

Market Monitor Report

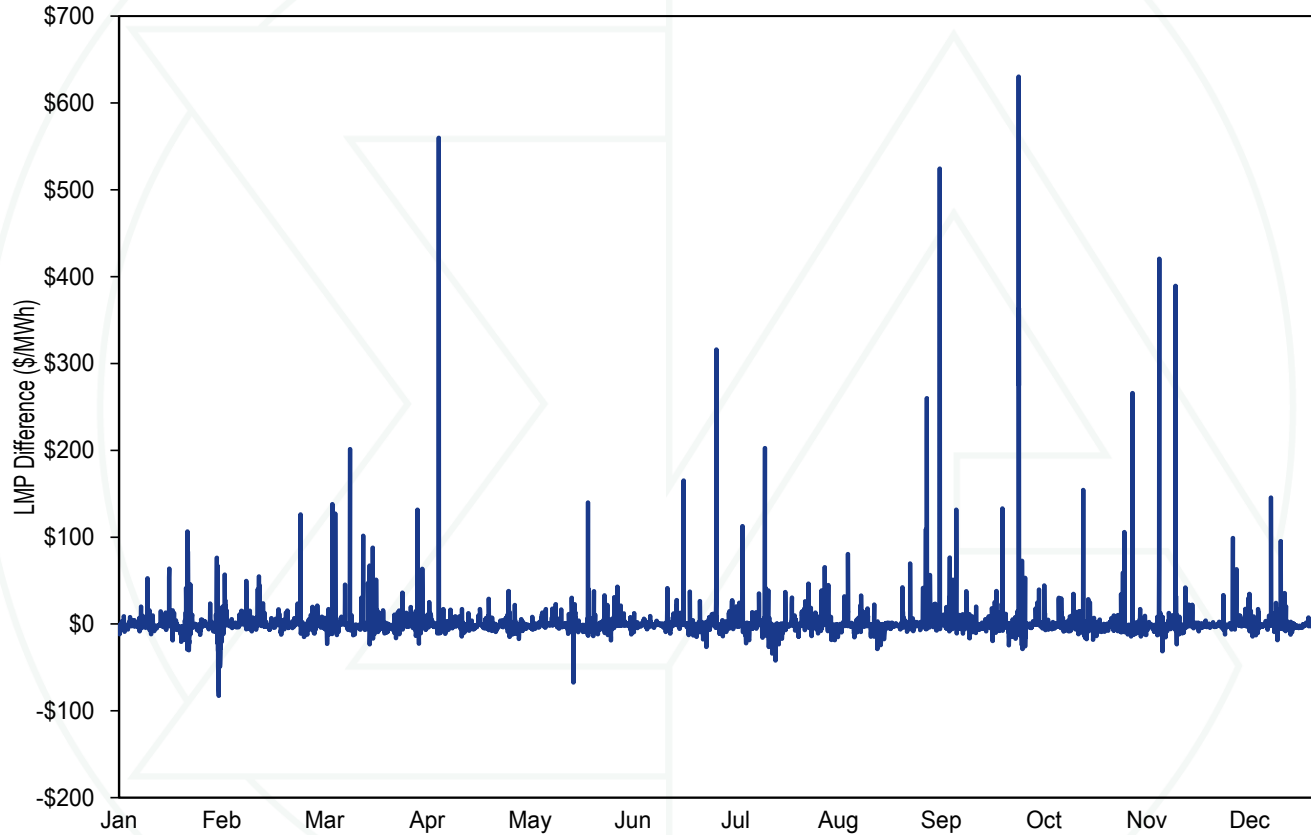
MC Webinar
01.21.2020

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Monitoring Analytics

RT Hourly LMP Minus DA Hourly LMP



DA and RT Average LMP

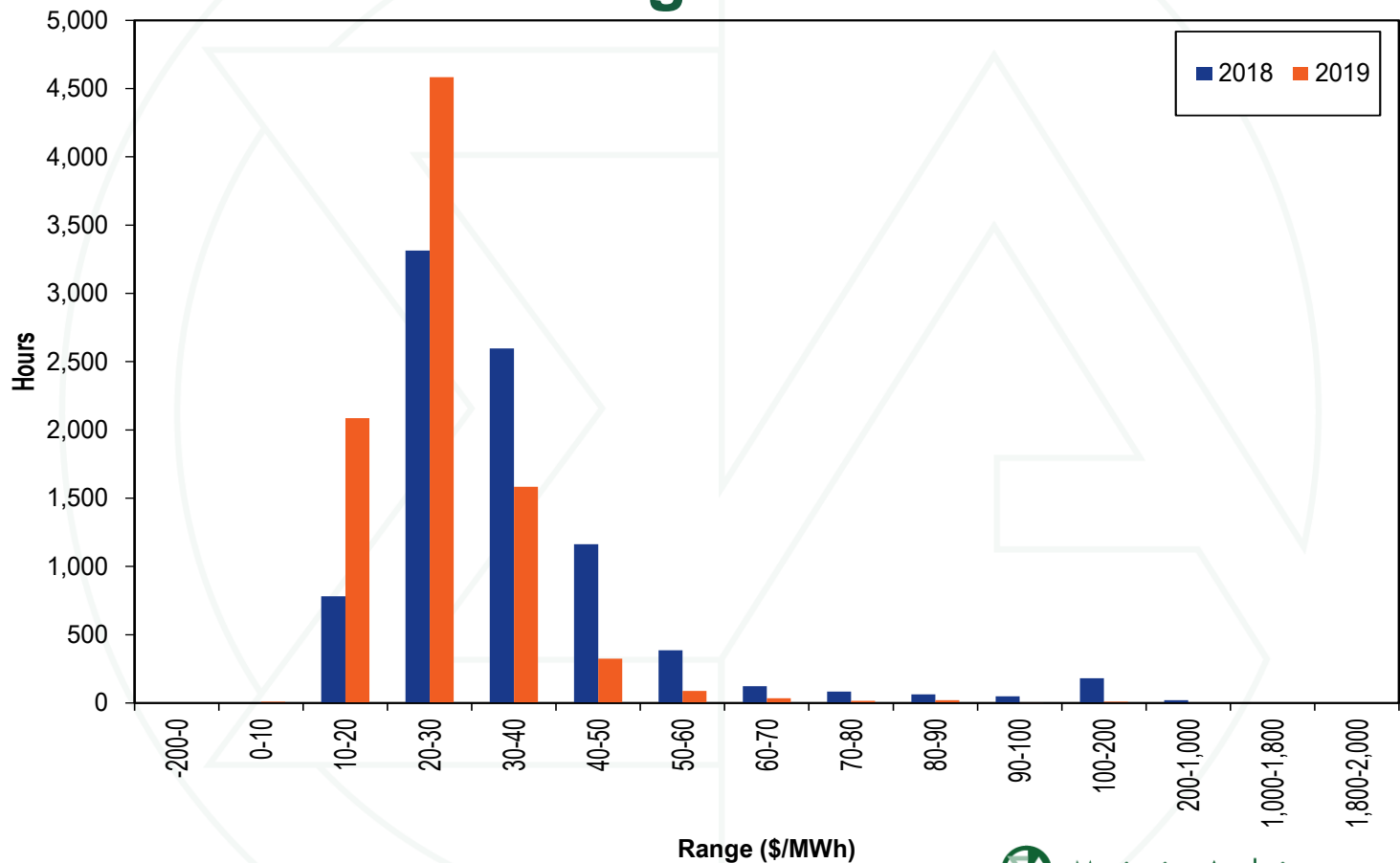
	Day-Ahead	Real-Time	Difference	Percent of Real Time
2001	\$32.75	\$32.38	(\$0.37)	(1.1%)
2002	\$28.46	\$28.30	(\$0.16)	(0.6%)
2003	\$38.73	\$38.28	(\$0.45)	(1.2%)
2004	\$41.43	\$42.40	\$0.97	2.3%
2005	\$57.89	\$58.08	\$0.18	0.3%
2006	\$48.10	\$49.27	\$1.17	2.4%
2007	\$54.67	\$57.58	\$2.90	5.3%
2008	\$66.12	\$66.40	\$0.28	0.4%
2009	\$37.00	\$37.08	\$0.08	0.2%
2010	\$44.57	\$44.83	\$0.26	0.6%
2011	\$42.52	\$42.84	\$0.32	0.7%
2012	\$32.79	\$33.11	\$0.32	1.0%
2013	\$37.15	\$36.55	(\$0.60)	(1.6%)
2014	\$49.15	\$48.22	(\$0.93)	(1.9%)
2015	\$34.12	\$33.39	(\$0.73)	(2.1%)
2016	\$28.10	\$27.57	(\$0.53)	(1.9%)
2017	\$29.48	\$29.42	(\$0.06)	(0.2%)
2018	\$35.69	\$35.75	\$0.06	0.2%
2019	\$26.03	\$26.02	(\$0.01)	(0.1%)



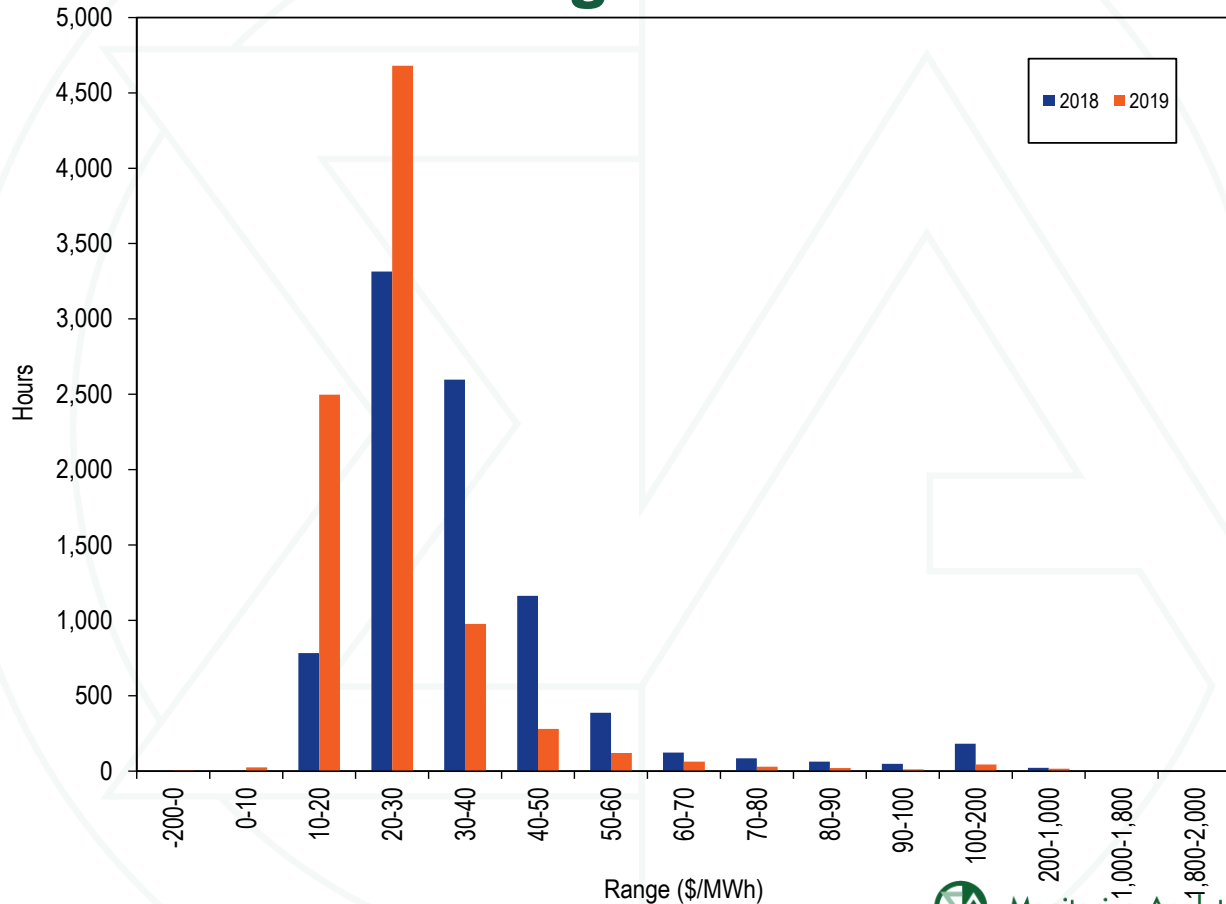
Frequency of RT Minus DA LMP

LMP	2018		2019	
	Frequency	Cumulative Percent	Frequency	Cumulative Percent
< (\$1,000)	0	0.00%	0	0.00%
(\$1,000) to (\$750)	0	0.00%	0	0.00%
(\$750) to (\$500)	0	0.00%	0	0.00%
(\$500) to (\$450)	0	0.00%	0	0.00%
(\$450) to (\$400)	0	0.00%	0	0.00%
(\$400) to (\$350)	0	0.00%	0	0.00%
(\$350) to (\$300)	0	0.00%	0	0.00%
(\$300) to (\$250)	0	0.00%	0	0.00%
(\$250) to (\$200)	0	0.00%	0	0.00%
(\$200) to (\$150)	1	0.01%	0	0.00%
(\$150) to (\$100)	3	0.05%	0	0.00%
(\$100) to (\$50)	32	0.41%	5	0.06%
(\$50) to \$0	5,715	65.65%	6,013	68.70%
\$0 to \$50	2,855	98.24%	2,681	99.30%
\$50 to \$100	112	99.52%	29	99.63%
\$100 to \$150	26	99.82%	16	99.82%
\$150 to \$200	5	99.87%	2	99.84%
\$200 to \$250	8	99.97%	3	99.87%
\$250 to \$300	1	99.98%	3	99.91%
\$300 to \$350	1	99.99%	1	99.92%
\$350 to \$400	0	99.99%	2	99.94%
\$400 to \$450	1	100.00%	1	99.95%
\$450 to \$500	0	100.00%	0	99.95%
\$500 to \$750	0	100.00%	4	100.00%
\$750 to \$1,000	0	100.00%	0	100.00%
\$1,000 to \$1,250	0	100.00%	0	100.00%
>= \$1,250	0	100.00%	0	100.00%

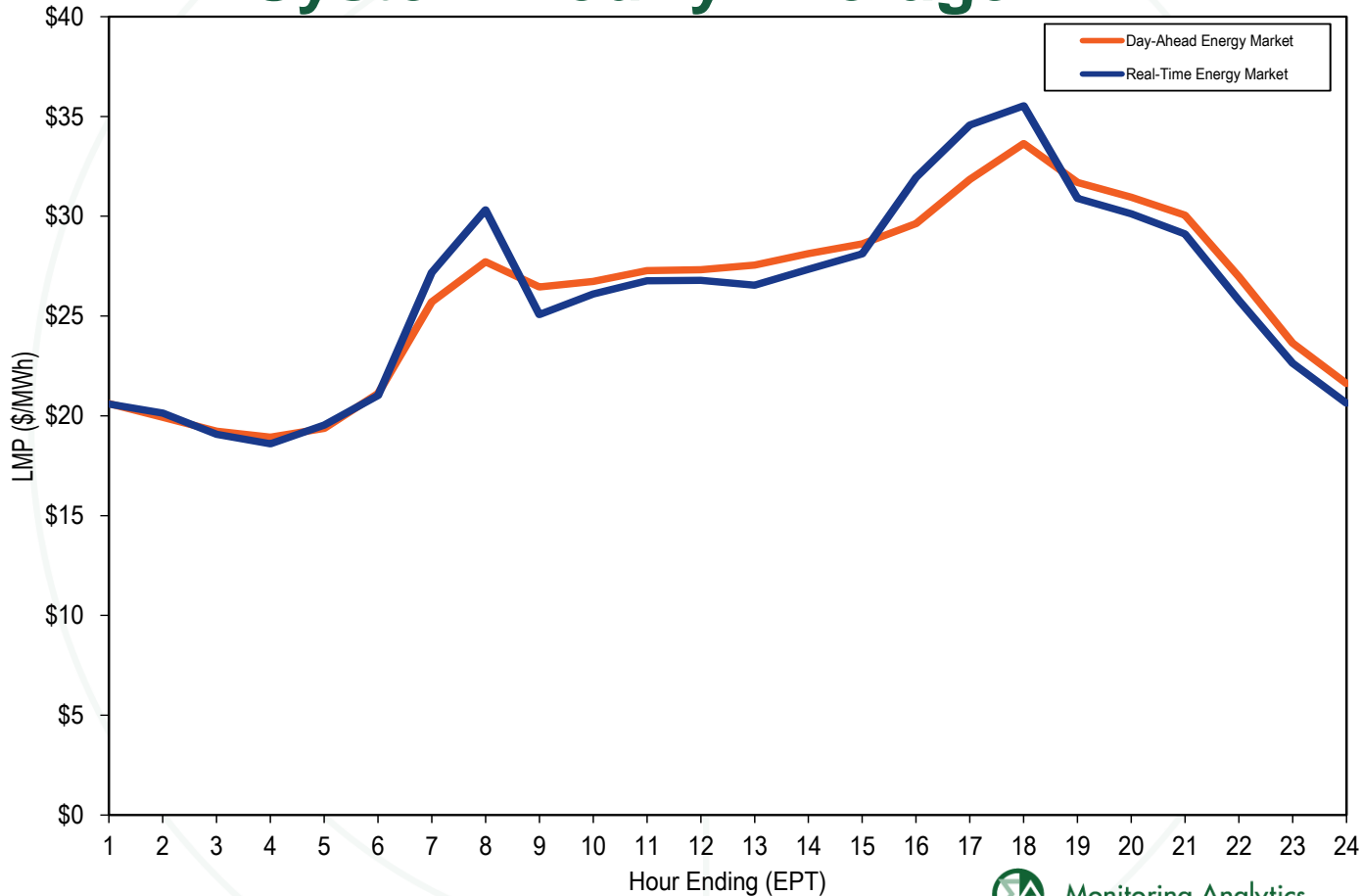
Average DA LMP



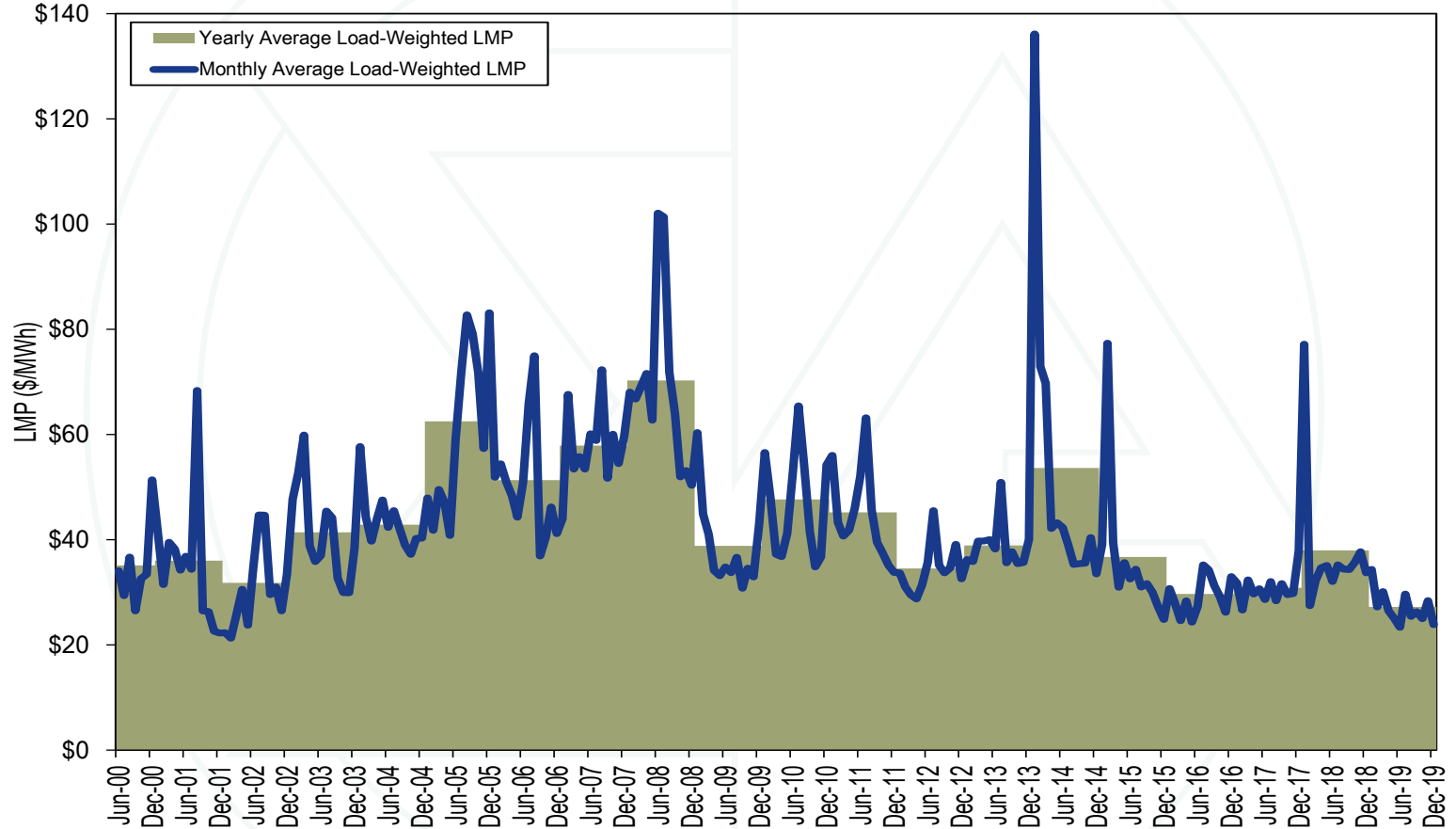
Average RT LMP



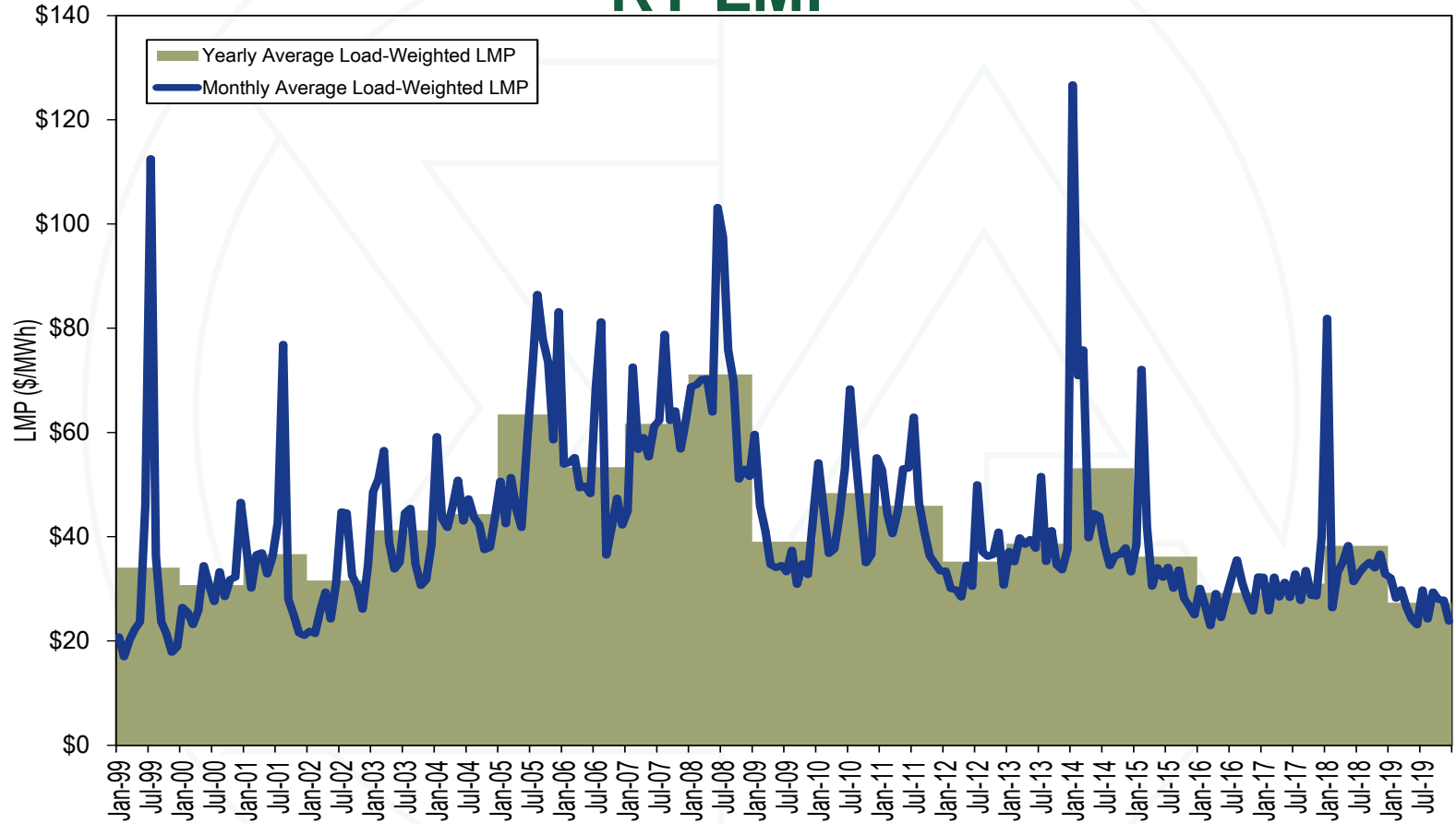
System Hourly Average LMP



DA LMP



RT LMP



DA and RT LMP

	2018				2019			
	Day-Ahead	Real-Time	Difference	Percent of Real Time	Day-Ahead	Real-Time	Difference	Percent of Real Time
Average	\$35.69	\$35.75	\$0.06	0.2%	\$26.03	\$26.02	(\$0.01)	(0.1%)
Median	\$30.96	\$28.28	(\$2.68)	(9.5%)	\$24.36	\$22.89	(\$1.47)	(6.4%)
Standard deviation	\$22.32	\$29.52	\$7.20	24.4%	\$9.35	\$21.19	\$11.84	55.9%
Peak average	\$41.41	\$40.81	(\$0.60)	(1.5%)	\$30.23	\$30.13	(\$0.09)	(0.3%)
Peak median	\$36.66	\$32.99	(\$3.67)	(11.1%)	\$27.95	\$25.34	(\$2.61)	(10.3%)
Peak standard deviation	\$22.71	\$28.01	\$5.30	18.9%	\$9.87	\$26.26	\$16.39	62.4%
Off peak average	\$30.70	\$31.33	\$0.62	2.0%	\$22.38	\$22.43	\$0.06	0.3%
Off peak median	\$25.43	\$24.41	(\$1.03)	(4.2%)	\$21.07	\$20.35	(\$0.72)	(3.5%)
Off peak standard deviation	\$20.73	\$30.10	\$9.37	31.1%	\$7.08	\$14.55	\$7.47	51.4%

DA LMP

	Day-Ahead, Load-Weighted, Average LMP			Year-to-Year Change		
	Average	Median	Standard Deviation	Average	Median	Standard Deviation
2000	\$35.12	\$28.50	\$22.26	NA	NA	NA
2001	\$36.01	\$29.02	\$37.48	2.5%	1.8%	68.4%
2002	\$31.80	\$26.00	\$20.68	(11.7%)	(10.4%)	(44.8%)
2003	\$41.43	\$38.29	\$21.32	30.3%	47.3%	3.1%
2004	\$42.87	\$41.96	\$16.32	3.5%	9.6%	(23.4%)
2005	\$62.50	\$54.74	\$31.72	45.8%	30.4%	94.3%
2006	\$51.33	\$46.72	\$26.45	(17.9%)	(14.6%)	(16.6%)
2007	\$57.88	\$55.91	\$25.02	12.8%	19.7%	(5.4%)
2008	\$70.25	\$62.91	\$33.14	21.4%	12.5%	32.4%
2009	\$38.82	\$36.67	\$14.03	(44.7%)	(41.7%)	(57.7%)
2010	\$47.65	\$42.06	\$20.59	22.7%	14.7%	46.8%
2011	\$45.19	\$39.66	\$24.05	(5.2%)	(5.7%)	16.8%
2012	\$34.55	\$31.84	\$15.48	(23.5%)	(19.7%)	(35.6%)
2013	\$38.93	\$35.77	\$18.05	12.7%	12.3%	16.6%
2014	\$53.62	\$39.84	\$59.62	37.8%	11.4%	230.4%
2015	\$36.73	\$30.60	\$25.46	(31.5%)	(23.2%)	(57.3%)
2016	\$29.68	\$27.00	\$11.64	(19.2%)	(11.8%)	(54.3%)
2017	\$30.85	\$28.21	\$12.64	3.9%	4.5%	8.6%
2018	\$37.97	\$32.49	\$24.76	23.1%	15.2%	95.9%
2019	\$27.23	\$25.28	\$10.18	(28.3%)	(22.2%)	(58.9%)



RT LMP

	Real-Time, Load-Weighted, Average LMP			Year-to-Year Change		
	Average	Median	Standard Deviation	Average	Median	Standard Deviation
1998	\$24.16	\$17.60	\$39.29	NA	NA	NA
1999	\$34.07	\$19.02	\$91.49	41.0%	8.1%	132.8%
2000	\$30.72	\$20.51	\$28.38	(9.8%)	7.9%	(69.0%)
2001	\$36.65	\$25.08	\$57.26	19.3%	22.3%	101.8%
2002	\$31.60	\$23.40	\$26.75	(13.8%)	(6.7%)	(53.3%)
2003	\$41.23	\$34.96	\$25.40	30.5%	49.4%	(5.0%)
2004	\$44.34	\$40.16	\$21.25	7.5%	14.9%	(16.3%)
2005	\$63.46	\$52.93	\$38.10	43.1%	31.8%	79.3%
2006	\$53.35	\$44.40	\$37.81	(15.9%)	(16.1%)	(0.7%)
2007	\$61.66	\$54.66	\$36.94	15.6%	23.1%	(2.3%)
2008	\$71.13	\$59.54	\$40.97	15.4%	8.9%	10.9%
2009	\$39.05	\$34.23	\$18.21	(45.1%)	(42.5%)	(55.6%)
2010	\$48.35	\$39.13	\$28.90	23.8%	14.3%	58.7%
2011	\$45.94	\$36.54	\$33.47	(5.0%)	(6.6%)	15.8%
2012	\$35.23	\$30.43	\$23.66	(23.3%)	(16.7%)	(29.3%)
2013	\$38.66	\$33.25	\$23.78	9.7%	9.3%	0.5%
2014	\$53.14	\$36.20	\$76.20	37.4%	8.9%	220.4%
2015	\$36.16	\$27.66	\$31.06	(31.9%)	(23.6%)	(59.2%)
2016	\$29.23	\$25.01	\$16.12	(19.2%)	(9.6%)	(48.1%)
2017	\$30.99	\$26.35	\$19.32	6.0%	5.4%	19.9%
2018	\$38.24	\$29.55	\$32.89	23.4%	12.1%	70.2%
2019	\$27.32	\$23.63	\$23.12	(28.6%)	(20.0%)	(29.7%)



Zonal DA LMP

Zone	Day-Ahead Average LMP			Day-Ahead, Load-Weighted, Average LMP		
	2018	2019	Percent Change	2018	2019	Percent Change
AECO	\$34.67	\$23.70	(31.6%)	\$36.71	\$24.92	(32.1%)
AEP	\$35.42	\$26.81	(24.3%)	\$37.46	\$28.02	(25.2%)
APS	\$36.84	\$26.68	(27.6%)	\$39.15	\$27.84	(28.9%)
ATSI	\$37.10	\$27.05	(27.1%)	\$39.03	\$28.14	(27.9%)
BGE	\$40.37	\$29.22	(27.6%)	\$43.79	\$30.93	(29.4%)
ComEd	\$28.65	\$23.59	(17.7%)	\$30.13	\$24.62	(18.3%)
DAY	\$36.65	\$27.93	(23.8%)	\$38.86	\$29.27	(24.7%)
DEOK	\$37.33	\$27.22	(27.1%)	\$40.11	\$28.64	(28.6%)
DLCO	\$39.38	\$27.83	(29.3%)	\$43.29	\$29.33	(32.2%)
Dominion	\$38.20	\$25.06	(34.4%)	\$42.48	\$27.44	(35.4%)
DPL	\$36.98	\$26.63	(28.0%)	\$39.10	\$27.72	(29.1%)
EKPC	\$33.40	\$26.39	(21.0%)	\$36.01	\$27.97	(22.3%)
JCPL	\$34.34	\$23.78	(30.7%)	\$36.65	\$25.04	(31.7%)
Met-Ed	\$34.38	\$24.60	(28.4%)	\$36.78	\$25.78	(29.9%)
OVEC	\$31.48	\$25.91	NA	NA	\$28.03	NA
PECO	\$33.74	\$23.26	(31.0%)	\$35.96	\$24.38	(32.2%)
PENELEC	\$35.41	\$25.57	(27.8%)	\$37.59	\$26.89	(28.5%)
Pepco	\$39.37	\$28.38	(27.9%)	\$42.61	\$29.99	(29.6%)
PPL	\$33.19	\$23.30	(29.8%)	\$35.68	\$24.39	(31.6%)
PSEG	\$34.87	\$24.03	(31.1%)	\$37.05	\$25.13	(32.2%)
RECO	\$35.14	\$24.60	(30.0%)	\$37.36	\$25.94	(30.6%)
PJM	\$35.69	\$26.03	(27.1%)	\$37.97	\$27.23	(28.3%)

Zonal RT LMP

Zone	Real-Time Average LMP			Real-Time, Load-Weighted, Average LMP		
	2018	2019	Percent Change	2018	2019	Percent Change
AECO	\$34.81	\$23.72	(31.8%)	\$37.06	\$25.07	(32.4%)
AEP	\$35.57	\$26.92	(24.3%)	\$37.79	\$28.21	(25.4%)
APS	\$36.94	\$26.55	(28.1%)	\$39.78	\$27.83	(30.0%)
ATSI	\$37.85	\$26.86	(29.0%)	\$40.19	\$28.06	(30.2%)
BGE	\$40.22	\$28.95	(28.0%)	\$44.03	\$30.82	(30.0%)
ComEd	\$28.57	\$23.53	(17.6%)	\$30.05	\$24.72	(17.7%)
DAY	\$36.55	\$27.96	(23.5%)	\$38.96	\$29.52	(24.2%)
DEOK	\$36.49	\$27.02	(26.0%)	\$39.16	\$28.49	(27.2%)
DLCO	\$39.07	\$27.59	(29.4%)	\$43.16	\$29.08	(32.6%)
Dominion	\$38.91	\$25.16	(35.3%)	\$43.76	\$27.71	(36.7%)
DPL	\$37.56	\$26.45	(29.6%)	\$39.98	\$27.69	(30.7%)
EKPC	\$33.22	\$26.54	(20.1%)	\$36.20	\$28.18	(22.2%)
JCPL	\$34.32	\$23.90	(30.3%)	\$37.08	\$25.40	(31.5%)
Met-Ed	\$34.12	\$24.92	(27.0%)	\$37.06	\$26.34	(28.9%)
OVEC	\$30.79	\$25.98	(15.6%)	\$30.89	\$26.23	(15.1%)
PECO	\$33.66	\$23.43	(30.4%)	\$36.36	\$24.75	(31.9%)
PENELEC	\$35.78	\$25.19	(29.6%)	\$37.90	\$26.17	(31.0%)
Pepco	\$39.14	\$28.03	(28.4%)	\$42.60	\$29.68	(30.3%)
PPL	\$32.94	\$23.55	(28.5%)	\$35.95	\$24.85	(30.9%)
PSEG	\$34.50	\$24.11	(30.1%)	\$36.68	\$25.28	(31.1%)
RECO	\$34.95	\$24.44	(30.1%)	\$37.40	\$25.72	(31.2%)
PJM	\$35.75	\$26.02	(27.2%)	\$38.24	\$27.32	(28.6%)



Review of Operations and Maintenance Costs

- **The MMU is reviewing the generator operations and maintenance costs approved by PJM in 2019.**
 - **Contacting Market Sellers and requesting additional documentation**
 - **Identifying prohibited costs and errors**
 - **Recommending that PJM impose Schedule 2 penalties and reevaluate the approved costs**
- **The MMU review follows PJM's review because the level of detail for the MMU's review requires more time.**

Issues Identified

- **Maintenance items that are not directly related to electric production**
 - **Based on PJM's standard as approved by FERC**
- **Double counting of costs**
- **Errors in calculations**
- **Calculations of energy offers inconsistent with PJM's approval**
 - **For example, approved maintenance adder in dollars per MWh is used in offer as dollars per hour.**
 - **Manual 15 provision effective in February**

Level of Maintenance Costs

- **Approved maintenance costs are significantly higher than last year.**
- **The 2019 State of the Market Report will show average levels of approved maintenance costs by technology.**
- **The effect on LMP will show up in 2020, having begun in late 2019. For most of 2019, the previously approved maintenance costs were used.**

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