

Recommendations for the PJM Reserve Markets

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PJM Reserve Markets

- **Synchronized Reserves**
 - Tier 1
 - Tier 2
- **Nonsynchronized Reserves**
- **Day Ahead Scheduling Reserves**

Tier 1

- **Cost of providing tier 1 is zero.**
- **Payment based on tier 2 clearing price is a windfall.**
- **No performance obligation**
 - **50.5 percent response rate to events in 2017.**
- **PJM tier 1 biasing is an administrative operator intervention that affects clearing prices and scarcity determination without adequate transparency.**

Tier 1 Recommendations

- **Eliminate payment of tier 2 price.**
- **Define rules for tier 1 biasing.**
- **No payment if resource deselected by PJM (Adopted)**
- **Or simply get rid of tier 1.**

The tier 2 synchronized reserve market results were competitive.

Market Element	Evaluation	Market Design
Market Structure: Regional Markets	Not Competitive	
Participant Behavior	Competitive	
Market Performance	Competitive	Mixed

Tier 2

- **Local and aggregate market power exist.**
 - **Cost based market mitigates market power.**
- **Must offer requirement**



Tier 2 Recommendations

- **Enforce must offer requirement.**
- **Remove \$7.50 margin and heat rate degradation from cost-based offer.**
- **Use five minute LMP and lost opportunity cost to determine price (Adopted).**

The day-ahead scheduling reserve market results were competitive.

Market Element	Evaluation	Market Design
Market Structure	Not Competitive	
Participant Behavior	Mixed	
Market Performance	Competitive	Mixed

Secondary Reserves - DASR

- **No performance obligation**
- **Must offer market**
- **Cost of providing DASR is zero, unless LOC.**
- **Aggregate market power**
 - **DASR market has three or fewer pivotal suppliers in 15.9 percent of hours.**
 - **Economic withholding, daily average of 39.2 percent of units offer above zero.**

Secondary Reserves Recommendations

- **Add a real-time performance obligation.**
- **Apply market power mitigation.**
- **Document reasons for expanding requirement.**



Operating Reserve Demand Curve Recommendations

- **Reassess zonal requirements**
- **Cascading scarcity prices as reserve products go short**
- **Downward sloping curve based on loss of load probability**
- **Shifting reserve requirements to capture operator actions**

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