

Market Monitor Report

MC Webinar
02.22.2022

IMM



Monitoring Analytics

CEJA

- **IL legislation established emissions caps for investor owned, gas-fired units with three years of operating history. New units will have caps after three years.**
- **Emissions caps based on average emissions over three year period from 2018 through 2020.**
- **Emissions caps low for some units, much higher for others.**
- **Total MW currently affected: >10,000 MW**
 - **About half have requested an opportunity cost calculation.**
- **The IMM is calculating opportunity costs for units that make request and provide required data.**

CEJA: Emissions Limits

- **No EGU or large greenhouse gas-emitting unit that uses gas as a fuel and is not a public GHG-emitting unit may emit, in any 12-month period, CO₂e or co-pollutants in excess of that unit's existing emissions for those pollutants (Public Act 102-0662, Section 90-55)**



CEJA: Existing Emissions

- **Existing emissions means:**
 - **for CO₂e, the total average tons-per-year of CO₂e emitted by the EGU or large GHG-emitting unit either in the years 2018 through 2020 or, if the unit was not yet in operation by January 1, 2018, in the first 3 full years of that unit's operation;**
 - **for any copollutant, the total average tons-per-year of that copollutant emitted by the EGU or large GHG-emitting unit either in the years 2018 through 2020 or, if the unit was not yet in operation by January 1, 2018, in the first 3 full years of that unit's operation.**

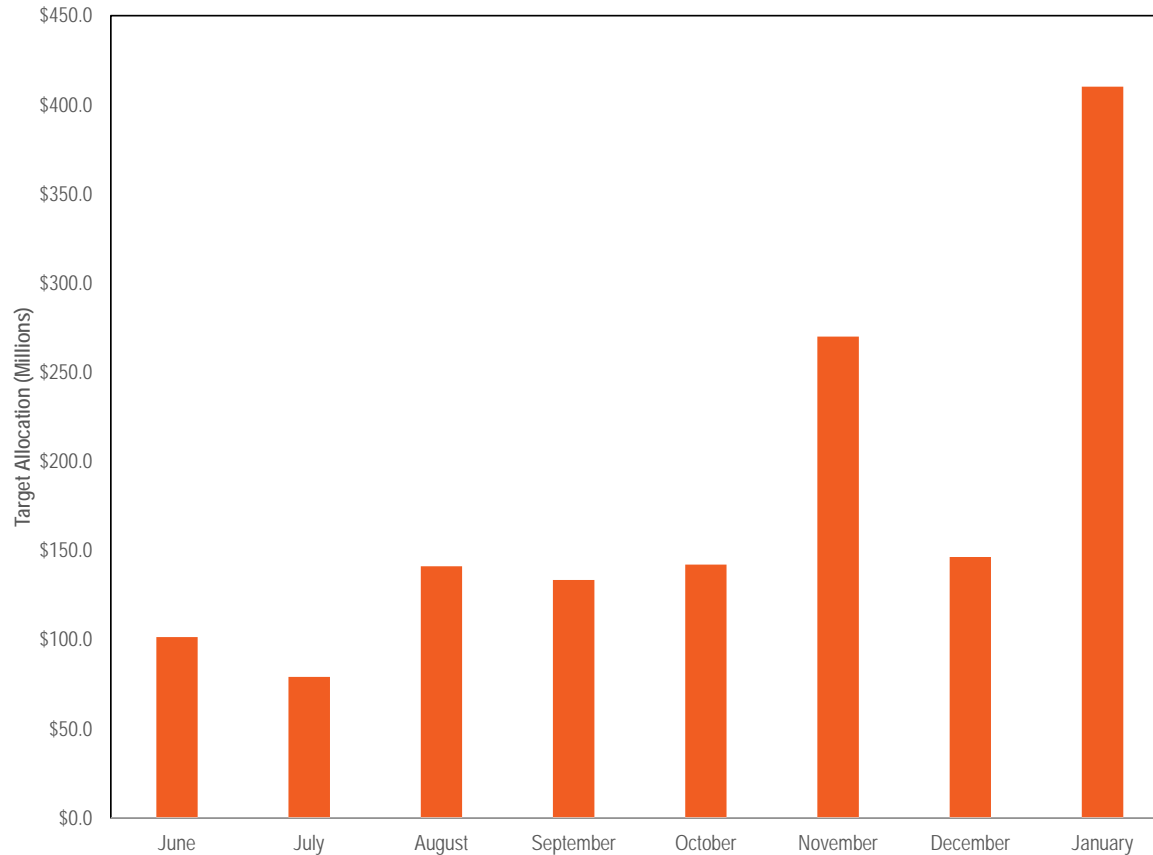
CEJA: CO₂e and Co-pollutants

- **Carbon dioxide equivalent (CO₂e) emissions means the total emissions of six greenhouse gases (carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride)**
- **Co-pollutants refers to the six criteria pollutants identified by the US EPA pursuant to the Clean Air Act: Carbon Monoxide, Lead, Nitrogen Dioxide, Ozone, Particle Pollution, Sulfur Dioxide**

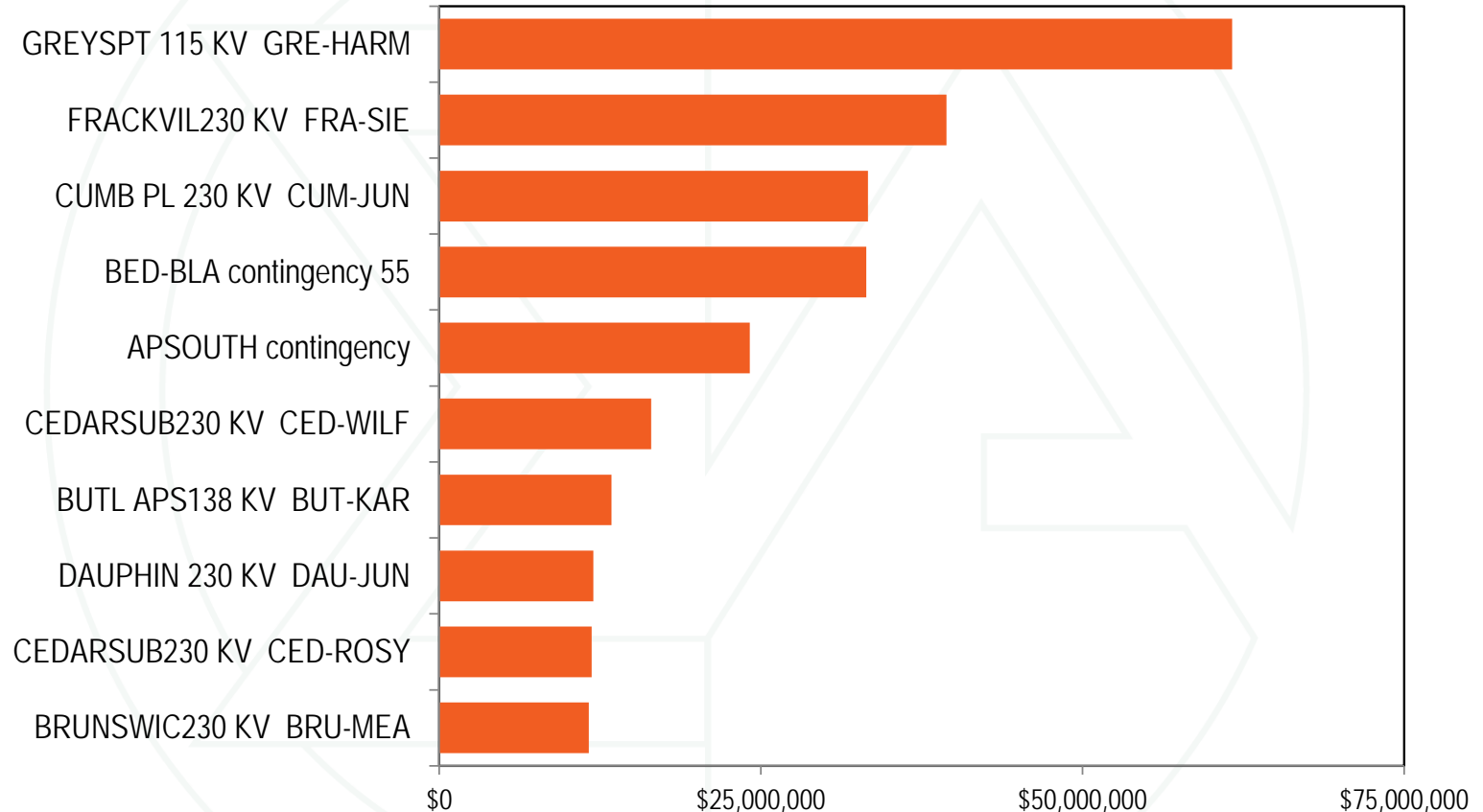
FTR Target Allocations: January 2022

- **FTR target allocations were higher in January 2022 than prior months in planning period.**
 - **Positive: \$557.0 million**
 - **Negative: -\$146.8 million**
 - **Net: \$410.2 million**
- **January target allocations were 28.8 percent of total target allocations for first 8 months of 2021/2022 planning period**
- **Target allocation from GRE-HARM constraint in Dominion was 15.0 percent of January total (\$61.6 million).**

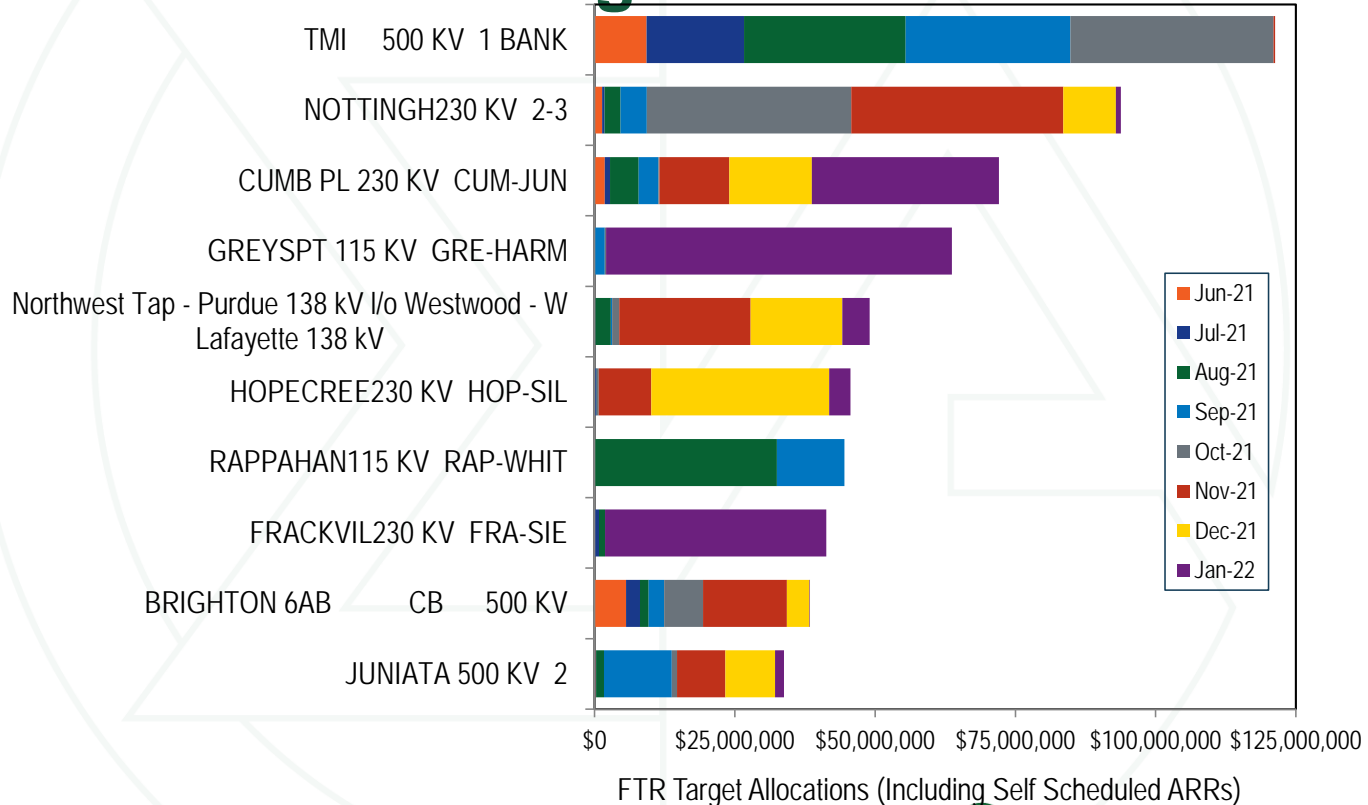
FTR Target Allocations: 2021/2022



FTR Target Allocations by Constraint: January 2022



FTR Target Allocations by Month: 2021/2022 Planning Period



GRE-HARM Constraint: 2021/2022 Planning Period

- **Outage of Lanexa-Dunnsville beginning January 5.**
- **Result was 96.7 percent of total target allocation for planning year to date on GRE-HARM constraint in one month.**

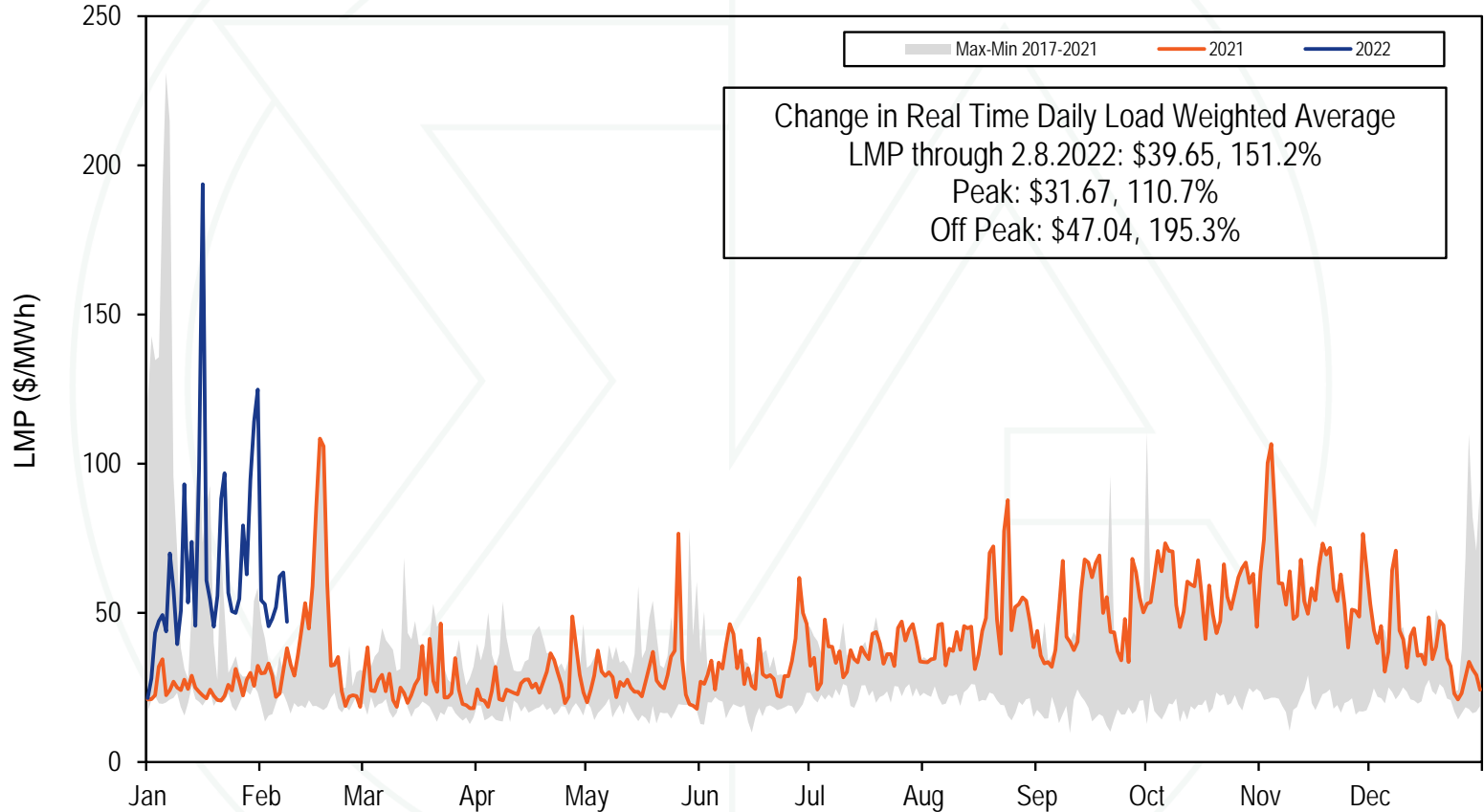
GRE-HARM FTR Over Allocation: January 2022

- **GRE-HARM constraint in January:**
 - **FTR target allocations: \$61.6 million**
 - **Day-ahead congestion: \$45.7 million**
 - **DA congestion less target allocations: \$15.9 million**
 - **Mismatch between definition of congestion paid to FTRs and actual congestion.**

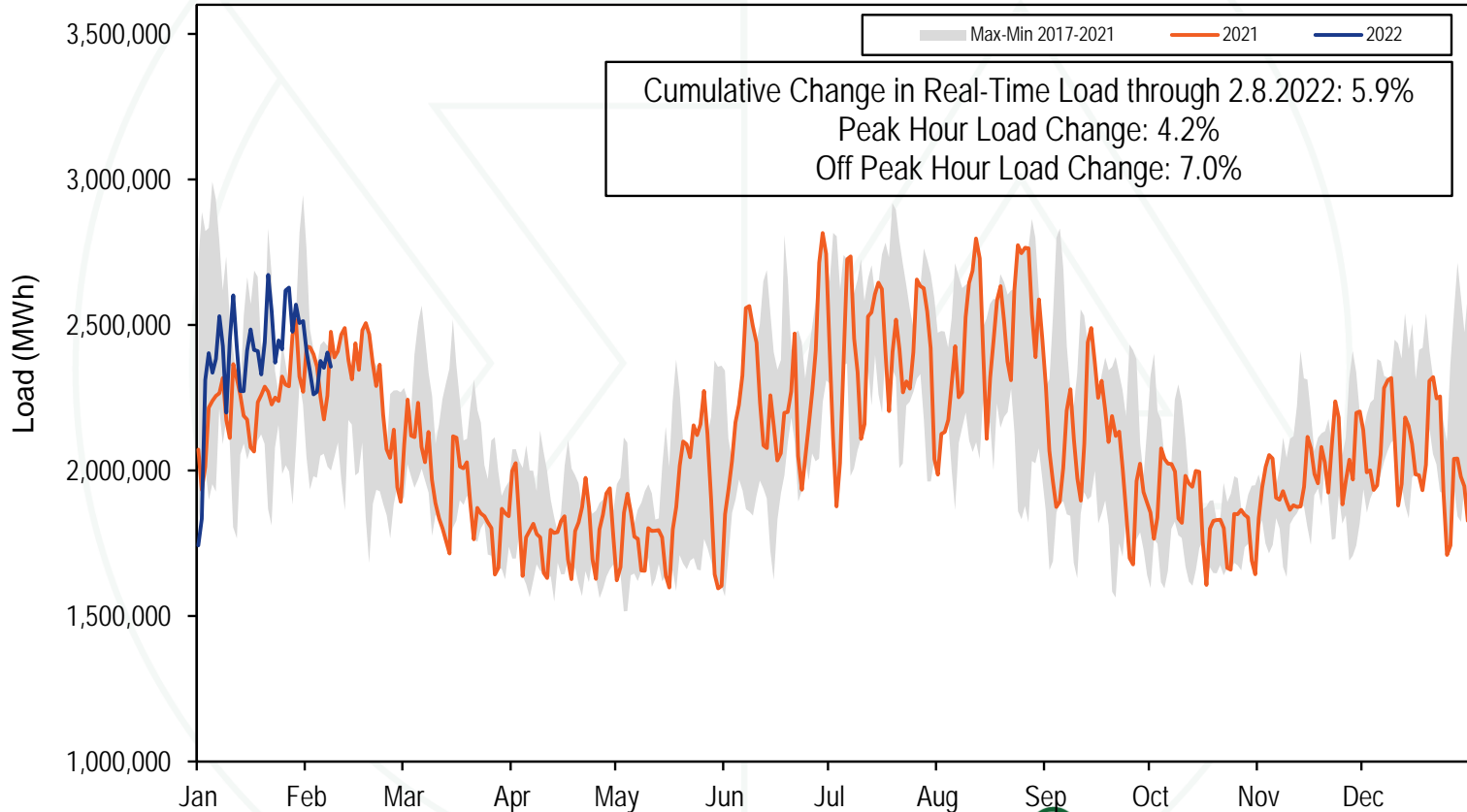
GRE-HARM FTR Over Allocation: January 2022

- **GRE-HARM constraint in January:**
 - **FTR target allocations: \$61.6 million**
 - **Day-ahead congestion: \$45.7 million**
 - **Balancing congestion: -\$7.9 million**
 - **Total congestion: \$37.8 million**
 - **Accounting for DA and balancing congestion, actual total congestion less target allocations: \$23.8 million**
 - **Congestion is currently incorrectly defined to exclude balancing congestion.**
 - **Mismatch between definition of congestion paid to FTRs and actual, correctly defined, total congestion.**

2022 YTD PJM Real-Time LMP



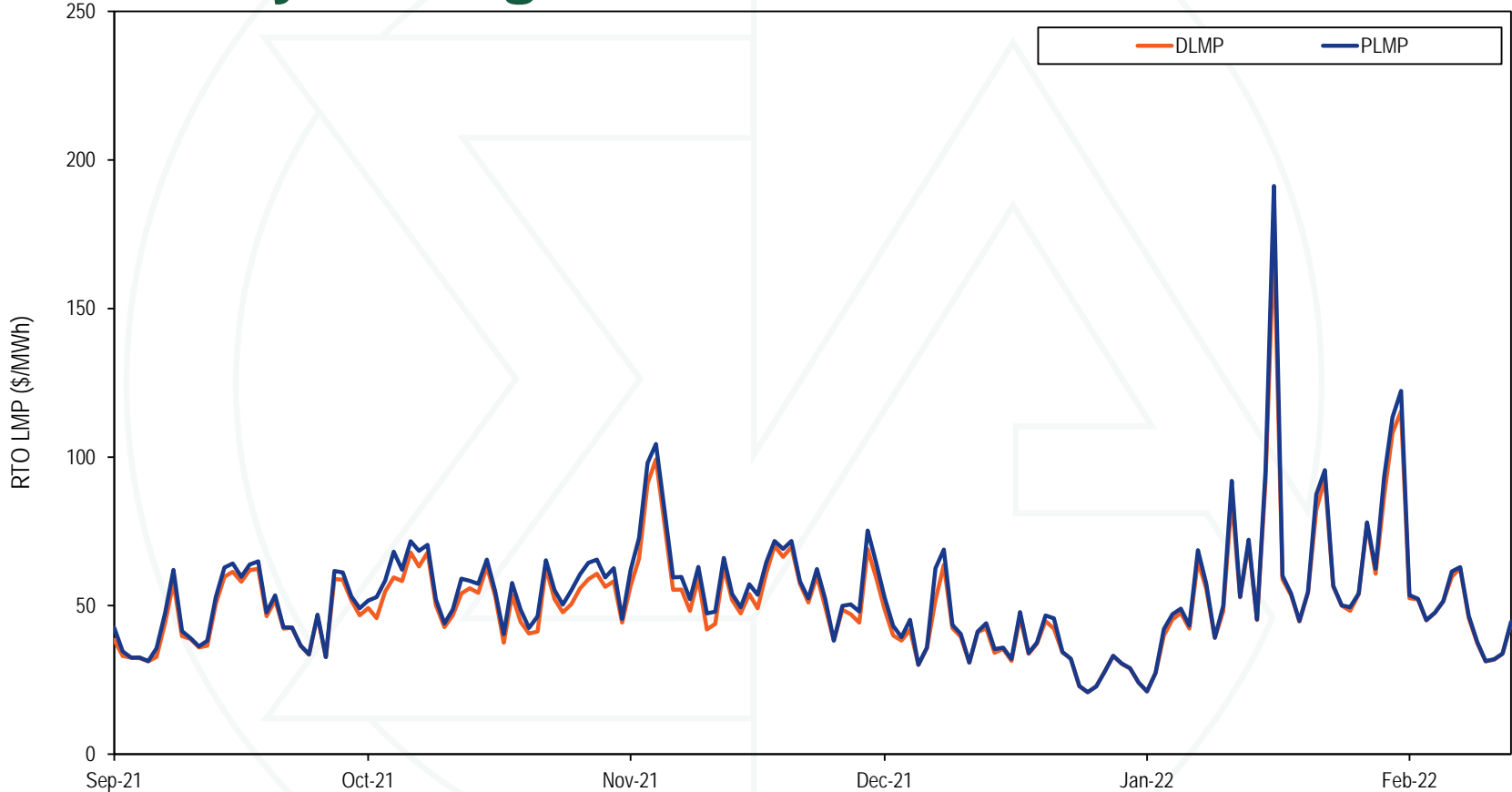
2022 YTD PJM Real-Time Daily Load



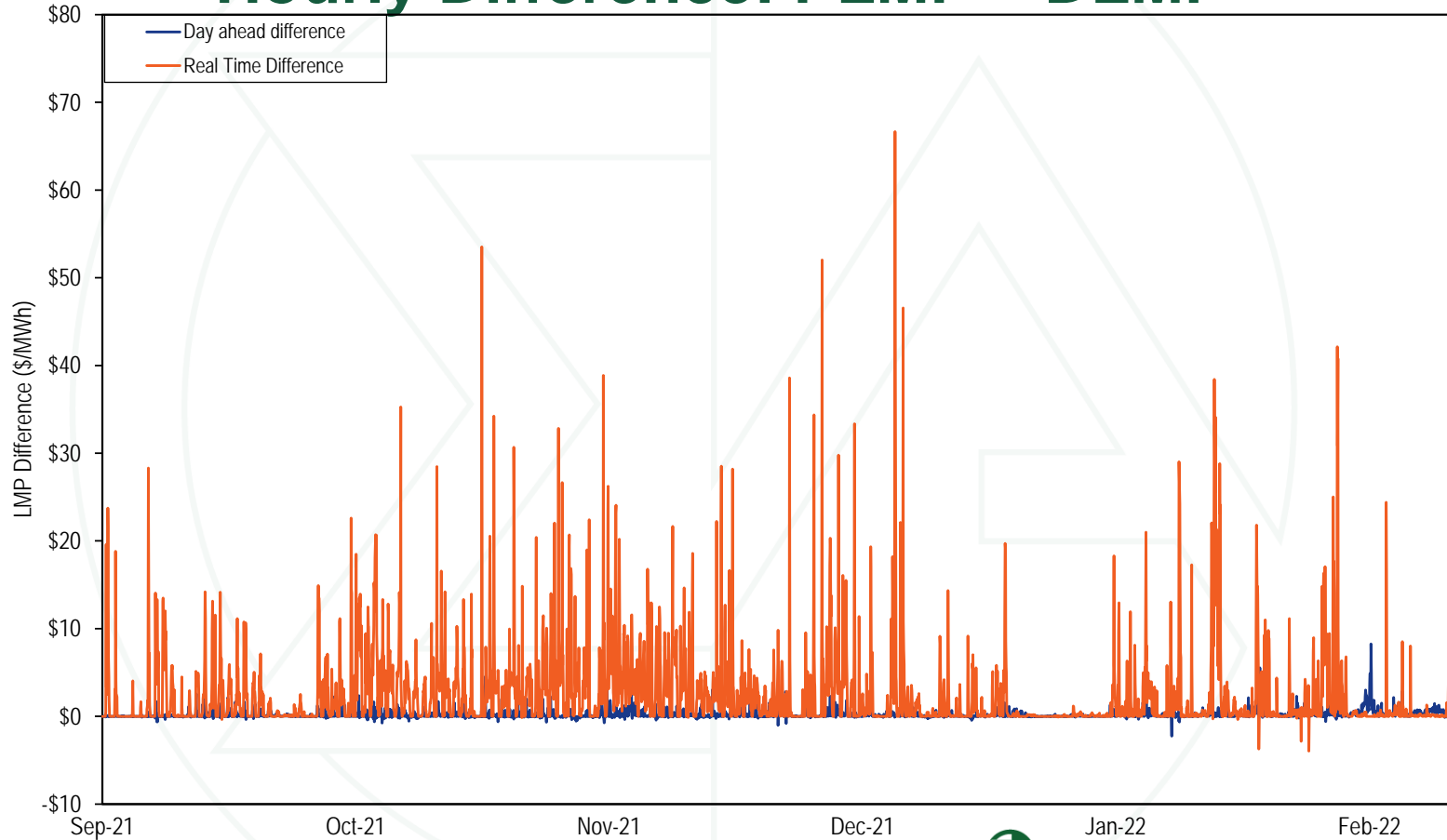
Monthly Average Load-Weighted PLMP and DLMP

Year	Month	Day-Ahead Load-Weighted Average				Real-Time Load-Weighted Average			
		DLMP	PLMP	Difference	Difference Percent	DLMP	PLMP	Difference	Difference Percent
2021	Sep	\$46.00	\$46.14	\$0.13	0.3%	\$47.74	\$49.65	\$1.90	4.0%
2021	Oct	\$57.86	\$57.98	\$0.12	0.2%	\$54.54	\$58.43	\$3.89	7.1%
2021	Nov	\$60.76	\$61.00	\$0.24	0.4%	\$59.30	\$63.04	\$3.74	6.3%
2021	Dec	\$37.74	\$37.85	\$0.11	0.3%	\$37.36	\$38.91	\$1.55	4.2%
2021	Sep - Dec	\$50.30	\$50.46	\$0.15	0.3%	\$49.48	\$52.21	\$2.73	5.5%
2022	Jan	\$63.93	\$64.15	\$0.22	0.3%	\$66.39	\$69.02	\$2.64	4.0%

Daily Average Real-Time PLMP and DLMP



Hourly Difference: PLMP – DLMP



Fast Start Units as a Percent of Marginal Units

Year	Month	Pricing Run				Dispatch Run			
		CT	Diesel	Wind	All Fast Start Units	CT	Diesel	Wind	All Fast Start Units
2021	Sep	6.7%	1.3%	0.0%	8.1%	2.2%	0.8%	0.0%	3.0%
2021	Oct	11.1%	2.1%	0.0%	13.3%	3.2%	1.4%	0.0%	4.6%
2021	Nov	11.3%	0.6%	0.0%	11.9%	3.2%	0.3%	0.0%	3.5%
2021	Dec	4.4%	0.6%	0.1%	5.2%	1.4%	0.3%	0.2%	1.8%
2022	Jan	5.0%	0.9%	0.2%	6.2%	1.3%	0.3%	0.2%	1.8%

Fast Start Impacts: Zonal Average Differences

2021 Sep - 2022 Jan								
Zone	Day Ahead				Real Time			
	Average DLMP	Average PLMP	Difference	Difference Percent	Average DLMP	Average PLMP	Difference	Difference Percent
AECO	\$44.47	\$44.58	\$0.11	0.2%	\$46.57	\$48.48	\$1.91	4.1%
AEP	\$51.43	\$51.60	\$0.17	0.3%	\$50.13	\$52.28	\$2.15	4.3%
APS	\$53.65	\$53.83	\$0.18	0.3%	\$52.97	\$55.21	\$2.24	4.2%
ATSI	\$51.11	\$51.27	\$0.16	0.3%	\$49.25	\$51.32	\$2.08	4.2%
BGE	\$60.48	\$60.66	\$0.17	0.3%	\$60.31	\$63.09	\$2.78	4.6%
COMED	\$43.22	\$43.39	\$0.16	0.4%	\$41.20	\$43.53	\$2.33	5.7%
DAY	\$53.72	\$53.89	\$0.17	0.3%	\$52.12	\$54.28	\$2.16	4.1%
DEOK	\$52.48	\$52.65	\$0.17	0.3%	\$50.20	\$52.29	\$2.09	4.2%
DOM	\$58.80	\$58.96	\$0.16	0.3%	\$60.08	\$62.68	\$2.60	4.3%
DPL	\$50.72	\$50.89	\$0.18	0.3%	\$51.29	\$54.21	\$2.92	5.7%
DUQ	\$50.13	\$50.29	\$0.16	0.3%	\$48.48	\$50.50	\$2.02	4.2%
EKPC	\$52.51	\$52.67	\$0.17	0.3%	\$50.80	\$52.92	\$2.12	4.2%
JCPL	\$46.88	\$46.99	\$0.11	0.2%	\$48.93	\$51.09	\$2.16	4.4%
METED	\$55.78	\$55.91	\$0.13	0.2%	\$56.00	\$58.31	\$2.31	4.1%
OVEC	\$50.91	\$51.08	\$0.17	0.3%	\$49.27	\$51.32	\$2.06	4.2%
PECO	\$44.74	\$44.84	\$0.10	0.2%	\$46.63	\$48.59	\$1.96	4.2%
PENELEC	\$53.52	\$53.69	\$0.17	0.3%	\$51.07	\$52.99	\$1.93	3.8%
PEPCO	\$59.27	\$59.44	\$0.17	0.3%	\$60.28	\$63.04	\$2.76	4.6%
PPL	\$49.72	\$49.84	\$0.12	0.2%	\$49.52	\$51.58	\$2.06	4.2%
PSEG	\$48.07	\$48.18	\$0.11	0.2%	\$50.07	\$52.28	\$2.20	4.4%
RECO	\$50.57	\$50.69	\$0.11	0.2%	\$52.17	\$54.47	\$2.30	4.4%

Fast Start Impacts: Hub Average Differences

2021 Sep - 2022 Jan

Day Ahead

Real Time

Hub	Day Ahead				Real Time			
	Average DLMP	Average PLMP	Difference	Difference Percent	Average DLMP	Average PLMP	Difference	Difference Percent
AEP GEN HUB	\$50.26	\$50.43	\$0.17	0.3%	\$48.49	\$50.53	\$2.04	4.2%
AEP-DAYTON HUB	\$50.61	\$50.78	\$0.17	0.3%	\$48.80	\$50.94	\$2.14	4.4%
ATSI GEN HUB	\$50.17	\$50.33	\$0.16	0.3%	\$48.06	\$50.10	\$2.04	4.2%
CHICAGO GEN HUB	\$42.48	\$42.64	\$0.16	0.4%	\$40.16	\$42.43	\$2.28	5.7%
CHICAGO HUB	\$43.50	\$43.66	\$0.17	0.4%	\$41.47	\$43.82	\$2.35	5.7%
DOMINION HUB	\$57.65	\$57.80	\$0.15	0.3%	\$58.74	\$61.24	\$2.49	4.2%
EASTERN HUB	\$49.84	\$50.03	\$0.19	0.4%	\$50.54	\$53.36	\$2.82	5.6%
N ILLINOIS HUB	\$43.17	\$43.34	\$0.17	0.4%	\$41.11	\$43.42	\$2.32	5.6%
NEW JERSEY HUB	\$47.04	\$47.15	\$0.11	0.2%	\$49.03	\$51.17	\$2.14	4.4%
OHIO HUB	\$50.28	\$50.45	\$0.17	0.3%	\$48.27	\$50.43	\$2.16	4.5%
WEST INT HUB	\$52.43	\$52.59	\$0.16	0.3%	\$51.58	\$53.79	\$2.20	4.3%
WESTERN HUB	\$55.34	\$55.51	\$0.17	0.3%	\$53.84	\$56.11	\$2.27	4.2%



Zonal PLMP and DLMP Difference Frequency

2021 Sep - 2022 Jan

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%	1.3%	0.0%	0.9%	47.2%	45.4%	3.2%	1.6%	0.3%	0.1%
AECO	0.0%	1.4%	0.3%	6.8%	47.8%	39.6%	2.3%	1.2%	0.4%	0.2%
AEP	0.0%	1.3%	0.0%	1.1%	47.3%	45.3%	3.3%	1.2%	0.3%	0.1%
APS	0.0%	1.3%	0.0%	1.2%	47.4%	44.7%	3.3%	1.6%	0.3%	0.1%
ATSI	0.0%	1.3%	0.0%	1.5%	47.3%	45.3%	3.0%	1.1%	0.3%	0.1%
BGE	0.0%	1.3%	0.1%	2.7%	47.4%	41.5%	4.2%	2.1%	0.6%	0.2%
COMED	0.0%	1.3%	0.0%	2.2%	47.7%	43.8%	3.2%	1.3%	0.3%	0.1%
DAY	0.0%	1.3%	0.0%	1.3%	47.5%	45.0%	3.3%	1.3%	0.3%	0.1%
DEOK	0.0%	1.3%	0.0%	1.3%	47.5%	45.2%	3.2%	1.2%	0.3%	0.1%
DOM	0.0%	1.3%	0.1%	2.2%	47.6%	42.4%	3.8%	1.9%	0.5%	0.1%
DPL	0.0%	1.3%	0.1%	9.6%	47.8%	34.5%	2.7%	2.8%	0.8%	0.4%
DUQ	0.0%	1.3%	0.0%	1.7%	47.4%	45.1%	3.0%	1.1%	0.3%	0.1%
EKPC	0.0%	1.3%	0.0%	1.4%	47.5%	44.9%	3.2%	1.3%	0.3%	0.1%
JCPL	0.0%	1.3%	0.1%	3.5%	47.8%	42.8%	2.4%	1.3%	0.5%	0.2%
METED	0.0%	1.3%	0.2%	3.4%	47.5%	41.4%	3.4%	1.8%	0.7%	0.2%
OVEC	0.0%	1.3%	0.0%	1.4%	47.5%	45.1%	3.0%	1.2%	0.3%	0.1%
PECO	0.0%	1.3%	0.1%	8.4%	47.8%	38.2%	2.4%	1.2%	0.5%	0.2%
PENELEC	0.0%	1.3%	0.1%	1.4%	47.3%	44.8%	3.4%	1.3%	0.3%	0.1%
PEPCO	0.0%	1.3%	0.1%	2.8%	47.5%	41.5%	4.1%	2.1%	0.5%	0.2%
PPL	0.0%	1.3%	0.1%	3.2%	47.6%	42.9%	2.8%	1.5%	0.5%	0.1%
PSEG	0.0%	1.3%	0.1%	3.4%	47.8%	42.9%	2.6%	1.4%	0.5%	0.2%
RECO	0.0%	1.3%	0.1%	2.5%	47.5%	43.8%	2.6%	1.5%	0.5%	0.2%

Intermittent Generation in Excess of ICAP: 2019

2019 Summer Testing Hours (June through August, 2pm - 6pm)

	MWh	MWh > ICAP	Percent
Solar	281,924.2	74,348.8	26.4%
Wind	559,859.2	308,554.1	55.1%
Solar & Wind	841,783.4	382,902.9	45.5%

Intermittent Generation in Excess of ICAP: 2020

2020 Summer Testing Hours (June through August, 2pm - 6pm)

	MWh	MWh > ICAP	Percent
Solar	367,693.5	90,858.6	24.7%
Wind	463,991.8	226,610.6	48.8%
Solar & Wind	831,685.3	317,469.2	38.2%

Intermittent Generation in Excess of ICAP: 2021

2021 Summer Testing Hours (June through August, 2pm - 6pm)

	MWh	MWh > ICAP	Percent
Solar	756,448.6	222,893.6	29.5%
Wind	565,146.0	281,788.1	49.9%
Solar & Wind	1,321,594.6	504,681.7	38.2%

Intermittent Generation in Excess of ICAP: 2019-2021

2019 - 2021 Summer Testing Hours (June through August, 2pm - 6pm)

	MWh	MWh > ICAP	Percent
Solar	1,406,066.2	388,100.9	27.6%
Wind	1,588,997.1	816,952.9	51.4%
Solar & Wind	2,995,063.3	1,205,053.8	40.2%

Intermittent Generation Above ICAP

- **Definitions:**
 - **ICAP is the derated MW value of a resource**
 - **ICAP is the amount of capacity sold in the PJM capacity market**
 - **ICAP equals CIR value**

Intermittent Generation Above ICAP

- **Summer testing hours are defined by PJM as the 368 hours between 2pm and 6pm, beginning on June 1 and ending on August 31.**
- **For each wind and solar generator, hourly generation was compared to the generator's ICAP over three summer testing periods, 2019-2021.**
- **The MWh in excess of ICAP equals the sum of the hourly generation in excess of the MWh produced by the rated ICAP during the summer testing hours.**

Wind and Solar ICAP

Fuel	Current ICAP (MW)	ICAP based on Max MWH		ICAP based on current CIR levels	
		ICAP ₁ (MW)	Percent Difference	ICAP ₂ (MW)	Percent Difference
Solar	1,818.4	3,563.3	96.0%	1,455.6	(20.0%)
Wind	1,575.4	8,922.2	466.3%	804.7	(48.9%)
Wind & Solar	3,393.8	12,485.5	267.9%	2,260.3	(33.4%)

ICAP Calculations

- **Current ICAP: ICAP rating using Appendix B of PJM Manual 21**
 - **Manual 21 uses the terms rated ICAP and UCAP for the same concept.**
- **ICAP₁: the maximum generation for each wind and solar generator over three summer testing periods.**
- **ICAP₂: the value obtained by capping the hourly generation for each wind and solar generator at the CIR and applying the method in Appendix B of PJM Manual 21.**

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