

Market Monitor Report

Members Committee
July 24, 2017

Joe Bowring

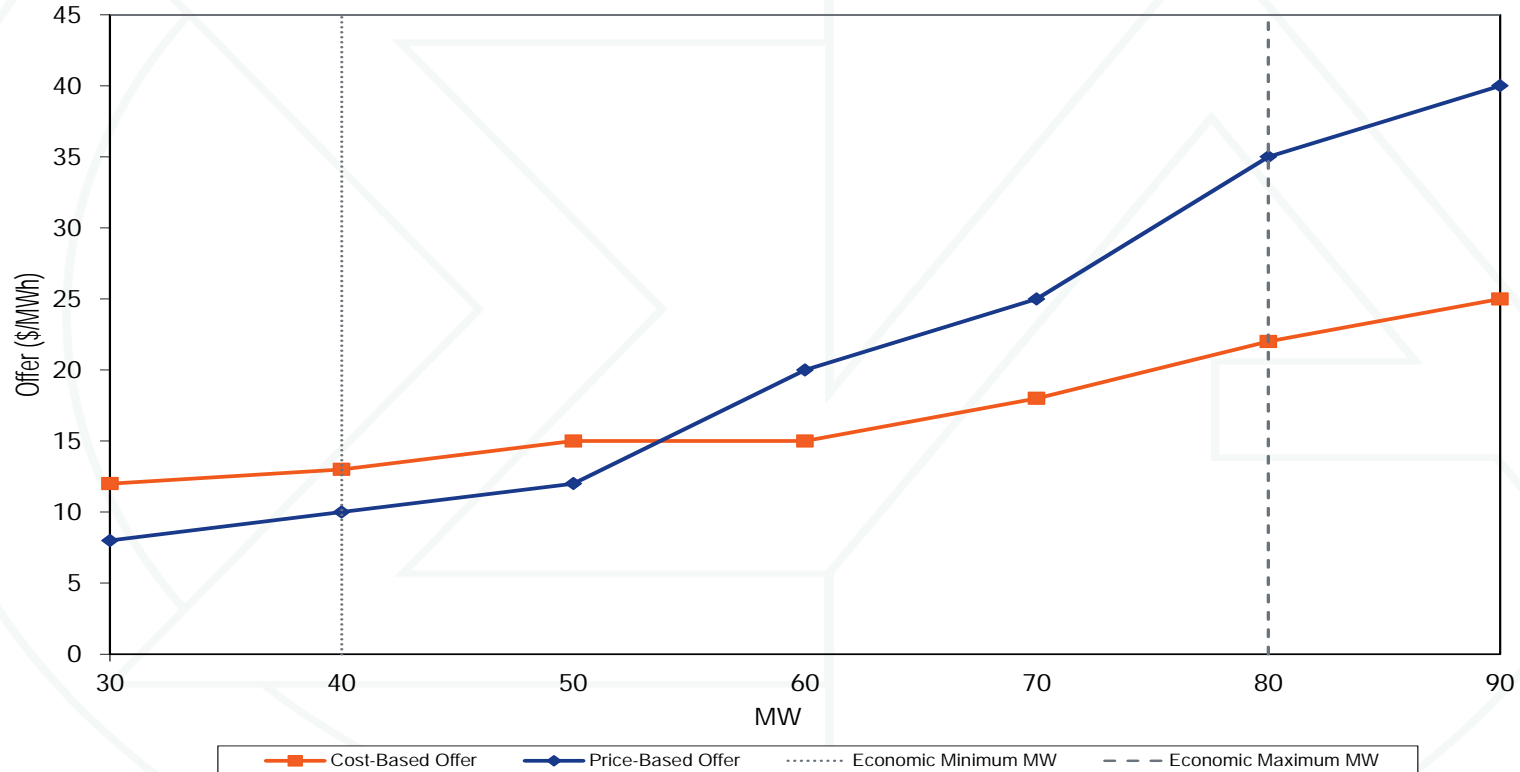


Monitoring Analytics

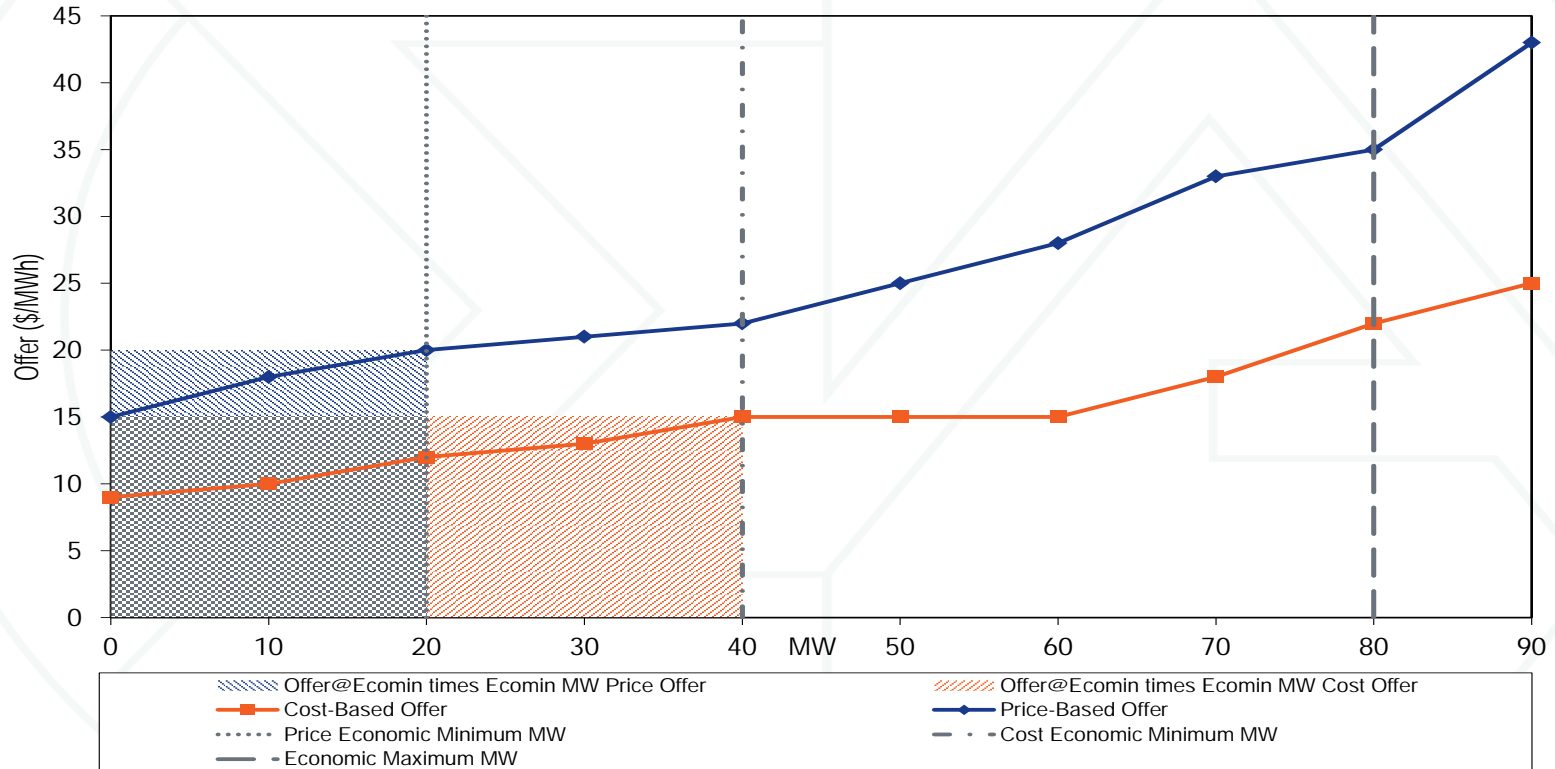
Real-Time Market Power Mitigation

- In the Real-Time Energy Market, PJM uses ‘Dispatch Cost’ to select the offer on which units whose owners failed the TPS test are committed.
- **Dispatch Cost Formula:**
- $$\left[\left(Offer@Ecomin(\$/MWh) * Ecomin(MW) \right) + Noload(\$/h) \right] \times MinRunTime(h) + Startup\ Cost(\$)$$
- **Units can circumvent mitigation using crossing curves and operating parameters to make the price-based schedule appear cheaper while including a positive markup.**

Offers with varying markups at different MW output levels



Offers with a positive markup but different economic minimum MW



Crossing Curve Statistics

- Units with both positive and negative markup (crossing curves).

2017	Day-Ahead			Real-Time		
	Number of Schedule Hours with Crossing Curves	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Crossing Curves	Number of Schedule Hours with Crossing Curves	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Crossing Curves
Jan	21,600	803,424	2.7%	19,381	803,424	2.4%
Feb	20,435	729,264	2.8%	19,318	729,264	2.6%
Mar	22,429	806,810	2.8%	20,547	806,810	2.5%
Apr	18,940	792,480	2.4%	17,970	792,480	2.3%
May	18,797	822,552	2.3%	18,168	822,552	2.2%
Jun	19,523	810,240	2.4%	18,606	810,240	2.3%

Minimum Run Time Statistics

- Units with positive markup and lower minimum run time on price-based offer.

2017	Day-Ahead			Real-Time		
	Number of Schedule Hours with Lower Min Run Time in Price Compared to Cost	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Lower Min Run Time in Price Compared to Cost	Number of Schedule Hours with Lower Min Run Time in Price Compared to Cost	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Lower Min Run Time in Price Compared to Cost
Jan	12,346	803,424	1.5%	11,996	803,424	1.5%
Feb	10,356	729,264	1.4%	10,374	729,264	1.4%
Mar	6,831	806,810	0.8%	6,759	806,810	0.8%
Apr	5,757	792,480	0.7%	5,462	792,480	0.7%
May	5,904	822,552	0.7%	5,720	822,552	0.7%
Jun	8,750	810,240	1.1%	8,669	810,240	1.1%

Economic Minimum Statistics

- Units with positive markup and lower economic minimum MW on price-based offer.

2017	Day-Ahead			Real-Time		
	Number of Schedule Hours with Lower Economic Minimum MW in Price Compared to Cost	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Lower Economic Minimum MW in Price Compared to Cost	Number of Schedule Hours with Lower Economic Minimum MW in Price Compared to Cost	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Lower Economic Minimum MW in Price Compared to Cost
Jan	72	803,424	0.01%	48	803,424	0.01%
Feb	0	729,264	0.00%	0	729,264	0.00%
Mar	168	806,810	0.02%	136	806,810	0.02%
Apr	24	792,480	0.00%	0	792,480	0.00%
May	216	822,552	0.03%	216	822,552	0.03%
Jun	168	810,240	0.02%	168	810,240	0.02%



Evasion Behavior Statistics

- **Combination of all three behaviors resulting in potential exercise of market power.**

2017	Day-Ahead			Real-Time		
	Number of Schedule Hours with Potential Evasion	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Potential Evasion	Number of Schedule Hours with Potential Evasion	Total Number of Cost Schedule Hours Offered by Price Based Units	Percent of Schedule Hours with Potential Evasion
Jan	30,582	803,424	3.8%	28,882	803,424	3.6%
Feb	28,426	729,264	3.9%	27,861	729,264	3.8%
Mar	27,298	806,810	3.4%	25,838	806,810	3.2%
Apr	23,050	792,480	2.9%	22,124	792,480	2.8%
May	22,757	822,552	2.8%	22,236	822,552	2.7%
Jun	26,414	810,240	3.3%	25,525	810,240	3.2%

Fuel Cost Policy Review Update

- **Pre Annual Review**
 - **Two Market Sellers that had failed fuel cost policies (FCP) submitted new fuel cost policies that passed the IMM's evaluation.**
- **2017 Annual Review**
 - **The IMM is reviewing all confirmed/submitted fuel cost policies.**
 - **The current review shows routine issues and required changes due to hourly offers.**

Fuel Cost Policy Review Update

- **The IMM informs Market Sellers if existing FCPs continue to pass under hourly offers.**
- **The IMM informs Market Sellers if new submitted FCPs pass or fail.**
- **The IMM would like to continue working with Market Sellers to incorporate in FCPs the changes necessary to continue to meet the IMM standards under the hourly offers rules.**

Fuel Cost Policy Review Update

- **The IMM has until August 1 to communicate to Market Sellers and PJM the result of the IMM review of policies submitted by June 15 .**
- **The IMM will continue to work with Market Sellers after August 1.**
- **Market Sellers are not required to submit a new FCP by August 1.**
- **The IMM will review new FCPs as they are submitted.**

Fuel Cost Policy Compliance

- The IMM has identified several avoidable instances of cost-based offers that do not comply with the FCP.
- All Market Sellers should review their cost-based offers for FCP compliance regularly.
- May 15 to July 15 penalty at West Hub LMP: \$1.38/MWh or \$2,020 per available MW

$$\sum \text{Penalty}_{dh} = \frac{\min(d, 15)}{20} \times \text{LMP}_h \times \text{MW}_h$$

Offer Cap Verification (Order 831)

- **The IMM has concerns with PJM's filed OA language to comply with Order 831.**
 - **Overstated gas costs**
 - **Incorrect gas hubs**
 - **Inaccurate calculations**
 - **Lack of clarity for appeal process**
 - **No ex ante verification for demand response**

Offer Cap Verification (Order 831)

- **The IMM has concerns with PJM's planned implementation. (Tech Change Forum presentation.)**
 - **Offer submittal via email**
 - **Manual handling of files**
 - **Manual capping of partially verified offers**
 - **Lack of visibility of final verified offers**
- **Compliance risk for PJM and financial risk for market participants.**

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