



# MISO-SPP Market-to-Market Process: Interface Pricing

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## Introduction

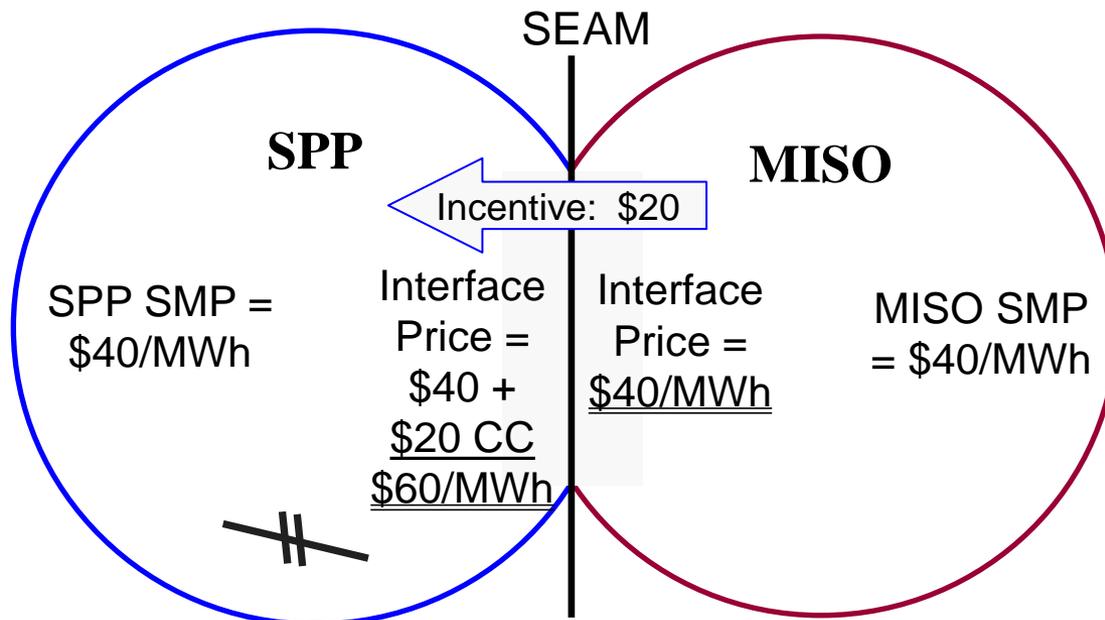
- Due to the interaction between the SPP and MISO systems, the implementation of a market-to-market (“M2M”) coordination process is essential for achieving an efficient outcomes in both areas.
- FERC has identified some key aspects of the M2M process proposed by SPP.
  - ✓ We identify a number of significant issues regarding these aspects of the M2M proposal.
  - ✓ However, none of the issues we will discuss on any of the three panel today are significant enough to warrant rejection or postponement of the M2M process.
  - ✓ Nonetheless, we make a number of recommendations to address these issues.



## Introduction: Interface Pricing

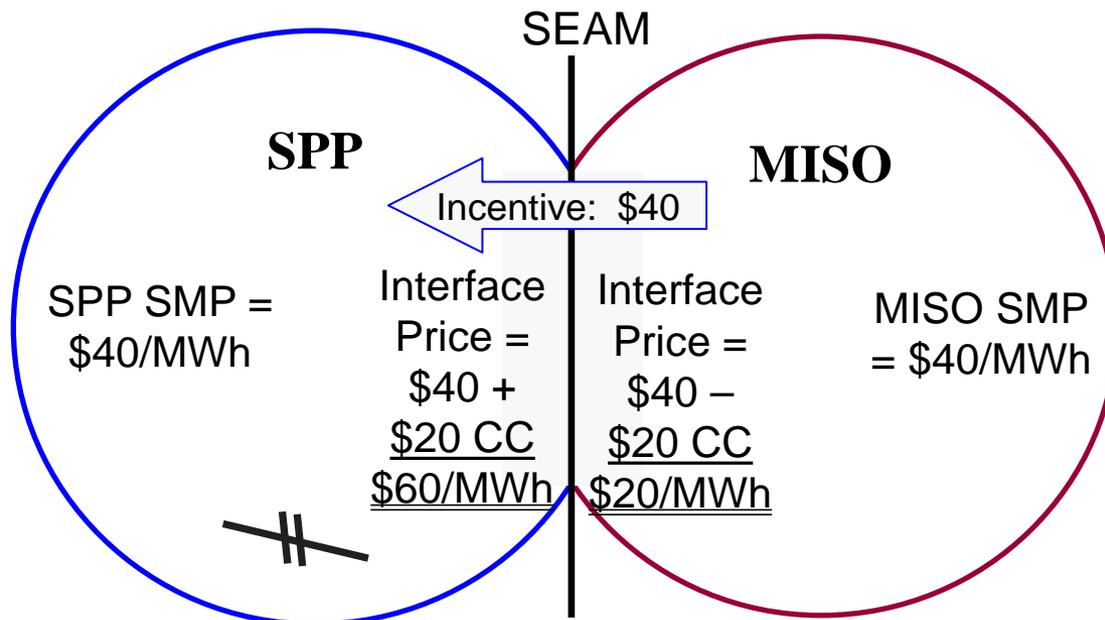
- Interface pricing is essential because:
  - ✓ It is the sole means to facilitate efficient power flows between RTOs.
  - ✓ Poor interface pricing can lead to significant uplift costs and other inefficiency.
- One of the key components of the interface price is the congestion component, which reflects the estimated effect of transactions on any constraint in an RTO's market that is binding.
- M2M processes create interface pricing issues because they cause both RTO's to model the *same* constraint.
  - ✓ Hence, the interface prices must be coordinated to avoid duplicative settlements with the transactions.
  - ✓ This is illustrated in the following 2 slides.

## Interface Pricing without Market-to-Market (or TLR)



- Assume the binding constraint is *relieved* by an import from MISO.
  - ✓ Without M2M, SPP will estimate the value of the relief (\$20 in this example) and the interface price will include a congestion component to incent participants to schedule the transaction.
  - ✓ MISO's interface price would not include a congestion component for this because it is an SPP constraint.

# Interface Pricing with Market-to-Market



- Once M2M is initiated, this constraint will appear in both RTOs' dispatch and both will estimate the relief the transaction will provide.
- SPP's settlement is unchanged, but MISO now includes the \$20 congestion component in its interface price also, doubling the incentive provided to participants to schedule the transaction (\$60-\$20).
- MISO's \$20 payment will be uplifted to its customers.



## Calculating the Congestion Component at the Interface

- The issue in this case involves the congestion included in the interface price, which is reflected in the congestion component of the LMP.
- The congestion component is calculated by:
  - ✓ Estimating a “shift factor” that indicates the incremental change in flow over a constraint associated with a transaction.
  - ✓ The shift factor is multiplied by the marginal value of the constraint (i.e., the shadow price) to determine the congestion component.
  - ✓ Hence, if the shift factor = 10% and the shadow price = \$150, the congestion component will equal \$15 per MWh.
- The shift factor is estimated by assuming a source in the neighboring control area (referred to as the “interface definition”) and a sink at the “reference bus” in the RTO’s own area.



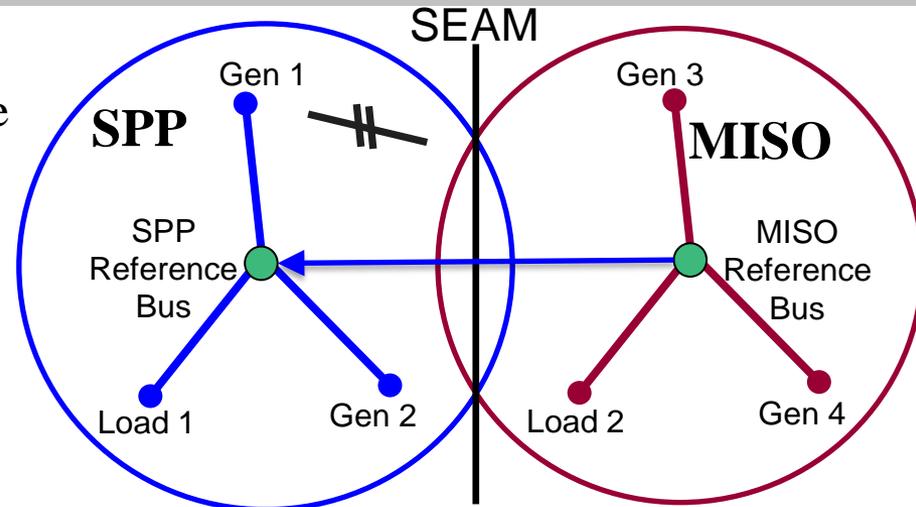
## Alternatives for Eliminating Duplicative Settlements

- Two alternatives have been discussed for eliminating the duplicative settlements with PJM:
  1. The monitoring RTO reflects the congestion in its interface price
    - ✓ This matches the settlements for non-M2M constraints.
    - ✓ The non-monitoring RTO would not include the monitoring RTO's constraints in its interface price.
  2. Both RTO's implement a common interface bus at the seam.
    - ✓ Theoretically, this would cause the two shift factors to sum to the value the monitoring RTO would have gotten on its own.
    - ✓ Hence, if both RTO's calculate the same shadow costs, their two congestion components should sum to create an efficient settlement.

# Interface Pricing Alternatives under Market-to-Market

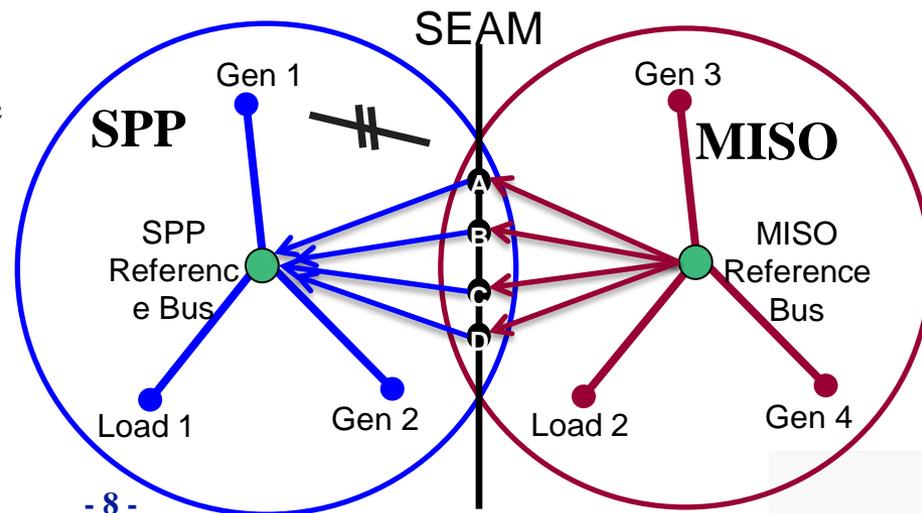
## Alternative #1:

- Monitoring RTO prices the entire path from the NMRTO area.
- No payments made by NMRTO.
- No need for settlement adjustments through the JOA to account NMRTO payments.
- Gen and load LMPs



## Alternative #2:

- Each RTO sets its interface price relative to a common set of interface points.
- JOA must account for the payments and receipts of the NMRTO.



## Interface Pricing Alternatives: Examples

- The following examples show how both Alternatives can produce an efficient settlement with the transaction.
  - ✓ Examples assume a 1 MW export from MISO to SPP that relieves a binding SPP M2M constraint.
- While the net settlement is efficient, The inflated offsetting payments leaves SPP with a shortfall to be uplifted (balancing congestion).

### Example 1- Alternative #1

	SPP	MISO	Balancing Congestion/FTR Underfunding
Shadow Cost	\$500	0	
Shift Factor	-10%	0	
Congestion Payment	\$50	0	None
Total Payment	<b>\$50</b>		<b>Payment is efficient</b>

### Example 2- Alternative #2 with Equal Shadow Prices

	SPP	MISO	Balancing Congestion/FTR Underfunding
Shadow Cost	500	500	
Shift Factor	-20%	10%	
Congestion Payment	\$100	(\$50)	SPP = \$50 shortfall, MISO = \$50 surplus
Total Payment	<b>\$50</b>		<b>Payment is efficient</b>

## Interface Pricing Alternatives: Examples

- The following examples shows that when shadow prices do not converge, or the constraint is not a M2M constraint, the settlement is inefficient and the RTOs will incur net balancing congestion or FTR underfunding.

### Example 3- Alternative #2 with Non-Convergent Shadow Prices

	SPP	MISO	Balancing Congestion/FTR Underfunding
Shadow Cost	500	100	
Shift Factor	-20%	10%	
Congestion Payment	\$100	(\$10)	SPP = \$50 shortfall, MISO = \$10 surplus
Total Payment	<b>\$90</b>		<b>Transaction overpaid</b>

### Example 4- Alternative #2 for Non-M2M Constraints

	SPP	Balancing Congestion/FTR Underfunding
Shadow Cost	500	
Shift Factor	-20%	
Congestion Payment	\$100	SPP = \$50 shortfall
Total Payment	<b>\$100</b>	<b>Transaction significantly overpaid</b>



## Conclusions

- We have been analyzing these issues and alternative solutions for roughly two years and have the following conclusions:
- Alternative #1:
  - ✓ Ensures efficient interface pricing under all conditions.
  - ✓ Eliminates balancing congestion/FTR underfunding.
  - ✓ No potential unintended consequences have been identified.
  - ✓ There is no inconsistency for the NMRTO to price the M2M constraint at gen/load locations, but not at the interface.
- Alternative #2:
  - ✓ When the shadow costs don't converge, the incentive to schedule is distorted and can be in the wrong direction.
  - ✓ Can be extremely inaccurate for non M2M constraints since since there is no companion settlement from the NMRTO.
  - ✓ Requires inter-RTO settlements to account for the NMRTO payments and collections of the NMRTO that can result revenue inadequacies and uplift.



## Conclusions

- We have validated the conclusions regarding these alternatives with empirical data on actual MISO and PJM M2M constraints.
- Making the MRTO responsible for pricing its own constraints at the interface (Alternative 1) has all benefits and no costs in comparison to:
  - ✓ Dividing responsibility (Alternative 2),
  - ✓ Allowing the RTO's to engage in duplicative settlements at the interface.
- Hence, we are recommending that the Commission require the RTOs to implement Alternative #1.
  - ✓ We believe that this solution is straightforward and resolves all interface pricing concerns.
  - ✓ Nonetheless, implementation of the Market to Market coordination process as soon as possible should remain a top priority.