

A large, light gray sunburst graphic is positioned on the left side of the slide. It features a central white circle with rays extending outwards, forming a semi-circle at the top and a larger, more complex shape at the bottom. The rays are composed of various geometric shapes like triangles and trapezoids.

MISO Make-Whole Payment Overview

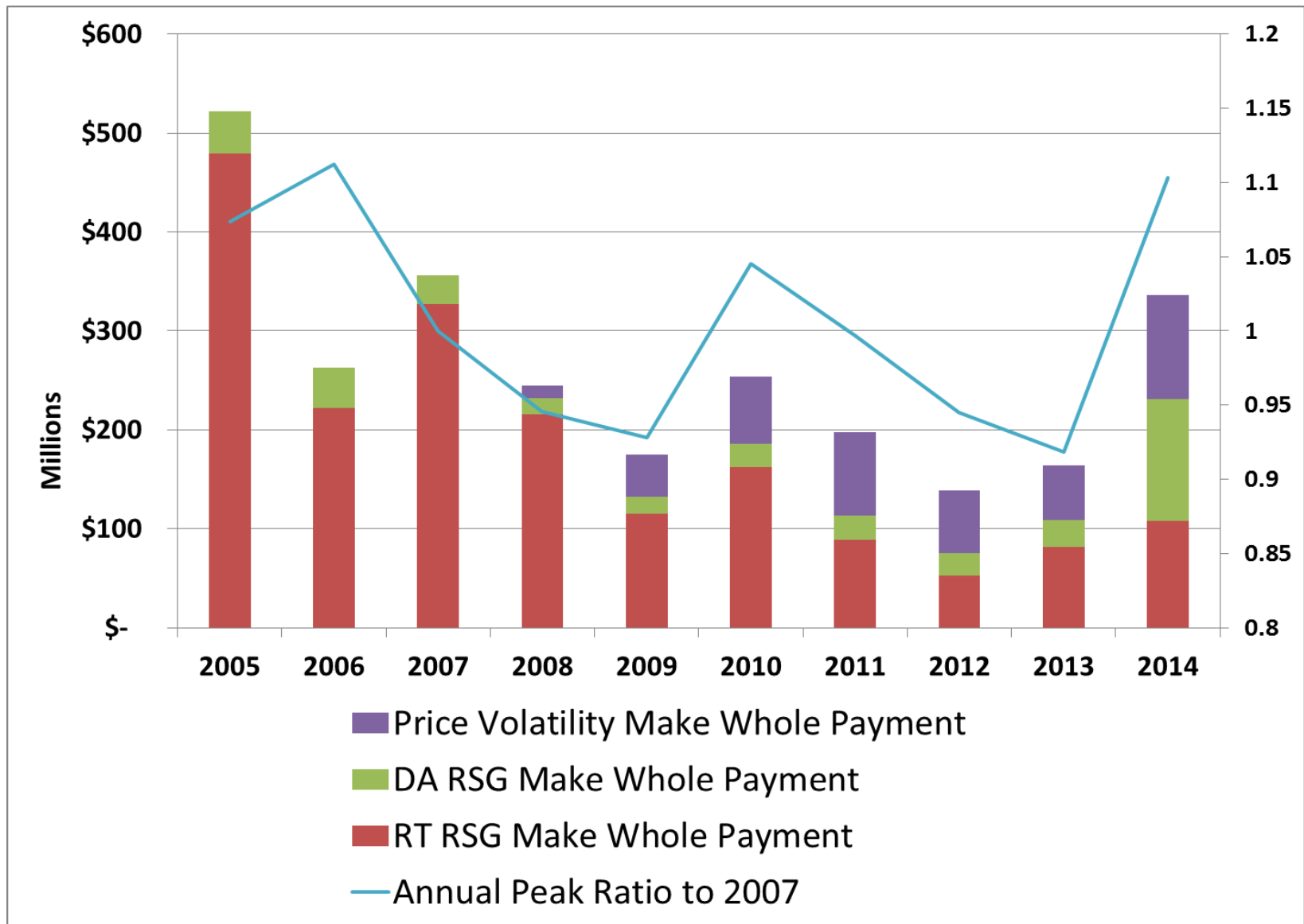
**PJM Energy Market Uplift Senior Task Force
December 2014**

Uplifts in MISO's Energy and Operating Reserves Markets

• Background

- MISO's Markets commenced in 2005 with relatively simple Revenue Sufficiency Guarantee (RSG) Make-Whole Payment uplift allocation rules. Committed Generation received payments for un-recovered production costs that were allocated as follows:
 - Day-Ahead RSG Make-Whole Payments were allocated to Cleared Demand in the DA Market
 - Real-Time RSG Make-Whole Payments were allocated to Day-Ahead Schedule Deviations
- In January 2009, MISO consolidated 27 Balancing Authority Areas and implemented its Ancillary Services Markets. Price Volatility Make-Whole Payments were added for resources cleared in the Day-Ahead Market of Must Run in Real-Time
- The level of complexity of MISO's RSG allocation has evolved beginning in 2011 with the RSG Redesign that added Constraint Management allocation, Headroom and Second Pass. In 2012, Voltage and Local Reliability commitments and allocations were added to the tariff to address Load Pocket issues.

Uplifts in MISO's Energy and Operating Reserves Markets



Uplifts in MISO's Energy and Operating Reserves Markets

- **Revenue Sufficiency Guarantee (RSG) Make-Whole Payments**

- Day-Ahead Allocation Categories

- Capacity
- Voltage and Local Reliability (VLR)

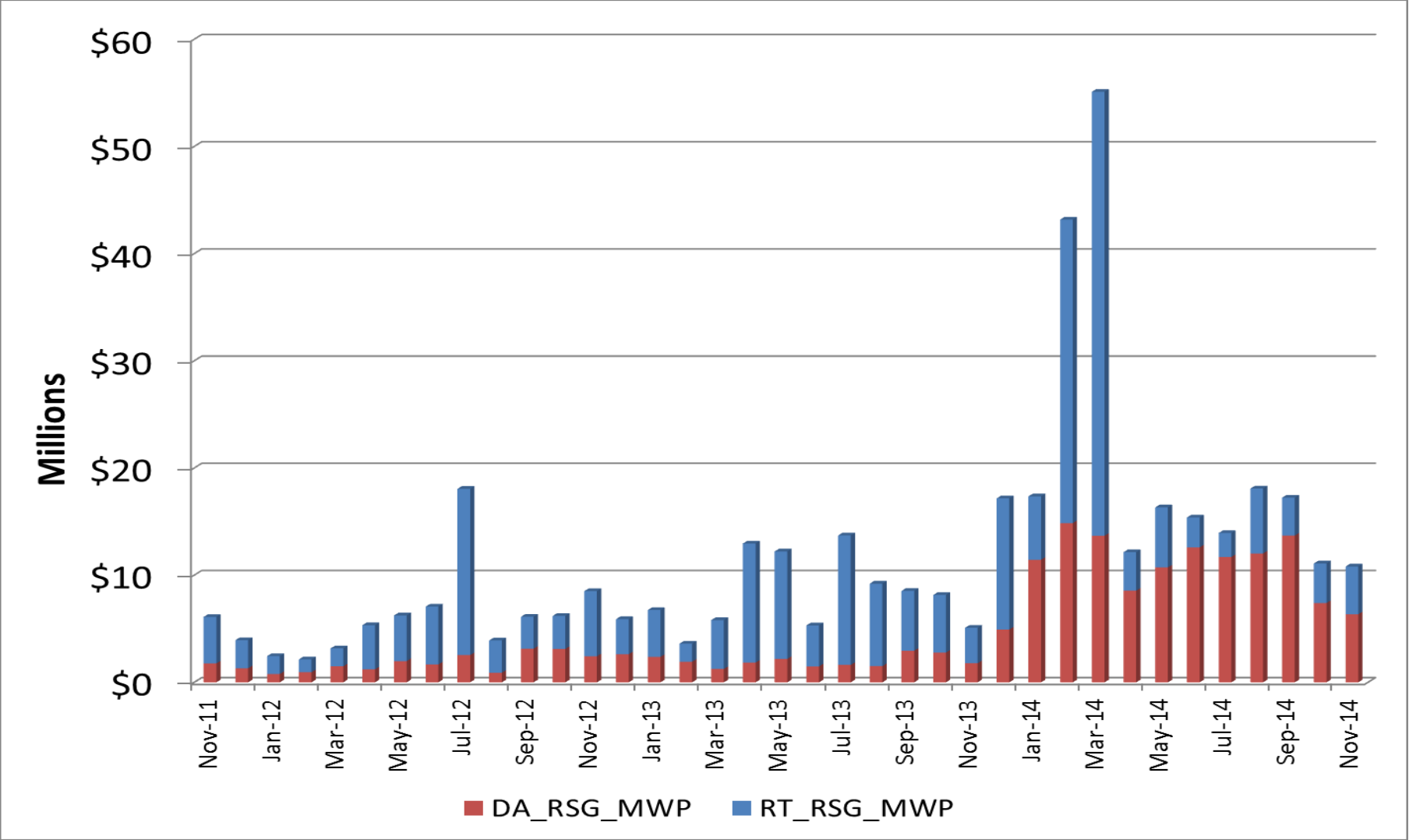
- Real-Time Allocation Categories

- Day-Ahead Deviations
- Headroom
- Constraint Management (CMC)
- Voltage and Local Reliability (VLR)

- **Price Volatility Make-Whole Payments**

- Day Ahead Margin Assurance Payments
- Real-Time Offer Revenue Sufficiency Guarantee Payments

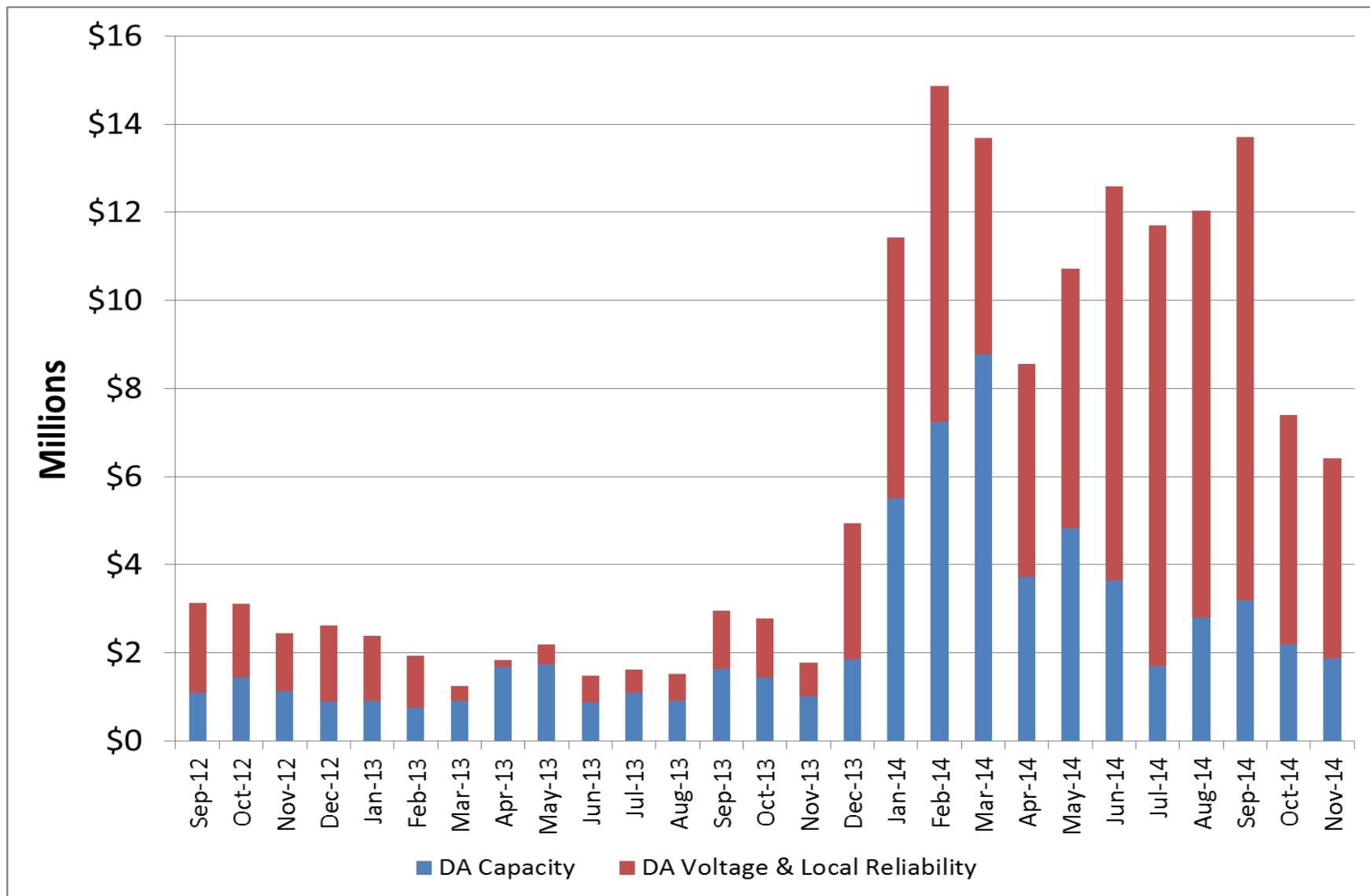
Total Monthly RSG by Market



Revenue Sufficiency Guarantee (RSG) Make-Whole Payments

- DA and RT RSG Make-Whole Payments Guarantee recovery of production offers for Energy and Ancillary Services for Resources committed by MISO
- Offers include Start-Up, No-Load, Energy and Operating Reserve Offers
- Allocation of DA RSG costs depend on the primary reason for committing the Resource
 - Capacity
 - Resources Committed in the Day Ahead Market to meet Bid Demand and Operating Reserve Requirements
 - Voltage and Local Reliability
 - Resource commitments in addition to, or in lieu of, commitments resulting from the Security Constrained Unit Commitment in the Day-Ahead Energy and Operating Reserve Market or any Reliability Assessment Commitment, in order to mitigate issues with Transmission System voltage or other local reliability concerns

Day Ahead RSG Breakdown



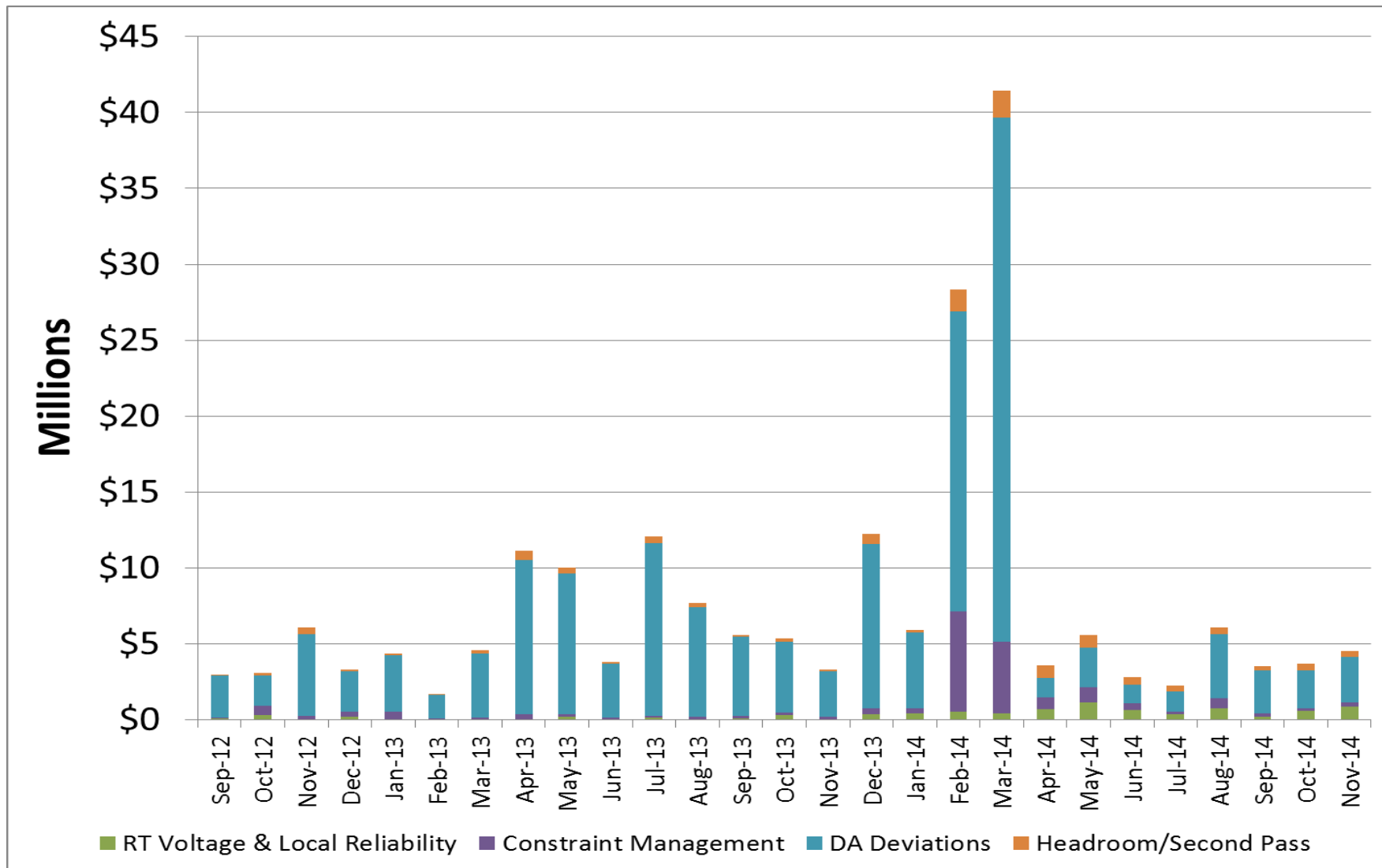
Day Ahead Revenue Sufficiency Guarantee (RSG) Allocation

- DA RSG Make-Whole Payments Guarantee are allocated based on the reason for the Unit Commitment
 - Capacity DA RSG MWP costs related to Capacity commitments are allocated to Cleared Demand bids, including Virtual Demand Bids hourly in the Day Ahead Market
 - Voltage and Local Reliability DA RSG MWP costs related to VLR commitments are allocated based on a percentage basis to:
 - Cleared Demand bids, including Virtual Demand Bids hourly in the Day Ahead Market
 - Real-Time Metered Withdrawals in Local Balancing Authority Areas associated with identified Voltage and Local Reliability Issues

Revenue Sufficiency Guarantee (RSG) Make-Whole Payments

- Allocation of RT RSG costs depend on the primary reason for committing the Resource
 - Capacity
 - Resources Committed in any Reliability Assessment Commitment Process (RAC process) to meet forecasted Energy and Operating Reserve Requirements or system reliability needs. A portion of this committed capacity is accounted for as Headroom, i.e. unloaded rampable capacity
 - Constraint Management
 - Resources committed in any RAC process or the LAC process for an Active Transmission Constraint
 - Voltage and Local Reliability
 - Resource commitments in addition to, or in lieu of, commitments resulting from the Security Constrained Unit Commitment in the Day-Ahead Energy and Operating Reserve Market or any Reliability Assessment Commitment, in order to mitigate issues with Transmission System voltage or other local reliability concerns

Real Time RSG Breakdown



Real Time Revenue Sufficiency Guarantee (RSG) Allocation

- Real Time RSG Make-Whole Payments Guarantee are allocated based on the reason for the Unit Commitment
 - Day Ahead Deviations and Headroom (DDC) RT RSG MWP costs related to Capacity commitments are generally allocated to Day Ahead Schedule Deviations. These deviations include: Load Deviations, Resource Derates, No Shows, Must Runs, cleared Virtual Supply Offers, Physical Schedule changes. A portion of capacity commitment costs accounted for as Headroom is allocated *pro rata* to Load and Exports. Market Participants can manage deviation charges through netting transactions four hours prior to the Operating Hour.
 - Congestion Management Charge (CMC) RT RSG MWP costs related to Active Transmission constraints are allocated to Day Ahead Schedule Deviations that impact congestion based on Constraint Contribution Factors
 - VLR RT RSG MWP costs related to Voltage and Local Reliability commitments are allocated based on a percentage basis to:
 - Day Ahead Deviations and Headroom (DDC)
 - Real-Time Metered Withdrawals in Local Balancing Authority Areas associated with identified Voltage and Local Reliability Issues

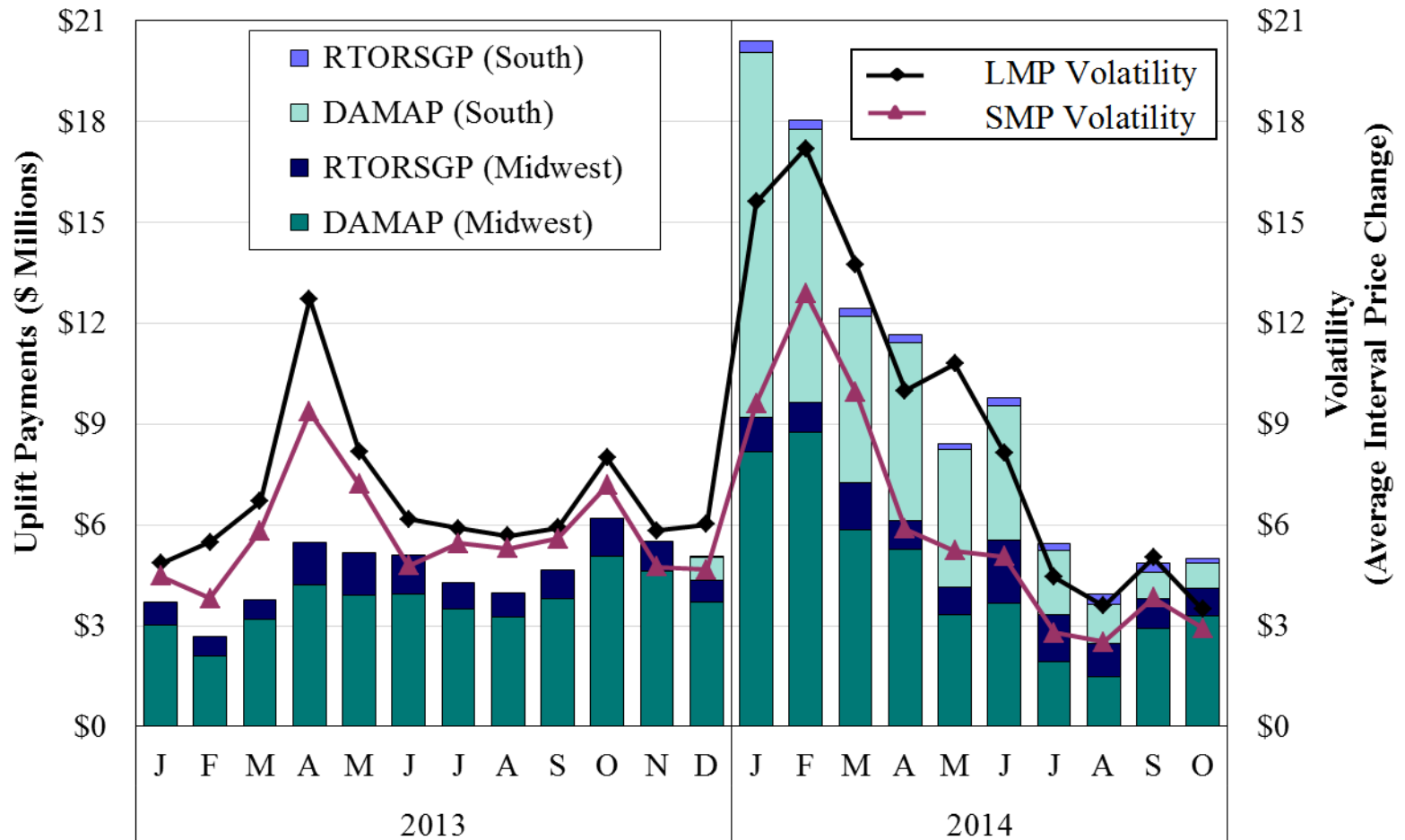
Price Volatility Make-Whole Payments (PVMWP)

MISO settles its Real-Time Energy and Ancillary Services markets on an hourly basis based on a time-weighted Real-Time LMP. Other market and system conditions may also cause Resource Owners to have Day-Ahead Margins eroded, or not recover production costs from market revenues when intra-hour price spikes occur. PVMWP fall into two categories and are allocated *pro rata* to Load and Exports

- Day Ahead Margin Assurance Payments (DAMAP): Compensates eligible Resources for market conditions that erode the margin earned the DA Market, such as RT dispatch less than the respective DA Schedule, and/or adverse Energy or Operating Reserves pricing. Incentivizes Resource Owners to follow Dispatch and Deployment instructions for Energy and Ancillary Services.
- Real-Time Offer Revenue Sufficiency Guarantee Payments (RTORSGP): Resources that are committed in the DA or RT Markets and are not eligible for Real Time RSG Make-Whole Payments may be eligible for RTORSGP under certain circumstances.

Price Volatility Make-Whole Payments

- DAMAP - Day Ahead Margin Assurance Payments
- RTORSGP - Real-Time Offer Revenue Sufficiency Guarantee Payments



Future Enhancements

- **Extended Locational Marginal Pricing (ELMP) – MISO has developed and completed testing of ELMP. Plan to implement in the first quarter of 2015 following some minor modifications.**
 - The ELMP includes Start-Up and No-Load costs in setting LMP for Fast Start Resources (start and notification time 10 minutes or less)
 - Allows Emergency Demand Response to set LMP
 - Implementation allows Fast Start Resources operating at Economic Minimum or Economic Maximum to set LMP
 - Also allows for off-line Fast Start Resources to set LMP during scarcity intervals
 - Will improve price formation, reflecting system costs and conditions in the LMP

Future Enhancements

- **Ramp Capability Product**

- The Ramp Capability Product reserves and compensates ramp-capable capacity for expected and unexpected net load variations which can be used in a future interval dispatch when needed.
- This will enable response to larger ramp requirements with the same generating fleet.
- Up Ramp Capability and Down Ramp Capability products includes pricing based on opportunity costs to provide economic signals for market transparency of the dispatch and incentives for resources to maintain or increase their ramp capability.
- Benefits include: Reflecting physical system needs in market revenues, including the LMP; Production cost savings through better utilization of available resources; and, replacement of a portion of uncompensated Headroom with a market cleared product.

- Whitepaper

<https://www.misoenergy.org/Library/Repository/Communication%20Material/Key%20Presentations%20and%20Whitepapers/Ramp%20Capability%20for%20Load%20Following%20in%20MISO%20Markets%20White%20Paper.pdf>

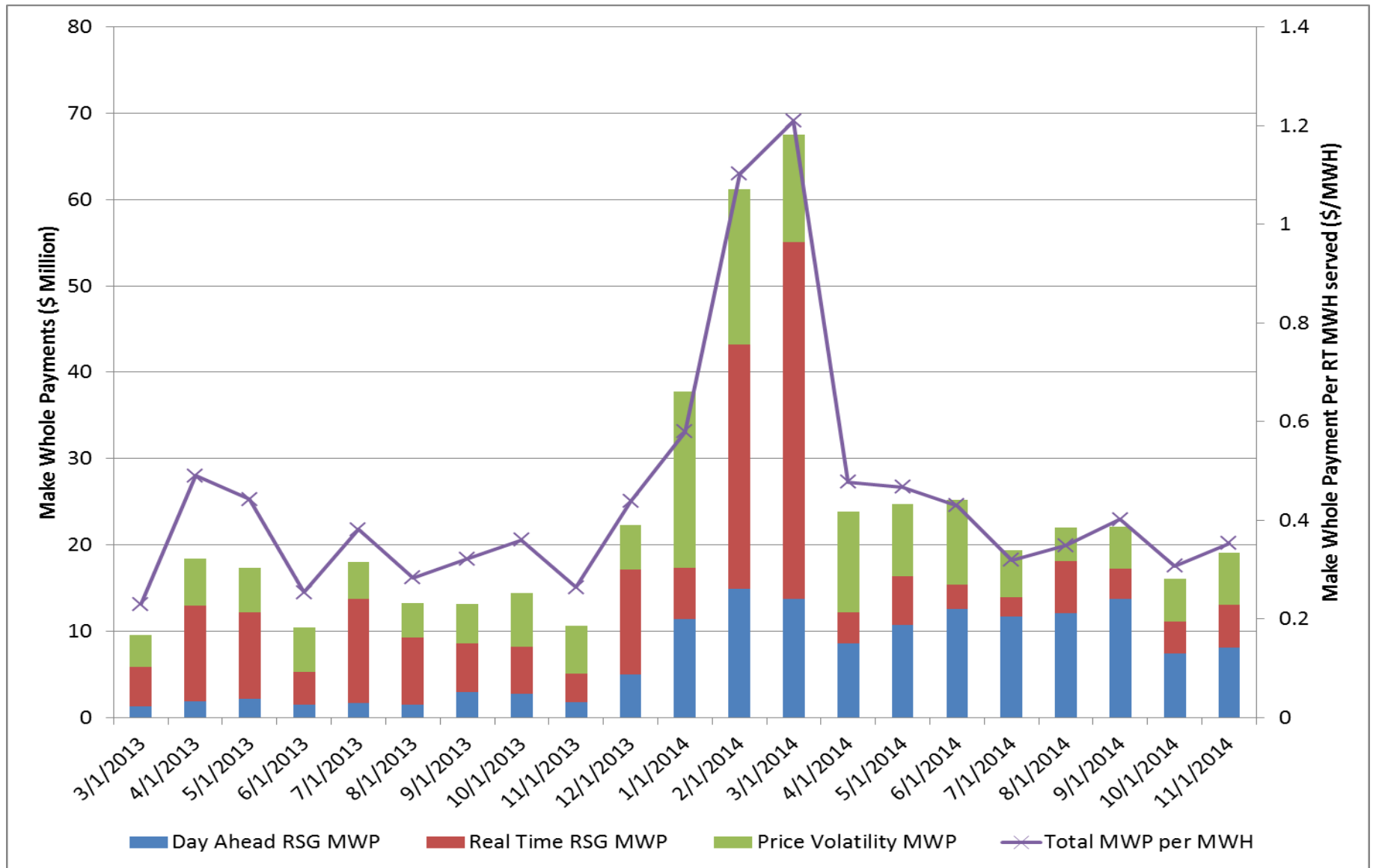
- Filing

<https://www.misoenergy.org/Library/Repository/Tariff/FERC%20Filings/2014-06-10%20Docket%20No.%20ER14-2156-000.pdf>

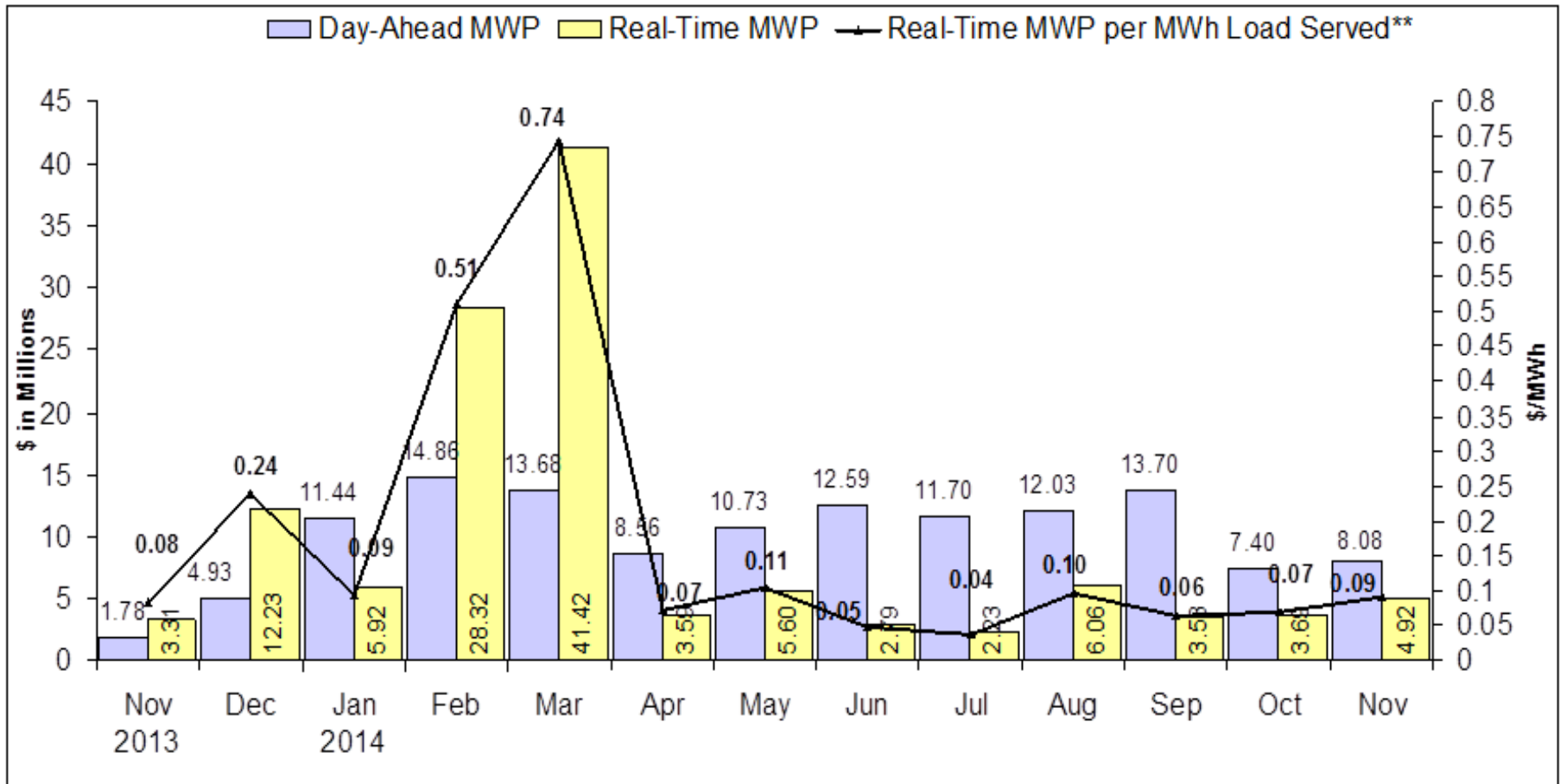
Questions

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