

Market Monitor Report

MC Webinar
June 27, 2022

IMM



Monitoring Analytics

Financial Risk of Unreliable MW

- **Units that offer MW in RPM that are rarely deployed and/or not reliable to be counted upon face little financial risks. Additional MW could be from:**
 - **Stressed operation.**
 - **Testing the unit during ideal conditions.**
- **Example:**
 - **ICAP: 100 MW**
 - **Reliable ICAP: 90 MW**
 - **Unreliable ICAP: 10 MW**

Financial Risk of Unreliable MW

Expected MW (EFORd vs BR)		Balancing Ratio					
		75%	80%	85%	90%	95%	100%
EFORd	0%	75.0	80.0	85.0	90.0	95.0	100.0
	5%	71.3	76.0	80.8	85.5	90.3	95.0
	10%	67.5	72.0	76.5	81.0	85.5	90.0
	20%	60.0	64.0	68.0	72.0	76.0	80.0

Shortfall if unit only reaches reliable ICAP		Balancing Ratio					
		75%	80%	85%	90%	95%	100%
EFORd	0%	0.0	0.0	0.0	0.0	(5.0)	(10.0)
	5%	0.0	0.0	0.0	0.0	(0.3)	(5.0)
	10%	0.0	0.0	0.0	0.0	0.0	0.0
	20%	0.0	0.0	0.0	0.0	0.0	0.0

Financial Risk of Unreliable MW

PAI Penalty \$/hour		Balancing Ratio					
		75%	80%	85%	90%	95%	100%
EFORd	0%	\$0	\$0	\$0	\$0	(\$15,208)	(\$30,417)
	5%	\$0	\$0	\$0	\$0	(\$913)	(\$15,208)
	10%	\$0	\$0	\$0	\$0	\$0	\$0
	20%	\$0	\$0	\$0	\$0	\$0	\$0

PAI hours to lose everything		Balancing Ratio					
		75%	80%	85%	90%	95%	100%
EFORd	0%	NA	NA	NA	NA	12.0	6.0
	5%	NA	NA	NA	NA	190.0	11.4
	10%	NA	NA	NA	NA	NA	NA
	20%	NA	NA	NA	NA	NA	NA

Financial Risk of Unreliable MW

- **At balancing ratios between 0.75 and 0.90 and EFORd above 10%, the unit's unreliable MW are not tested for performance assessment. Therefore, there are no penalties.**
- **At high balancing ratios and low EFORd, the unit is tested, but the numbers of hours of PAI at those balancing ratios are rare.**
- **For example, at 0.90 balancing ratio and 5% EFORd, the PAI need to last 190 hours for the unit to forgo all the capacity revenues (assuming \$50 price and \$250 Net CONE for penalty).**

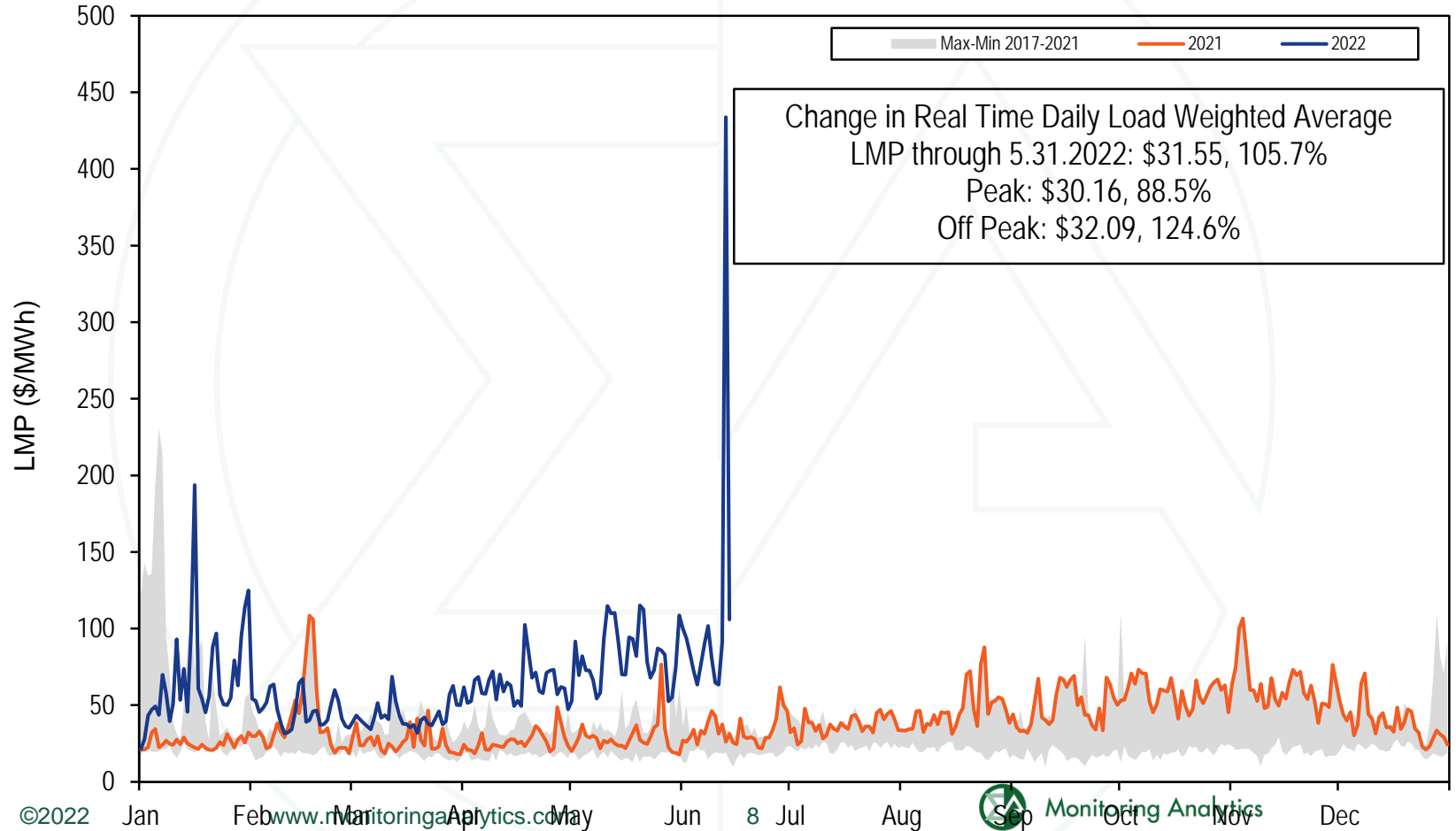
Reserves Must Offer

- **The October 1, 2022, implementation of reserve market changes includes a stronger synchronized reserve must offer requirement.**
- **Dispatchable resources offering their full flexibility will meet the requirement.**
- **Fixed output resources that are capable of offering flexibly and self schedule their resources below eco max will not meet the requirement.**
- **Hydro, wind, solar, batteries, and nuclear will need to calculate and maintain updated reserve capabilities in their offers for compliance.**

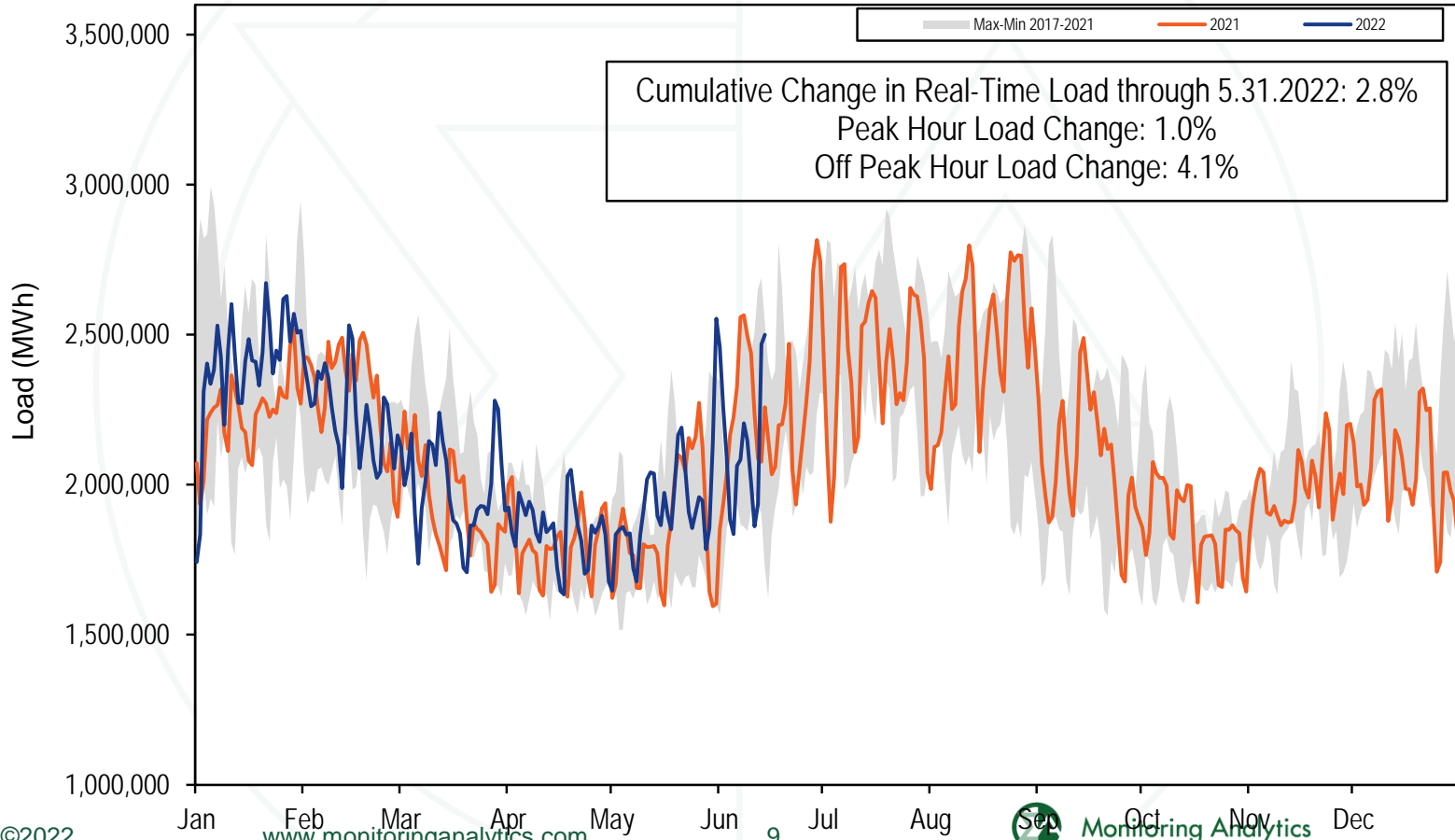
Reserves Must Offer

- **Recommended compliance review for market participants:**
 - **Check current ramp rates. Ramp rates must be accurate.**
 - **Units in ramp rate curves affected by ambient conditions should use hourly ramp rates and keep them up to date.**
 - **Check validity of spin max parameters. Spin max should only be used in situations in which ramp rates cannot.**
 - **Review use of self scheduling, fixed gen, and changes to eco max and min parameters for potential withholding of reserve capability.**
 - **Hydro units: plan for accurate new reserve offers and intraday updates.**

2022 YTD PJM Real-Time LMP



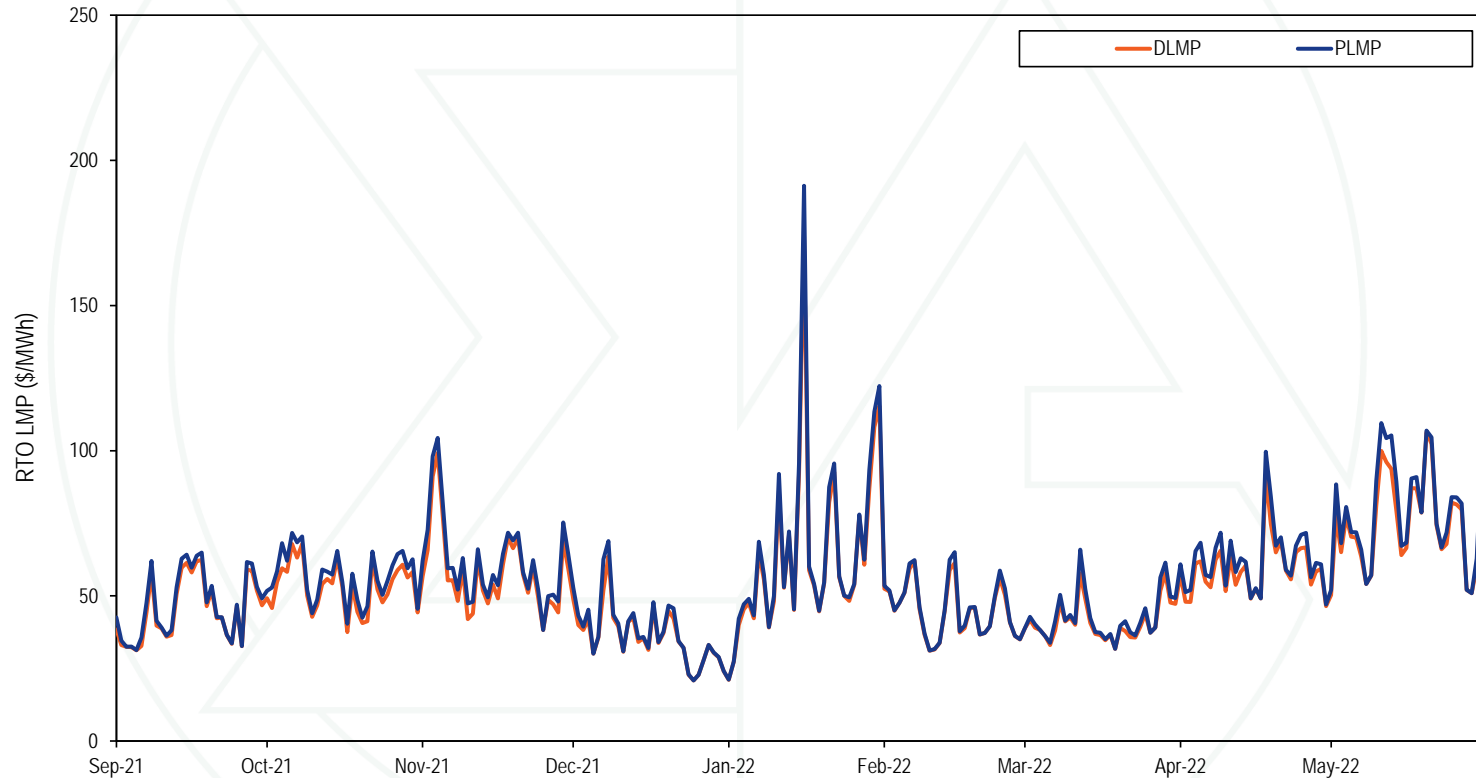
2022 YTD PJM Real-Time Daily Load



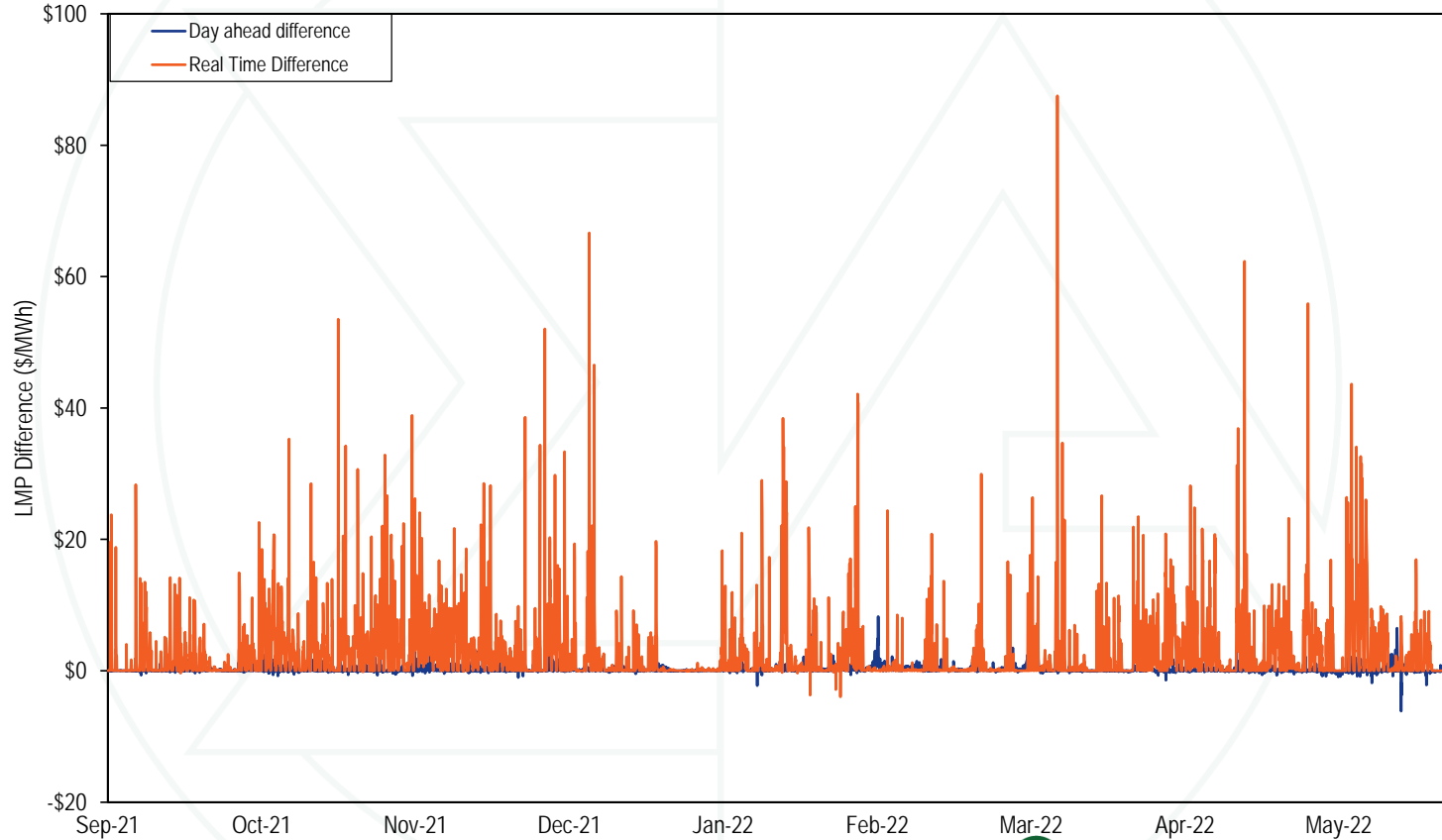
Monthly Average Load-Weighted DLMP and PLMP

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	\$63.93	\$64.15	\$0.22	0.3%	\$66.43	\$69.06	\$2.64	4.0%
2022	Feb	\$49.75	\$50.13	\$0.39	0.8%	\$45.93	\$46.76	\$0.83	1.8%
2022	Mar	\$45.15	\$45.40	\$0.25	0.6%	\$41.83	\$43.56	\$1.73	4.1%
2022	Apr	\$64.22	\$64.30	\$0.08	0.1%	\$60.38	\$63.91	\$3.52	5.8%
2022	May	\$82.73	\$82.79	\$0.06	0.1%	\$79.04	\$83.16	\$4.12	5.2%
2022	Jan - May	\$61.01	\$61.22	\$0.21	0.3%	\$58.85	\$61.39	\$2.54	4.3%

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
2021	Sep	2.2%	0.8%	0.0%	3.0%	6.7%	1.3%	0.0%	8.1%
2021	Oct	3.2%	1.4%	0.0%	4.6%	11.1%	2.1%	0.0%	13.3%
2021	Nov	3.2%	0.3%	0.0%	3.5%	11.3%	0.6%	0.0%	11.9%
2021	Dec	1.4%	0.3%	0.2%	1.8%	4.4%	0.6%	0.1%	5.2%
2022	Jan	1.3%	0.3%	0.2%	1.8%	5.0%	0.9%	0.2%	6.2%
2022	Feb	0.6%	0.2%	0.3%	1.2%	3.3%	0.5%	0.3%	4.0%
2022	Mar	0.5%	0.2%	0.4%	1.1%	3.5%	0.5%	0.4%	4.4%
2022	Apr	0.9%	0.1%	0.1%	1.2%	4.6%	0.3%	0.1%	5.0%
2022	May	1.6%	0.8%	0.1%	2.5%	7.0%	1.3%	0.1%	8.3%

Fast Start Impacts: Zonal Average Differences

Sep 2021 - May 2022								
Zone	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
ACEC	\$47.37	\$47.50	\$0.13	0.3%	\$46.62	\$48.63	\$2.00	4.3%
AEP	\$54.83	\$55.01	\$0.18	0.3%	\$52.30	\$54.99	\$2.68	5.1%
APS	\$56.49	\$56.68	\$0.19	0.3%	\$53.82	\$56.53	\$2.72	5.1%
ATSI	\$54.72	\$54.90	\$0.18	0.3%	\$51.63	\$54.24	\$2.61	5.1%
BGE	\$63.56	\$63.75	\$0.19	0.3%	\$60.55	\$63.84	\$3.29	5.4%
COMED	\$45.59	\$45.76	\$0.17	0.4%	\$42.73	\$45.32	\$2.59	6.1%
DAY	\$56.99	\$57.18	\$0.19	0.3%	\$54.32	\$57.04	\$2.72	5.0%
DUKE	\$55.80	\$55.98	\$0.19	0.3%	\$52.69	\$55.35	\$2.65	5.0%
DOM	\$64.15	\$64.30	\$0.15	0.2%	\$65.38	\$68.51	\$3.13	4.8%
DPL	\$52.07	\$52.24	\$0.17	0.3%	\$50.71	\$53.50	\$2.79	5.5%
DUQ	\$53.63	\$53.80	\$0.18	0.3%	\$50.74	\$53.32	\$2.58	5.1%
EKPC	\$55.75	\$55.93	\$0.18	0.3%	\$53.10	\$55.76	\$2.66	5.0%
JCPLC	\$49.38	\$49.52	\$0.14	0.3%	\$48.42	\$50.68	\$2.26	4.7%
MEC	\$57.19	\$57.34	\$0.15	0.3%	\$54.40	\$57.03	\$2.63	4.8%
OVEC	\$54.14	\$54.32	\$0.18	0.3%	\$51.57	\$54.17	\$2.60	5.0%
PECO	\$47.24	\$47.37	\$0.13	0.3%	\$46.40	\$48.43	\$2.03	4.4%
PE	\$55.24	\$55.42	\$0.18	0.3%	\$51.69	\$54.06	\$2.37	4.6%
PEPCO	\$61.93	\$62.12	\$0.19	0.3%	\$59.71	\$62.91	\$3.20	5.4%
PPL	\$52.16	\$52.30	\$0.14	0.3%	\$49.54	\$51.87	\$2.33	4.7%
PSEG	\$50.41	\$50.55	\$0.14	0.3%	\$49.87	\$52.10	\$2.23	4.5%
REC	\$52.95	\$53.09	\$0.14	0.3%	\$52.05	\$54.34	\$2.29	4.4%

Fast Start Impacts: Hub Average Differences

Sep 2021 - May 2022

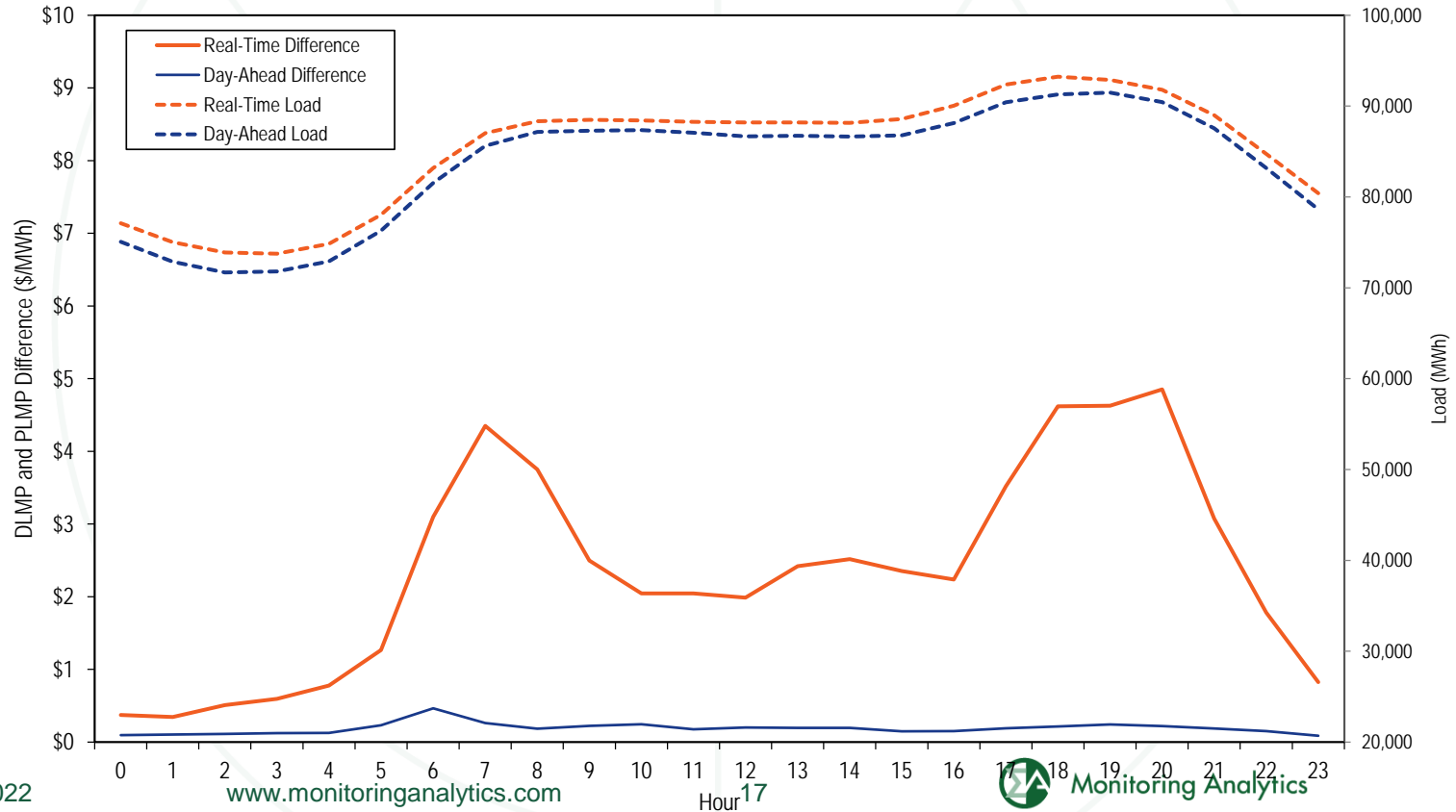
Hub	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Difference Percent	Average DLMP	Average PLMP	Difference	Difference Percent
AEP GEN HUB	\$53.68	\$53.86	\$0.18	0.3%	\$50.87	\$53.08	\$2.22	4.4%
AEP-DAYTON HUB	\$54.20	\$54.38	\$0.18	0.3%	\$51.36	\$53.65	\$2.29	4.5%
ATSI GEN HUB	\$53.80	\$53.98	\$0.18	0.3%	\$50.55	\$52.77	\$2.22	4.4%
CHICAGO GEN HUB	\$44.90	\$45.06	\$0.16	0.4%	\$41.88	\$44.11	\$2.23	5.3%
CHICAGO HUB	\$45.86	\$46.03	\$0.17	0.4%	\$42.96	\$45.22	\$2.27	5.3%
DOMINION HUB	\$59.91	\$60.09	\$0.18	0.3%	\$58.52	\$61.03	\$2.51	4.3%
EASTERN HUB	\$51.56	\$51.74	\$0.18	0.3%	\$50.09	\$52.68	\$2.59	5.2%
N ILLINOIS HUB	\$45.54	\$45.70	\$0.17	0.4%	\$42.66	\$44.90	\$2.23	5.2%
NEW JERSEY HUB	\$49.52	\$49.66	\$0.14	0.3%	\$48.80	\$50.77	\$1.97	4.0%
OHIO HUB	\$53.96	\$54.14	\$0.18	0.3%	\$51.01	\$53.31	\$2.30	4.5%
WEST INT HUB	\$55.67	\$55.85	\$0.18	0.3%	\$53.19	\$55.51	\$2.32	4.4%
WESTERN HUB	\$57.75	\$57.93	\$0.19	0.3%	\$54.32	\$56.66	\$2.34	4.3%

Zonal PLMP-DLMP Difference Frequency

Sep 2021 - May 2022

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
PJM-RTO	0.0%	0.7%	0.0%	0.7%	50.5%	42.2%	3.8%	1.8%	0.3%	0.1%
ACEC	0.0%	0.8%	0.3%	7.1%	51.0%	36.3%	2.7%	1.4%	0.3%	0.1%
AEP	0.0%	0.7%	0.0%	0.9%	50.6%	42.0%	3.8%	1.7%	0.3%	0.1%
APS	0.0%	0.7%	0.0%	0.9%	50.6%	41.5%	3.9%	1.9%	0.3%	0.1%
ATSI	0.0%	0.7%	0.0%	1.1%	50.6%	42.0%	3.6%	1.6%	0.3%	0.1%
BGE	0.0%	0.7%	0.1%	2.3%	50.6%	38.5%	4.7%	2.5%	0.5%	0.1%
COMED	0.0%	0.7%	0.1%	2.3%	50.9%	40.6%	3.5%	1.6%	0.3%	0.1%
DAY	0.0%	0.7%	0.0%	1.0%	50.7%	41.6%	3.9%	1.8%	0.3%	0.1%
DUKE	0.0%	0.7%	0.0%	1.0%	50.7%	41.8%	3.8%	1.7%	0.3%	0.1%
DOM	0.0%	0.8%	0.1%	1.7%	50.7%	39.7%	4.3%	2.2%	0.4%	0.1%
DPL	0.0%	0.7%	0.1%	10.4%	50.9%	31.4%	2.9%	2.4%	0.7%	0.4%
DUQ	0.0%	0.7%	0.0%	1.2%	50.6%	42.0%	3.5%	1.5%	0.3%	0.1%
EKPC	0.0%	0.7%	0.0%	1.1%	50.7%	41.6%	3.8%	1.7%	0.2%	0.1%
JCPLC	0.0%	0.7%	0.1%	3.8%	51.0%	39.6%	2.8%	1.5%	0.3%	0.1%
MEC	0.0%	0.7%	0.2%	2.7%	50.7%	39.5%	3.8%	1.8%	0.5%	0.1%
OVEC	0.0%	0.7%	0.0%	1.1%	50.7%	41.8%	3.7%	1.7%	0.2%	0.1%
PECO	0.0%	0.7%	0.1%	9.3%	50.9%	34.3%	2.8%	1.4%	0.3%	0.1%
PE	0.0%	0.7%	0.1%	1.0%	50.5%	42.1%	3.8%	1.5%	0.3%	0.1%
PEPCO	0.0%	0.7%	0.1%	2.2%	50.6%	38.9%	4.6%	2.4%	0.5%	0.1%
PPL	0.0%	0.7%	0.1%	2.7%	50.7%	40.5%	3.3%	1.6%	0.4%	0.1%
PSEG	0.0%	0.7%	0.1%	3.5%	50.9%	39.8%	3.0%	1.5%	0.4%	0.1%
REC	0.0%	0.8%	0.1%	2.3%	50.7%	40.9%	3.1%	1.7%	0.4%	0.1%

Hourly Average Load and LMP Difference: Jan through May 2022



Real-Time Monthly 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%				
Jul	\$31.52	\$42.83	\$11.31	35.9%				
Aug	\$36.74	\$56.71	\$19.97	54.4%				
Sep	\$39.47	\$59.03	\$19.56	49.6%				
Oct	\$49.53	\$67.34	\$17.81	36.0%				
Nov	\$55.73	\$70.49	\$14.76	26.5%				
Dec	\$34.83	\$42.56	\$7.73	22.2%				

Monitoring Analytics, LLC

2621 Van Buren Avenue

Suite 160

Eagleville, PA

19403

(610) 271-8050

MA@monitoringanalytics.com

www.MonitoringAnalytics.com

