

Market Monitor Report

MC Webinar

September 19, 2022

IMM



Monitoring Analytics

ICAP Must Offer Requirement

- **Generation Capacity Resources are required to offer into the Day-Ahead and Real-Time Energy Market at least the ICAP equivalent of their committed UCAP. This is known as the ICAP must offer requirement (OA Schedule 1 Section 1.10.1A(d)).**

$$\text{ICAP} = \frac{\text{UCAP}}{(1 - \text{Final EFORd})}$$

Emergency Maximum + Outage Reduction \geq ICAP

Issues

- **Highlight PJM interpretation of must offer rules in the tariff.**
 - **Obligation to offer full committed ICAP in both the Day-Ahead and Real-Time Energy Markets.**
 - **Role of ambient derates.**
 - **Role of eDART and eGADS**
- **PJM should state position clearly and document that position.**

Issues

- **Units are required to offer committed ICAP unless on outage.**
 - **This includes forced outages due to ambient derates. All forced outages should affect UCAP. Any different interpretation must be documented.**
 - **This includes forced outages that do not have a clear designation in eGADS and eGADS does not have a description for their codes. Any different interpretation must be documented.**
- **PJM has not made a clear statement that the ICAP must offer requirement applies to both the Day-Ahead and Real-Time Energy Market.**

Ambient Derates

- **Units that cannot meet ICAP because of ambient derates are required to submit forced outages in eDART. Those outages are not reported in eGADS**
 - **No eGADS report means zero impact on UCAP.**
 - **PJM Manual 10 (Pre-Scheduling Operations) states that “ambient air tickets do not get tracked in GADS in accordance with NERC GADS reporting requirements”.**
 - **Manual 10 language is inconsistent with the tariff UCAP definition.**

Ambient Derates

- **Units are required to report planned, maintenance and forced outages to PJM. Outages are initially submitted in eDART and subsequently reported in eGADS. Both of these tools predate the PJM Market.**
- **Units should not be allowed to submit forced outages only in eDART in order to meet the must offer requirement but that do not affect UCAP because they are not also submitted in eGADS.**
- **PJM does allow such outages. This is a process choice made by PJM, not a rule.**

Ambient Derates

- **Units sell UCAP in RPM. UCAP is defined as the MW not on a forced outage or derate. It is inconsistent with the tariff to allow the submittal of forced outages that do not affect a generator's UCAP but that allow the must offer requirement to be met.**
- **PJM is responsible for calculating UCAP. Calculating UCAP that does not reflect forced outages (including ambient) submitted by generators is a tariff violation.**
- **The same conclusion applies to any situation in which a unit is not available in the market and it is not reported as an outage.**

Requirement in RT

- The ICAP must offer requirement applies to both the Day-Ahead and the Real-Time Energy Market. FERC clarified that in the Capacity Performance order (151 FERC ¶ 61,208) paragraph 95:
 - *“PJM’s tariff currently provides, for example, that a resource with a capacity commitment must offer into the day-ahead and real-time energy markets, must leave its real-time offer open throughout the operating day, and must follow PJM’s dispatch instructions.”*

Recommendations

- **Generators should not be able to violate the ICAP must offer requirement. PJM should require generators to submit the available MW that they can reliably provide.**
- **Any shortfall between the offered MW in the Energy Market (Emergency Maximum) and the committed ICAP MW in the Capacity Market should be reflected as an outage.**
- **Any Shortfall MW between the offered Emergency Maximum and the committed ICAP MW that is not defined as an outage should automatically be documented as a forced outage.**

Recommendations

- **PJM should integrate outage submittal and reporting into Markets Gateway.**
- **PJM should document in Manual 11 that all committed capacity resources are required to meet the ICAP must offer requirement in the Day-Ahead Energy Market and Real-Time Energy Market.**

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.**

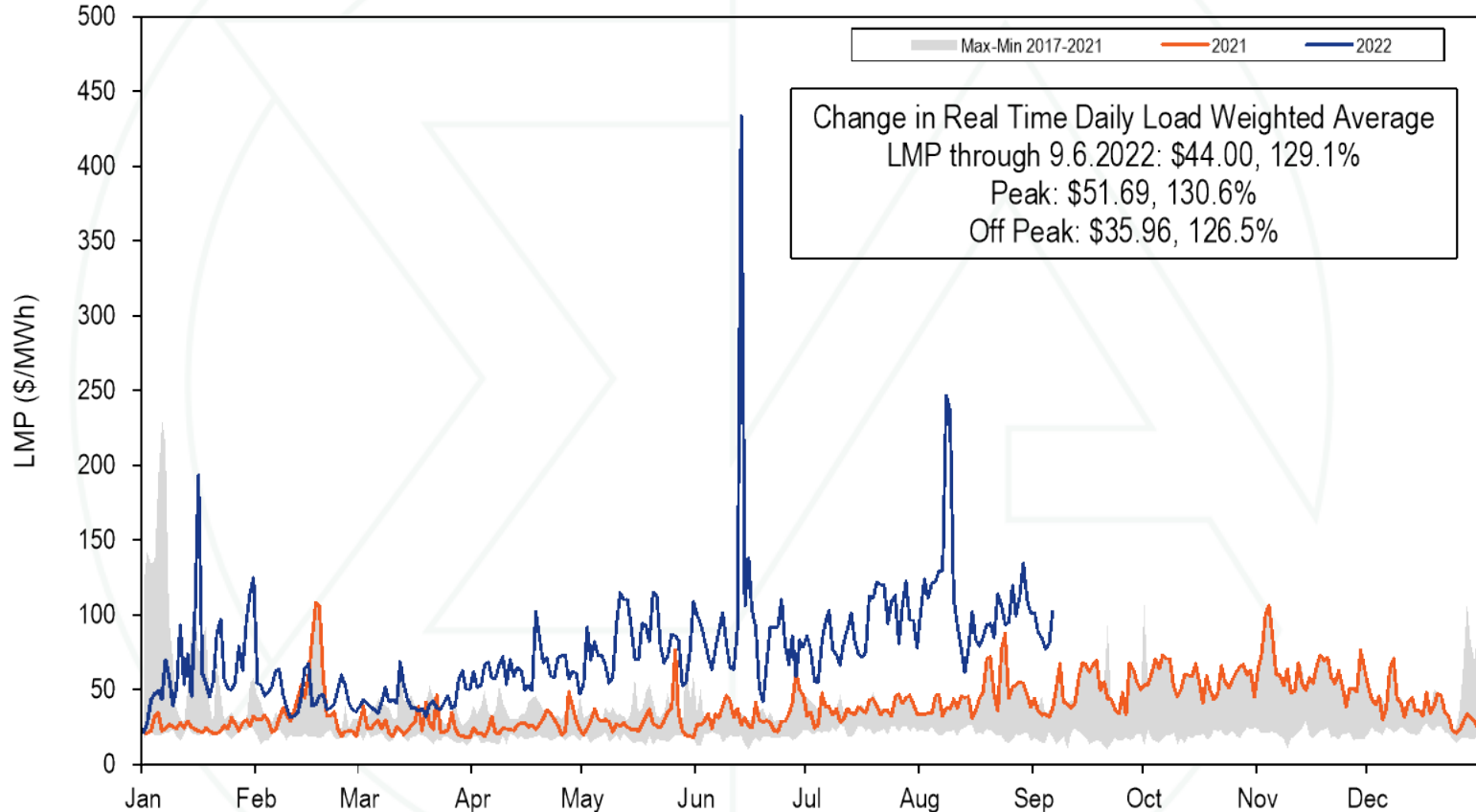
Reserves Must Offer

- **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.**

Reserves Must Offer

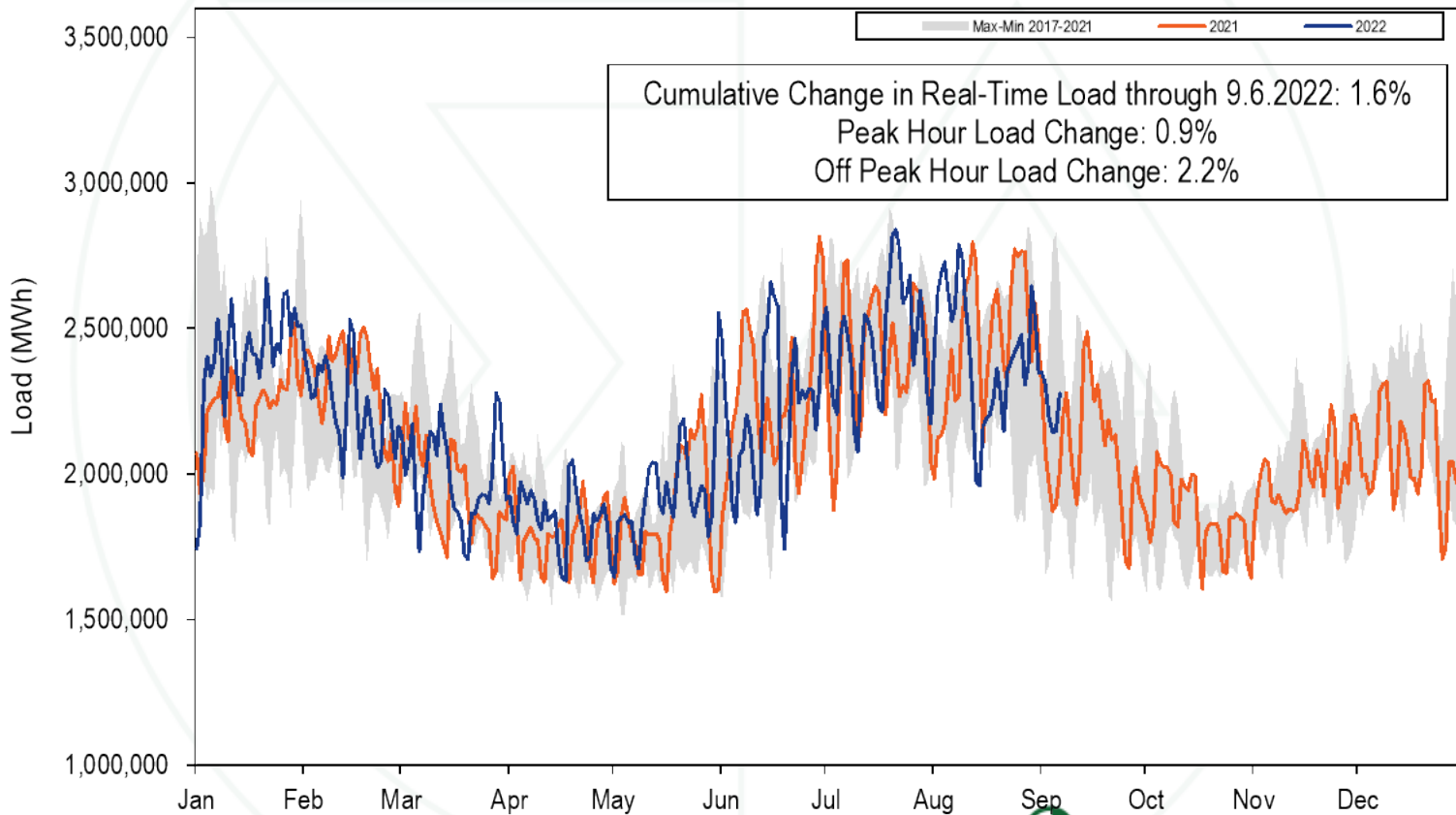
- **There are outstanding issues regarding the documentation of the new rules in Manual 11.**
- **M11 goes to the MRC for a vote next week.**
- **M11 does not make clear how the market will interpret and use hydro reserve offers. Market Seller's with hydro resources need this information to understand how to comply with the new requirements.**
- **M11 does not explain the ramifications of being deselected for reserves by PJM dispatchers. Certain deselections will result in noncompliance with the must offer requirement if there is no outage or derate.**

2022 YTD PJM Real-Time LMP



Change in Real Time Daily Load Weighted Average LMP through 9.6.2022: \$44.00, 129.1%
Peak: \$51.69, 130.6%
Off Peak: \$35.96, 126.5%

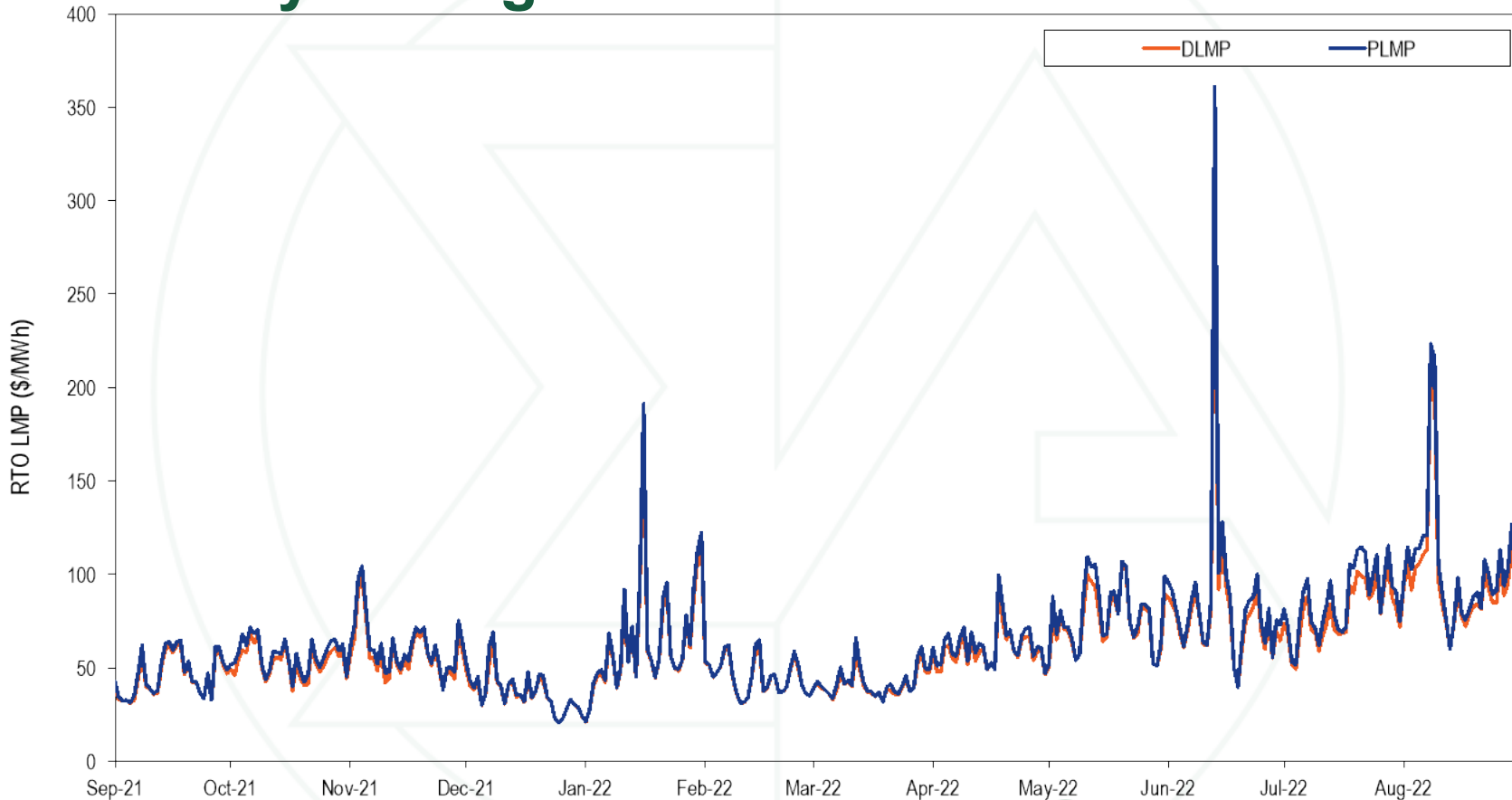
2022 YTD PJM Real-Time Daily Load



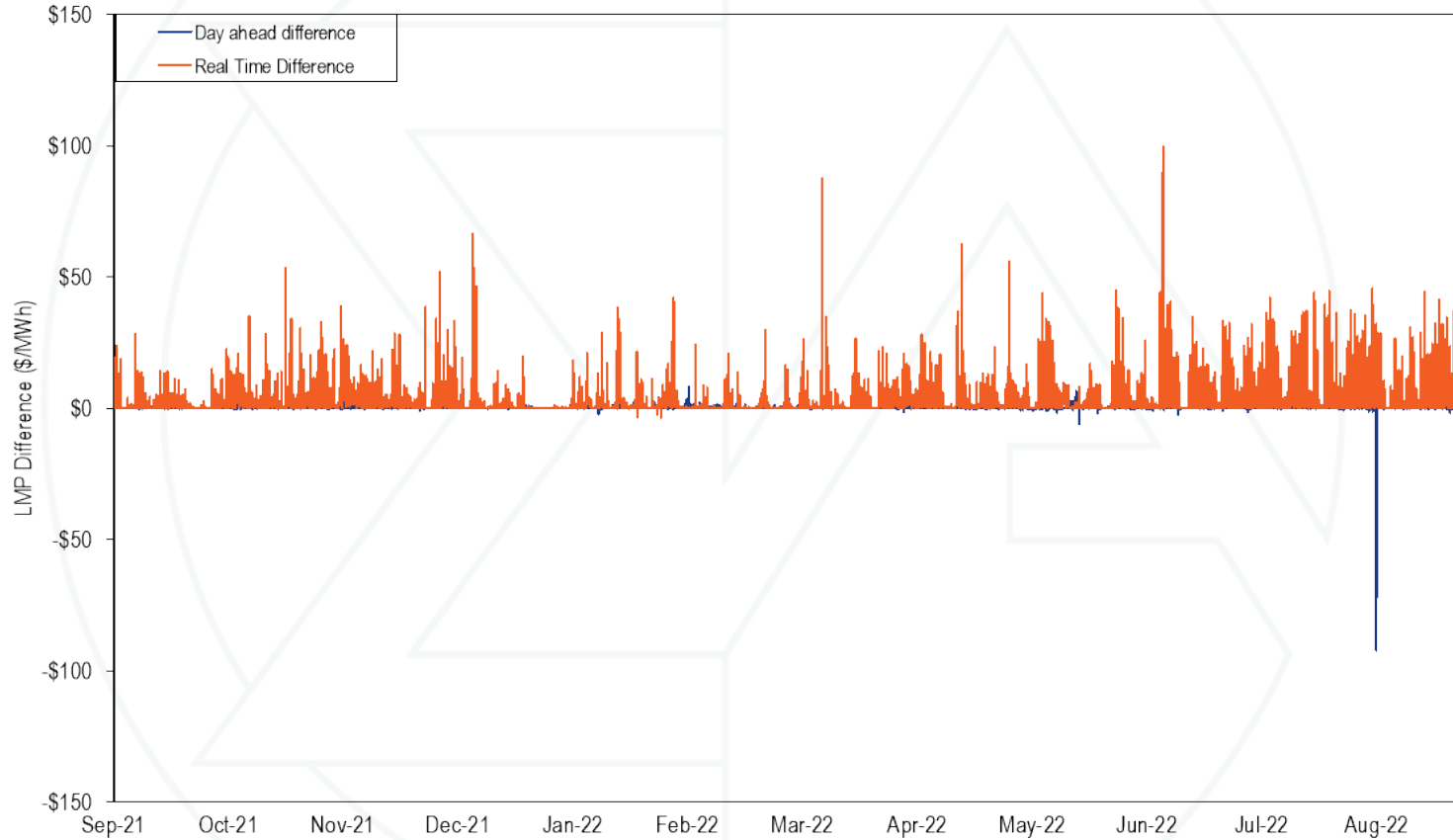
Monthly Average Load-Weighted DLMP and PLMP

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	Jun	\$89.64	\$89.93	\$0.29	0.3%	\$91.44	\$97.89	\$6.46	7.1%
2022	Jul	\$96.03	\$96.34	\$0.31	0.3%	\$84.03	\$92.48	\$8.45	10.1%
2022	Aug	\$106.13	\$106.02	(\$0.11)	(0.1%)	\$105.68	\$113.74	\$8.06	7.6%
2022	Jan - Aug	\$75.98	\$76.17	\$0.19	0.2%	\$73.13	\$77.79	\$4.65	6.4%

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	1.5%	0.7%	0.1%	2.4%	6.8%	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	2.2%	0.8%	0.1%	3.1%	15.5%	1.6%	0.0%	17.1%
2022	Aug	1.6%	0.4%	0.0%	2.1%	8.8%	1.3%	0.0%	10.1%

Fast Start Impacts: Zonal Average Differences

Sep 2021 - Aug 2022								
Zone	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Percent Difference	Average DLMP	Average PLMP	Difference	Percent Difference
ACEC	\$55.71	\$55.85	\$0.14	0.3%	\$54.53	\$57.66	\$3.12	5.7%
AEP	\$63.74	\$63.93	\$0.19	0.3%	\$60.58	\$64.47	\$3.88	6.4%
APS	\$64.91	\$65.11	\$0.21	0.3%	\$61.72	\$65.64	\$3.92	6.4%
ATSI	\$63.34	\$63.55	\$0.20	0.3%	\$59.66	\$63.48	\$3.82	6.4%
BGE	\$73.81	\$74.00	\$0.20	0.3%	\$70.97	\$75.67	\$4.70	6.6%
COMED	\$55.58	\$55.76	\$0.18	0.3%	\$51.65	\$55.41	\$3.77	7.3%
DAY	\$66.21	\$66.40	\$0.20	0.3%	\$62.92	\$66.90	\$3.98	6.3%
DUKE	\$64.96	\$65.16	\$0.19	0.3%	\$61.23	\$65.12	\$3.89	6.4%
DOM	\$74.02	\$74.04	\$0.02	0.0%	\$74.32	\$78.63	\$4.31	5.8%
DPL	\$60.87	\$61.04	\$0.17	0.3%	\$59.68	\$63.76	\$4.08	6.8%
DUQ	\$62.22	\$62.42	\$0.20	0.3%	\$58.66	\$62.44	\$3.78	6.4%
EKPC	\$64.36	\$64.56	\$0.19	0.3%	\$61.30	\$65.16	\$3.86	6.3%
JCPLC	\$57.29	\$57.45	\$0.15	0.3%	\$55.99	\$59.32	\$3.33	5.9%
MEC	\$66.78	\$66.93	\$0.15	0.2%	\$64.06	\$67.85	\$3.79	5.9%
OVEC	\$62.69	\$62.88	\$0.19	0.3%	\$59.55	\$63.33	\$3.78	6.4%
PECO	\$55.35	\$55.49	\$0.14	0.3%	\$54.15	\$57.26	\$3.12	5.8%
PE	\$62.76	\$62.95	\$0.19	0.3%	\$59.11	\$62.66	\$3.55	6.0%
PEPCO	\$71.53	\$71.71	\$0.19	0.3%	\$69.07	\$73.61	\$4.53	6.6%
PPL	\$61.04	\$61.19	\$0.15	0.3%	\$58.54	\$62.02	\$3.49	6.0%
PSEG	\$58.05	\$58.20	\$0.15	0.3%	\$57.01	\$60.30	\$3.29	5.8%
REC	\$60.27	\$60.43	\$0.15	0.3%	\$58.85	\$62.20	\$3.35	5.7%

Fast Start Impacts: Hub Average Differences

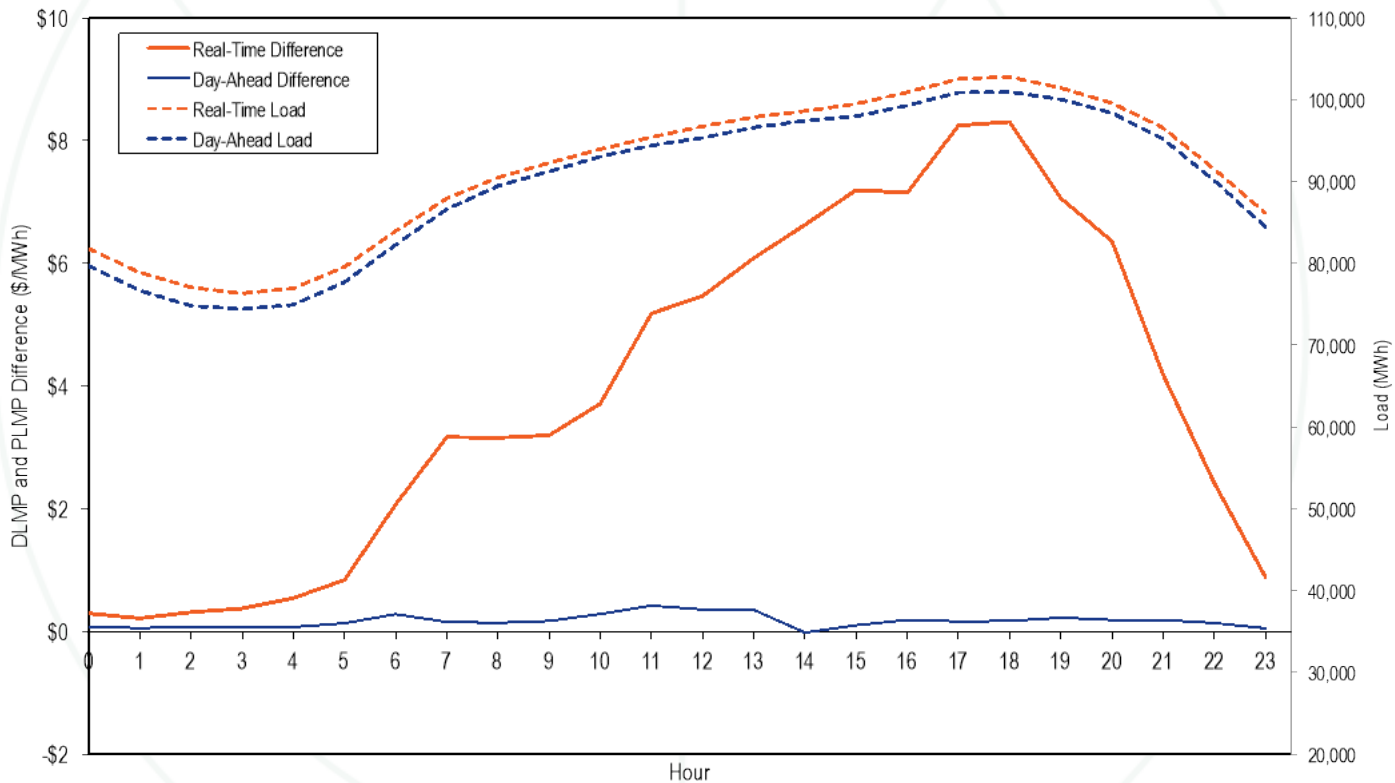
Sep 2021 - Aug 2022

Hub	Day-Ahead				Real-Time			
	Average DLMP	Average PLMP	Difference	Difference Percent	Average DLMP	Average PLMP	Difference	Difference Percent
AEP GEN HUB	\$62.18	\$62.37	\$0.19	0.3%	\$58.79	\$62.05	\$3.27	5.6%
AEP-DAYTON HUB	\$63.18	\$63.37	\$0.19	0.3%	\$59.71	\$63.08	\$3.37	5.6%
ATSI GEN HUB	\$62.20	\$62.40	\$0.20	0.3%	\$58.32	\$61.60	\$3.28	5.6%
CHICAGO GEN HUB	\$54.72	\$54.89	\$0.18	0.3%	\$50.60	\$53.86	\$3.25	6.4%
CHICAGO HUB	\$55.86	\$56.04	\$0.18	0.3%	\$51.88	\$55.19	\$3.31	6.4%
DOMINION HUB	\$68.84	\$69.00	\$0.17	0.2%	\$66.69	\$70.27	\$3.58	5.4%
EASTERN HUB	\$60.52	\$60.71	\$0.19	0.3%	\$58.83	\$62.54	\$3.70	6.3%
N ILLINOIS HUB	\$55.44	\$55.62	\$0.18	0.3%	\$51.53	\$54.80	\$3.27	6.3%
NEW JERSEY HUB	\$57.35	\$57.50	\$0.15	0.3%	\$56.19	\$59.11	\$2.92	5.2%
OHIO HUB	\$63.05	\$63.25	\$0.19	0.3%	\$59.47	\$62.86	\$3.39	5.7%
WEST INT HUB	\$64.48	\$64.66	\$0.18	0.3%	\$61.37	\$64.77	\$3.39	5.5%
WESTERN HUB	\$66.25	\$66.44	\$0.19	0.3%	\$62.69	\$66.16	\$3.47	5.5%

Zonal PLMP-DLMP Difference Frequency

Zone	Sep 2021 - Aug 2022									
	< (\$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%	0.6%	0.0%	0.6%	49.7%	40.2%	5.4%	3.1%	0.4%	0.1%
ACEC	0.0%	0.6%	0.2%	6.6%	50.1%	35.7%	3.7%	2.5%	0.4%	0.1%
AEP	0.0%	0.6%	0.0%	0.8%	49.8%	39.7%	5.4%	3.2%	0.4%	0.1%
APS	0.0%	0.6%	0.0%	0.8%	49.9%	39.5%	5.5%	3.3%	0.4%	0.1%
ATSI	0.0%	0.6%	0.0%	1.0%	49.8%	40.0%	5.1%	3.1%	0.4%	0.1%
BGE	0.0%	0.6%	0.1%	2.3%	49.8%	36.3%	5.9%	4.1%	0.7%	0.2%
COMED	0.0%	0.6%	0.1%	2.0%	50.1%	38.8%	5.0%	3.0%	0.4%	0.1%
DAY	0.0%	0.6%	0.0%	0.8%	49.9%	39.4%	5.4%	3.3%	0.4%	0.1%
DUKE	0.0%	0.6%	0.0%	0.9%	49.9%	39.5%	5.4%	3.2%	0.4%	0.1%
DOM	0.0%	0.6%	0.2%	1.7%	49.9%	37.6%	5.6%	3.7%	0.5%	0.1%
DPL	0.0%	0.6%	0.2%	10.3%	50.1%	30.6%	3.8%	3.0%	1.1%	0.4%
DUQ	0.0%	0.6%	0.0%	1.0%	49.8%	39.9%	5.1%	2.9%	0.4%	0.1%
EKPC	0.0%	0.6%	0.0%	1.0%	49.9%	39.4%	5.5%	3.2%	0.4%	0.1%
JCPLC	0.0%	0.6%	0.1%	3.4%	50.1%	38.9%	3.9%	2.6%	0.4%	0.1%
MEC	0.0%	0.6%	0.2%	2.4%	49.9%	38.2%	5.1%	2.9%	0.6%	0.1%
OVEC	0.0%	0.6%	0.0%	1.0%	49.9%	39.6%	5.3%	3.0%	0.4%	0.1%
PECO	0.0%	0.6%	0.1%	9.0%	50.1%	33.4%	3.8%	2.5%	0.4%	0.1%
PE	0.0%	0.6%	0.1%	0.9%	49.7%	40.3%	5.2%	2.8%	0.4%	0.1%
PEPCO	0.0%	0.6%	0.1%	2.1%	49.9%	36.8%	5.9%	4.0%	0.6%	0.1%
PPL	0.0%	0.6%	0.1%	2.4%	49.9%	39.3%	4.5%	2.6%	0.4%	0.1%
PSEG	0.0%	0.6%	0.1%	3.1%	50.1%	39.0%	4.0%	2.6%	0.4%	0.1%
REC	0.0%	0.6%	0.1%	2.0%	49.9%	40.0%	4.2%	2.8%	0.4%	0.1%

Hourly Average Load and LMP Difference: Jan through August 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%	\$61.63	\$126.83	\$65.20	105.8%
Jul	\$31.52	\$42.83	\$11.31	35.9%	\$71.83	\$114.13	\$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%				
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

