



# IMM Quarterly Report Supplement: December Highlights and Other Issues

MISO Independent Market Monitor

David Patton, Ph.D.  
Potomac Economics

February 3, 2017

**POTOMAC  
ECONOMICS**



## Highlights and Findings: December 2016

- Natural gas prices rose sharply -- 45 percent from November and 91 percent from last year -- leading to higher energy prices, RSG payments and congestion costs.
  - ✓ Real-time energy prices rose 25 and 47 percent over last month and last year.
- Higher gas prices led to disproportionate increases in RSG in December.
  - ✓ Day-ahead RSG increased to \$6.1 million, most of which was paid VLR resources in the South (\$5.3 million).
  - ✓ Conservative operations and emergency conditions were declared in the MISO South load pockets on a number of days early in December.
  - ✓ Real-time RSG increased more than 300 percent to \$7 million. An addition to the effects of higher gas prices, MISO also incurred more RSG to maintain adequate regional capacity in periods when the RDT constraint was binding.
- Real-time congestion nearly doubled from last year because of:
  - ✓ Higher fuel prices that increase the redispatch costs incurred to manage congestion; and
  - ✓ Constraints that were affected by transmission and generation outages.
- On December 7, MISO set a new wind peak at over 13.7 GW.



# Summary of December 2016 – Dashboard

		Value	Change <sup>1</sup>			Value	Change <sup>1</sup>	
			Prior Mo.	Prior Year			Prior Mo.	Prior Year
<b>RT Energy Prices (\$/MWh)</b>	●	\$31.31	25%	47%	<b>FTR Funding (%)</b>	●	100%	100% 99%
<b>Fuel Prices (\$/MMBtu)</b>					<b>Wind Output (MW/hr)</b>	●	7,630	18% 37%
Natural Gas - Chicago	●	\$3.63	50%	87%	<b>Guarantee Payments (\$M)<sup>4</sup></b>			
Natural Gas - Henry Hub	●	\$3.57	45%	91%	Real-Time RSG	●	\$7.1	185% 303%
Western Coal	●	\$0.67	2%	20%	Day-Ahead RSG	●	\$6.5	149% 83%
Eastern Coal	●	\$1.57	4%	8%	Day-Ahead Margin Assurance	●	\$3.8	25% 32%
<b>Load (GW)<sup>2</sup></b>					Real-Time Offer Rev. Sufficiency	●	\$0.6	-34% 11%
Average Load	●	77.4	13%	9%	<b>Price Convergence<sup>5</sup></b>			
Peak Load	●	101.6	23%	16%	Market-wide DA Premium	●	0.6%	-0.3% 0.7%
% Scheduled DA (Peak Hour)	●	98.7%	97.7%	99.1%	<b>Virtual Trading</b>			
<b>Transmission Congestion (\$M)</b>					Cleared Quantity (MW/hr)	●	11,940	-3% 9%
Real-Time Congestion Value	●	\$126.1	38%	97%	% Price Insensitive	●	31%	27% 29%
Day-Ahead Congestion Revenue	●	\$65.6	73%	53%	% Screened for Review	●	1%	0% 0%
Balancing Congestion Revenue <sup>3</sup>	●	-\$0.7	\$3.5	\$2.1	Profitability (\$/MW)	●	\$0.18	\$0.86 \$0.41
<b>Ancillary Service Prices (\$/MWh)</b>					<b>Dispatch of Peaking Units (MW/hr)</b>	●	755	558 505
Regulation	●	\$10.46	18%	86%	<b>Output Gap- Low Thresh. (MW/hr)</b>	●	138	96 44
Spinning Reserves	●	\$2.05	3%	87%	<b>Other:</b>			
Supplemental Reserves	●	\$1.03	72%	145%				

**Key:** ● Expected  
● Monitor/Discuss  
● Concern

**Notes:** 1. Values not in italics are the value for the past period rather than the change.  
2. Comparisons adjusted for any change in membership.  
3. Net real-time congestion collection, unadjusted for M2M settlements.  
4. Includes effects of market power mitigation.  
5. Values include allocation of RSG.



## Submittals to External Entities and Other Issues

- We responded to FERC questions related to prior referrals and continued to meet with FERC on a weekly basis to discuss market outcomes.
  - ✓ We responded to several data requests related to past referrals.
  - ✓ We made two new referrals of wind suppliers associated with inaccurate forecasts.
  - ✓ We recommended MISO to remove eligibility for price volatility make-whole payments from a resource we determined to be earning unjustified payments and referred the resource to FERC for failure to provide accurate offers.
  - ✓ We made referral of a partial pseudo-tied resource for failing to provide accurate offers.
- We met with an additional MISO transmission operator to consider participation in a program with MISO to extend use of dynamic ratings.
  - ✓ We will continue to work with MISO expand the use of more frequent rating updates and will be identifying high-value potential facilities.





## Submittals to External Entities and Other Issues

- On December 15, FERC issued a Notice Of Proposed Rulemaking (NOPR) on pricing of fast start resources.
  - ✓ We will be filing comments and believe that this rulemaking supports MISO online pricing in its ELMP model.
  - ✓ However, we believe this NOPR does not support MISO offline pricing.
- On January 19, FERC issued NOPR on Uplift Cost Allocation and Transparency in RTOs.
  - ✓ MISO's uplift cost allocation is the model FERC is proposing in this NOPR, so MISO will likely have to make few changes to comply.
  - ✓ The transparency aspect of the NOPR focuses on transmission constraint penalty values (or "demand curves") and related operator actions. MISO's tariff and operating procedures are consistent with the NOPR.
- MISO made a compliance filing in the complaint docket filed by the Coalition of MISO Transmission Customers addressing facility specific reference levels and the transfer limit used in the Planning Resource Auction.
  - ✓ We filed an affidavit supporting the reference level provisions, but plan to file a protest on MISO's tariff language on the transfer limit (consistent with our State of the Market recommendation on this topic).



## Submittals to External Entities and Other Issues

- MISO M2M constraints where PJM has most of the effective relief have been generating substantial real-time congestion.
  - ✓ These constraints accounted for more than \$20 million in real-time congestion in December. The constraints are being impacted by transmission outages and these outages are expected to continue until May 2017.
  - ✓ Similar issues have arisen with SPP and the most effective resolution is to transfer control of the constraint to the RTO with the most relief.
  - ✓ MISO is working to develop the software changes and agreements necessary to address these issues, which are likely to grow with the increase in pseudo-ties that are being implemented.
- We supported MISO's compliance filing on Technology-Specific Avoidable Costs (which can be used to develop reference levels for the PRA). We posted our TSAC values on the MISO web page on January 30.
- We supported MISO's filing of changes to Module D that is responsive to our PRA recommendations to: a) apply physical withholding tests to affiliates jointly, and b) exclude of demand response resources from mitigation.



## List of Acronyms

- AMP Automated Mitigation Procedures
- BCA Broad Constrained Area
- CDD Cooling Degree Days
- CMC Constraint Management Charge
- DAMAP Day-Ahead Margin Assurance Payment
- DDC Day-Ahead Deviation & Headroom Charge
- DIR Dispatchable Intermittent Resource
- ELMP Enhanced Locational Marginal Price
- HDD Heating Degree Days
- JCM Joint and Common Market Initiative
- JOA Joint Operating Agreement
- LAC Look-Ahead Commitment
- LSE Load-Serving Entities
- M2M Market-to-Market
- MSC MISO Market Subcommittee
- NCA Narrow Constrained Area
- ORCA Operations Reliability Coordination Agreement
- ORDC Operating Reserve Demand Curve
- PITT Pseudo-Tie Issues Task Team
- PRA Planning Resource Auction
- PVMWP Price Volatility Make Whole Payment
- RAC Resource Adequacy Construct
- RDT Regional Directional Transfer
- RSG Revenue Sufficiency Guarantee
- RTORSGP Real-Time Offer Revenue Sufficiency Guarantee Payment
- SMP System Marginal Price
- SOM State of the Market
- SRPBC Sub-Regional Power Balance Constraint
- TLR Transmission Line Loading Relief
- TCDC Transmission Constraint Demand Curve
- VCA Voluntary Capacity Auction
- VLR Voltage and Local Reliability
- WPP Weekly Procurement Process
- WUMS Wisconsin Upper Michigan System