

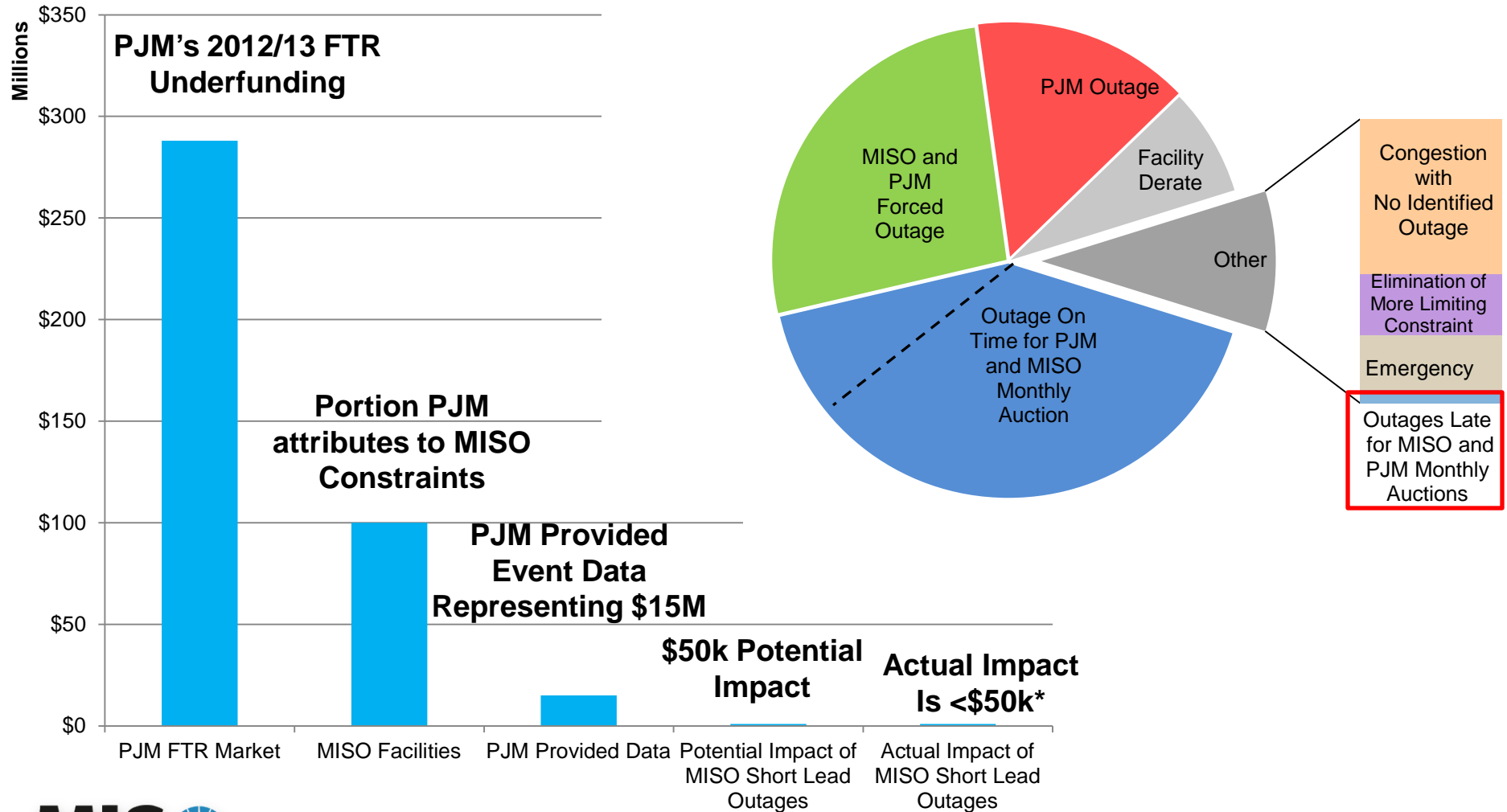
MISO-PJM Discussion on Funding, Outages and Constraint Identification

November 8, 2013

Background

- MISO's analysis presented at the Sep. 20th JCM on PJM-provided subset of temporary flowgates indicated that lack of constraint modeling and FTR over-allocation, not outage submittal time, are the significant drivers for underfunding
- Since then, MISO has expanded its analysis to all M2M flowgates bound in planning year 2012/2013 to understand drivers in order to develop solution options
- This additional analysis shows that \$27M (80%) of M2M settlement occurred on Permanent Flowgates
 - This suggests that focusing on short-submitted M2M flowgates will not significantly improve FTR funding

At Sept. JCM, MISO showed that short scheduled outages are insignificant drivers of PJM FTR underfunding

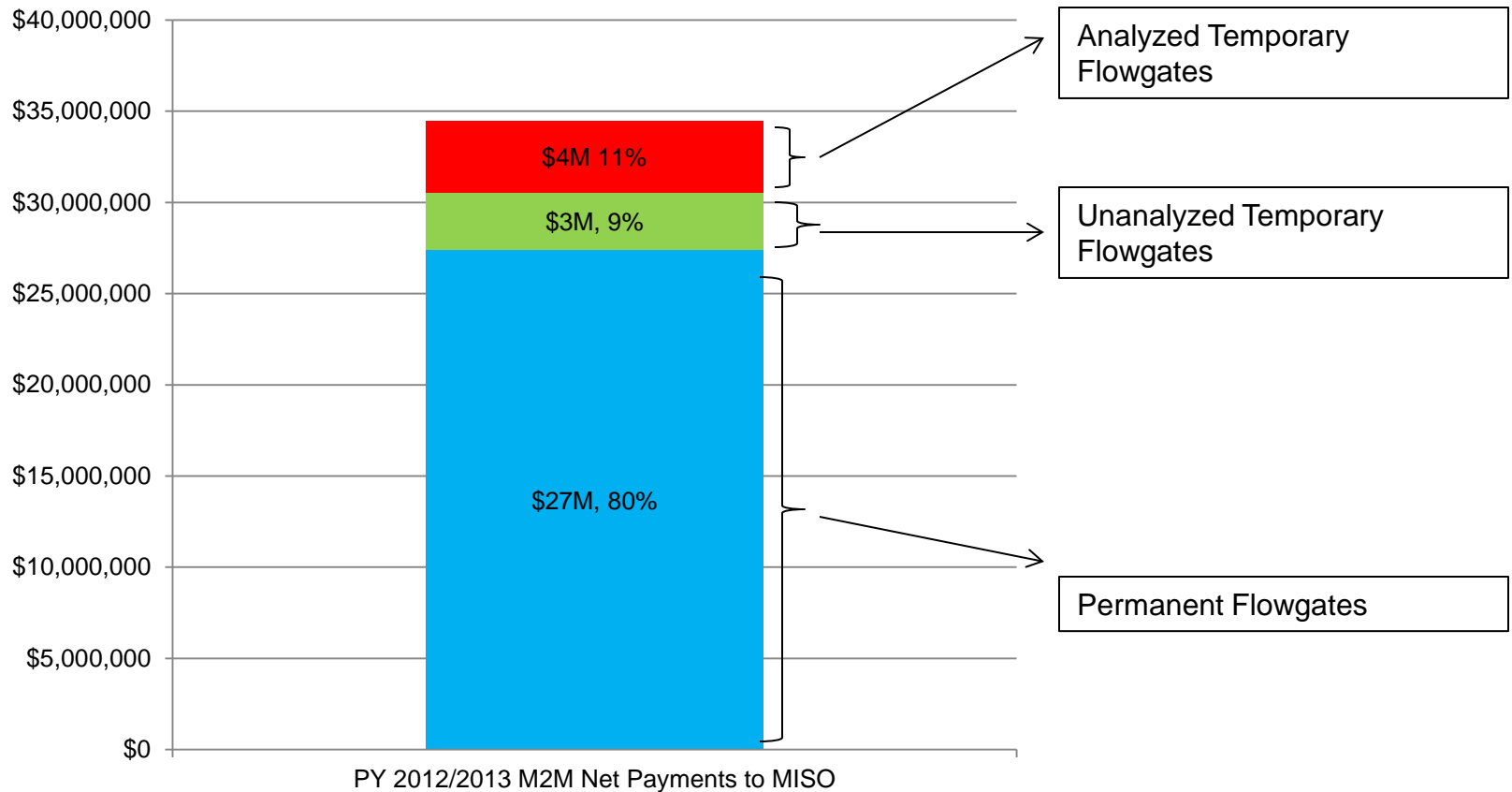


*Actual impact only to the extent LTRs are not already over-allocated

80% of M2M Payments on Permanent FGs

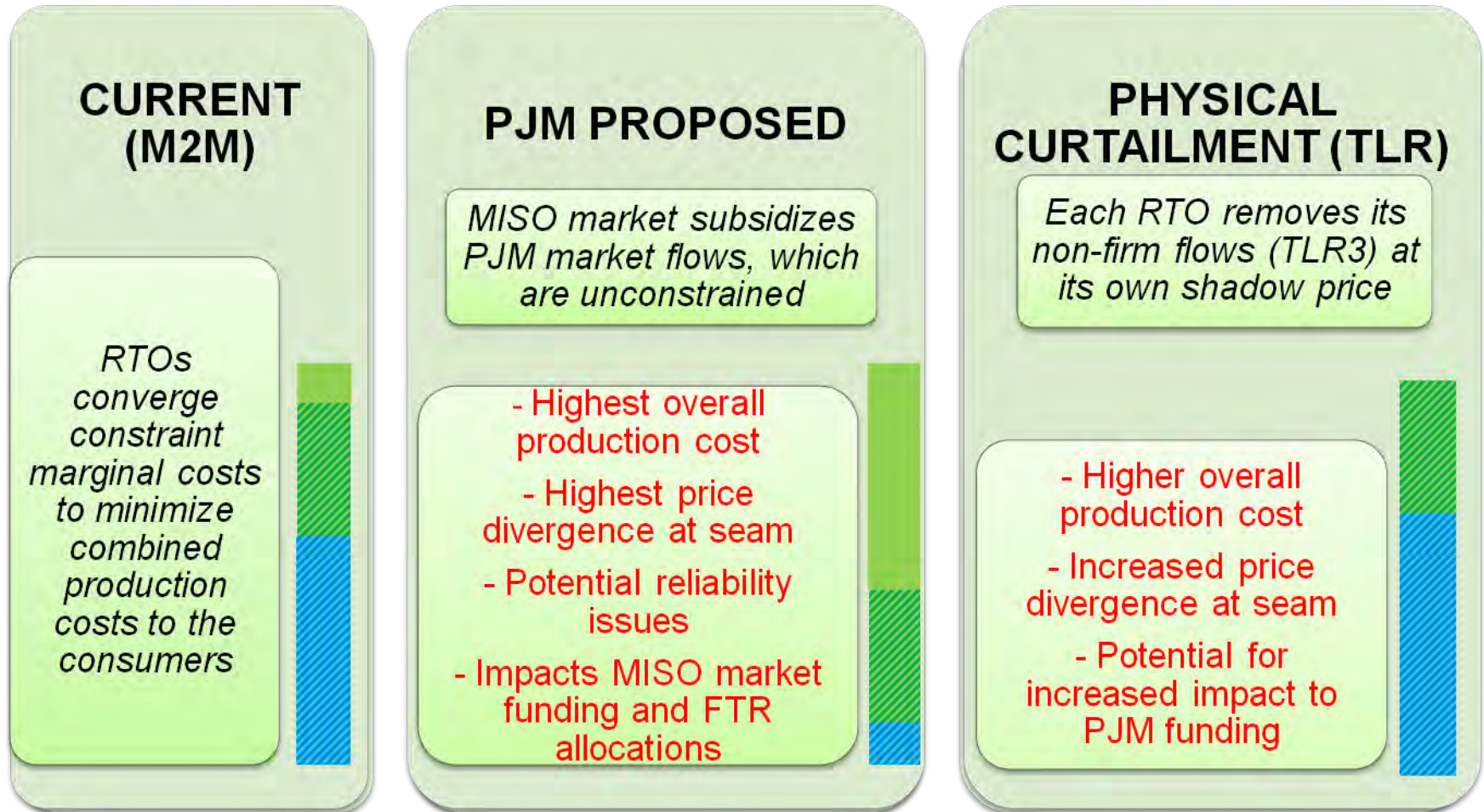
Correlates to FTR funding, assuming ratios are similar

M2M Payment to MISO vs Flowgate Type



* Source: MISO M2M settlements data equaled \$34M compared to PJM's \$30M referenced at Sep. JCM

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



Current JOA Processes Address Equity Concerns

- “Higher-of Logic” for Allocations preserves PJM entitlements on MISO Permanent and Temporary flowgates
 - A MISO outage would reduce MISO entitlement and leave PJM’s entitlement unchanged
- Temporary flowgates required for outages are effectively modeled as commercial flow constraints in FTR models
 - Modeling needs for FTR processes differs than the needs for congestion management in Day Ahead and Real Time
 - System conditions influence M2M constraint identification process and will always be finalized closer to Day Ahead

MISO Creates Multiple M2M Flowgates As Needed

For precise congestion management under various scenarios

- Each temporary flowgate represents a possible constraint under a specific operating condition – variables include:
 - Weather forecast
 - Load pattern
 - Wind forecast
 - Generation dispatch – internal and external
 - Resource offers (influenced by fuel prices)
 - Transfer levels

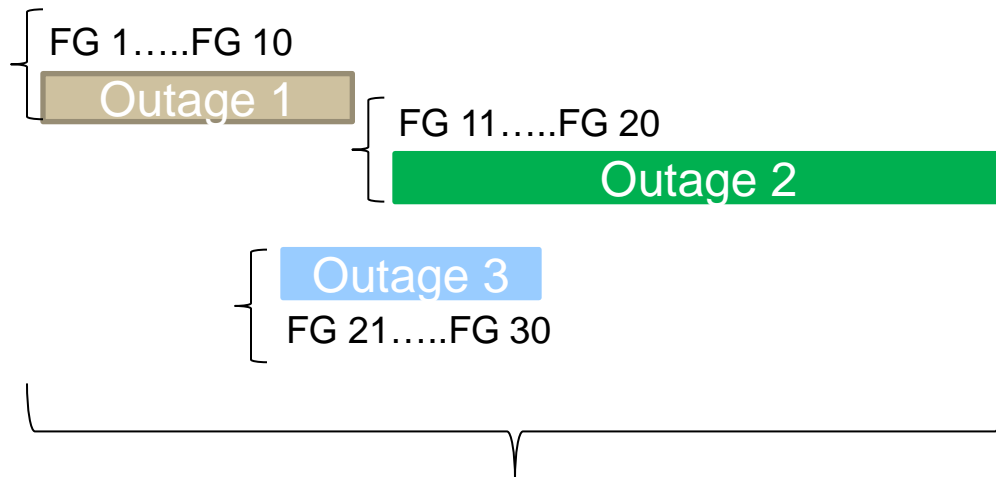
More FGs Are Required For 60 Day Notice

- The number of study scenarios and uncertainty would increase
 - This would lead to an even higher number of M2M FGs per outage
- For reliability and efficient market operations, both RTOs will always re-study outages closer to their start date, which could yield new FGs
 - FGs modeled in FTR may not exactly match those used in DA/RT

MISO creates temporary constraints in FTR for flowgates most likely to bind in DA/RT

- Monthly FTR models represent expected conditions for the entire month
 - Select the most limiting outages and representative constraints likely to occur in DA/RT to maximize funding efficiency

3 outages in close proximity during upcoming month, each with 10 possible M2M FGs

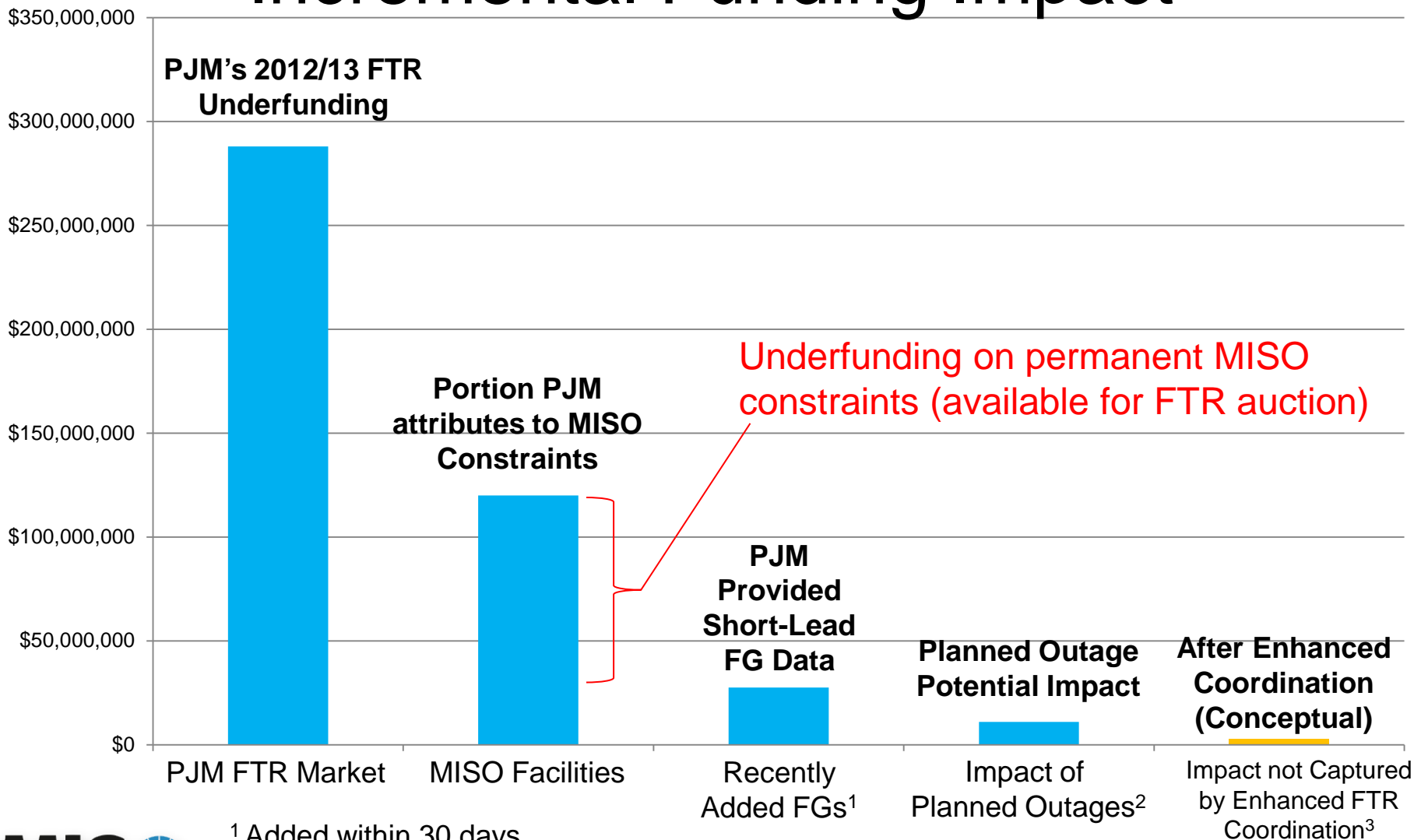


Only the most limiting outages and constraints are needed for the FTR auction



Most impactful subset of constraints, when modeled appropriately, manage funding position on a much wider range of possible constraints

PJM's Proposal Would Have Minimal Incremental Funding Impact



¹ Added within 30 days

² Assuming forced outages, derates, other causes similar to September analysis

³ See Forward Markets Coordination material (agenda item 2)

MISO Concerns With PJM's Proposal

- Large administrative burden for minimal impact
 - Additional flowgate creation
 - Settlement determination
- Elimination of M2M leads to higher production costs and increased reliance on TLR
 - There are no provisions for compensation under industry-wide congestion management protocols
 - For example, a MISO TLR affecting TVA driven by outages would have no compensation
- It is not clear the extent (if any) to which identifying flowgates accurately will reduce underfunding
 - PJM's data shows that 77% of underfunding on MISO flowgates occurred on previously identified (or permanent) flowgates

MISO's Proposal for Enhanced Constraint Identification and Modeling

- Leave Market to Market rules unchanged
- Focus on:
 - Improving coordination of outages and constraints modeled for FTR and DA markets*
 - Outage-driven constraints modeled as temporary constraints in MISO and PJM FTR auctions
 - Promoting submission of planned outages in time to be incorporated into Monthly FTR auctions
 - MISO TOs have agreed conceptually to advance lead times for important (Class I) outages, now working out implementation details



*Refer to Forward Markets Coordination Presentation

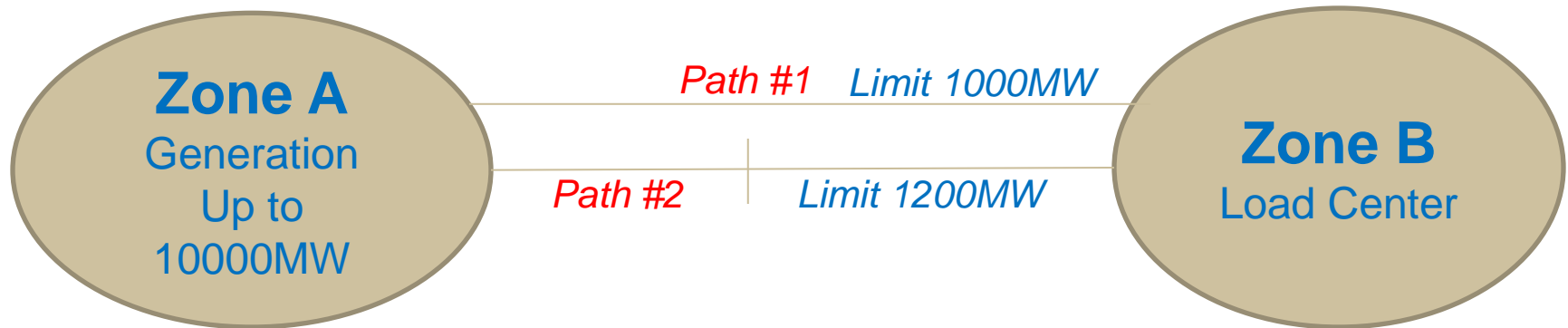
Summary

- Process changes focused on flowgate submittal time are not likely to achieve meaningful FTR funding improvement because:
 - Majority of M2M settlements and FTR underfunding occur on permanent flowgates identified prior to monthly auction
 - Temporary constraints are effective substitutes for temporary flowgates not defined prior to monthly auction and will capture the vast majority of congestion impacts
- Continuing efforts to improve coordination, modeling of outages and existing constraints, and PJM's improvements to its ARR/FTR market design can deliver immediate and long-term improvements

Appendix



Simplified Example



- Auction should constrain generation from Zone A to 2000MW (Path #1 most limiting if equal impedance)
- It is superfluous in this example to enforce constraint Path #2 (Path #1 constraint manages other constraints)
- If Path #2 is suddenly de-rated (LiDAR, outage, etc.) to 950MW, FTR exposure is limited to only 100MW
 - However, an over-allocated position has much greater exposure