Joint and Common Market

ITEM 4 – PSEUDO TIES

Agenda

1.	Overview
2.	Background
3.	Common Issues
4.	PJM Update
5.	MISO Update
6.	Double-Counting
7.	Next Steps

Overview

Purpose

- Provide a status update on MISO-PJM pseudo ties

Goals

- Address near-term pseudo tie implementation challenges
- Explore long-term enhancements/alternatives for pseudo tie challenges

Key Takeaways

- MISO and PJM implemented 2016 pseudo ties without any reliability issues
- MISO and PJM will discuss parallel efforts to revise processes

Background

- PJM and MISO pseudo tied 156 MW during 2015-2016 planning year
- PJM and MISO will pseudo tie 2061 MW for 2016-2017 planning year
- Near term goals address 2016-2017 pseudo tie implementation challenges
- Long term goals address all pseudo ties and pseudo-tie processes

Common Issues

Reliability

- Local reliability concerns (MISO)
- Increased interregional outage coordination (PJM)
- EMS modeling (PJM)

Markets

- Out of merit dispatch for local reliability concerns (PJM and MISO)
- Pseudo-Tie Congestion Double-Counting (PJM and MISO)
- Firm Flow Entitlement limits utilized in Day-ahead (PJM and MISO)

Planning

- Aligning study processes (MISO and PJM)

Compliance

- NERC, NAESB, JOA and Tariff obligations (MISO and PJM)

PJM Overview: Main Challenges

- Network Model Expansions - EMS and Markets Modeling Challenges adhering to NERC and FERC compliance standards
- Planning Analysis – External entity planning analysis comparability to PJM planning criteria
- Congestion Management – Local and Regional external system Congestion Management challenges

PJM Stakeholder Efforts

- URMSTF: Underperformance Risk Management Senior Task Force
  - External Capacity Performance Enhancements Problem statement http://www.pjm.com/~/media/committees-groups/committees/mrc/20160526/20160526-item-03-external-capacity-performance-enhancements-problem-statement-and-issue-charge.ashx
  - Focus on Operational, Markets, and Planning challenges
  - Recommendation to Markets and Reliability Committee anticipated in September, 2016
    - Treatment of existing and future Pseudo Tie resources

MISO Overview

- Purpose
  - To provide an update on MISO's internal process improvements and external stakeholder efforts

- Key Takeaways
  - MISO continues to update its pseudo-tie processes and procedures through various stakeholder efforts

Remaining Issues

Reliability

- Host RTO / RC may be unable to effectively control its transmission system without sufficient generation control

Markets

- Out-of-merit dispatch for local reliability concerns

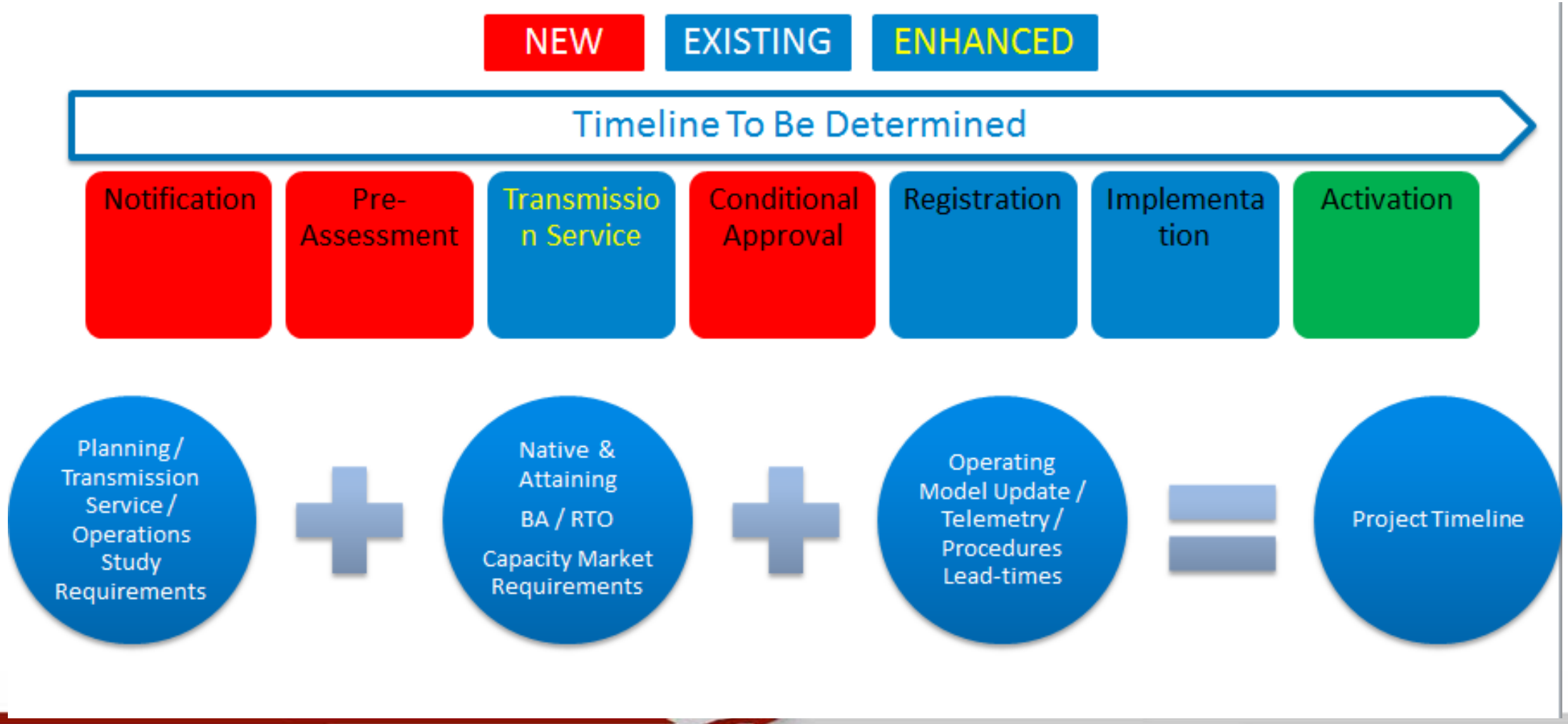
Planning

- Transmission service request evaluation process
- Unit retirements

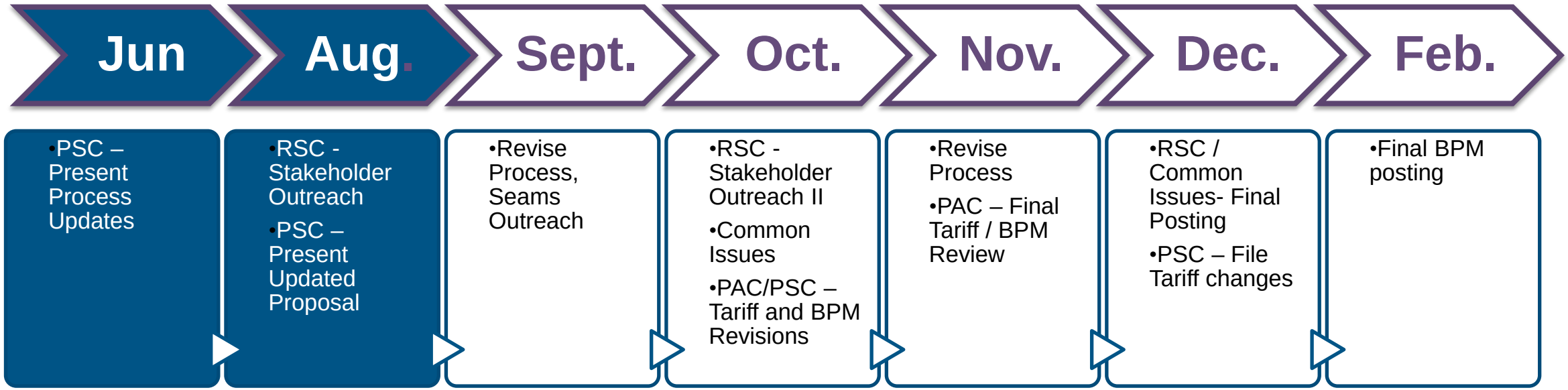
Compliance

- NERC, NAESB, JOA and Tariff implications

MISO Pseudo-Tie Process Revisions



MISO Timeline



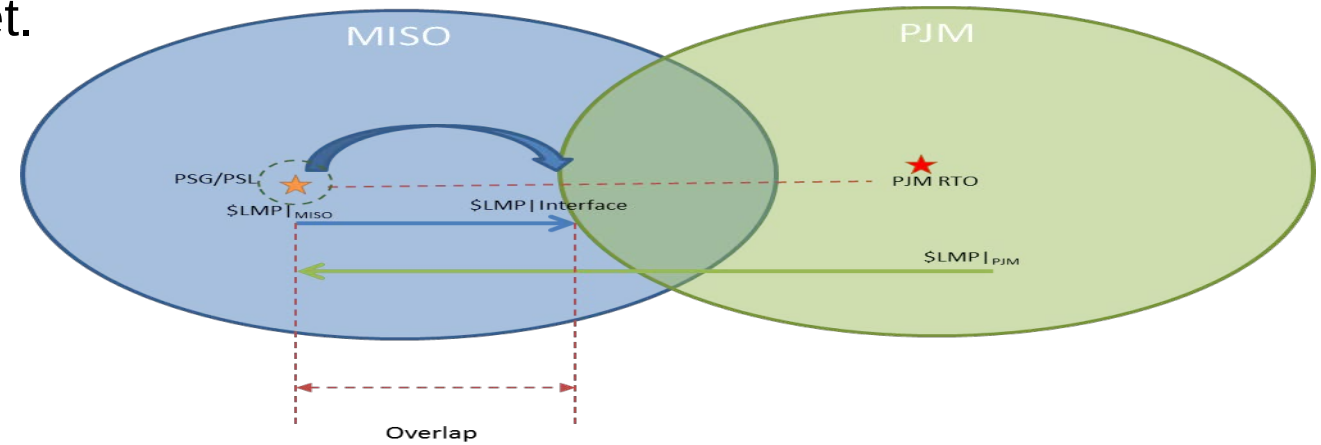
Congestion Double Counting: Overview

- Purpose
  - Explain the issue and impact
  - Update on preliminary study results
  - Discuss path forward

- Key Takeaways
  - The issue is limited to M2M constraints and associated congestion contribution between the source and interface.
  - MISO and PJM are exploring options to address this issue.

Congestion Double Counting: Issue Explanation

- Current settlement process
  - MISO creates a financial schedule to capture the congestion and loss between the source and interface point.
  - PJM models the unit like any other asset in its market and establishes an LMP to settle in the energy market.



- Clarification of the congestion cost overlap
  - The congestion cost overlap only occurs when an associated M2M constraint binds in both markets.
  - The overlap could be a payment or a charge depending on the location of the constraint and the pseudo-tied unit.
  - The interface definition issue which would impact the congestion charge on pseudo-ties is addressed in the interface pricing study.

Congestion Double Counting: Issue Elaboration

- Often there is no congestion overlap since the issue is limited to M2M constraints and its associated congestion contribution between the source and interface
- Level of impact can vary from minor to significant depending on the associated M2M constraints
  - Net impact may be small due to offsetting impacts from all the M2M constraints for the period
- Higher marginal congestion component at the interface and pseudo-tied unit nodes may not be entirely from M2M constraints or impacted by this issue
  - Predominant congestion impact at the node could be caused by non-M2M constraints
- The interface definition change could impact the congestion charges on pseudo-ties.

Congestion Double Counting: Impact Evaluation

- MISO determined congestion charges due to M2M constraints for some pseudo-tied generators using June 2016 production data
  - MISO-PJM M2M constraints bound approximately 18% of the time in June 2016
  - Congestion charge due to M2M constraints on average was about $0.22/MWh which represented approximately:
    - 30% of the congestion charge at these nodes in MISO market
    - 1.0% of the energy revenue in PJM market
- MISO is studying Interface definition change impact on congestion charges for pseudo-ties

Congestion Overlap: Path Forward

- Continue to explore and evaluate options
  - Option 1: Native RTO eliminates congestion charge at pseudo-tie node due to associated M2M constraints.
  - Option 2: Attaining RTO uses interface prices for settlement instead of pseudo-tie nodal prices
  - Option 3: No changes
  - Option 4: Dynamic schedule
  - Other Options?

Next Steps

- RTOs revising policy and procedures for external capacity
- RTOs will update stakeholders during upcoming JCM sessions & regional committee meetings

Contacts

Stakeholder feedback – send comments to:

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Appendix A
MISO Planning – Transmission Service

Current Transmission Service Request Process

- In order to pseudo-tie, firm point to point transmission is required (short-term/long-term).
- Short Term TSRs: Evaluated based on an OASIS AFC evaluation
  - Issue: AFC analysis involves a system dispatch flow base analysis, no source/sink analysis is performed
- Long Term TSRs: Evaluated based on an OASIS AFC evaluation for the first 18 months from the queued date with System Impact Study required for the remainder of the term
  - Issue: AFC analysis involves a system dispatch flow base analysis, no source/sink analysis is performed

MISO Planning – Transmission Service

MISO Proposed Updates for Transmission Service Request Process

- Firm MISO TSR is required and should be maintained for the entire duration of Pseudo-Tie
- Source/Sink specific System Impact Study is required for all the new TSRs (monthly/yearly) intended to utilized for Pseudo-Ties
- Additional study criteria (deliverability analysis/contingency list/ flowgates) might be required based on the following:
  - MISO External requirements: Warranted based on the external BA market rules
  - MISO Internal requirements: TSR study per the new rules will be required if Pseudo-Tie source/sink is not same as that of the underlying TSR
- Transmission Customer will be responsible for upgrades identified due to both internal and external requirements.