

# *Potential PJM/MISO Seams Initiatives*



**Midwest ISO-PJM Joint Stakeholder  
Meeting  
July 16, 2012**



# Joint and Common Market Initiative Categories

- Market Operations
  - Transmission Operations Coordination
  - Day-Ahead coordination
  - Interchange Scheduling Business Rule Alignment
  - Interchange Optimization
  - Fine-tuning Market to Market Process
- Transmission Planning
  - Cross Border Projects to Address Market Efficiency
  - Request for Incremental Auction Revenue Rights
  - Market Participant Funded Upgrades
- Resource Adequacy
  - Capacity Deliverability
- Broader Regional Markets
  - PAR Coordination Study
  - Modeling PARs in historic allocation and market flows
  - NYISO reporting market flows to the IDC
  - Parallel Flow visualization



# Market Operations

# Transmission Operations Coordination

- Seams Issue: disparate timelines for outage submission and approval hinder the RTOs' ability to coordinate outages effectively leading to increased congestion and FTR revenue inadequacy. The same impacts also occur due to the RTOs' occasional inability to direct transmission operations in a coordinated manner
- Opportunities for Enhanced Coordination:
  - Identify specific differences in outage scheduling timelines
  - Establish mutually acceptable outage scheduling requirements, particularly for outages that impact M2M flowgates
- PJM/MISO Assessment – PJM and MISO agree that this is a high priority item for near term investigation and resolution

# Transmission Operations Coordination (cont'd)

- Case study: Maintenance switching - 345kV line needed to be taken out of service to switch a transformer back in service in the MISO footprint
  - PJM and MISO operators coordinated the best time to perform the switching based on load and generation conditions.
  - Switching event was delayed by an hour – not an unusual circumstance – but in this case the delay caused the need for re-dispatch because it pushed past the optimal window
  - MISO and PJM coordinated efforts to determine if the work could be postponed until the following day.
  - Due upcoming planned maintenance schedules, switching was not delayed.
  - Market to Market Coordination was necessary to curtail the high west to east transfers given the timing with which the switching was actually performed
  - PJM participants incurred costs of \$325,000 due to resulting M2M settlement

## MISO Assessment:

- MISO agrees that there is room for improvement in coordination, but believes that the switching delay of an hour is within the operational tolerance for equipment maintenance

## PJM Assessment:

- Coordination accomplished by the RTOs to minimize or eliminate the congestion was circumvented when the switching proceeded after the delay, resulting in an unfair cost to PJM customers
- JOA enhancements and FERC action are necessary in order to allow RTO coordination to be effective; the process cannot work consistently the way it is currently structured

# Transmission Operations Coordination (cont'd)

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  - PJM and MISO operators coordinated the best time to perform the switching based on load and generation conditions.
  - Switching event was delayed by an hour – not an unusual circumstance
  - MISO and PJM coordinated efforts to determine if the work could be postponed until the following day.
  - Due to reliability concerns and upcoming planned maintenance, switching could not be delayed.
  - Market to Market Coordination was necessary to curtail the high west to east transfers
  - PJM participants incurred \$325,000 for flows above their entitlements.
- Market to Market provided the necessary and efficient congestion management.
- Additional Transmission Operations coordination could have reduced the impact of the switching, lowering the cost of managing congestion

# Day-Ahead Coordination

- Seams Issue: differing constraints and congestion patterns on jointly managed constraints in the RTO Day-Ahead Markets lead to inefficient congestion management and price differences at the seam
- Coordination Opportunities:
  - Enhanced wind generation forecasting coordination: increase locational granularity of wind forecast data exchanged on a day-ahead basis
  - Enhanced identification and communication of key topology and generation status changes and expected constraints
  - Redesign or elimination of day-ahead Firm Flow Entitlement shift (this JOA component has never been utilized)
  - Common Day-Ahead Market
- PJM/MISO Assessment: PJM and MISO agree that the first two items are high priorities for investigation; the third item should be investigated based on the outcome of the first two items, and the last item is a low priority for future investigation.

# Interchange Scheduling Business Rule Alignment

## Issue

- Market Participants have requested alignment of Interchange Scheduling rules that will provide more flexibility in scheduling transactions across the seam
- Coordination Opportunities:
  - Reduce MISO's notification time for Fixed Transactions
  - Increase MISO's export ramp limit from 500MW/15min to 1000MW/15min
  - Align PJM's 45 min duration requirements versus MISO's prohibition of intra-hour schedule change
  - Revise/align definitions of proxy bus

## MISO/PJM Assessment

- PJM and MISO agree that this is a high priority item for near term investigation and resolution



# Interchange Optimization

## Issue

- Volatility of Real-Time energy transfers (Net Interchange) creates operational challenges across the seam. Participants may not be able to effectively arbitrage price differences in Real-time. IMMs have indicated that over 50% of transactions are scheduled in uneconomic direction.
- Coordination Opportunities:
  - Dispatchable Interregional Transactions (DIT)
    - MISO and PJM exchange interchange demand/supply curves reflecting incremental price at varying levels of Net Interchange
    - Prior to the Real-time Economic Dispatch, the Net Interchange across the interface is optimized through economic clearing of the Market Participant submitted DIT offers

## MISO/PJM Assessment

- MISO considers this a high priority item that needs near term evaluation and resolution
- PJM believes that scheduling rules should be aligned first and this initiative should be undertaken if sufficient potential benefits remain to be achieved

# Managing Volatility on Flowgates

## ➤ Issue

- Real time fluctuations in load, wind, forced outages and other uncertainties can cause significant volatility on certain Market to Market Constraints

## ➤ Proposed Solution(s)

- Forward and real-time process data exchanges and coordination including review of shadow prices

## ➤ MISO/PJM Assessment

- PJM and MISO agree that this is a high priority item for near term investigation and resolution

# Switching Flowgate Managing Entity

## ➤ Issue

- Volatility in flows and prices across the RTO seam can occur when the Managing Entity for a constraint doesn't have the most effective generation for re-dispatch. It could also result in non convergence in the interface prices

## ➤ Proposed solution(s)

- Transfer flowgate control from the owning/monitoring RTO to the partner RTO
- Control performance criteria consistent with the owning/monitoring RTO

## ➤ MISO/PJM Assessment

- PJM and MISO are currently implementing this high priority item incrementally

# Eliminating Proxy Constraints

## ➤ Issue

- Use of proxy constraints to manage congestion can result in excess curtailment of economic resources resulting in market inefficiencies

## ➤ Proposed Solution(s)

- Market to Market constraint identification process.
- Effective criteria for identifying the constraints that will load in real-time

## ➤ MISO/PJM Assessment

- PJM and MISO agree that this is a high priority item for near term investigation and resolution

# Enhanced Data Exchange for Verification

## ➤ Issue

- In the revised JOA, MISO and PJM agreed to exchange detailed Market-to-Market related data to foster enhanced transparency and data access for verification

## ➤ Proposed Solution(s)

- Supplement existing real time data exchange with information used during a M2M event
- Exchange input data used for market flow calculation and final market flows on a frequent basis

## ➤ MISO/PJM Assessment

- PJM and MISO are currently working on this high priority item for implementation in 2012

# Market Flow Calculation Enhancements

- Issue
  - Imports to an RTO are currently not accounted in the determination of Market Flows
  
- Proposed Solution(s)
  - Change MISO and PJM Market Flow Calculation engines to account for the imports into the Market Flow calculation
  - Requires FERC filing
  
- MISO/PJM Assessment
  - High Priority – MISO and PJM are working together to implement a change in their respective Market Flow Calculation process



# Transmission Planning

# Cross Border Projects to Address Market Efficiency

## ➤ Issue

- There are known areas of congestion between the two markets that could be addressed through transmission solutions

## ➤ Coordination Opportunities

- MISO and PJM staff are working on a study scope to evaluate areas of congestion between the two markets per the processes in place in the existing JOA
- Also, MISO and PJM will be working to improve coordination through our FERC Order 1000 compliance filings

## ➤ MISO/PJM Assessment

- High Priority. MISO and PJM are actively working on the proposed solutions above.



# Request for Incremental Auction Revenue Rights

## ➤ Issue:

- MISO and PJM have different mechanisms for market participants to obtain incremental Auction Revenue Rights.

## ➤ Coordination Opportunities

- Develop a common method to obtain Auction Revenue Rights and have that common method work for upgrades required on either system for ARR in either market.

## ➤ MISO/PJM Assessment:

- Heavily related to participant-funded upgrade and cross border market efficiency issues. The desire to relieve congestion is often the driver for a participant funded upgrade seeking ARR. These high priority issues are being worked on together.

# Market Participant Funded Upgrades

## ➤ Issue

- MISO and PJM have different procedures and recovery mechanisms for market participant funded upgrades

## ➤ Coordination Opportunities

- Modify transmission planning tariffs to provide a consistent process for evaluating market participant funded upgrades.
- Requires a tariff change

## ➤ MISO/PJM Assessment

- Medium Priority. MISO has initiated discussions with its stakeholders to define the process for evaluating, approving and cost recovery of market participant funded upgrades. Market participant funded upgrades are often the remedy sought when a Cross Border Market Efficiency solution cannot be identified.



# Resource Adequacy

# Capacity Deliverability

- Seams Issue: ensure ability for participants to efficiently transfer capacity across the seam while respecting physical limitations to minimize total capacity costs across the region
- Coordination Opportunities:
  - Coordination of long-term transmission service request analysis
    - establish total transfer capability across the seam
    - ensure existing capacity transactions are not impacted
    - ensure consistency of models and analysis methodologies used for long-term transmission service request analysis
  - PJM/MISO Assessment: PJM and MISO agree that this initiative is a high priority for near term investigation and resolution

# Capacity Deliverability (cont'd)

- Seams Issue: ensure ability for participants to efficiently transfer capacity across the seam while respecting physical limitations to minimize total capacity costs across the region
- Coordination Opportunities:
  - Coordination of capacity deliverability modeling and assumptions
    - coordinate modeling of zonal transfer limits in capacity auctions
    - ensure consistency of generator and load deliverability analyses in both RTOs
    - coordinate assumptions utilized in RTO generator and load deliverability analysis
- PJM/MISO Assessment: PJM believes this is a second step, medium priority. MISO believes this is a high priority and an essential step in eliminating the capacity barrier

# Capacity Deliverability (cont'd)

- Seams Issue: ensure ability for participants to efficiently transfer capacity across the seam while respecting physical limitations to minimize total capacity costs across the region
- Coordination Opportunities:
  - Joint deliverability analysis and common capacity commitment timeframe
    - establish “network service” across the seam
    - conduct joint generation deliverability analysis
    - conduct joint load deliverability analysis
    - analyze generation deliverability to combined RTO load
- PJM/MISO Assessment:
  - PJM believes this requires a common DA market and is therefore a low priority
  - MISO believes joint deliverability analysis is a high priority because it is the fundamental to eliminating the capacity barrier and can be achieved without the common DA market

# Capacity Deliverability (cont'd)

- Seams Issue: ensure ability for participants to efficiently transfer capacity across the seam while respecting physical limitations to minimize total capacity costs across the region
- Coordination Opportunities:
  - Coordination of capacity product definition
    - identify and ensure consistency of resource eligibility criteria and performance requirements
    - ensure consistency of resource measurement and verification mechanisms
    - coordinate day-ahead must offer requirements
    - enhance operating procedures during emergency conditions
- PJM/MISO Assessment: PJM believes this is a high priority for near term investigation. MISO believes this is a low priority - today even with the current definitions, resources in MISO (approx. 400 MW) participate in PJM's market

# Capacity Deliverability (cont'd)

- Seams Issue: ensure ability for participants to efficiently transfer capacity across the seam while respecting physical limitations to minimize total capacity costs across the region
- Coordination Opportunities:
  - Coordination of capacity auction timing
  - Coordinate PJM Incremental Auctions with MISO annual capacity auction
  - Coordinate opening/closing of bid/offer windows and auction executions
- PJM/MISO Assessment: PJM and MISO believe this is a second step item of medium priority



# Capacity Deliverability (cont'd)

- Seams Issue: ensure ability for participants to efficiently transfer capacity across the seam while respecting physical limitations to minimize total capacity costs across the region
- Coordination Opportunities:
  - Combined capacity market
  - Establish common, forward capacity auctions
  - Establish common incremental auctions
  - Establish combined set of locational capacity constraints
  - Coordinate/combine reference prices/demand curves
- PJM/MISO Assessment: PJM and MISO believe this is a long-term, low priority item



# Broader Regional Markets

## ➤ Status Report

- Final Report issued on 6/1/2011 by IESO, MISO, NYISO and PJM
- Found Correlation between Lake Erie Circulation (Loop Flows) and...
  - MISO-IESO scheduled interchange: strongest
  - Ramapo PAR flow: strong
  - St Lawrence and J5D PARs: weak
- Future empirical analysis required after Michigan-Ontario PARs are placed in service.

# Michigan-Ontario PAR Modeling

## ➤ Status Report

- DOE's issuance of the Presidential Permit encouraged reporting on PAR control
- Modeling PARs in historic allocations and market flows pending outcome of additional Regional Power Control Device analysis efforts
- Allocation calculations use IDC model
- Market Flow calculation uses EMS models

# NYISO Market Flow Reporting to IDC

## ➤ Status Report

- NYISO currently implementing Market-to-Market coordination with PJM
- NYISO-PJM Market-to-Market coordination target date for implementation is January 15, 2013
- NYISO will be calculating market flows to support the implementation of the NYISO-PJM Market-to-Market coordination
- NYISO currently submitting data to the Parallel Flow Visualization test system
- NYISO market flow reporting to the IDC is currently dependent on the successful completion of the NAESB Parallel Flow Visualization project

# Parallel Flow Visualization

## ➤ Status Report

- PFV will identify the source and magnitude of parallel flows in the Eastern Interconnection
- NERC approved Interchange Distribution Calculator (IDC) changes in May 2009 to use real-time data to determine generator-to-load impacts
- NAESB is developing a mechanism to assign curtailment priorities to generator-to-load impacts
- Following a 12-18 month field test, the IDC changes will be used by RCs to track parallel flows and will be used by the IDC to manage congestion
- Netting in the IDC will be addressed once the PFV field test is underway