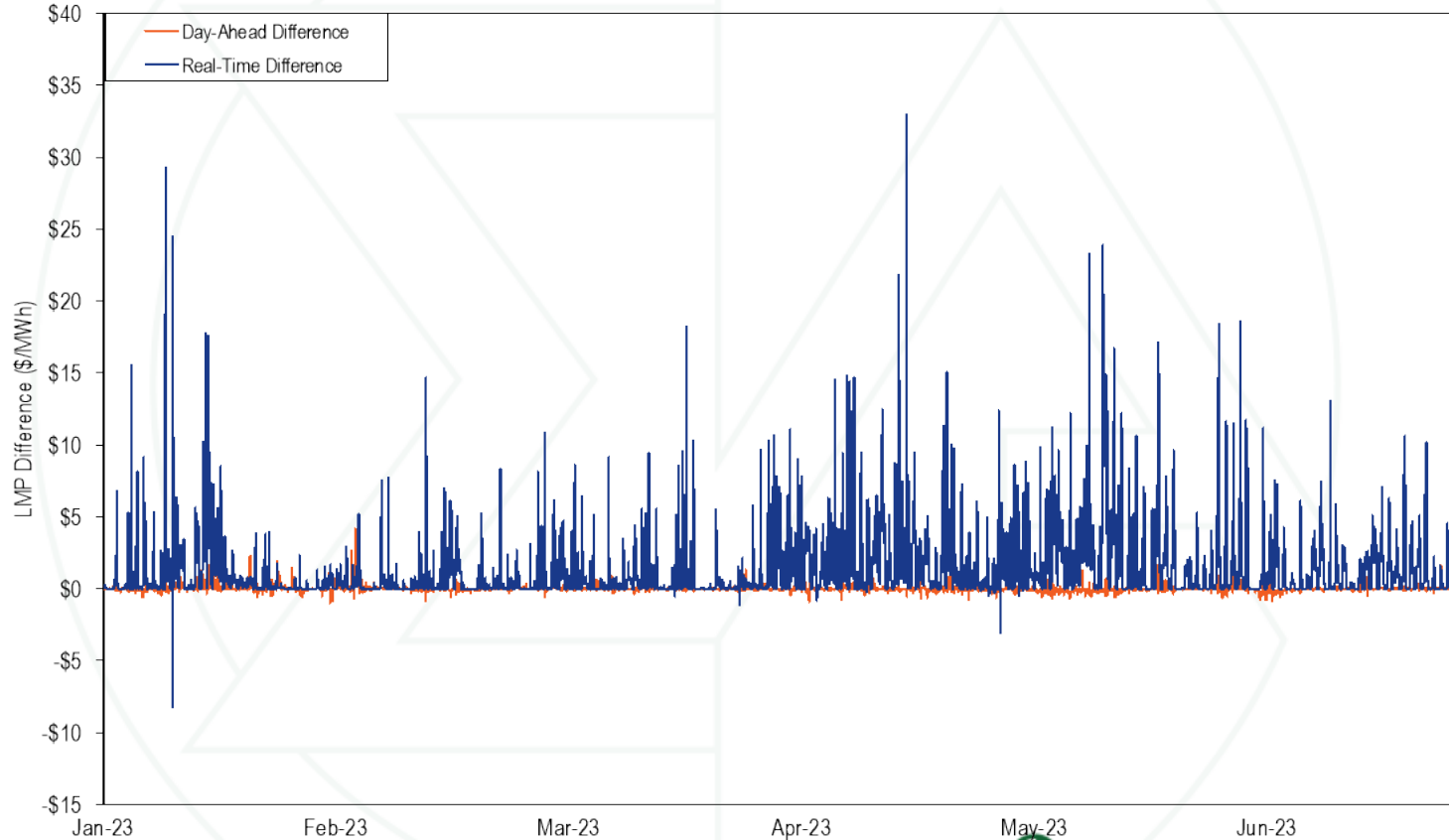
Monthly Average Load-Weighted DLMP and PLMP

Year	Month	Day-Ahead Load-Weighted Average				Real-Time Load-Weighted Average			
		DLMP	PLMP	Difference	Percent Difference	DLMP	PLMP	Difference	Percent Difference
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	Dec	\$93.02	\$93.39	\$0.37	0.4%	\$143.65	\$142.22	(\$1.42)	(1.0%)
2022	Jan - Dec	\$75.35	\$75.44	\$0.08	0.1%	\$76.34	\$80.14	\$3.80	5.0%
2023	Jan	\$36.53	\$36.58	\$0.05	0.1%	\$34.66	\$35.75	\$1.09	3.1%
2023	Feb	\$31.16	\$31.22	\$0.06	0.2%	\$25.47	\$26.04	\$0.57	2.2%
2023	Mar	\$28.39	\$28.41	\$0.02	0.1%	\$27.58	\$28.42	\$0.85	3.1%
2023	Apr	\$29.81	\$29.81	(\$0.00)	(0.0%)	\$27.09	\$29.32	\$2.22	8.2%
2023	May	\$28.86	\$28.80	(\$0.05)	(0.2%)	\$25.91	\$28.44	\$2.53	9.7%
2023	Jun	\$27.82	\$27.82	(\$0.00)	(0.0%)	\$25.69	\$27.29	\$1.60	6.2%
2023	Jan - Jun	\$30.52	\$30.53	\$0.01	0.0%	\$27.89	\$29.34	\$1.45	5.2%

Daily Average Real-Time DLMP and PLMP



Hourly Difference: PLMP – DLMP



Fast Start Units as a Percent of Marginal Units

Year	Month	Dispatch Run				Pricing Run			
		CT	Diesel	Wind	All Fast Start Units	CT	Diesel	Wind	All Fast Start Units
2022	Jan	1.3%	0.3%	0.2%	1.8%	4.9%	0.9%	0.2%	6.2%
2022	Feb	0.6%	0.2%	0.3%	1.1%	3.2%	0.5%	0.3%	4.0%
2022	Mar	0.5%	0.2%	0.4%	1.1%	3.4%	0.5%	0.4%	4.4%
2022	Apr	0.8%	0.1%	0.1%	1.2%	4.4%	0.3%	0.1%	5.0%
2022	May	1.4%	0.7%	0.1%	2.4%	6.6%	1.2%	0.1%	8.1%
2022	Jun	2.3%	0.3%	0.1%	2.6%	9.3%	0.8%	0.1%	10.2%
2022	Jul	2.7%	0.6%	0.1%	3.3%	16.3%	1.4%	0.0%	17.7%
2022	Aug	2.0%	0.4%	0.0%	2.4%	12.0%	1.3%	0.0%	13.3%
2022	Sep	0.8%	0.3%	0.1%	1.2%	5.6%	1.0%	0.1%	6.7%
2022	Oct	2.2%	0.2%	0.3%	2.6%	6.6%	0.9%	0.2%	7.7%
2022	Nov	1.3%	0.2%	0.2%	1.7%	5.1%	0.9%	0.2%	6.1%
2022	Dec	1.3%	0.7%	0.2%	2.2%	6.3%	1.5%	0.2%	8.0%
2022	Jan - Dec	1.4%	0.3%	0.2%	2.0%	7.0%	0.9%	0.1%	8.1%
2023	Jan	1.6%	0.5%	0.1%	2.1%	6.2%	2.8%	0.0%	9.0%
2023	Feb	0.9%	0.2%	0.0%	1.1%	3.1%	0.6%	0.0%	3.7%
2023	Mar	0.8%	0.4%	0.1%	1.2%	3.0%	0.7%	0.1%	3.8%
2023	Apr	2.5%	0.4%	0.2%	3.2%	8.1%	0.8%	0.2%	9.1%
2023	May	1.0%	0.3%	0.1%	1.3%	4.8%	0.7%	0.1%	5.6%
2023	Jun	0.5%	0.2%	0.0%	0.7%	2.5%	0.5%	0.0%	3.0%
2023	Jan - Jun	1.2%	0.3%	0.1%	1.6%	4.6%	1.0%	0.1%	5.7%

Fast Start Impacts: Zonal Average Differences

Zone	2023 Jan - Jun							
	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
ACEC	\$50.02	\$50.13	\$0.11	0.2%	\$49.57	\$51.65	\$2.08	4.2%
AEP	\$56.81	\$56.91	\$0.10	0.2%	\$55.14	\$57.80	\$2.67	4.8%
APS	\$57.74	\$57.89	\$0.15	0.3%	\$55.76	\$58.54	\$2.79	5.0%
ATSI	\$56.30	\$56.42	\$0.12	0.2%	\$54.05	\$56.68	\$2.63	4.9%
BGE	\$66.41	\$66.53	\$0.12	0.2%	\$64.12	\$67.43	\$3.31	5.2%
COMED	\$48.48	\$48.57	\$0.09	0.2%	\$46.27	\$48.66	\$2.39	5.2%
DAY	\$59.02	\$59.12	\$0.11	0.2%	\$57.02	\$59.80	\$2.78	4.9%
DUKE	\$57.96	\$58.06	\$0.11	0.2%	\$55.84	\$58.57	\$2.73	4.9%
DOM	\$67.67	\$67.30	(\$0.37)	(0.6%)	\$68.16	\$71.08	\$2.92	4.3%
DPL	\$53.01	\$53.14	\$0.13	0.2%	\$52.86	\$55.66	\$2.80	5.3%
DUQ	\$55.34	\$55.46	\$0.12	0.2%	\$53.37	\$55.97	\$2.61	4.9%
EKPC	\$57.11	\$57.21	\$0.10	0.2%	\$55.88	\$58.57	\$2.68	4.8%
JCPLC	\$51.08	\$51.19	\$0.11	0.2%	\$50.71	\$52.92	\$2.21	4.4%
MEC	\$58.08	\$58.18	\$0.10	0.2%	\$56.41	\$59.01	\$2.61	4.6%
OVEC	\$55.74	\$55.84	\$0.10	0.2%	\$53.88	\$56.49	\$2.61	4.8%
PECO	\$48.90	\$49.01	\$0.10	0.2%	\$48.48	\$50.46	\$1.98	4.1%
PE	\$55.47	\$55.59	\$0.12	0.2%	\$53.23	\$55.73	\$2.50	4.7%
PEPCO	\$64.16	\$64.27	\$0.12	0.2%	\$61.98	\$65.12	\$3.14	5.1%
PPL	\$53.62	\$53.73	\$0.11	0.2%	\$52.41	\$54.76	\$2.35	4.5%
PSEG	\$51.71	\$51.83	\$0.11	0.2%	\$51.38	\$53.61	\$2.23	4.3%
REC	\$53.74	\$53.86	\$0.11	0.2%	\$52.94	\$55.30	\$2.36	4.5%

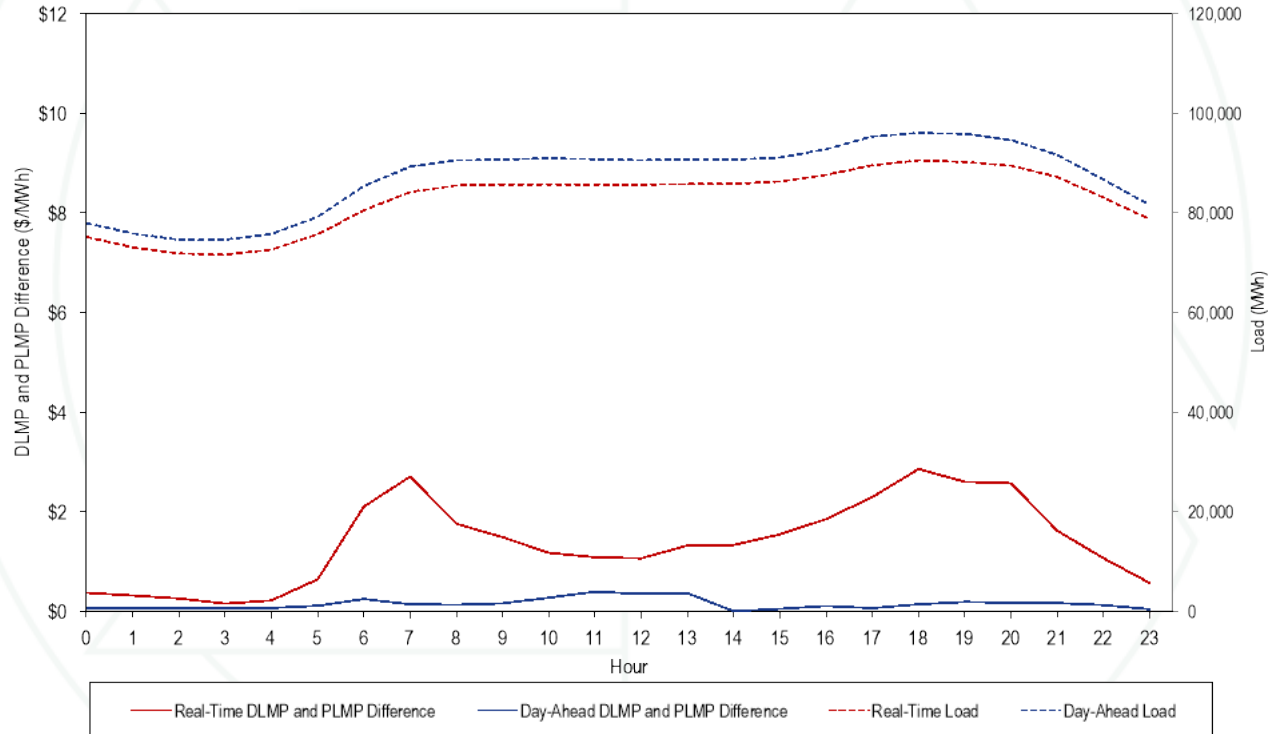
Fast Start Impacts: Hub Average Differences

Hub	2023 Jan - Jun							
	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
AEP GEN HUB	\$55.22	\$55.33	\$0.11	0.2%	\$53.19	\$55.75	\$2.56	4.8%
AEP-DAYTON HUB	\$56.26	\$56.36	\$0.11	0.2%	\$54.21	\$56.84	\$2.63	4.9%
ATSI GEN HUB	\$55.17	\$55.29	\$0.12	0.2%	\$52.77	\$55.33	\$2.57	4.9%
CHICAGO GEN HUB	\$47.74	\$47.83	\$0.09	0.2%	\$45.45	\$47.81	\$2.36	5.2%
CHICAGO HUB	\$48.69	\$48.78	\$0.09	0.2%	\$46.45	\$48.85	\$2.40	5.2%
DOMINION HUB	\$61.90	\$61.92	\$0.02	0.0%	\$60.61	\$63.46	\$2.85	4.7%
EASTERN HUB	\$53.23	\$53.36	\$0.13	0.2%	\$52.55	\$55.28	\$2.73	5.2%
N ILLINOIS HUB	\$48.31	\$48.40	\$0.09	0.2%	\$46.14	\$48.51	\$2.38	5.2%
NEW JERSEY HUB	\$51.16	\$51.27	\$0.11	0.2%	\$50.78	\$52.97	\$2.19	4.3%
OHIO HUB	\$56.15	\$56.25	\$0.11	0.2%	\$54.06	\$56.69	\$2.63	4.9%
WEST INT HUB	\$57.70	\$57.76	\$0.07	0.1%	\$55.65	\$58.33	\$2.68	4.8%
WESTERN HUB	\$59.11	\$59.23	\$0.12	0.2%	\$56.57	\$59.35	\$2.77	4.9%

Zonal PLMP-DLMP Difference Frequency

Zone	2023 Jan - Jun										
	< (\$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%	0.4%	46.1%	50.8%	2.2%	0.4%	0.0%	0.0%	0.0%	
ACEC	0.0%	0.0%	7.2%	46.7%	44.2%	1.6%	0.3%	0.0%	0.0%	0.0%	
AEP	0.0%	0.0%	0.6%	46.5%	50.0%	2.4%	0.5%	0.0%	0.0%	0.0%	
APS	0.0%	0.0%	0.6%	46.4%	50.1%	2.4%	0.5%	0.0%	0.0%	0.0%	
ATSI	0.0%	0.0%	0.5%	46.3%	50.4%	2.3%	0.4%	0.0%	0.0%	0.0%	
BGE	0.0%	0.0%	3.6%	46.0%	46.4%	2.9%	1.0%	0.1%	0.0%	0.0%	
COMED	0.0%	0.0%	2.7%	47.0%	47.7%	2.1%	0.4%	0.0%	0.0%	0.0%	
DAY	0.0%	0.0%	0.6%	46.4%	49.7%	2.6%	0.6%	0.0%	0.0%	0.0%	
DUKE	0.0%	0.0%	0.7%	46.5%	49.7%	2.5%	0.5%	0.0%	0.0%	0.0%	
DOM	0.0%	0.1%	2.1%	46.3%	47.9%	2.7%	0.8%	0.1%	0.0%	0.0%	
DPL	0.0%	0.0%	11.9%	46.6%	39.3%	1.6%	0.4%	0.1%	0.1%	0.0%	
DUQ	0.0%	0.0%	0.5%	46.3%	50.5%	2.3%	0.4%	0.0%	0.0%	0.0%	
EKPC	0.0%	0.0%	0.8%	46.5%	49.8%	2.5%	0.5%	0.0%	0.0%	0.0%	
JCPLC	0.0%	0.0%	3.0%	46.5%	48.6%	1.5%	0.3%	0.0%	0.0%	0.0%	
MEC	0.0%	0.0%	2.3%	46.1%	49.0%	2.1%	0.4%	0.1%	0.0%	0.0%	
OVEC	0.0%	0.0%	0.8%	46.5%	49.8%	2.3%	0.5%	0.0%	0.0%	0.0%	
PECO	0.0%	0.0%	10.6%	46.7%	40.8%	1.6%	0.3%	0.0%	0.0%	0.0%	
PE	0.0%	0.0%	0.6%	46.0%	50.9%	2.1%	0.4%	0.0%	0.0%	0.0%	
PEPCO	0.0%	0.0%	2.4%	46.3%	47.6%	2.7%	0.8%	0.1%	0.0%	0.0%	
PPL	0.0%	0.0%	2.8%	46.2%	49.0%	1.7%	0.4%	0.0%	0.0%	0.0%	
PSEG	0.0%	0.0%	2.8%	46.5%	48.8%	1.5%	0.3%	0.0%	0.0%	0.0%	
REC	0.0%	0.0%	2.0%	46.3%	49.8%	1.6%	0.3%	0.0%	0.0%	0.0%	

Hourly Average Load and LMP Difference: Jan through Jun 2023



Real-Time Load-Weighted Average LMP

	2022				2023			
	Off Peak	On Peak	Difference	Percent Difference	Off Peak	On Peak	Difference	Percent Difference
Jan	\$74.99	\$62.54	(\$12.46)	(16.6%)	\$33.20	\$38.53	\$5.32	16.0%
Feb	\$45.70	\$47.86	\$2.16	4.7%	\$23.45	\$28.67	\$5.22	22.3%
Mar	\$41.58	\$45.41	\$3.83	9.2%	\$26.96	\$29.78	\$2.82	10.5%
Apr	\$55.93	\$71.89	\$15.96	28.5%	\$24.08	\$35.00	\$10.92	45.4%
May	\$66.12	\$100.85	\$34.73	52.5%	\$22.65	\$33.84	\$11.19	49.4%
Jun	\$61.63	\$126.83	\$65.20	105.8%	\$21.64	\$32.16	\$10.52	48.6%
Jul	\$71.83	\$114.14	\$42.31	58.9%				
Aug	\$85.89	\$136.31	\$50.42	58.7%				
Sep	\$66.36	\$89.76	\$23.40	35.3%				
Oct	\$47.61	\$64.50	\$16.90	35.5%				
Nov	\$45.48	\$60.50	\$15.01	33.0%				
Dec	\$153.54	\$129.51	(\$24.03)	(15.7%)				

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