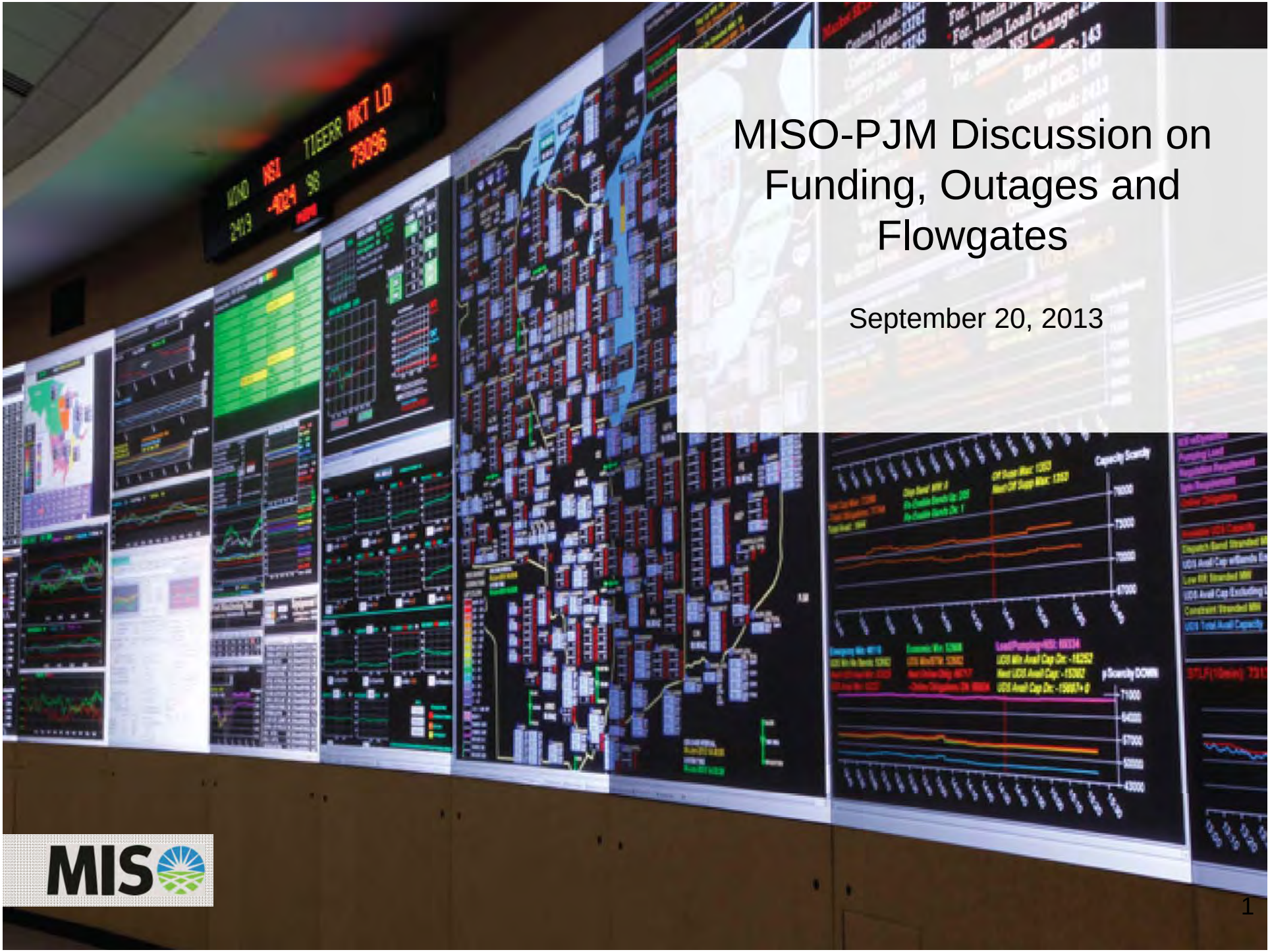

MISO-PJM Discussion on Funding, Outages and Flowgates

September 20, 2013

Background

- PJM has hypothesized that MISO short lead scheduled outages are a significant contributor to PJM FTR underfunding
  - i.e., not submitted in time to be represented in PJM monthly FTR auctions
- PJM has proposed JOA redlines that would restrict the use of M2M on a flowgate for short lead time MISO scheduled outage
- MISO requested and analyzed FTR underfunding data provided by PJM and identified the specific drivers for the underfunding

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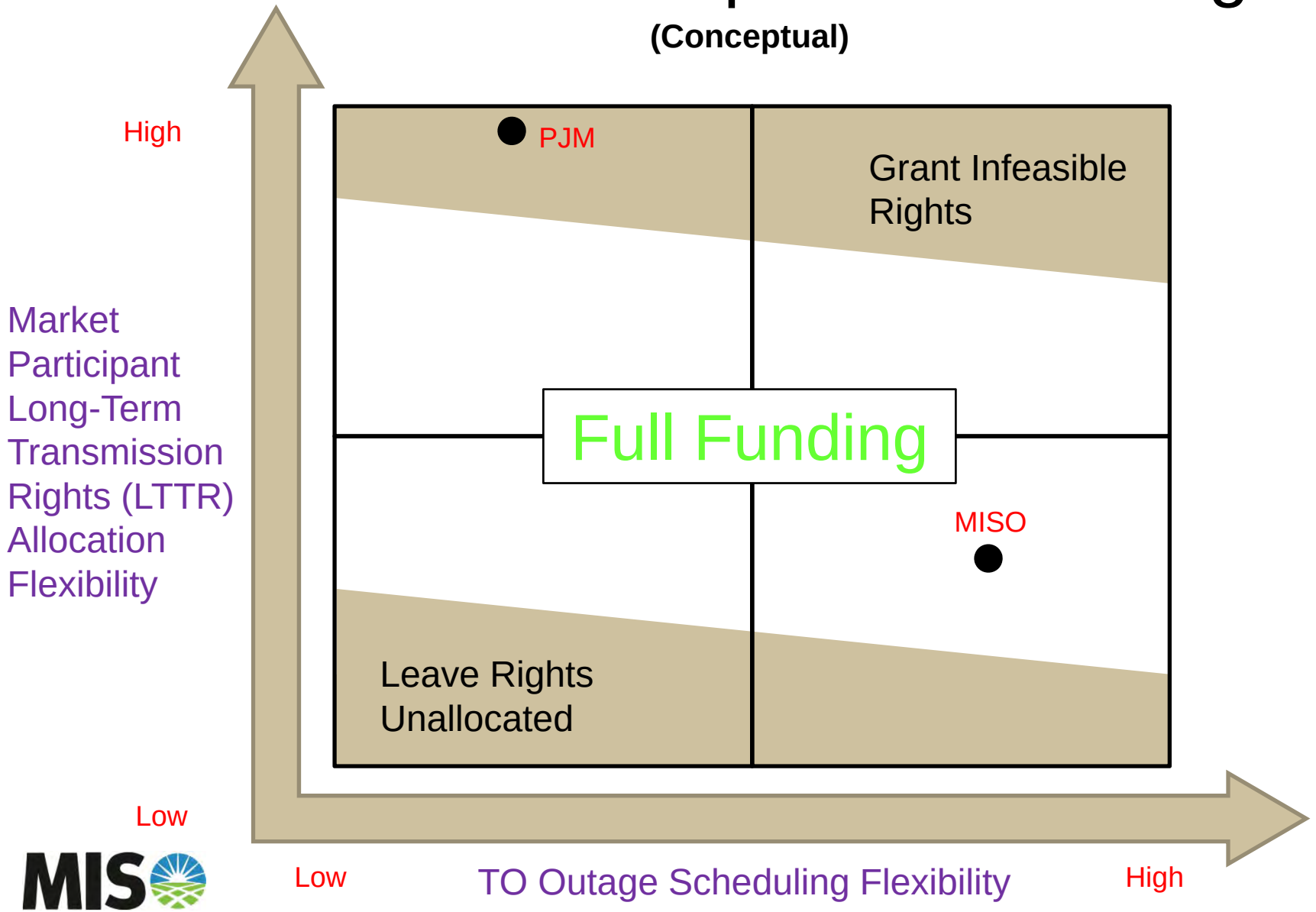
Findings and Takeaways

- Findings
  - For the data analyzed, short lead scheduled outages were not an appreciable driver for PJM FTR underfunding
- Takeaways
  - Restricting M2M to manage FTR funding would introduce risks to reliability, efficiency and equity concerns
  - Instead, changes to market rules, operating timelines, and implementation of best practices can best mitigate FTR funding issues

MISO

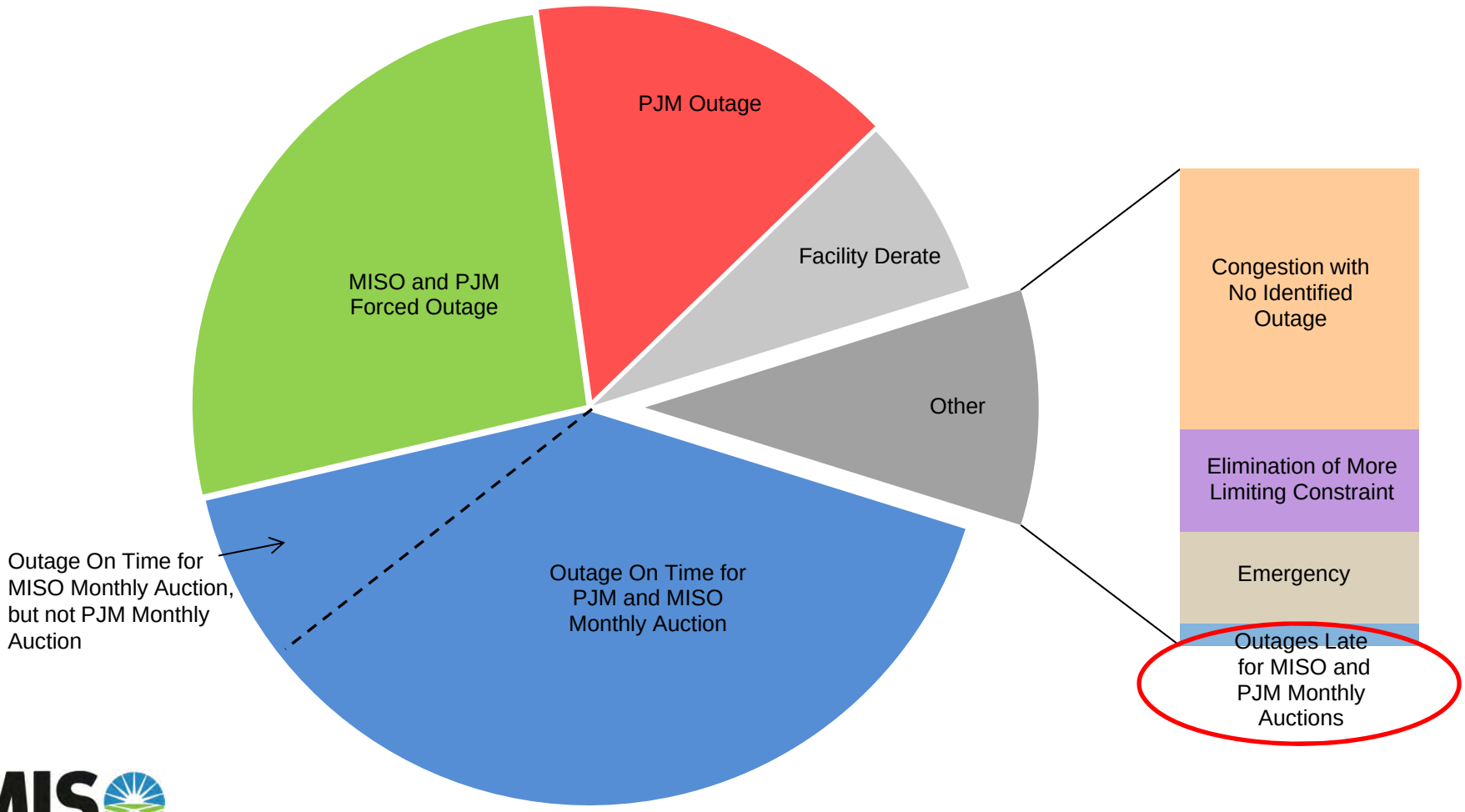
Market Rules Impact on Funding

(Conceptual)

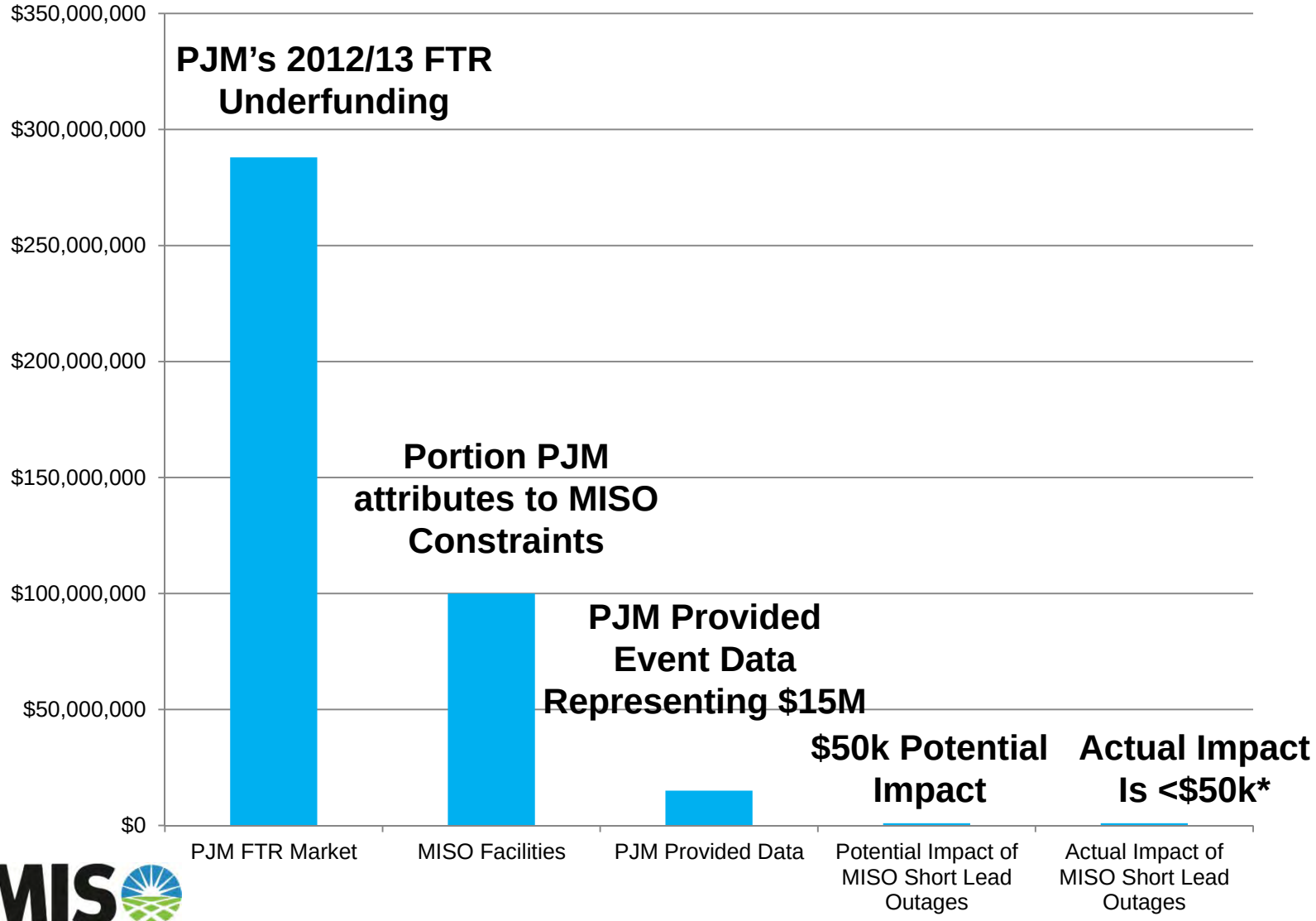


Short lead scheduled outages are insignificant drivers of FTR underfunding in PJM

MISO Analysis of Drivers for the PJM-Supplied FTR Underfunding Events (~$15M)



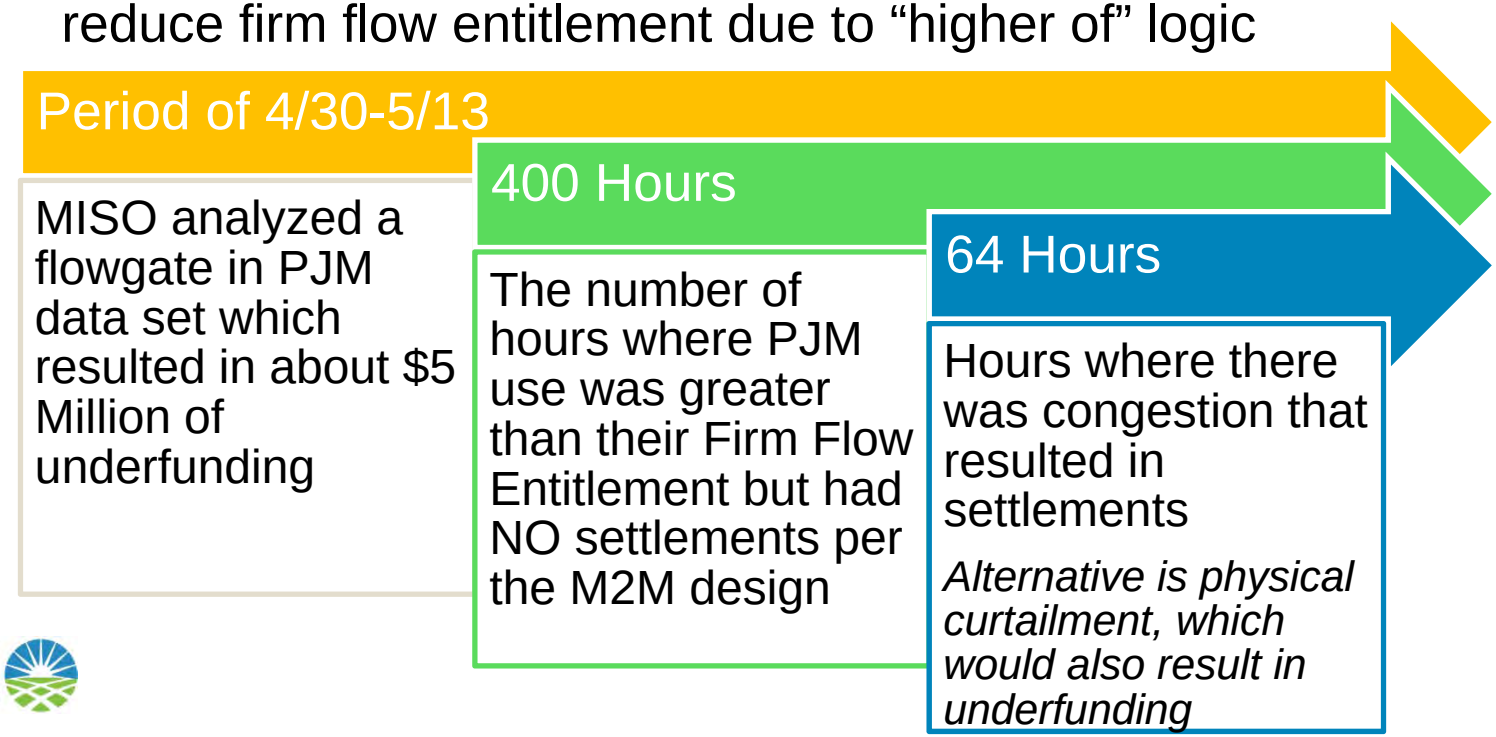
Analysis Findings: Short lead MISO outages have low impact on PJM's FTR underfunding



**Actual impact only to the extent LTTRs are not already over-allocated*

M2M Design: Increased efficiencies, Protection against topology changes

- M2M facilitates higher transfer capability and lowest overall production cost to the load
- PJM entitlements on MISO facilities are preserved during the allocation process
  - i.e., short term topology changes, scheduled or forced, do not reduce firm flow entitlement due to “higher of” logic



MARKET-TO-MARKET CONGESTION MANAGEMENT:
THE MOST EFFICIENT AND LOWEST COST ANSWER FOR CUSTOMERS

CURRENT (M2M)

RTOs converge constraint marginal costs to minimize combined production costs to the consumers

PJM PROPOSED

MISO market subsidizes PJM market flows, which are unconstrained

- Highest overall production cost
- Highest price divergence at seam
- Potential reliability issues
- Impacts MISO market funding and FTR allocations

PHYSICAL CURTAILMENT (TLR)

Each RTO removes its non-firm flows (TLR3) at its own shadow price

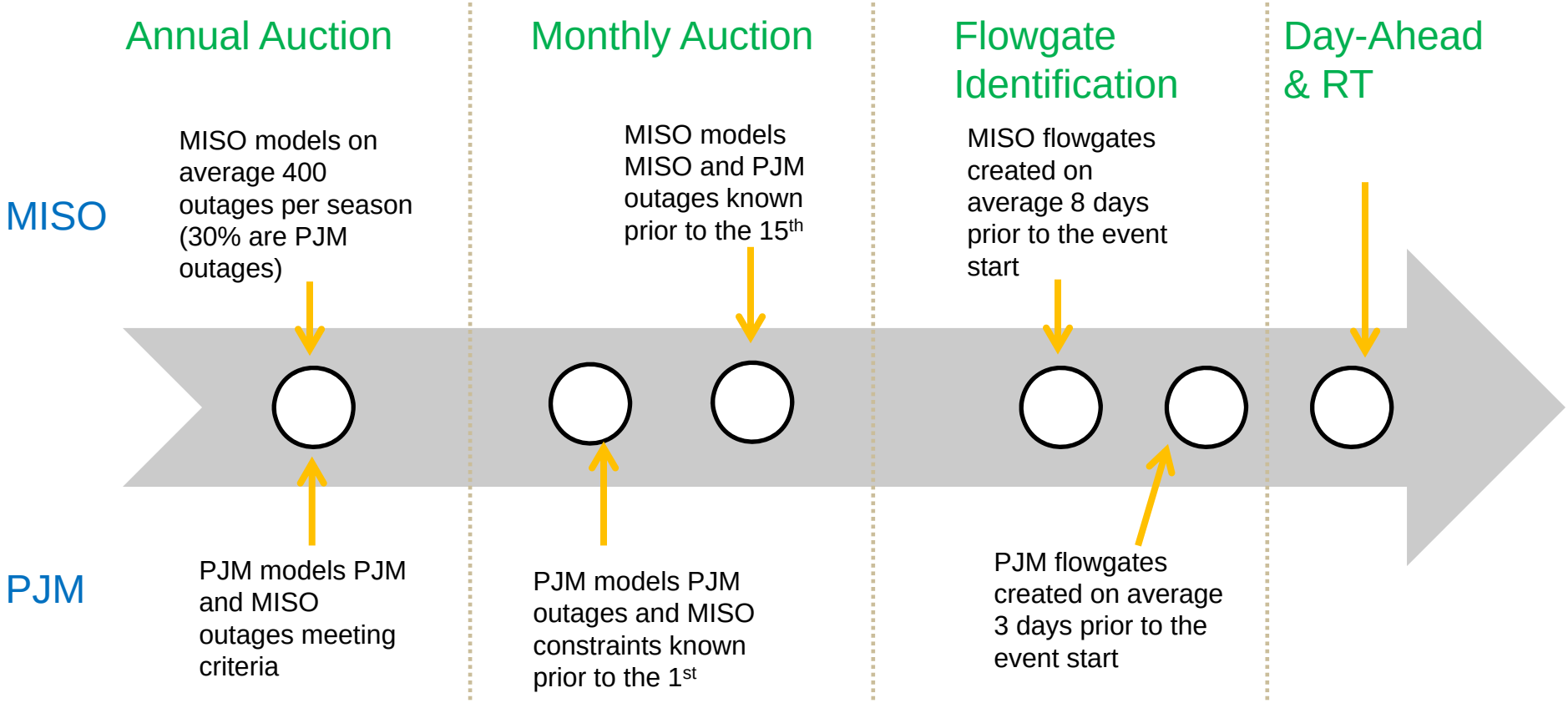
- Higher overall production cost
- Increased price divergence at seam
- Potential for increased impact to PJM funding

MISO

MISO Market Flow | PJM Market Flow | Firm

MISO FTR Auctions Include Outages and Impacts

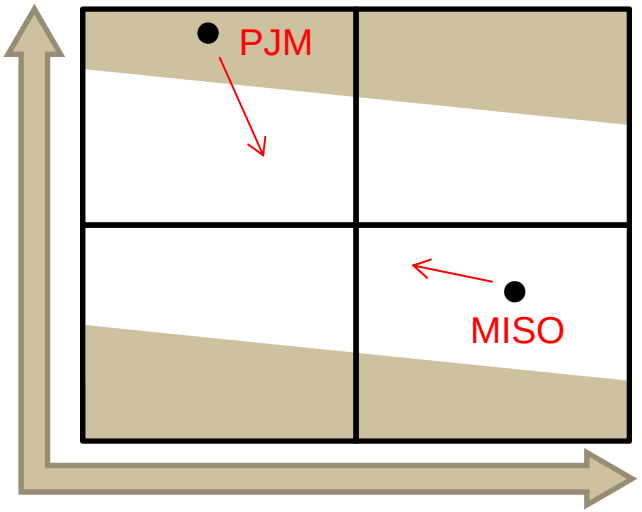
Exact Flowgate Determination is Unnecessary



Rather than relying on identification of flowgates, MISO uses available outage data, advanced collaboration, and enhanced constraint modeling practices in its monthly FTR auctions. These practices are effective at minimizing FTR underfunding exposure even when the exact constraint is uncertain

Collaboration and Improvement Opportunities Are Available

- **Near-Term**
  - Further coordination of outages and constraints applied in FTR models
  - Explore opportunities to improve constraint modeling
- **Longer-Term**
  - Evaluate LTTR feasibility
  - Consider additional FTR models
  - Review market rules and implement best practices
  - Modify FTR outage criteria
  - Continue MISO discussions with TOs about advanced lead time



Summary

- In an effort to evaluate the need for PJM's outage coordination proposal, MISO has reviewed the PJM-supplied funding driver events
- MISO's analysis has determined that short lead scheduled outages are not an appreciable driver for PJM's under-funding problems
- Instead, MISO's counter-proposal is to jointly consider changes to FTR market rules, timelines, and inclusion criteria
  - MISO believes that these actions, along with improvements in overall coordination, will be effective in addressing the core FTR funding issues identified

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