

Market Monitor Report

MC Webinar

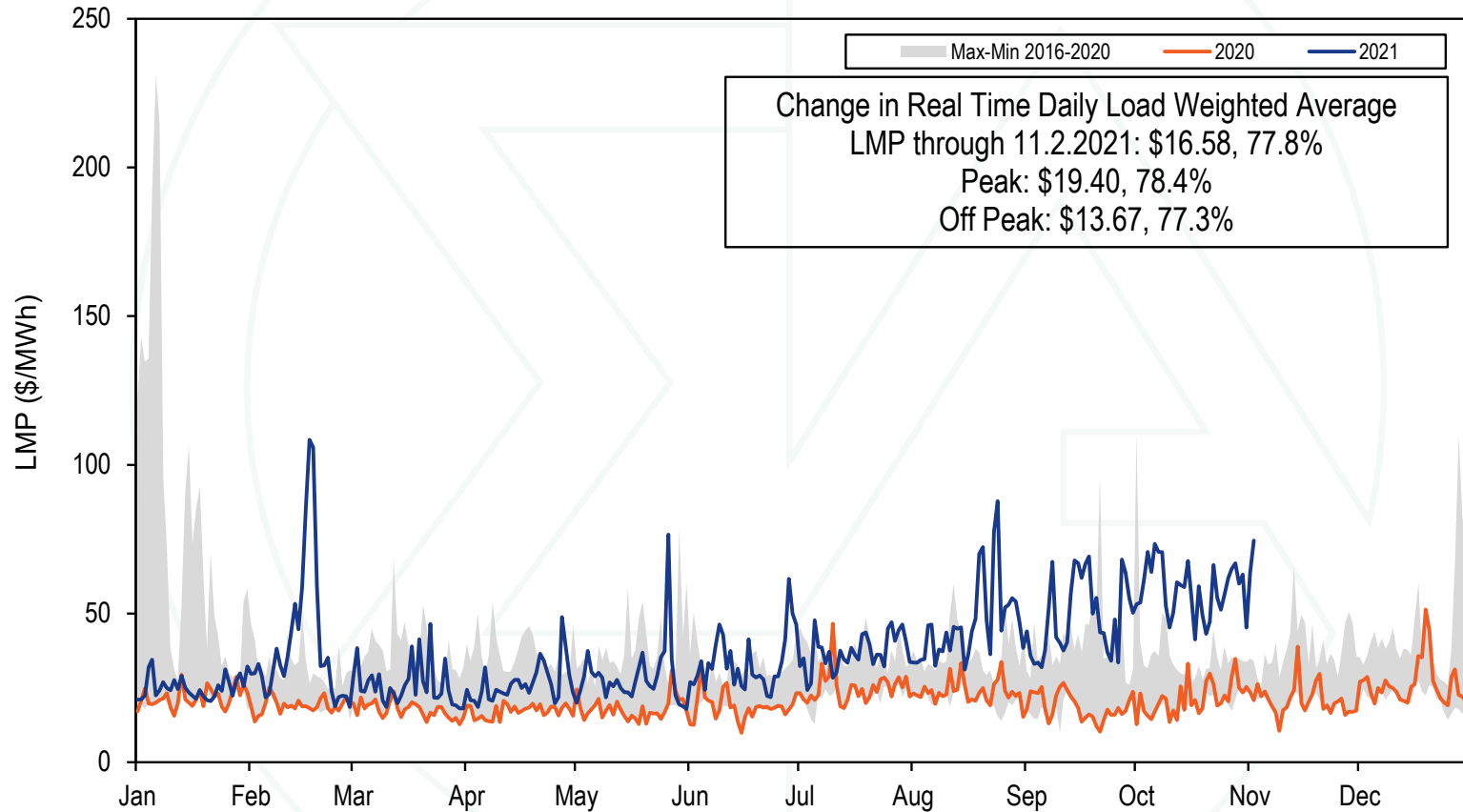
November 15, 2021

IMM



Monitoring Analytics

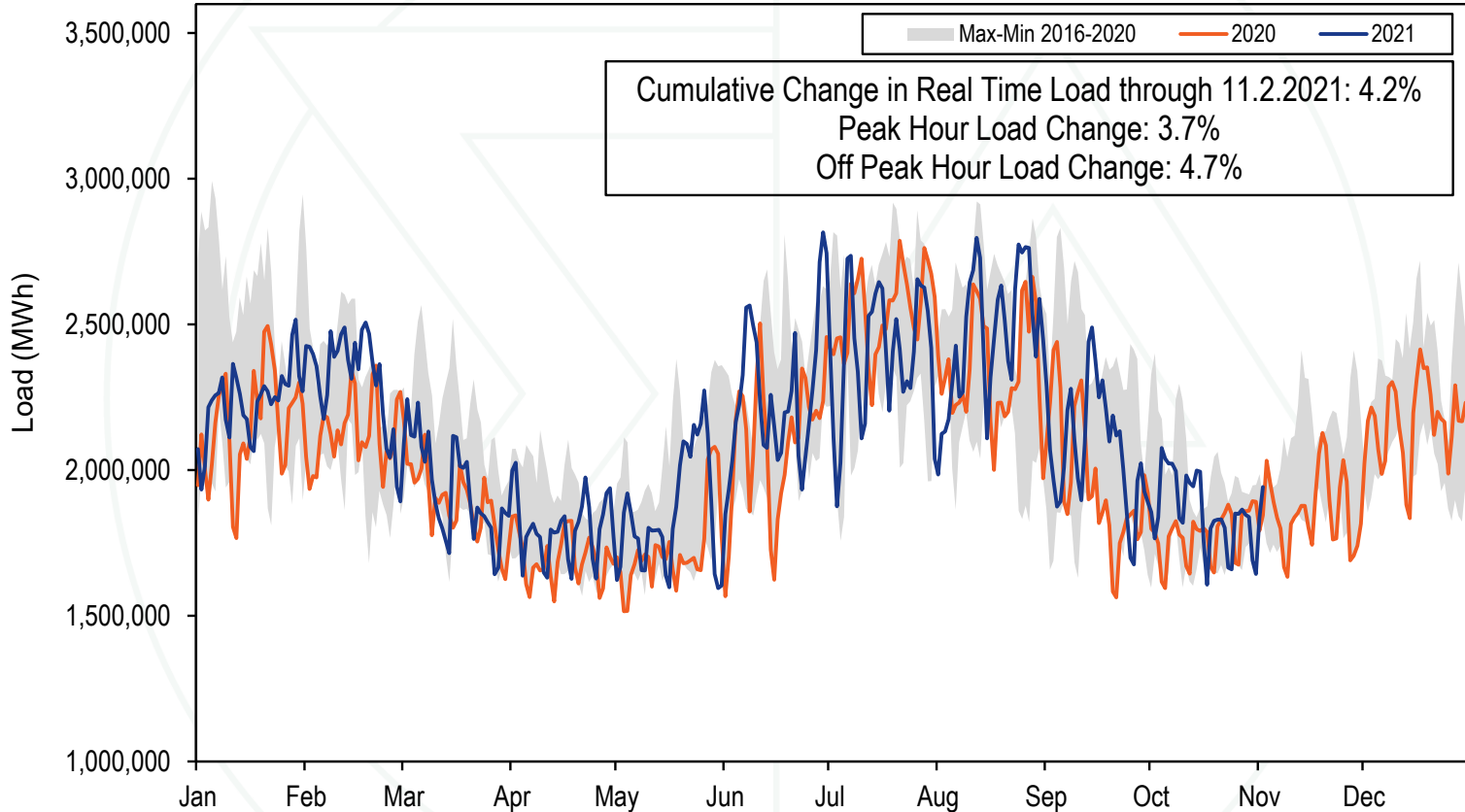
Year to date PJM real-time LMP



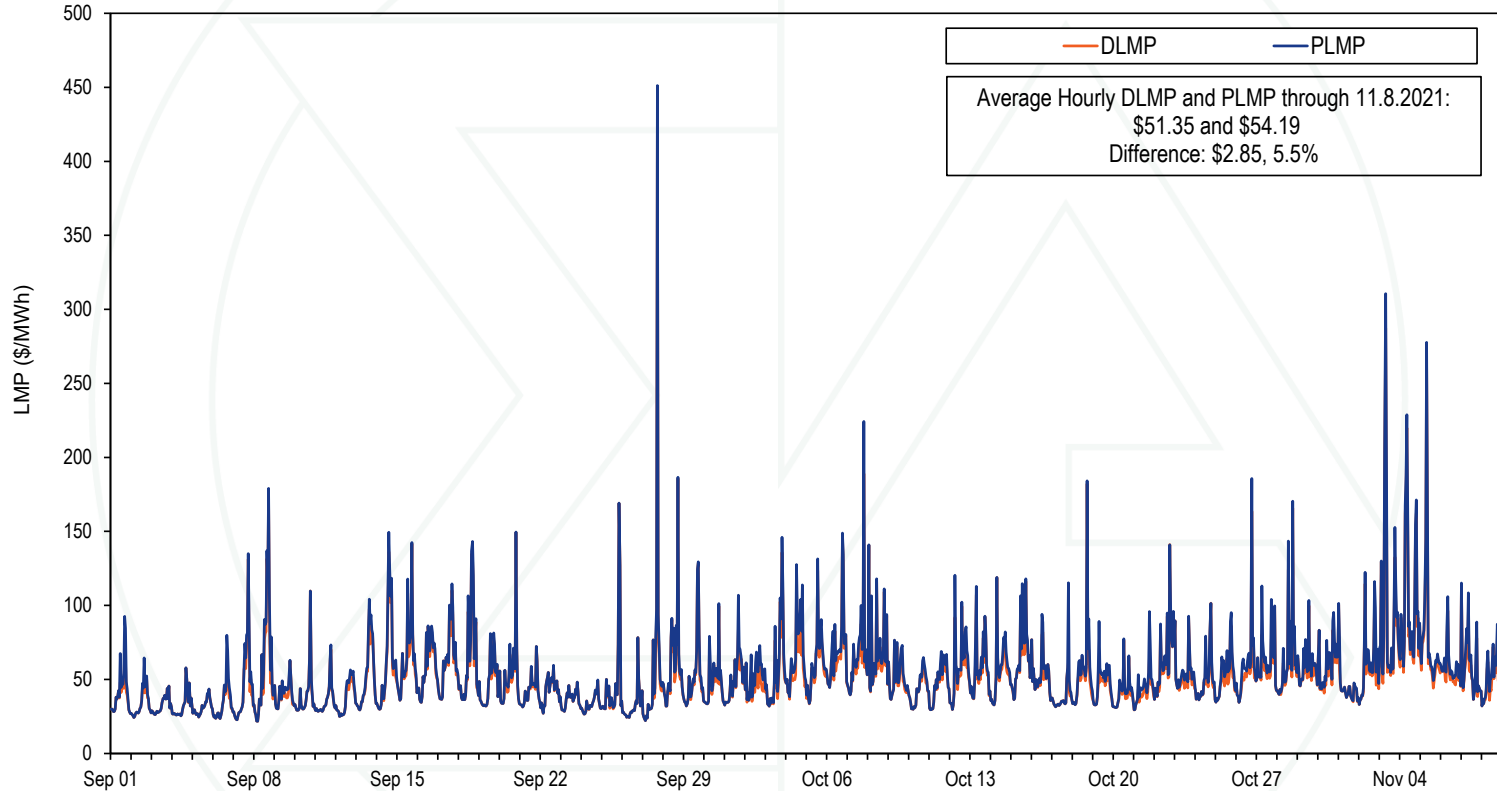
Change in Real Time Daily Load Weighted Average LMP through 11.2.2021: \$16.58, 77.8%
Peak: \$19.40, 78.4%
Off Peak: \$13.67, 77.3%



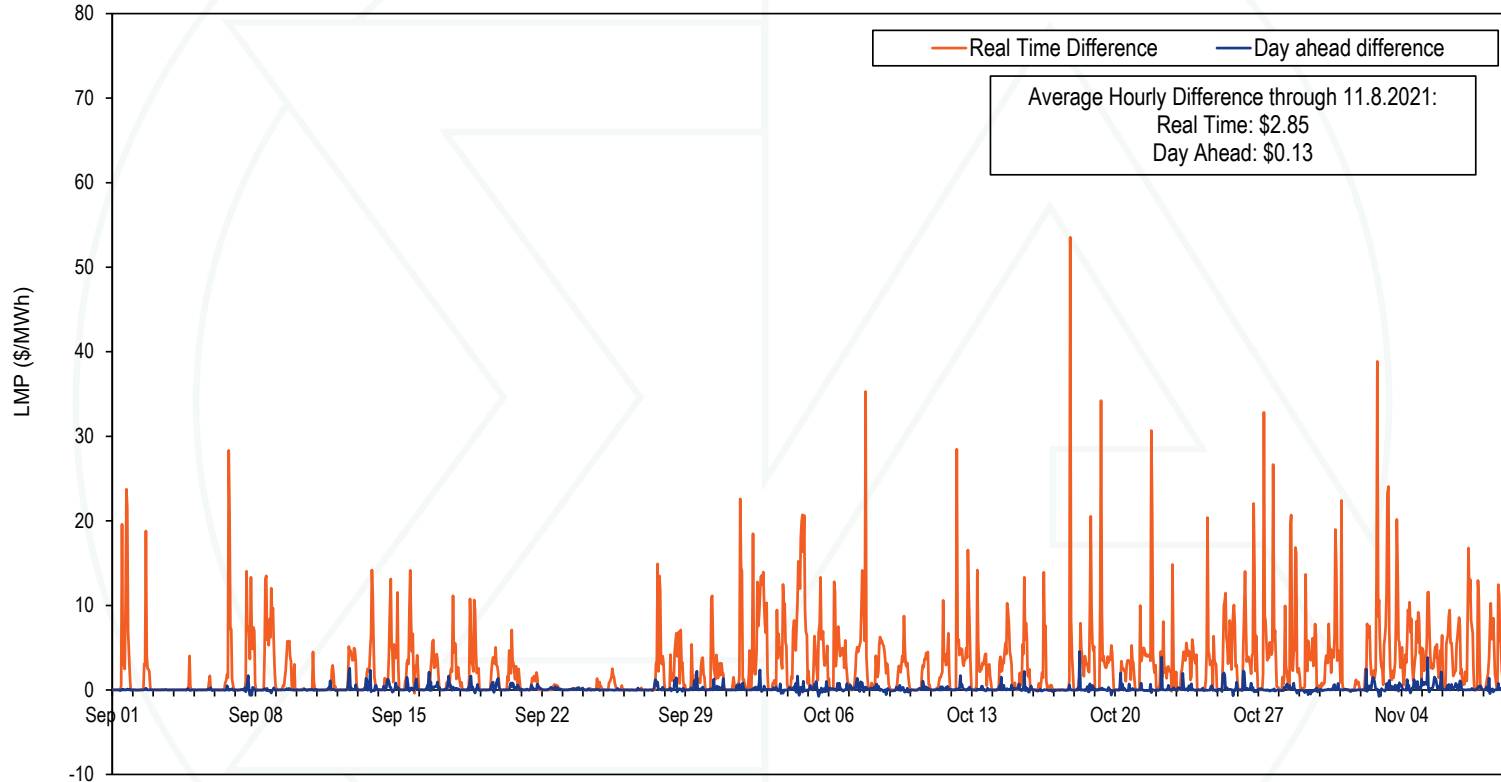
Year to date PJM real-time daily load



Real-time hourly PLMP and DLMP



Hourly differences: PLMP and DLMP



Fast start pricing by zone

- **Fast start pricing has different impacts by zone.**
- **For example, from September 1 through November 8, the average increase in BGE average real-time prices as a result of fast start pricing was \$3.57 per MWh, 6.1 percent.**
- **For example, from September 1 through November 8,, the average increase in PECO average real-time prices as a result of fast start pricing was \$1.70 per MWh, 4.1 percent.**

Fast start impacts: zonal PLMP, DLMP and differences

ZONE	Average DLMP	Average PLMP	Difference	Difference Percent
AECO	42.28	44.08	1.80	4.3%
AEP	52.76	55.84	3.08	5.8%
APS	54.24	57.35	3.11	5.7%
ATSI	52.42	55.36	2.94	5.6%
BGE	58.42	61.99	3.57	6.1%
COMED	46.59	49.64	3.05	6.5%
DAY	54.90	58.02	3.12	5.7%
DEOK	52.93	56.00	3.06	5.8%
DOM	58.32	61.65	3.33	5.7%
DPL	44.21	46.55	2.35	5.3%
DUQ	52.16	55.09	2.93	5.6%
EKPC	53.08	56.16	3.08	5.8%
JCPL	43.62	45.61	2.00	4.6%
METED	54.28	57.29	3.01	5.6%
OVEC	52.08	55.08	3.00	5.8%
PECO	41.76	43.46	1.70	4.1%
PENELEC	51.03	53.80	2.77	5.4%
PEPCO	57.97	61.49	3.52	6.1%
PPL	48.13	50.63	2.49	5.2%
PSEG	43.59	45.59	1.99	4.6%
RECO	44.91	47.08	2.17	4.8%

Interval differences between PLMP and DLMP

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%	0.0%	0.6%	44.1%	49.5%	4.0%	1.4%	0.3%	0.1%	0.0%
AECO	0.0%	0.0%	6.8%	44.5%	44.8%	2.8%	0.8%	0.2%	0.0%	0.0%
AEP	0.0%	0.0%	0.6%	44.2%	48.8%	4.4%	1.5%	0.3%	0.1%	0.0%
APS	0.0%	0.1%	0.9%	44.2%	48.3%	4.3%	1.7%	0.4%	0.1%	0.0%
ATSI	0.0%	0.1%	0.7%	44.2%	49.2%	4.0%	1.5%	0.3%	0.1%	0.0%
BGE	0.0%	0.1%	2.0%	44.1%	45.2%	5.7%	2.3%	0.5%	0.1%	0.0%
COMED	0.0%	0.1%	1.2%	44.4%	47.9%	4.3%	1.8%	0.4%	0.0%	0.0%
DAY	0.0%	0.1%	0.9%	44.2%	48.5%	4.4%	1.6%	0.4%	0.1%	0.0%
DEOK	0.0%	0.0%	0.8%	44.2%	48.6%	4.4%	1.5%	0.3%	0.1%	0.0%
DOM	0.0%	0.1%	1.4%	44.3%	46.6%	5.2%	1.9%	0.4%	0.1%	0.0%
DPL	0.0%	0.1%	12.5%	44.5%	36.8%	3.2%	2.4%	0.5%	0.1%	0.0%
DUQ	0.0%	0.1%	0.7%	44.2%	49.1%	4.0%	1.5%	0.3%	0.1%	0.0%
EKPC	0.0%	0.0%	0.9%	44.3%	48.4%	4.4%	1.5%	0.3%	0.1%	0.0%
JCPL	0.0%	0.0%	2.4%	44.4%	49.2%	2.8%	0.9%	0.2%	0.0%	0.0%
METED	0.0%	0.2%	3.2%	44.3%	44.9%	4.7%	2.0%	0.6%	0.1%	0.0%
OVEC	0.0%	0.0%	0.8%	44.3%	48.8%	4.2%	1.5%	0.3%	0.1%	0.0%
PECO	0.0%	0.0%	10.1%	44.5%	41.6%	2.7%	0.8%	0.2%	0.0%	0.0%
PENELEC	0.0%	0.1%	0.6%	44.1%	49.6%	3.7%	1.5%	0.3%	0.0%	0.0%
PEPCO	0.0%	0.1%	1.9%	44.2%	45.6%	5.5%	2.2%	0.4%	0.1%	0.0%
PPL	0.0%	0.1%	2.7%	44.4%	47.6%	3.5%	1.4%	0.3%	0.0%	0.0%
PSEG	0.0%	0.0%	2.4%	44.4%	49.2%	2.9%	0.8%	0.2%	0.0%	0.0%
RECO	0.0%	0.0%	1.5%	44.2%	50.1%	3.0%	1.0%	0.2%	0.0%	0.0%



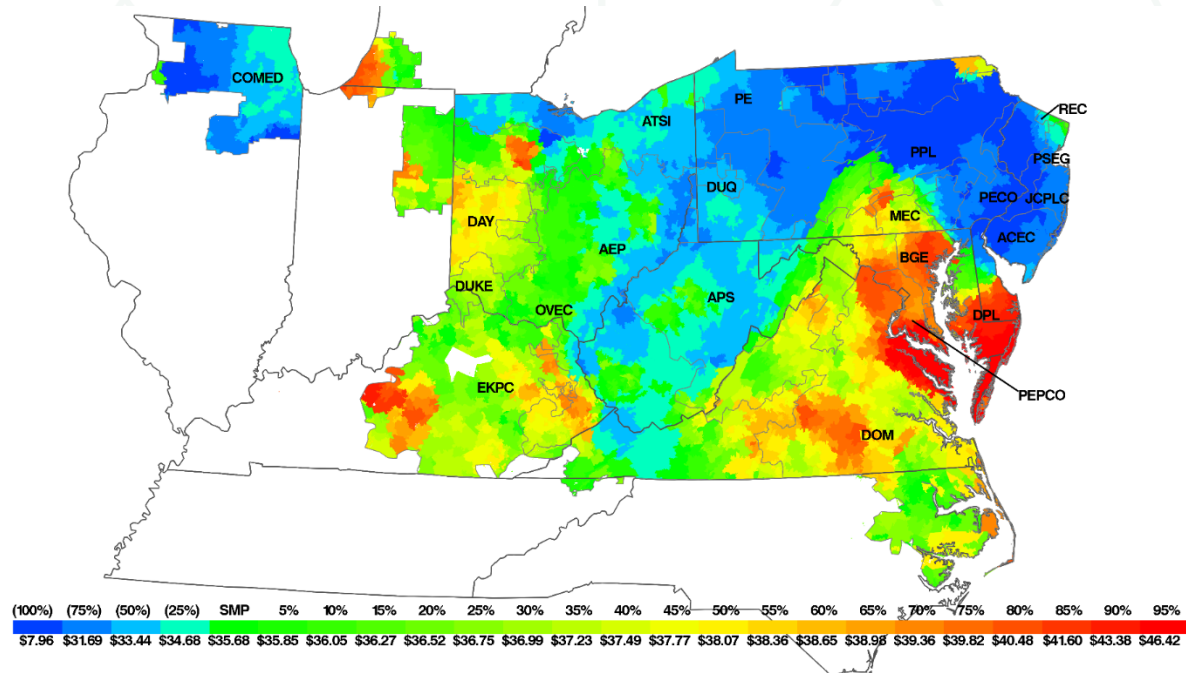
Carbon Price per MWh by unit type

	Low Heat Rate		High Heat Rate	
	Heat Rate	Carbon	Heat Rate	Carbon
	Btu/kWh	\$/MWh	Btu/kWh	\$/MWh
CC	7,000	\$5.24	7,865	\$5.89
CT	10,241	\$7.67	11,890	\$8.90
Coal	9,733	\$12.81	10,769	\$14.18
Oil	10,960	\$11.47	15,122	\$15.82
Carbon Price (\$ per ton)	\$12.80			

Uplift resettlements

- **The MMU has requested resettlements totaling \$13.4 million going as far back as 2018.**
- **To date:**
 - **\$1.5 million of credits have been resettled (11.0%)**
 - **\$11.5 million of credits are pending (85.8%)**
 - **\$0.4 million of credits have expired (3.2%)**
- **Since the beginning of Q3, additional units not following dispatched have been identified and notified:**
 - **New resettlement requests for units not following dispatch total \$0.4 million.**

Real-time, load-weighted average LMP: January through September, 2021



Real-time, fuel-cost adjusted load-weighted average LMP: January through September, 2021

	2021 Fuel-Cost Adjusted, Load-Weighted LMP	2021 Load-Weighted LMP	Change	Percent Change
Average	\$22.45	\$35.68	\$13.23	58.9%
	2020 Load-Weighted LMP	2021 Fuel-Cost Adjusted, Load-Weighted LMP	Change	Percent Change
Average	\$21.22	\$22.45	\$1.23	5.8%
	2020 Load-Weighted LMP	2021 Load-Weighted LMP	Change	Change
Average	\$21.22	\$35.68	\$14.46	68.1%

Total congestion costs (\$M)

(Jan - Sep)	Congestion Cost	Percent Change	Total PJM Billing	Percent of PJM Billing
2008	\$1,778	NA	\$26,979	6.6%
2009	\$544	(69.4%)	\$19,927	2.7%
2010	\$1,134	108.7%	\$26,249	4.3%
2011	\$875	(22.9%)	\$28,836	3.0%
2012	\$425	(51.4%)	\$22,119	1.9%
2013	\$510	19.9%	\$25,153	2.0%
2014	\$1,705	234.6%	\$40,770	4.2%
2015	\$1,143	(33.0%)	\$33,710	3.4%
2016	\$822	(28.1%)	\$29,490	2.8%
2017	\$455	(44.6%)	\$29,510	1.5%
2018	\$1,116	145.1%	\$37,950	2.9%
2019	\$419	(62.5%)	\$29,980	1.4%
2020	\$396	(5.5%)	\$25,010	1.6%
2021	\$615	55.1%	\$34,440	1.8%

Nuclear unit forward annual surplus (shortfall)

	ICAP (MW)	Surplus (Shortfall) (\$/MWh)		Subsidy (\$/MWh) 2021	Surplus (Shortfall) Excluding Subsidy (\$ in millions)		Surplus (Shortfall) Including Subsidy (\$ in millions)	
		2021	2022		2021	2022	2021	2022
		Beaver Valley	1,808		\$14.31	\$22.46		\$212.1
Braidwood	2,337	\$15.69	\$19.67	\$0.00	\$300.3	\$374.2	\$300.3	\$374.2
Byron	2,300	\$14.89	\$18.22	\$0.00	\$280.4	\$341.0	\$280.4	\$341.0
Calvert Cliffs	1,708	\$18.59	\$25.63		\$260.0	\$356.3	\$260.0	\$356.3
Davis Besse	894	\$5.56	\$13.44		\$41.2	\$97.8	\$41.2	\$97.8
Dresden	1,797	\$16.49	\$20.87	\$0.00	\$242.6	\$305.2	\$242.6	\$305.2
Hope Creek	1,172	\$13.32	\$19.68	\$10.00	\$127.9	\$187.7	\$223.3	\$283.1
LaSalle	2,271	\$15.45	\$19.45	\$0.00	\$287.3	\$359.5	\$287.3	\$359.5
Limerick	2,242	\$12.87	\$19.32		\$236.5	\$352.4	\$236.5	\$352.4
North Anna	1,892	\$17.22	NA		\$266.9	NA	\$266.9	NA
Peach Bottom	2,347	\$12.67	\$19.04		\$243.8	\$363.6	\$243.8	\$363.6
Perry	1,240	\$5.76	\$13.36		\$59.2	\$134.8	\$59.2	\$134.8
Quad Cities	1,819	\$12.98	\$14.75	\$16.50	\$193.5	\$218.3	\$437.7	\$462.6
Salem	2,328	\$12.98	\$19.37	\$10.00	\$247.7	\$367.0	\$437.1	\$556.5
Surry	1,676	\$16.52	NA		\$226.8	NA	\$226.8	NA
Susquehanna	2,520	\$8.88	\$15.09		\$184.0	\$309.4	\$184.0	\$309.4

ARR and FTR congestion offset

Revenue									Pre 2017/2018 (Without Balancing)		2017/2018 (With Balancing)		Post 2017/2018 (With Balancing and Surplus)		Effective Offset	
Planning Period	ARR Credits	Unadjusted FTR Credits	Day Ahead Congestion	Balancing +	Total Congestion	Surplus Revenue		Post 2017/2018 Rules	Total	Percent	Current Revenue Received	Percent Offset	New Revenue Received	New Offset	Cumulative Revenue	Offset
				M2M Congestion		Pre 2017/2018 Rules	Surplus Revenue 2017/2018 Rules		ARR/FTR Offset	Offset						
2011/2012	\$515.6	\$310.0	\$1,025.4	(\$275.7)	\$749.7	(\$50.6)	\$35.6	\$113.9	\$775.0	103.4%	\$585.5	78.1%	\$663.8	88.5%	\$775.0	103.4%
2012/2013	\$356.4	\$268.4	\$904.7	(\$379.9)	\$524.8	(\$94.0)	\$18.4	\$62.1	\$530.7	101.1%	\$263.2	50.2%	\$306.9	58.5%	\$530.7	101.1%
2013/2014	\$339.4	\$626.6	\$2,231.3	(\$360.6)	\$1,870.6	(\$139.4)	(\$49.0)	(\$49.0)	\$826.5	44.2%	\$556.3	29.7%	\$556.3	29.7%	\$826.5	44.2%
2014/2015	\$487.4	\$348.1	\$1,625.9	(\$268.3)	\$1,357.6	\$36.7	\$111.2	\$400.6	\$872.2	64.2%	\$678.4	50.0%	\$967.8	71.3%	\$872.2	64.2%
2015/2016	\$641.8	\$209.2	\$1,098.7	(\$147.6)	\$951.1	\$9.2	\$42.1	\$188.9	\$860.2	90.4%	\$745.5	78.4%	\$892.3	93.8%	\$860.2	90.4%
2016/2017	\$648.1	\$149.9	\$885.7	(\$104.8)	\$780.8	\$15.1	\$36.5	\$179.0	\$813.1	104.1%	\$729.6	93.4%	\$872.1	111.7%	\$813.1	104.1%
2017/2018	\$429.6	\$212.3	\$1,322.1	(\$129.5)	\$1,192.6	\$52.3	\$80.4	\$370.7	\$694.2	58.2%	\$592.8	49.7%	\$883.1	74.1%	\$592.8	49.7%
2018/2019	\$531.6	\$130.1	\$832.7	(\$152.6)	\$680.0	(\$5.8)	\$16.2	\$112.2	\$655.87	96.4%	\$525.3	77.2%	\$621.3	91.4%	\$621.3	91.4%
2019/2020	\$547.6	\$91.9	\$612.1	(\$169.4)	\$442.7	(\$1.6)	\$21.6	\$157.8	\$637.9	144.1%	\$491.7	111.1%	\$627.9	141.8%	\$627.9	141.8%
2020/2021	\$392.7	\$179.9	\$899.6	(\$256.2)	\$643.4	(\$43.2)	(\$0.0)	(\$0.0)	\$529.31	82.3%	\$316.4	49.2%	\$316.4	49.2%	\$316.4	49.2%
2021/2022*	\$157.2	\$97.8	\$378.8	(\$46.9)	\$331.9	(\$15.2)	(\$5.1)	(\$5.1)	\$239.7	72.2%	\$202.9	61.1%	\$202.9	61.1%	\$202.9	61.1%
Total	\$5,047.3	\$2,624.1	\$11,816.8	(\$2,291.5)	\$9,525.3	(\$236.6)	\$307.8	\$1,531.0	\$7,434.8	78.1%	\$5,687.6	59.7%	\$6,910.9	72.6%	\$7,039.0	73.9%

* four months of 2021/2022 planning period

RPM reserve margin

	01-Jun-18	01-Jun-19	01-Jun-20	01-Jun-21	01-Jun-22
Forecast peak load ICAP (MW)	152,407.9	151,643.5	148,355.3	149,482.9	150,229.0
FRR peak load ICAP (MW)	12,732.9	12,284.2	11,488.3	11,717.7	28,535.5
PRD ICAP (MW)	0.0	0.0	558.0	510.0	230.0
Installed reserve margin (IRM)	16.1%	16.0%	15.5%	14.7%	14.5%
Pool wide average EFORd	6.07%	6.08%	5.78%	5.22%	5.08%
RPM committed less deficiency UCAP (MW) (generation and DR)	161,242.6	162,276.1	159,560.4	156,633.6	139,666.7
RPM committed less deficiency ICAP (MW) (generation and DR)	171,662.5	172,781.2	169,348.8	165,260.2	147,141.5
RPM peak load ICAP (MW)	139,675.0	139,359.3	136,309.0	137,255.2	121,463.5
Reserve margin	22.9%	24.0%	24.2%	20.4%	21.1%
Reserve margin in excess of IRM (%)	6.8%	8.0%	8.7%	5.7%	6.6%
Reserve margin in excess of IRM (MW)	9,499.8	11,124.4	11,911.9	7,828.5	8,065.7
Projected replacement capacity UCAP (MW)	0.0	0.0	0.0	0.0	0.0
Projected reserve margin	22.9%	24.0%	24.2%	20.4%	21.1%

EFORd and EAF by unit type: January through September, 2012 through 2021

Year	Unit Types															
	Coal		Combined Cycle		Combustion Turbine		Diesel		Hydroelectric		Nuclear		Other		Average	
	EFORd	1-EAF	EFORd	1-EAF	EFORd	1-EAF	EFORd	1-EAF	EFORd	1-EAF	EFORd	1-EAF	EFORd	1-EAF	EFORd	1-EAF
2012	10.0%	21.5%	3.1%	21.5%	6.5%	10.7%	4.7%	21.5%	5.2%	21.5%	1.6%	21.5%	8.3%	21.5%	6.7%	21.5%
2013	10.7%	22.7%	2.6%	13.0%	10.5%	13.0%	6.1%	22.7%	3.4%	22.7%	1.1%	22.7%	11.5%	22.7%	7.5%	22.7%
2014	12.9%	24.0%	4.6%	13.6%	17.7%	13.6%	15.1%	24.0%	3.2%	24.0%	1.9%	24.0%	12.9%	24.0%	10.0%	24.0%
2015	9.4%	20.1%	2.8%	12.1%	9.9%	12.1%	9.8%	20.1%	3.2%	20.1%	1.2%	20.1%	13.1%	20.1%	7.0%	20.1%
2016	9.7%	21.5%	3.6%	13.3%	5.3%	13.3%	7.0%	21.5%	3.1%	21.5%	2.2%	21.5%	9.8%	21.5%	6.1%	21.5%
2017	11.8%	24.3%	2.4%	11.4%	4.9%	11.4%	7.2%	24.3%	3.2%	24.3%	0.6%	24.3%	12.9%	24.3%	6.5%	24.3%
2018	11.4%	25.3%	2.2%	10.6%	6.4%	10.6%	6.8%	25.3%	3.0%	25.3%	0.8%	25.3%	9.6%	25.3%	6.2%	25.3%
2019	10.0%	23.0%	2.0%	11.2%	5.0%	11.2%	8.0%	23.0%	1.8%	23.0%	0.7%	23.0%	9.6%	23.0%	5.4%	23.0%
2020	8.7%	20.9%	4.1%	11.0%	4.1%	11.0%	7.7%	20.9%	5.4%	20.9%	1.6%	20.9%	17.0%	20.9%	6.1%	20.9%
2021	11.0%	26.9%	3.7%	12.6%	5.3%	12.6%	10.0%	26.9%	9.0%	26.9%	0.9%	26.9%	18.5%	26.9%	7.0%	26.9%
Average	10.6%	23.0%	3.1%	13.1%	7.5%	12.0%	8.2%	23.0%	4.0%	23.0%	1.3%	23.0%	12.3%	23.0%	6.9%	23.0%

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