

Market Monitor Report

MC Webinar

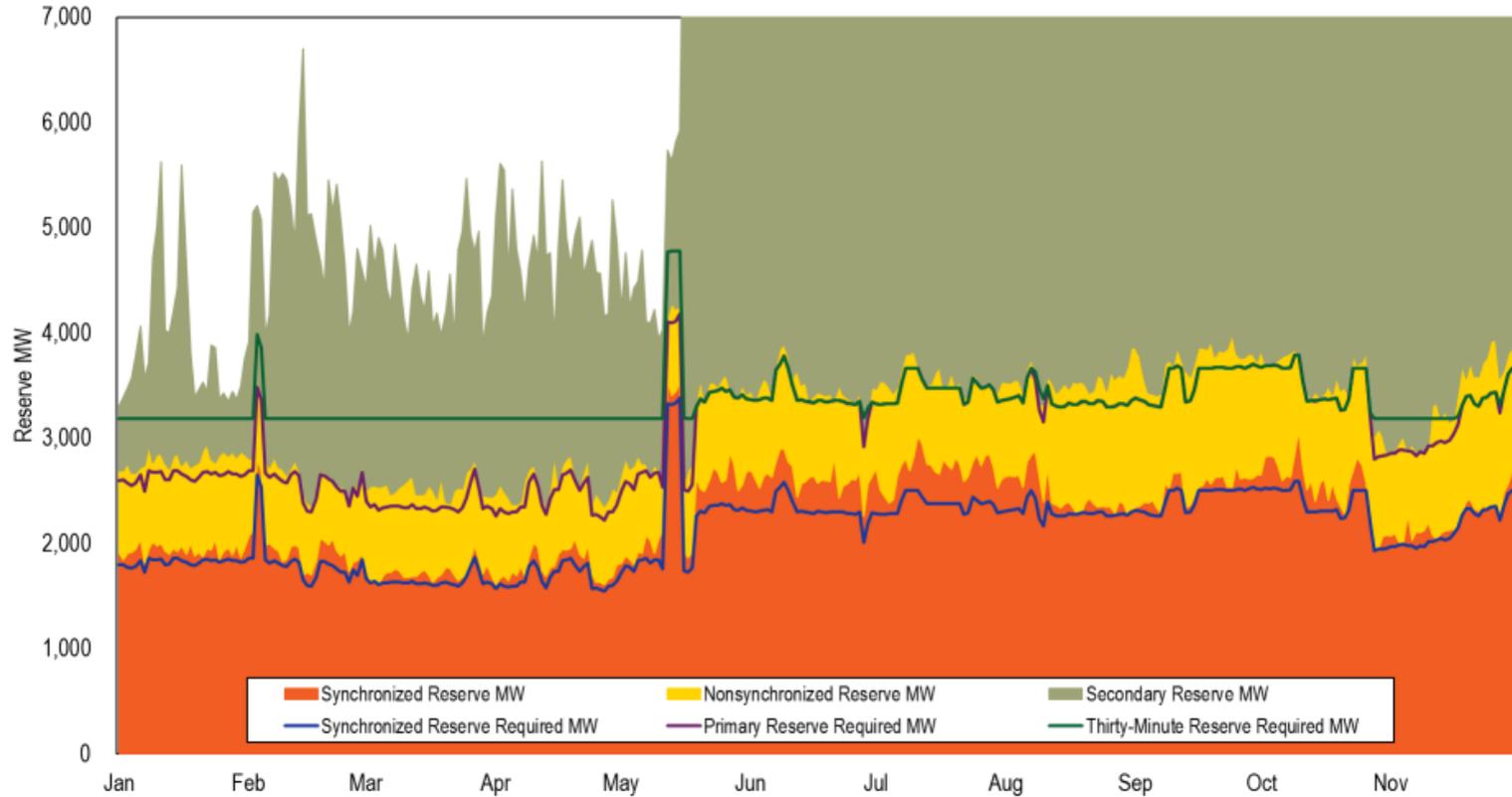
December 18, 2023

IMM



Monitoring Analytics

Real-Time Reserves and Requirements



Day-Ahead & Real-Time RTO Reserve MW

Year	Month	Synchronized Reserve MW		Nonsynchronized Reserve MW		Total Primary Reserve MW		Secondary Reserve MW		Total Thirty-Minute Reserve MW	
		DA	RT	DA	RT	DA	RT	DA	RT	DA	RT
2023	Jan	1,904	1,935	1,404	861	3,309	2,796	11,941	1,100	15,249	3,895
2023	Feb	1,889	1,975	1,311	718	3,200	2,693	16,793	2,295	19,993	4,988
2023	Mar	1,682	1,722	1,179	812	2,861	2,535	15,073	1,964	17,934	4,498
2023	Apr	1,766	1,788	968	771	2,734	2,559	10,955	2,266	13,689	4,825
2023	May	2,399	2,425	1,094	804	3,493	3,229	12,489	9,635	15,983	12,864
2023	Jun	2,848	2,628	987	848	3,835	3,476	13,484	17,101	17,319	20,578
2023	Jul	2,829	2,710	971	846	3,801	3,556	13,263	15,579	17,064	19,135
2023	Aug	2,875	2,464	1,019	1,079	3,894	3,543	13,357	17,406	17,251	20,949
2023	Sep	2,905	2,531	936	1,204	3,841	3,735	13,689	17,963	17,530	21,697
2023	Oct	2,939	2,544	763	992	3,702	3,536	9,911	13,485	13,613	17,021
2023	Nov	2,879	2,232	918	1,114	3,797	3,347	12,455	17,315	16,251	20,661

Day-Ahead & Real-Time MAD Reserve MW

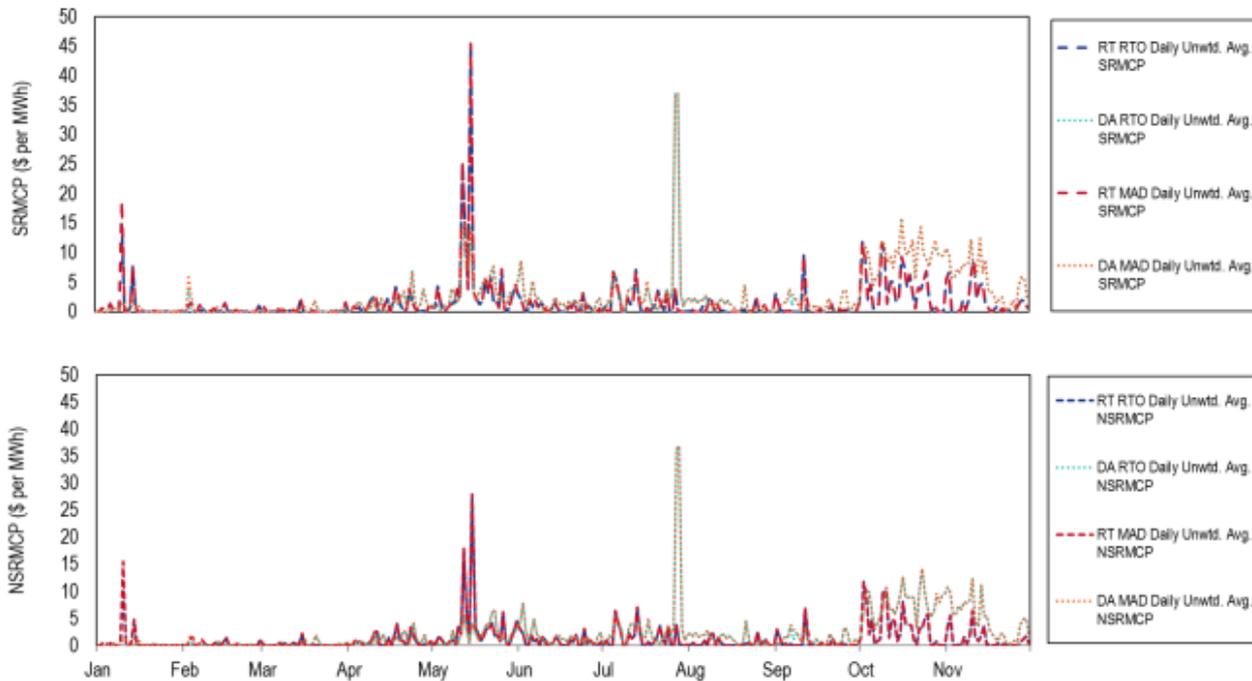
Year	Month	Synchronized Reserve MW		Nonsynchronized Reserve MW		Total Primary Reserve MW		Secondary Reserve MW		Total Thirty-Minute Reserve MW	
		DA	RT	DA	RT	DA	RT	DA	RT	DA	RT
2023	Jan	1,891	1,933	1,119	792	3,009	2,725	NA	NA	NA	NA
2023	Feb	1,874	1,955	992	673	2,866	2,628	NA	NA	NA	NA
2023	Mar	1,671	1,696	839	678	2,510	2,374	NA	NA	NA	NA
2023	Apr	1,690	1,664	684	615	2,374	2,279	NA	NA	NA	NA
2023	May	1,937	1,940	847	685	2,784	2,625	NA	NA	NA	NA
2023	Jun	2,023	1,973	817	688	2,839	2,661	NA	NA	NA	NA
2023	Jul	2,028	1,958	804	714	2,832	2,673	NA	NA	NA	NA
2023	Aug	2,099	1,966	844	764	2,943	2,729	NA	NA	NA	NA
2023	Sep	2,035	1,925	760	731	2,795	2,657	NA	NA	NA	NA
2023	Oct	2,078	1,975	609	688	2,686	2,663	NA	NA	NA	NA
2023	Nov	1,873	1,756	705	719	2,578	2,476	NA	NA	NA	NA

Reserve Settlements by Month

Year	Month	Total Day-Ahead Credits			Total Balancing MCP Credits			Total LOC Credits		
		SR	NSR	SecR	SR	NSR	SecR	SR	NSR	SecR
2023	Jan	\$505,429	\$73,610	\$0	(\$114,061)	(\$155,466)	\$0	\$977,167	\$4,850	\$5,114
2023	Feb	\$735,351	\$72,133	\$0	\$99,577	(\$113,200)	\$0	\$493,619	\$31,094	\$34,120
2023	Mar	\$439,364	\$72,194	\$0	(\$5,106)	(\$37,214)	\$0	\$744,883	\$3,368	\$12,363
2023	Apr	\$2,088,876	\$220,075	\$0	\$55,121	(\$112,777)	\$0	\$701,874	\$59,662	\$15,125
2023	May	\$8,590,787	\$764,690	\$0	(\$1,102,233)	(\$602,088)	\$0	\$1,523,223	\$477,365	\$64,711
2023	Jun	\$4,061,466	\$648,961	\$0	(\$136,555)	(\$134,877)	\$0	\$503,423	\$48,934	\$137,153
2023	Jul	\$10,125,951	\$1,697,877	\$0	(\$209,684)	(\$227,431)	\$0	\$842,992	\$30,765	\$351,847
2023	Aug	\$2,822,099	\$422,257	\$0	(\$101,170)	(\$17,911)	\$0	\$583,173	\$1,642	\$134,975
2023	Sep	\$2,808,344	\$503,832	\$0	(\$352,447)	\$68,227	\$0	\$761,958	\$2,149	\$159,441
2023	Oct	\$21,150,975	\$2,934,103	\$0	(\$806,826)	\$10,171	\$0	\$1,030,298	\$115,662	\$121,264
2023	Nov	\$11,822,028	\$1,789,002	\$0	(\$959,271)	(\$4,180)	\$0	\$663,563	\$59,988	\$156,458
Year	Month	Total Shortfall Charges			Total Credits					
		SR	NSR	SecR	SR	NSR	SecR			
2023	Jan	\$336,246	NA	\$0	\$1,032,289	(\$77,007)	\$5,114			
2023	Feb	\$0	NA	\$0	\$1,328,546	(\$9,973)	\$34,120			
2023	Mar	\$0	NA	\$0	\$1,179,141	\$38,348	\$12,363			
2023	Apr	\$0	NA	\$0	\$2,845,871	\$166,960	\$15,125			
2023	May	\$0	NA	\$0	\$9,011,777	\$639,967	\$64,711			
2023	Jun	\$0	NA	\$0	\$4,428,335	\$563,017	\$137,153			
2023	Jul	\$0	NA	\$0	\$10,759,259	\$1,501,211	\$351,847			
2023	Aug	\$0	NA	\$0	\$3,304,101	\$405,988	\$134,975			
2023	Sep	\$0	NA	\$0	\$3,217,854	\$574,208	\$159,441			
2023	Oct	\$0	NA	\$0	\$21,374,447	\$3,059,935	\$121,264			
2023	Nov	\$0	NA	\$0	\$11,526,321	\$1,844,809	\$156,458			

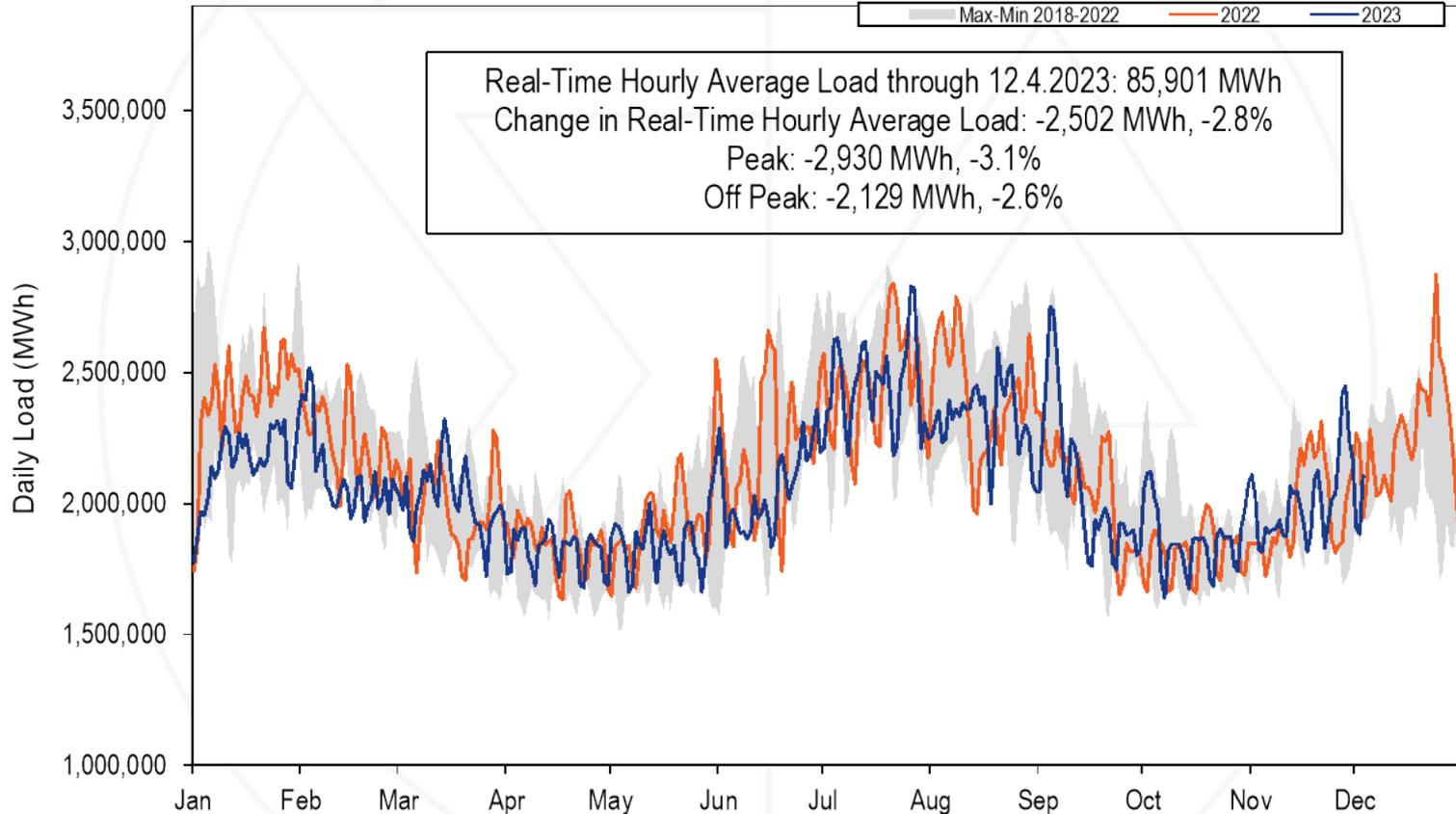
- For secondary reserve, the shortfall charge is part of the balancing MCP credit. For synchronized reserve, it is separate.
- The only spin events that were 10 minutes or longer happened in January, so only January has SR shortfall charges.

Reserve Prices

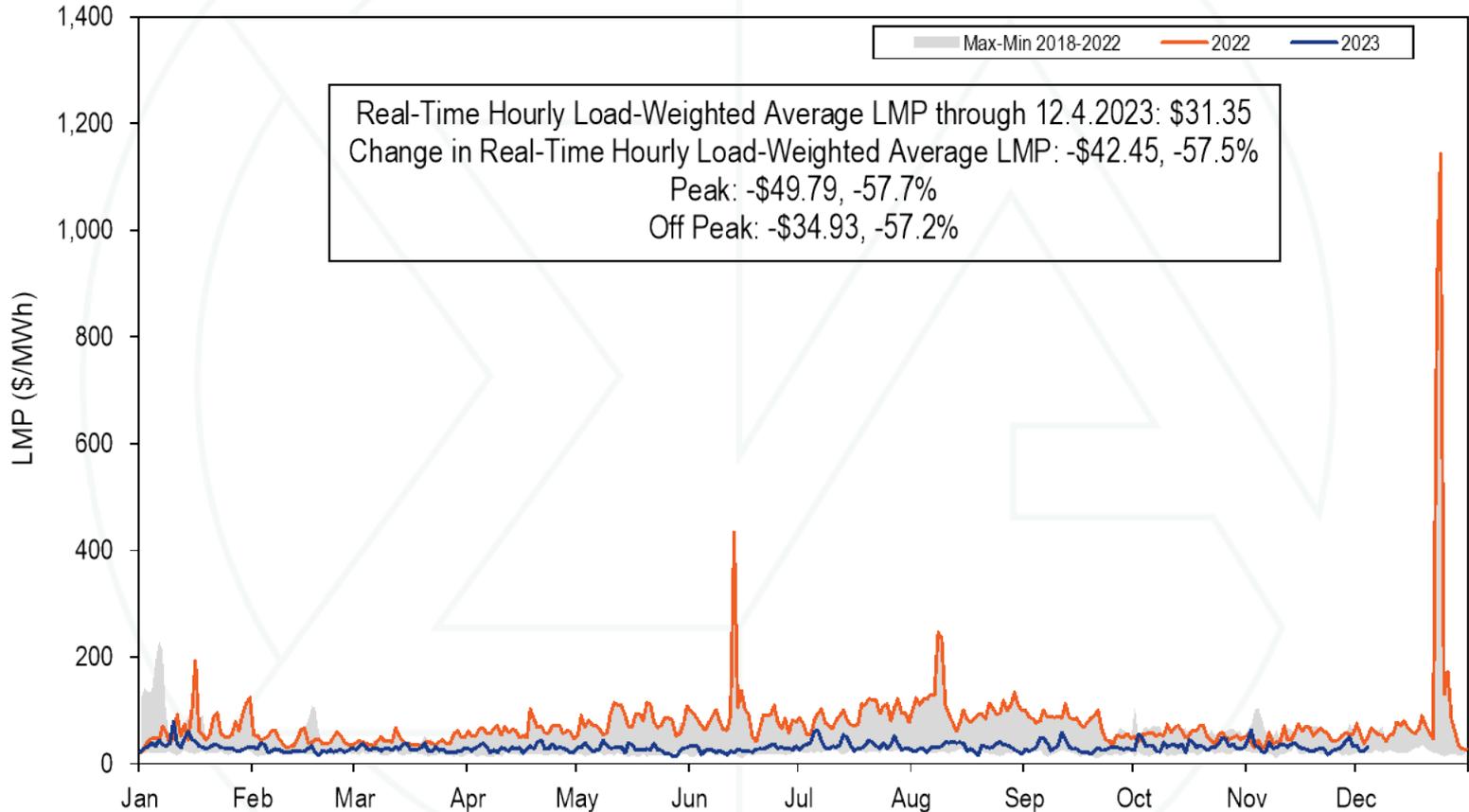


- SecRMCP always \$0 per MWh, so far in 2023
- Spikes on Jan. 10th due to shortage pricing
- Spikes on Feb. 3rd & 4th due to conservative operations
- Spikes on May 12th & 15th due to increased requirements
- Spikes of DA & RT MCPs on Jul. 27th & 28th during Hot Weather Alerts on Jul. 26th – Jul. 29th.
- Spikes on Sep. 11th due to shortage pricing.

2023 YTD PJM Real-Time Daily Load



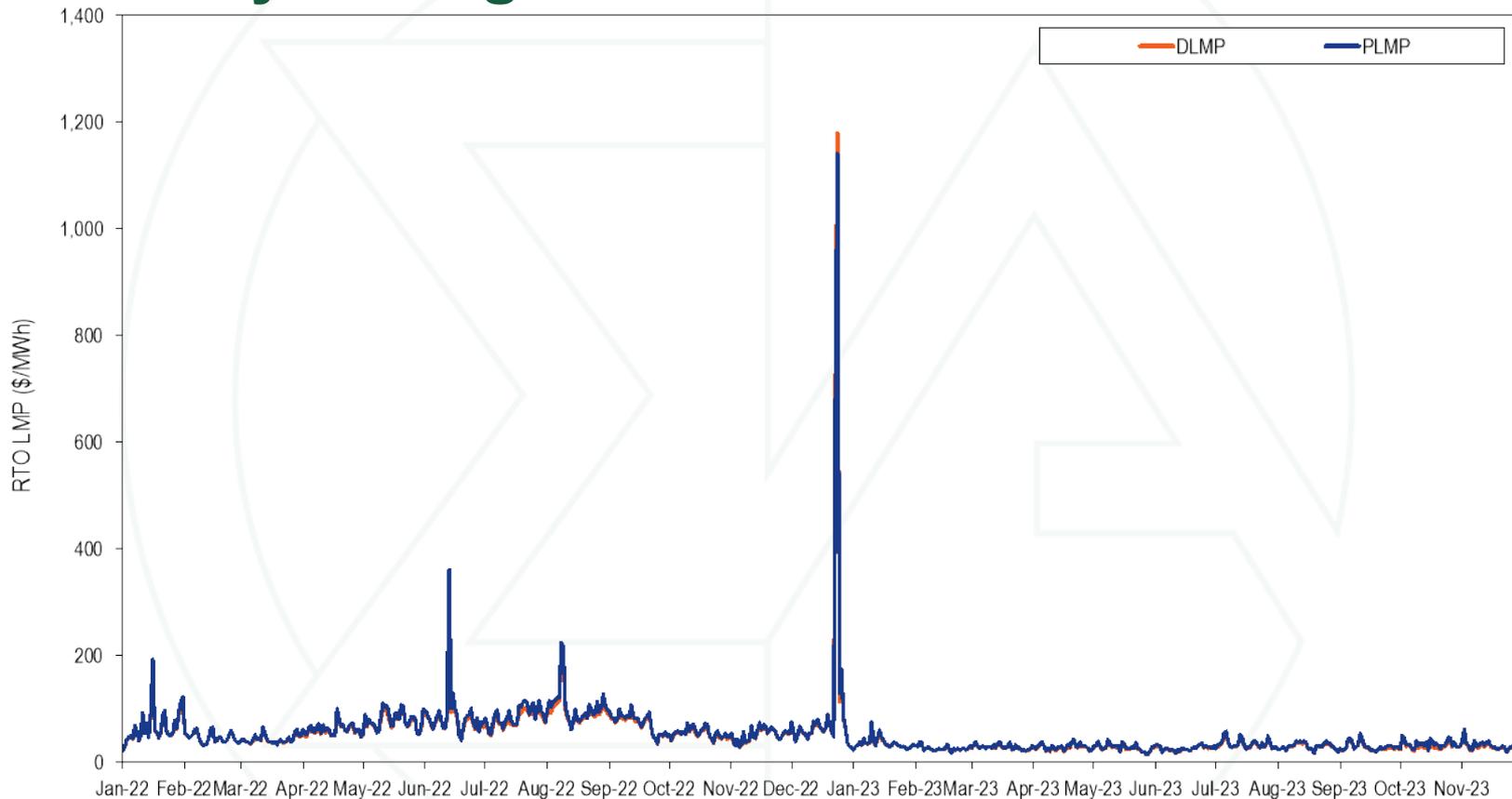
2023 YTD PJM Real-Time Daily LMP



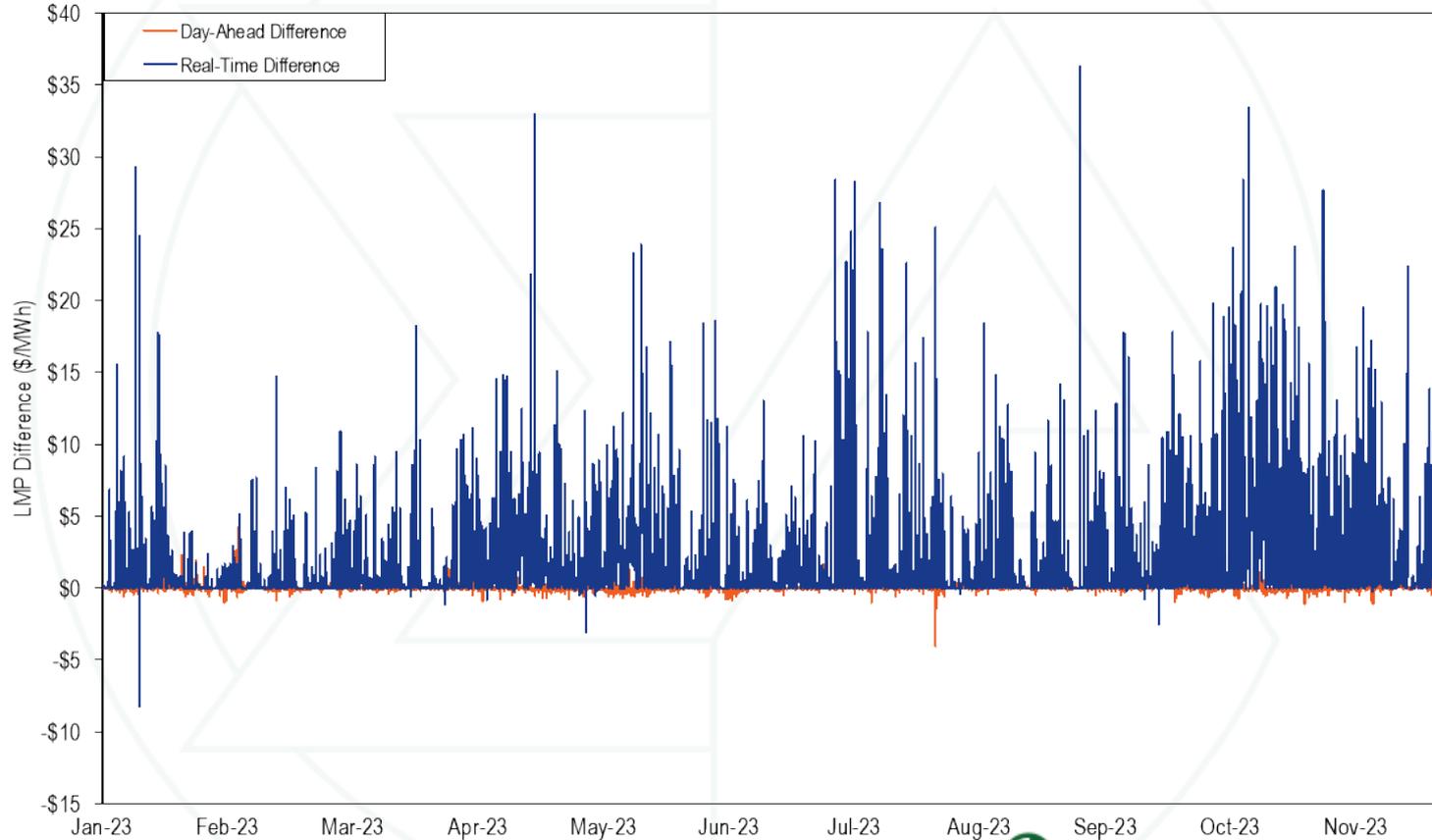
Monthly Average Load-Weighted DLMP and PLMP

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	Jul	\$40.46	\$40.56	\$0.10	0.3%	\$34.34	\$37.21	\$2.87	8.4%
2023	Aug	\$30.49	\$30.54	\$0.05	0.2%	\$29.77	\$31.33	\$1.55	5.2%
2023	Sep	\$30.82	\$30.91	\$0.09	0.3%	\$29.33	\$31.55	\$2.22	7.6%
2023	Oct	\$35.03	\$35.05	\$0.02	0.1%	\$30.66	\$34.92	\$4.26	13.9%
2023	Nov	\$33.32	\$33.40	\$0.08	0.2%	\$30.00	\$32.94	\$2.94	9.8%
2023	Jan - Nov	\$32.26	\$32.30	\$0.04	0.1%	\$29.34	\$31.38	\$2.04	7.0%

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	Jul	1.4%	0.9%	0.0%	2.4%	8.6%	1.6%	0.0%	10.3%
2023	Aug	0.9%	1.5%	0.0%	2.4%	5.1%	2.3%	0.0%	7.4%
2023	Sep	0.4%	0.8%	0.1%	1.3%	5.1%	1.4%	0.1%	6.6%
2023	Oct	1.4%	0.3%	0.0%	1.7%	6.9%	0.8%	0.0%	7.7%
2023	Nov	4.0%	0.6%	0.0%	4.5%	11.4%	1.4%	0.0%	12.8%
2023	Jan - Nov	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 - Nov							
	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
ACEC	\$44.34	\$44.43	\$0.10	0.2%	\$43.54	\$45.51	\$1.98	4.5%
AEP	\$51.51	\$51.61	\$0.09	0.2%	\$49.45	\$52.09	\$2.64	5.3%
APS	\$52.59	\$52.72	\$0.13	0.2%	\$50.29	\$53.05	\$2.77	5.5%
ATSI	\$51.02	\$51.13	\$0.11	0.2%	\$48.57	\$51.17	\$2.60	5.4%
BGE	\$61.04	\$61.15	\$0.11	0.2%	\$58.41	\$61.74	\$3.33	5.7%
COMED	\$44.32	\$44.40	\$0.08	0.2%	\$41.88	\$44.24	\$2.35	5.6%
DAY	\$53.46	\$53.56	\$0.10	0.2%	\$51.11	\$53.85	\$2.74	5.4%
DUKE	\$52.50	\$52.60	\$0.10	0.2%	\$50.06	\$52.75	\$2.69	5.4%
DOM	\$61.22	\$60.94	(\$0.28)	(0.5%)	\$61.06	\$63.98	\$2.92	4.8%
DPL	\$47.81	\$47.91	\$0.10	0.2%	\$47.27	\$50.16	\$2.89	6.1%
DUQ	\$50.47	\$50.58	\$0.11	0.2%	\$48.23	\$50.84	\$2.61	5.4%
EKPC	\$51.69	\$51.78	\$0.09	0.2%	\$50.08	\$52.73	\$2.65	5.3%
JCPLC	\$45.33	\$45.43	\$0.10	0.2%	\$44.60	\$46.71	\$2.11	4.7%
MEC	\$51.37	\$51.46	\$0.09	0.2%	\$49.48	\$51.98	\$2.49	5.0%
OVEC	\$50.51	\$50.60	\$0.10	0.2%	\$48.37	\$50.95	\$2.58	5.3%
PECO	\$43.24	\$43.33	\$0.09	0.2%	\$42.49	\$44.37	\$1.88	4.4%
PE	\$50.36	\$50.46	\$0.10	0.2%	\$48.07	\$50.58	\$2.51	5.2%
PEPCO	\$58.61	\$58.72	\$0.10	0.2%	\$56.14	\$59.26	\$3.12	5.6%
PPL	\$47.40	\$47.49	\$0.10	0.2%	\$45.93	\$48.19	\$2.25	4.9%
PSEG	\$45.84	\$45.94	\$0.10	0.2%	\$45.17	\$47.30	\$2.12	4.7%
REC	\$47.86	\$47.95	\$0.10	0.2%	\$46.85	\$49.10	\$2.25	4.8%

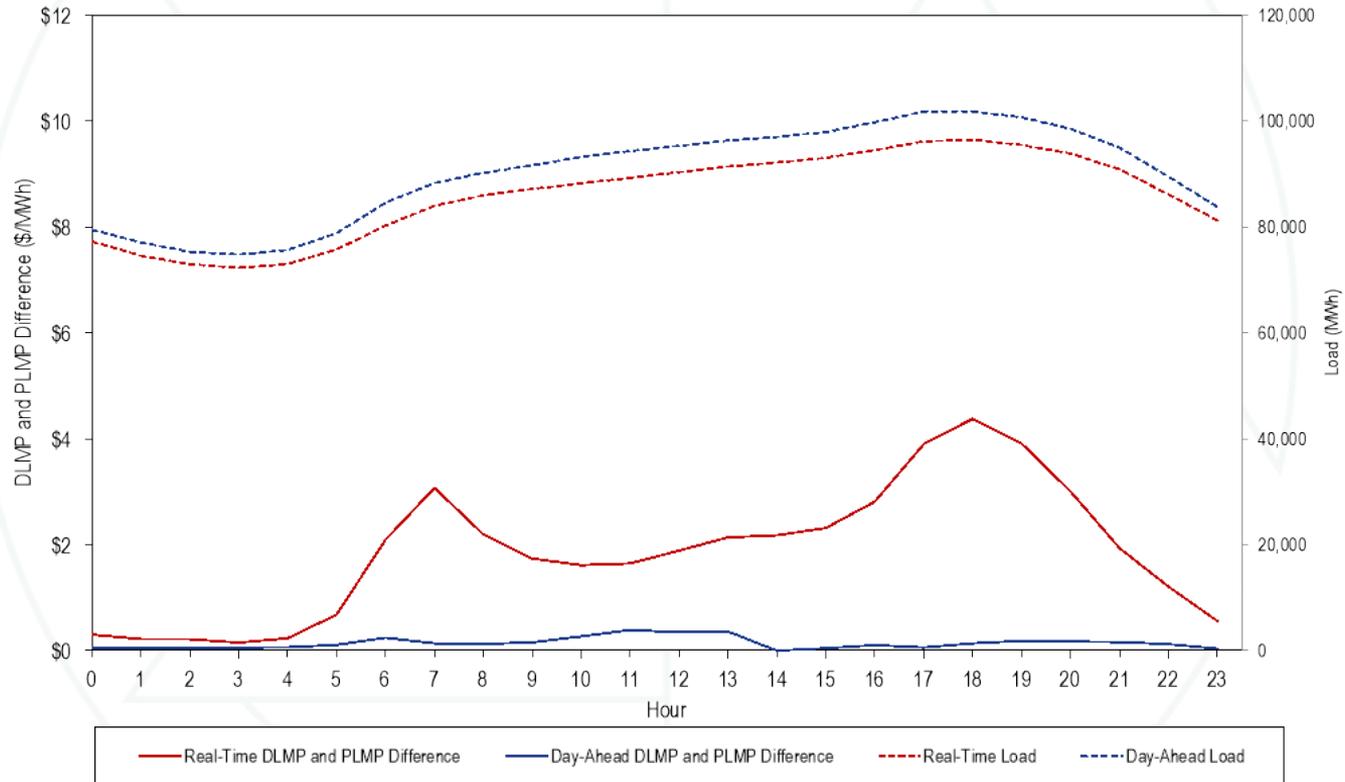
Fast Start Impacts: Hub Average Differences

Hub	2023 Jan - Nov							
	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
AEP GEN HUB	\$50.05	\$50.15	\$0.10	0.2%	\$47.73	\$50.25	\$2.52	5.3%
AEP-DAYTON HUB	\$51.04	\$51.14	\$0.10	0.2%	\$48.67	\$51.26	\$2.59	5.3%
ATSI GEN HUB	\$50.00	\$50.11	\$0.11	0.2%	\$47.42	\$49.93	\$2.52	5.3%
CHICAGO GEN HUB	\$43.61	\$43.69	\$0.08	0.2%	\$41.09	\$43.40	\$2.31	5.6%
CHICAGO HUB	\$44.50	\$44.59	\$0.08	0.2%	\$42.02	\$44.36	\$2.35	5.6%
DOMINION HUB	\$56.08	\$56.11	\$0.03	0.1%	\$54.42	\$57.23	\$2.81	5.2%
EASTERN HUB	\$48.06	\$48.16	\$0.10	0.2%	\$47.05	\$49.86	\$2.81	6.0%
N ILLINOIS HUB	\$44.18	\$44.27	\$0.08	0.2%	\$41.82	\$44.15	\$2.33	5.6%
NEW JERSEY HUB	\$45.36	\$45.46	\$0.10	0.2%	\$44.65	\$46.73	\$2.08	4.6%
OHIO HUB	\$50.95	\$51.05	\$0.10	0.2%	\$48.56	\$51.14	\$2.58	5.3%
WEST INT HUB	\$52.40	\$52.47	\$0.07	0.1%	\$50.10	\$52.75	\$2.65	5.3%
WESTERN HUB	\$53.91	\$54.01	\$0.11	0.2%	\$51.21	\$53.99	\$2.78	5.4%

Zonal Real-Time PLMP-DLMP Difference Frequency

Zone	2023 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%	43.8%	51.2%	3.5%	0.9%	0.1%	0.0%	0.0%
ACEC	0.0%	0.0%	7.7%	44.3%	45.0%	2.3%	0.6%	0.0%	0.0%	0.0%
AEP	0.0%	0.0%	1.6%	44.2%	49.4%	3.8%	0.9%	0.1%	0.0%	0.0%
APS	0.0%	0.0%	0.9%	44.1%	50.0%	3.9%	1.1%	0.1%	0.0%	0.0%
ATSI	0.0%	0.0%	1.9%	43.9%	49.4%	3.7%	0.9%	0.1%	0.0%	0.0%
BGE	0.0%	0.0%	4.1%	43.7%	45.2%	4.9%	2.0%	0.2%	0.0%	0.0%
COMED	0.0%	0.0%	3.7%	45.0%	47.0%	3.3%	0.8%	0.1%	0.0%	0.0%
DAY	0.0%	0.0%	1.4%	44.2%	49.3%	4.0%	1.1%	0.1%	0.0%	0.0%
DUKE	0.0%	0.0%	1.5%	44.2%	49.3%	3.9%	1.0%	0.1%	0.0%	0.0%
DOM	0.0%	0.1%	2.6%	44.0%	47.3%	4.3%	1.6%	0.1%	0.0%	0.0%
DPL	0.0%	0.1%	12.8%	44.2%	38.9%	2.2%	1.0%	0.2%	0.5%	0.0%
DUQ	0.0%	0.0%	1.7%	43.9%	49.5%	3.7%	1.0%	0.1%	0.0%	0.0%
EKPC	0.0%	0.0%	1.6%	44.2%	49.3%	3.8%	1.0%	0.1%	0.0%	0.0%
JCPLC	0.0%	0.0%	3.1%	44.2%	49.7%	2.3%	0.6%	0.0%	0.0%	0.0%
MEC	0.0%	0.0%	3.6%	43.8%	48.7%	3.1%	0.8%	0.1%	0.0%	0.0%
OVEC	0.0%	0.0%	1.7%	44.3%	49.3%	3.7%	0.9%	0.1%	0.0%	0.0%
PECO	0.0%	0.0%	11.1%	44.2%	41.7%	2.3%	0.6%	0.0%	0.0%	0.0%
PE	0.0%	0.1%	1.3%	43.6%	50.6%	3.5%	0.9%	0.1%	0.0%	0.0%
PEPCO	0.0%	0.0%	3.0%	43.9%	46.8%	4.5%	1.6%	0.1%	0.0%	0.0%
PPL	0.0%	0.0%	3.8%	43.8%	49.1%	2.6%	0.6%	0.1%	0.0%	0.0%
PSEG	0.0%	0.0%	3.1%	44.2%	49.8%	2.3%	0.6%	0.0%	0.0%	0.0%
REC	0.0%	0.0%	2.5%	43.9%	50.5%	2.4%	0.6%	0.0%	0.0%	0.0%

Hourly Average Load and LMP Difference: Jan through Nov 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%	\$26.86	\$48.04	\$21.18	78.9%
Aug	\$85.89	\$136.31	\$50.42	58.7%	\$26.60	\$35.30	\$8.70	32.7%
Sep	\$66.36	\$89.76	\$23.40	35.3%	\$24.76	\$38.65	\$13.88	56.1%
Oct	\$47.61	\$64.50	\$16.90	35.5%	\$26.40	\$43.09	\$16.69	63.2%
Nov	\$45.48	\$60.50	\$15.01	33.0%	\$29.45	\$36.48	\$7.02	23.9%
Dec	\$153.54	\$129.51	(\$24.03)	(15.7%)				

Monitoring Analytics, LLC

2621 Van Buren Avenue

Suite 160

Eagleville, PA

19403

(610) 271-8050

MA@monitoringanalytics.com

www.MonitoringAnalytics.com

