

Market Monitor Report

MC Webinar
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Monitoring Analytics

Topics

- **LMP recent history**
- **Replacement capacity results**
- **UTC data**
- **PJM and IMM approaches to UTC/FTR forfeitures**
- **Pipeline ratable takes and energy offers**

PJM real-time, monthly and annual, load-weighted, average LMP: 1999 through 2016

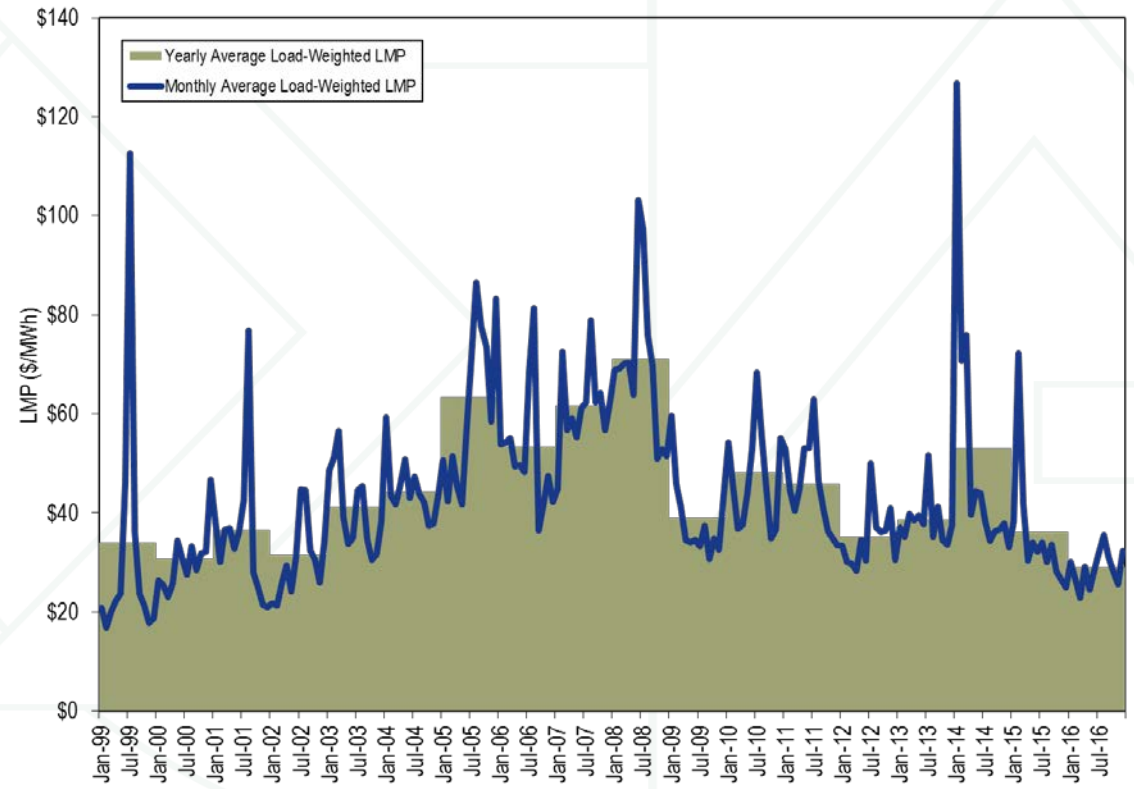


Table 1 RPM commitments for all Capacity Resources: June 1, 2007 to June 1, 2016

	UCAP (MW)				RPM Commitment Shortage	RPM Commitments Less Commitment Shortage
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments		
01-Jun-07	129,409.2	0.0	0.0	129,409.2	(8.1)	129,401.1
01-Jun-08	130,629.8	0.0	(766.5)	129,863.3	(246.3)	129,617.0
01-Jun-09	134,030.2	0.0	(2,068.2)	131,962.0	(14.7)	131,947.3
01-Jun-10	134,036.2	0.0	(4,179.0)	129,857.2	(8.8)	129,848.4
01-Jun-11	134,182.6	0.0	(6,717.6)	127,465.0	(79.3)	127,385.7
01-Jun-12	141,295.6	(11.7)	(9,400.6)	131,883.3	(157.2)	131,726.1
01-Jun-13	159,844.5	0.0	(12,235.3)	147,609.2	(65.4)	147,543.8
01-Jun-14	161,214.4	(9.4)	(13,615.9)	147,589.1	(1,208.9)	146,380.2
01-Jun-15	173,845.5	(326.1)	(11,849.4)	161,670.0	(1,822.0)	159,848.0
01-Jun-16	179,773.6	(24.6)	(16,153.5)	163,595.5	(709.8)	162,885.7

Table 2 RPM commitments for Generation Resources: June 1, 2007 to June 1, 2016

	UCAP (MW)				RPM Commitment Shortage	RPM Commitments Less Commitment Shortage
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments		
01-Jun-07	129,281.6	0.0	0.0	129,281.6	(8.1)	129,273.5
01-Jun-08	130,070.4	0.0	(726.5)	129,343.9	(187.9)	129,156.0
01-Jun-09	133,137.3	0.0	(1,593.5)	131,543.8	(0.4)	131,543.4
01-Jun-10	133,073.3	0.0	(3,662.7)	129,410.6	(1.1)	129,409.5
01-Jun-11	132,279.6	0.0	(5,665.4)	126,614.2	(79.3)	126,534.9
01-Jun-12	131,876.9	0.0	(7,112.1)	124,764.8	(117.2)	124,647.6
01-Jun-13	148,160.7	0.0	(9,041.5)	139,119.2	(21.4)	139,097.8
01-Jun-14	145,193.7	(9.4)	(7,088.8)	138,095.5	(989.3)	137,106.2
01-Jun-15	156,881.1	(5.0)	(7,355.6)	149,520.5	(1,759.3)	147,761.2
01-Jun-16	164,765.7	(5.2)	(11,413.9)	153,346.6	(397.6)	152,949.0

Table 3 RPM commitments for internal Generation Resources: June 1, 2007 to June 1, 2016

	RPM Cleared	Adjustments to Cleared	Net Replacements	UCAP (MW)		RPM Commitment Shortage	RPM Commitments Less Commitment Shortage
				RPM Commitments			
01-Jun-07	127,660.8	0.0	0.0	127,660.8		(8.1)	127,652.7
01-Jun-08	128,444.0	0.0	(715.7)	127,728.3		(187.9)	127,540.4
01-Jun-09	131,415.2	0.0	(1,827.8)	129,587.4		(0.4)	129,587.0
01-Jun-10	130,952.3	0.0	(3,445.7)	127,506.6		(1.1)	127,505.5
01-Jun-11	130,457.6	0.0	(5,651.0)	124,806.6		(79.3)	124,727.3
01-Jun-12	130,360.4	0.0	(6,988.8)	123,371.6		(60.8)	123,310.8
01-Jun-13	145,732.2	0.0	(8,562.3)	137,169.9		(21.4)	137,148.5
01-Jun-14	141,515.8	(9.4)	(6,277.2)	135,229.2		(989.3)	134,239.9
01-Jun-15	151,528.2	(5.0)	(7,515.5)	144,007.7		(1,735.8)	142,271.9
01-Jun-16	157,004.8	(5.2)	(8,479.5)	148,520.1		(396.2)	148,123.9

Table 4 RPM commitments for internal Generation Resources in service: June 1, 2007 to June 1, 2016

				UCAP (MW)		RPM Commitment Shortage	RPM Commitments Less Commitment Shortage
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments			
01-Jun-07	127,614.0	0.0	0.0	127,614.0		(8.1)	127,605.9
01-Jun-08	128,334.1	0.0	(707.2)	127,626.9		(182.8)	127,444.1
01-Jun-09	130,930.7	0.0	(2,030.3)	128,900.4		(0.4)	128,900.0
01-Jun-10	130,251.4	0.0	(3,403.1)	126,848.3		(1.1)	126,847.2
01-Jun-11	127,769.6	0.0	(4,871.1)	122,898.5		(2.2)	122,896.3
01-Jun-12	127,361.1	0.0	(7,055.9)	120,305.2		(13.2)	120,292.0
01-Jun-13	141,712.5	0.0	(8,082.8)	133,629.7		(21.4)	133,608.3
01-Jun-14	138,240.4	(9.4)	(6,304.1)	131,926.9		(365.2)	131,561.7
01-Jun-15	146,096.4	(5.0)	(6,656.8)	139,434.6		(395.5)	139,039.1
01-Jun-16	147,860.0	(5.2)	(6,138.4)	141,716.4		(51.1)	141,665.3

Table 5 RPM commitments for internal Generation Resources not in service: June 1, 2007 to June 1, 2016

				UCAP (MW)		RPM Commitment Shortage	RPM Commitments Less Commitment Shortage
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments			
01-Jun-07	46.8	0.0	0.0	46.8		0.0	46.8
01-Jun-08	109.9	0.0	(8.5)	101.4		(5.1)	96.3
01-Jun-09	484.5	0.0	202.5	687.0		0.0	687.0
01-Jun-10	700.9	0.0	(42.6)	658.3		0.0	658.3
01-Jun-11	2,688.0	0.0	(779.9)	1,908.1		(77.1)	1,831.0
01-Jun-12	2,998.0	0.0	68.4	3,066.4		(47.6)	3,018.8
01-Jun-13	4,018.4	0.0	(479.5)	3,538.9		0.0	3,538.9
01-Jun-14	3,274.0	0.0	28.3	3,302.3		(624.1)	2,678.2
01-Jun-15	4,751.9	0.0	(196.4)	4,555.5		(1,322.7)	3,232.8
01-Jun-16	7,461.0	0.0	(711.0)	6,750.0		(338.6)	6,411.4

Table 6 RPM commitments for external Generation Resources: June 1, 2007 to June 1, 2016

				UCAP (MW)		RPM Commitment Shortage	RPM Commitments Less Commitment Shortage
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments			
01-Jun-07	1,620.8	0.0	0.0	1,620.8		0.0	1,620.8
01-Jun-08	1,626.4	0.0	(10.8)	1,615.6		0.0	1,615.6
01-Jun-09	1,722.1	0.0	234.3	1,956.4		0.0	1,956.4
01-Jun-10	2,121.0	0.0	(217.0)	1,904.0		0.0	1,904.0
01-Jun-11	1,822.0	0.0	(14.4)	1,807.6		0.0	1,807.6
01-Jun-12	1,516.5	0.0	(123.3)	1,393.2	(56.4)		1,336.8
01-Jun-13	2,428.5	0.0	(479.2)	1,949.3	0.0		1,949.3
01-Jun-14	3,677.9	0.0	(811.6)	2,866.3	0.0		2,866.3
01-Jun-15	5,352.9	0.0	159.9	5,512.8	(23.5)		5,489.3
01-Jun-16	7,760.9	0.0	(2,934.4)	4,826.5	(1.4)		4,825.1

Table 7 RPM commitments and registrations for Demand Resources: June 1, 2007 to June 1, 2016

	UCAP (MW)						Registered DR		
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments	RPM Commitment Shortage	RPM Commitments Less Commitment Shortage	ICAP (MW)	UCAP Conversion Factor	UCAP (MW)
01-Jun-07	127.6	0.0	0.0	127.6	0.0	127.6	0.0	1.03260	0.0
01-Jun-08	559.4	0.0	(40.0)	519.4	(58.4)	461.0	488.0	1.03426	504.7
01-Jun-09	892.9	0.0	(474.7)	418.2	(14.3)	403.9	570.3	1.03308	589.2
01-Jun-10	962.9	0.0	(516.3)	446.6	(7.7)	438.9	572.8	1.03455	592.6
01-Jun-11	1,826.6	0.0	(1,052.4)	774.2	0.0	774.2	1,117.9	1.03455	1,156.5
01-Jun-12	8,752.6	(11.7)	(2,253.6)	6,487.3	(34.9)	6,452.4	7,443.7	1.03690	7,718.4
01-Jun-13	10,779.6	0.0	(3,314.4)	7,465.2	(30.5)	7,434.7	8,240.1	1.04208	8,586.8
01-Jun-14	14,943.0	0.0	(6,731.8)	8,211.2	(219.4)	7,991.8	8,923.4	1.04234	9,301.2
01-Jun-15	15,774.8	(321.1)	(4,829.7)	10,624.0	(61.8)	10,562.2	10,946.0	1.03783	11,360.0
01-Jun-16	13,284.7	(19.4)	(4,800.7)	8,464.6	(311.8)	8,152.8	8,961.7	1.04154	9,333.9

Table 8 RPM commitments for Energy Efficiency Resources: June 1, 2007 to June 1, 2016

				UCAP (MW)			
	RPM Cleared	Adjustments to Cleared	Net Replacements	RPM Commitments	RPM Commitment Shortage	RPM Commitments Less Commitment Shortage	
01-Jun-07	0.0	0.0	0.0	0.0	0.0	0.0	
01-Jun-08	0.0	0.0	0.0	0.0	0.0	0.0	
01-Jun-09	0.0	0.0	0.0	0.0	0.0	0.0	
01-Jun-10	0.0	0.0	0.0	0.0	0.0	0.0	
01-Jun-11	76.4	0.0	0.2	76.6	0.0	76.6	
01-Jun-12	666.1	0.0	(34.9)	631.2	(5.1)	626.1	
01-Jun-13	904.2	0.0	120.6	1,024.8	(13.5)	1,011.3	
01-Jun-14	1,077.7	0.0	204.7	1,282.4	(0.2)	1,282.2	
01-Jun-15	1,189.6	0.0	335.9	1,525.5	(0.9)	1,524.6	
01-Jun-16	1,723.2	0.0	61.1	1,784.3	(0.4)	1,783.9	

Table 9 Net replacements to cleared capacity by resource classifications: June 1, 2007 to June 1, 2016

	All Capacity Resources	Generation	Internal Generation	Internal Generation in Service	Internal Generation Not in Service	External Generation	Demand Resources	Energy Efficiency Resources
01-Jun-07	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
01-Jun-08	(0.6%)	(0.6%)	(0.6%)	(0.6%)	(7.7%)	(0.7%)	(7.2%)	
01-Jun-09	(1.5%)	(1.2%)	(1.4%)	(1.6%)	41.8%	13.6%	(53.2%)	
01-Jun-10	(3.1%)	(2.8%)	(2.6%)	(2.6%)	(6.1%)	(10.2%)	(53.6%)	
01-Jun-11	(5.0%)	(4.3%)	(4.3%)	(3.8%)	(29.0%)	(0.8%)	(57.6%)	0.3%
01-Jun-12	(6.7%)	(5.4%)	(5.4%)	(5.5%)	2.3%	(8.1%)	(25.8%)	(5.2%)
01-Jun-13	(7.7%)	(6.1%)	(5.9%)	(5.7%)	(11.9%)	(19.7%)	(30.7%)	13.3%
01-Jun-14	(8.4%)	(4.9%)	(4.4%)	(4.6%)	0.9%	(22.1%)	(45.1%)	19.0%
01-Jun-15	(6.8%)	(4.7%)	(5.0%)	(4.6%)	(4.1%)	3.0%	(31.3%)	28.2%
01-Jun-16	(9.0%)	(6.9%)	(5.4%)	(4.2%)	(9.5%)	(37.8%)	(36.2%)	3.5%

Table 10 Total replacements to cleared capacity by resource classification: June 1, 2007 to June 1, 2016

	All Capacity Resources	Generation	Internal Generation	Internal Generation in Service	Internal Generation Not in Service	External Generation	Demand Resources	Energy Efficiency Resources
01-Jun-07	(0.1%)	(0.1%)	(0.1%)	(0.1%)	0.0%	0.0%	0.0%	
01-Jun-08	(2.0%)	(2.0%)	(2.0%)	(2.0%)	(7.7%)	(1.3%)	(9.8%)	
01-Jun-09	(4.0%)	(3.7%)	(3.6%)	(3.5%)	(4.8%)	(12.5%)	(56.6%)	
01-Jun-10	(5.3%)	(5.0%)	(4.8%)	(4.8%)	(6.2%)	(12.1%)	(55.6%)	
01-Jun-11	(8.1%)	(7.3%)	(7.2%)	(6.8%)	(29.4%)	(13.1%)	(63.7%)	(1.0%)
01-Jun-12	(12.5%)	(10.4%)	(10.3%)	(10.4%)	(3.4%)	(19.2%)	(44.2%)	(25.2%)
01-Jun-13	(13.4%)	(8.8%)	(8.6%)	(8.5%)	(12.5%)	(21.4%)	(71.8%)	(70.4%)
01-Jun-14	(13.6%)	(8.2%)	(7.5%)	(7.5%)	(7.2%)	(36.8%)	(62.3%)	(64.9%)
01-Jun-15	(10.7%)	(6.9%)	(6.9%)	(6.5%)	(5.9%)	(6.8%)	(47.0%)	(39.5%)
01-Jun-16	(14.8%)	(10.9%)	(8.9%)	(7.8%)	(10.0%)	(52.8%)	(54.4%)	(77.8%)

PJM cleared up to congestion transactions by type (MW): 2015 and 2016

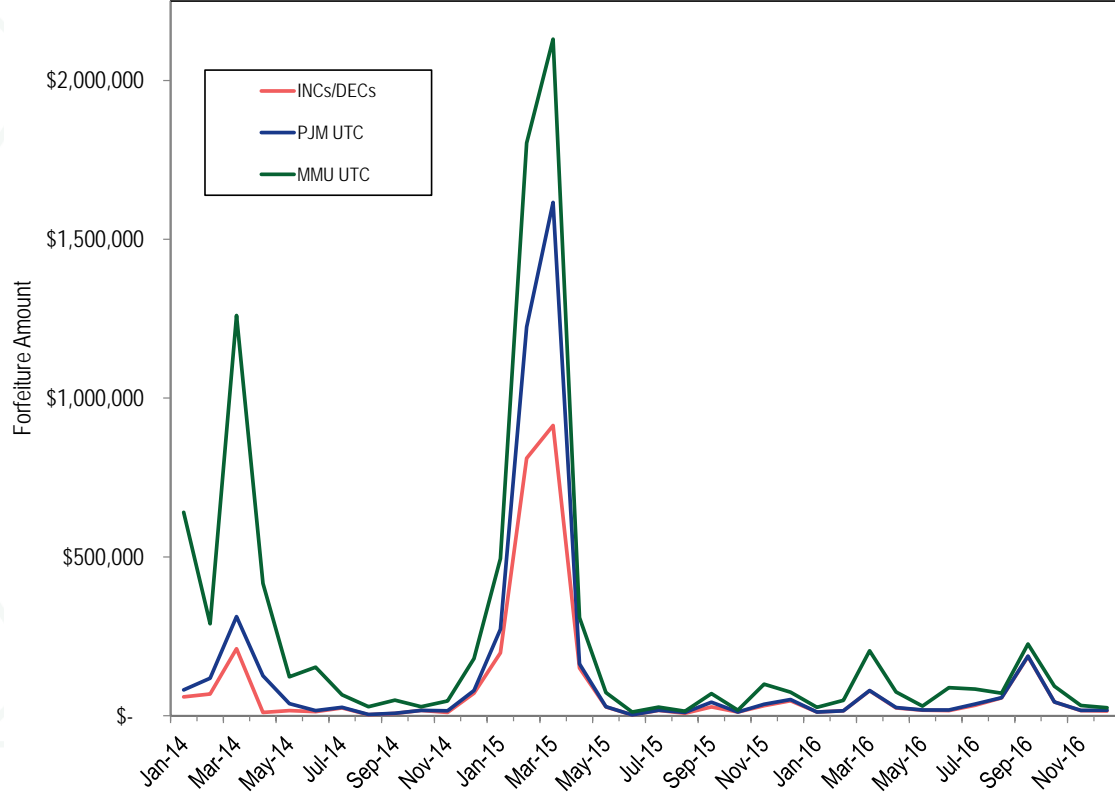
	2015				
	Cleared Up to Congestion Bids				
	Import	Export	Wheel	Internal	Total
Top ten total (MW)	4,597,055	3,023,589	1,211,465	11,250,868	20,082,977
PJM total (MW)	19,561,806	9,849,007	1,453,602	137,808,658	168,673,073
Top ten total as percent of PJM total	23.5%	30.7%	83.3%	8.2%	11.9%
PJM total as percent of all up to congestion transactions	11.6%	5.8%	0.9%	81.7%	100.0%
	2016				
	Cleared Up to Congestion Bids				
	Import	Export	Wheel	Internal	Total
Top ten total (MW)	4,883,581	6,689,640	2,146,815	11,105,541	24,825,577
PJM total (MW)	27,794,147	21,121,645	2,492,100	250,632,186	302,040,078
Top ten total as percent of PJM total	17.6%	31.7%	86.1%	4.4%	8.2%
PJM total as percent of all up to congestion transactions	9.2%	7.0%	0.8%	83.0%	100.0%

UTC profits by month: 2013 through 2016

	January	February	March	April	May	June	July	August	September	October	November	December	Total
2013	\$18,773,682	\$9,847,044	\$7,466,482	\$9,616,977	\$27,433,050	\$5,638,916	\$10,632,113	\$3,964,602	\$32,765,391	\$5,758,310	\$10,323,818	\$8,569,847	\$150,790,233
2014	\$150,903,592	\$25,310,177	\$41,877,547	\$4,266,601	\$6,654,816	\$9,927,987	\$5,648,821	\$2,771,344	\$3,671,710	\$11,233,117	\$11,461,910	\$6,653,683	\$280,381,306
2015	\$16,766,117	\$54,470,984	\$45,076,093	\$7,056,910	\$20,587,764	\$1,528,349	\$9,668,902	\$6,329,957	\$7,860,692	\$5,749,924	\$1,249,373	\$7,719,800	\$184,064,865
2016	\$10,517,760	\$7,631,987	\$2,498,271	\$4,030,392	\$85,273	\$2,333,399	\$4,740,963	\$4,643,648	(\$1,269,948)	\$5,491,702	\$1,789,061	\$4,997,166	\$47,489,676



PJM UTC Forfeitures: 2014 through 2016



PJM UTC Forfeitures: 2014 through 2016

Year	Total PJM UTC Forfeitures	Total IMM UTC Forfeitures
2014	\$840,730.69	\$3,279,161.39
2015	\$3,474,203.36	\$5,122,374.82
2016	\$526,685.25	\$1,001,581.42

Pipeline Enforced Ratable Takes and Energy Offers

- **FERC directed PJM to include in its energy uplift rules, revisions that “permit resources to recover, through make whole payments, the costs incurred if a resource operates within its actual constraints and not only within its unit-specific parameter limits based on its physical characteristics.” (151 FERC ¶ 61,208 P. 440)**

Pipeline Enforced Ratable Takes and Energy Offers

- **This compensation will only be provided if the market participant can justify that such operation was the result of an actual unit constraint and not an exercise of market power.**



Pipeline Enforced Ratable Takes and Energy Offers

- **The Commission explained that “PJM’s proposed revisions may prevent a resource from reflecting actual parameter limits caused by legitimate, non-physical constraints in its energy market offer. ‘For example, the Commission stated, a natural gas pipeline may impose, due to physical constraints during peak periods, a requirement that all shippers take uniform delivery throughout the day. (151 FERC ¶ 61,208 P. P 437 & n.322 & 155 FERC ¶ 61,157 P. 331)**

Pipeline Enforced Ratable Takes and Energy Offers

- **It is the Market Monitor's position, based on the Commission's decision and the related market rules, that market participants may reflect non-physical constraints, such as pipelines' ratable take provisions when they are enforced, in its cost-based and price-based PLS parameters if these constraints are expected and the basis for the expectation is verifiable.**

Pipeline Enforced Ratable Takes and Energy Offers

- **Market participants can also self schedule for the hours that they must run to meet the ratable take requirement in order to meet a PJM day-ahead and/or real-time commitment.**
- **It is not acceptable to add the expected cost of unburned natural gas to the cost-based energy offer.**

PJM OA Schedule 1 Section 3.2.3 (e) Second Paragraph

- **A Generation Capacity Resource that operates outside of its unit-specific parameters will not receive Operating Reserve Credits nor be made whole for such operation when not dispatched by the Office of the Interconnection, unless the Market Seller of the Generation Capacity Resource can justify to the Office of the Interconnection that operation outside of such unit-specific parameters was the result of an actual constraint. Such Market Seller shall provide to the Market Monitoring Unit and the Office of the Interconnection its request to receive Operating Reserve Credits and/or to be made whole for such operation, along with documentation explaining in detail the reasons for operating its resource outside of its unit-specific parameters, within thirty calendar days following the issuance of billing statement for the Operating Day. The Market Seller shall also respond to additional requests for information from the Market Monitoring Unit and the Office of the Interconnection.**

PJM OA Schedule 1 Section 3.2.3 (e) Second Paragraph (Ctnd)

- **The Market Monitoring Unit shall evaluate such request for compensation and provide its determination of whether there was an exercise of market power to the Office of the Interconnection by no later than twenty-five calendar days after receiving the Market Seller's request for compensation. The Office of the Interconnection shall make its determination whether the Market Seller justified that it is entitled to receive Operating Reserve Credits and/or be made whole for such operation of its resource for the day(s) in question, by no later than thirty calendar days after receiving the Market Seller's request for compensation.**

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