

Synchronized Reserve Offers and Prices

EPFSTF

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Synchronized Reserve Offers

- **The synchronized reserve market is cost based due to the presence of market power.**
- **The cost for units dispatched for energy with room to move up consists of lost opportunity costs only.**
- **Costs in Manual 15 associated with heat rate increases are not identifiable.**
- **Current PJM rules allow for a \$7.50/MW margin. The margin needs to be recalculated.**
- **Condensing costs specified in Manual 15 are not accurate and are too high.**

Synchronized Reserve Market Power

Year	Month	Mid Atlantic Dominion	RTO Reserve Zone
		Reserve Subzone	Reserve Subzone
		Pivotal Supplier Hours	Pivotal Supplier Hours
2017	Jan	79.3%	67.0%
2017	Feb	73.8%	57.6%
2017	Mar	72.6%	38.3%
2017	Apr	75.0%	51.0%
2017	May	70.9%	69.8%
2017	Jun	62.6%	84.9%
2017	Jul	57.3%	69.5%
2017	Aug	34.8%	71.0%
2017	Sep	53.7%	66.4%
2017	Oct	72.8%	38.5%
2017	Nov	71.2%	47.4%
2017	Dec	75.9%	45.1%
2017		66.7%	58.9%

Current Manual 15 Costs

5.7 Synchronized Reserve

Note: The information in Section 2.7 contains basic Synchronized Reserve Cost information relevant for all unit types. The following information only pertains to CC units.

Total costs to provide Synchronized reserve from a CC unit shall include the following components:

Total Costs Synchronized Reserve (\$/MW) =

$$\frac{\text{Heat Rate Increase} * \text{Variable Cost Rate}}{\text{MW of Synchronized Reserve}} + \text{Margin (less than \$7.50)} + \text{Lost Opportunity Costs}$$

Heat Rate Increase is the incremental increase resulting from operating the unit at lower MW output resulting from the provision of Synchronized reserve service

Total CC Unit offers must be expressed in dollars per hour per MW of Synchronized Reserve (\$/MWh) and must specify the total MW of Synchronized Reserve offered.

Incorrect Adjustment to VOM

	Output	Heat Rate
CC Unit Full Load:	450 MW	7,500 MMBtu/kWh
CC Unit Reduced Load:	400 MW	7,800 MMBtu/kWh
VOM Rate:	\$0.50/MMBtu	
Heat Rate Penalty =	$(7,800 - 7,500)/7,500 = 4\%$	
Adjusted VOM =	$\$0.50 * 1.04 = \$0.52/\text{MMBtu}$	
CC Unit Reduced Load Heat Input =	$7,800 * 400 / 1000 = 3,120 \text{ MMBtu/Hr}$	
Heat Rate VOM Penalty =	$(\$0.52/\text{MMBtu} - \$0.50/\text{MMBtu}) * 3,120 \text{ MBTU/Hr} = \$62.40/\text{Hr}$	
Synchronized Reserve VOM Adder =	$\$62.40/\text{Hr} / (450 \text{ MW} - 400 \text{ MW}) = \$1.248/\text{Synchronized MW}$	

Exhibit 14: Combined Cycle Unit Synchronized Reserve Example

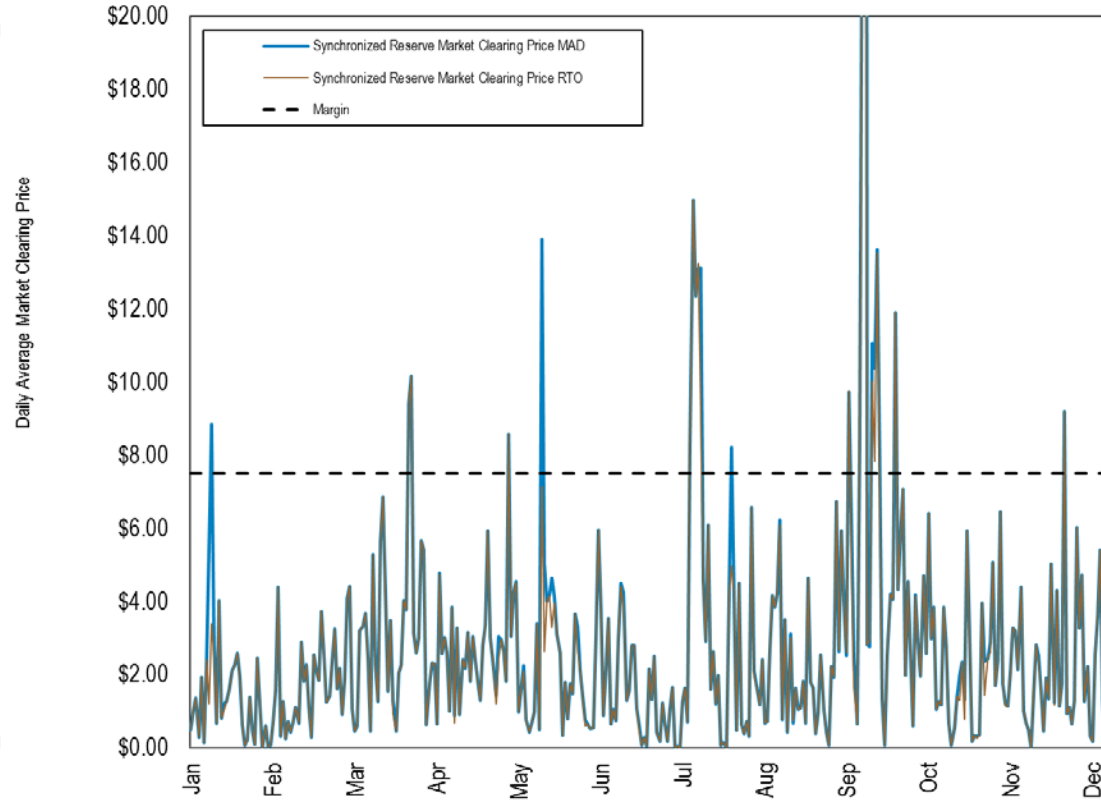
VOM Covered by the Energy Offer

- **VOM per MMBtu does not rise because a unit provides reserves.**
- **The appropriate amount of VOM is included in the incremental energy cost curve and in the no load cost.**
- **A unit does not incur higher VOM per MMBtu or per MWh due to operating at a lower dispatch point.**
- **The heat rate increase and VOM adjustment should be removed from Manual 15.**

Revise the \$7.50 per MW Margin

- **The MMU calculated the \$7.50 per MW margin in 2002 based on the difference between synchronized reserve revenues and costs.**
- **The MMU will update the analysis and provide the appropriate margin for 2017.**
- **Based on synchronized reserve prices, the revised margin is expected to be lower.**

Synchronized Reserve Prices in 2017



Overstated Condensing Costs

6.7 Synchronized Reserve: Costs to Condense

Note: The information in Section 2.7 contains basic Synchronized Reserve Cost information relevant for all unit types. The following additional information only pertains to CT and diesel engine units.

Total synchronous condensing costs for CTs and diesel units shall include the following components:

- **Start-up Costs** if applicable, shall be applied when a unit moves from cold to condensing operations and when a unit moves from condensing operations to energy generation, but shall not be applied when a unit moves from energy generation to condensing operations.
- **Variable Operating and Maintenance cost (EHMC)** in \$/Hr divided by the Synchronized MW provided.
- **Actual cost of power consumed during condensing operations** at real time bus LMP as determined by Market Settlements. MW consumed must be included in the offer.
- **Margin** up to \$7.50 per MW of Synchronized Reserve service provided.

The CT condensing offers must be expressed in dollars per hour per MW of Synchronized Reserve (\$/MWh) and must specify the total MW of Synchronized Reserve offered.

Revisions to Condensing Costs

- **Clarify that start cost means fuel costs.**
 - **Condense start cost should not exceed energy start cost.**
- **Remove maintenance costs**
 - **No fuel injected while condensing**
 - **Not causing the same stress on the unit**
- **PJM calculates cost of energy consumption.**
 - **No revision needed**

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