

Commercial Market Flow

JCM
November 10, 2014

- Commercial Market Flow (CMF) - Nodal level Market Flow calculation that includes both generation-to-load (nodal injections/withdrawals) and transaction impacts (interface injections/withdrawals)
- Market-to-market Market Flow (M2M-MF) - Excludes transactions and only considers native generation-to-load impacts (per MISO-PJM JOA)
- In 2013, PJM proposed M2M MF and FFE adopt transaction impacts complementing CMF principles (align M2M payments with balancing revenue)

Process	CMF Used?	M2M-MF Used?
FTR Market	✓	
DA Market	✓	
RT Market Settlement	✓	
M2M		✓

- During the July JCM, RTOs mentioned that this initiative is impacted by the Interface Pricing discussion
- PJM proposes to utilize a MISO-PJM common interface approach and each RTO calculate its respective transaction impact associated with MISO-PJM transactions and include those impacts in its respective M2M market flows
- MISO proposes to utilize a reference-to-reference interface approach and only the Monitoring RTO calculate the total transaction impact associated with MISO-PJM transactions and only the Monitoring RTO include the transaction impact in the M2M market flow calculation

- PJM posted a detailed report describing its proposal for adopting transaction impacts complementing Commercial Flow principals
 - Description of existing and proposed process for Market flow and FFE
 - Examples
 - Stakeholder feedback encouraged

PJM PROSPOSAL ON MARKET FLOW ENHANCEMENT

- Existing M2M market flow calculations currently do not align with calculations used in actual LMP settlements of each RTO
- M2M market flow calculations removes impact of transactions through mechanisms such as “Slice of system”, Marginal zone, or POR/POD
- In actual LMP settlements the commercial flow is utilized in which a nodal calculation accounts for all RTO market flow
 - Every MW that has a market flow impact is accounted for in congestion
 - Imports/Exports are settled at interface pricing locations and MWs are injected/withdrawn at the same interface pricing locations

- M2M market flow calculation could include transaction impacts using interface definitions (similar to Market settlements)
 - Utilize Commercial Flows

- M2M market flow and FFE calculations need to be aligned

- Alignment of M2M market flow with actual commercial market flow will ensure that net of M2M payment and balancing congestion will equal zero if FFE is honored in day-ahead market
 - Day-ahead market models all flowgates to expected Firm Flow Entitlement (FFE) values to ensure proper use of the system

Example Impacts of the Market Flow Calculation differences

Scenario	FFE	Day-ahead Market Flow	Real-Time commercial Market Flow	M2M Market Flow	Real-time Shadow Price	Balancing Congestion*	M2M Payment**	Total costs (Balancing Congestion + M2M Payments)
1	20	20	30	30	\$3,500	\$35,000	(\$35,000)	\$0
2	20	20	10	10	\$3,500	(\$35,000)	\$35,000	\$0
3	20	20	20	20	\$3,500	\$0	\$0	\$0
4	20	20	30	40	\$3,500	\$35,000	(\$70,000)	(\$35,000)
5	20	20	10	0	\$3,500	(\$35,000)	\$70,000	\$35,000

*Balancing Congestion= (Real-Time Market Flow - Day-Ahead Market Flow) * Shadow Price of Constraint

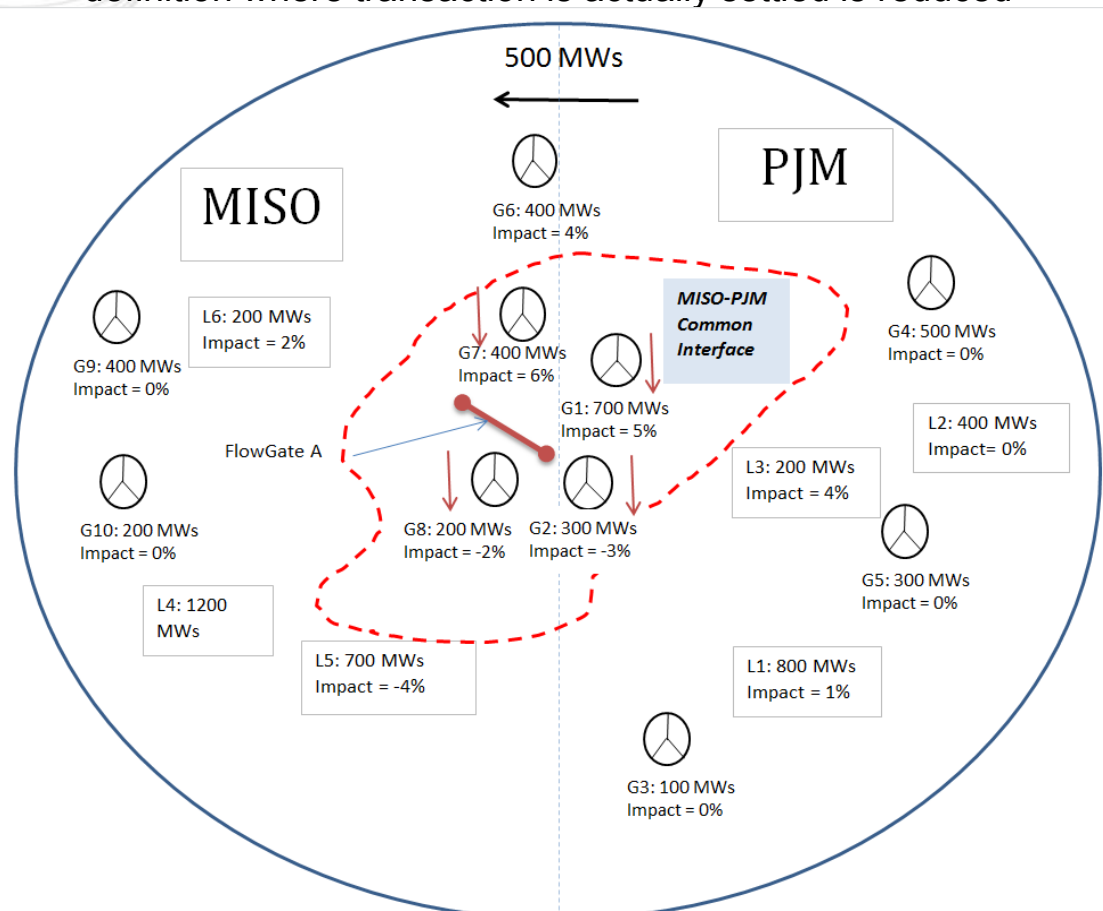
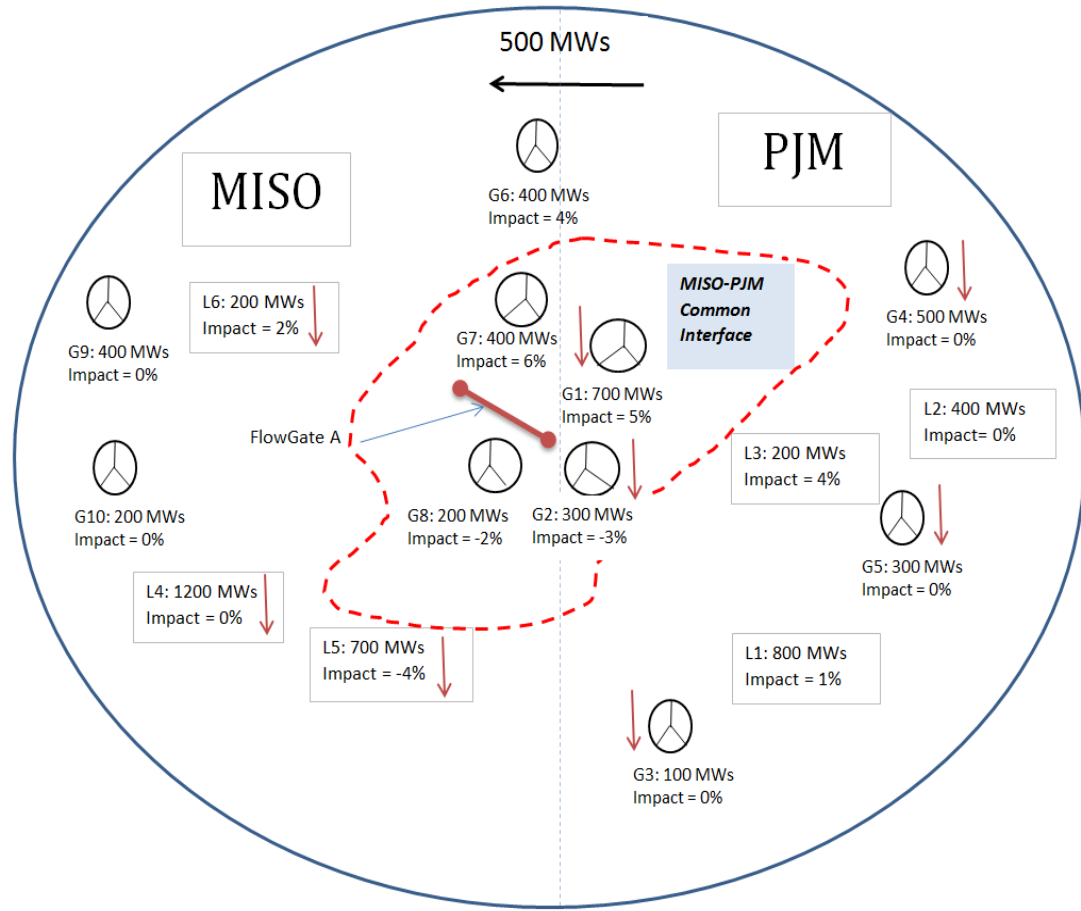
**M2M Payment = (FFE - M2M Market Flow) * Shadow Price of Constraint

- The zero total costs for scenarios 1-3 is expected because the actual real-time commercial flow equals M2M market flow.
- The non-zero total costs for scenarios 4 or 5 is what typically happens because of the mismatch between actual real-time market flow and M2M market flow.

Example: Market Flow Impacts of 500 MW transaction

Existing: All generation and load proportionally reduced

Proposed: Only generation that is defined within Interface definition where transaction is actually settled is reduced



	Load (MWs)	Gen (MWs)	Imports (MWs)	Exports (MWs)
MISO	2100	1600	500	0
PJM	1400	1900	0	500



Example: Market Flow Impacts of 500 MW transaction

M2M Market Flow Calculation: Slice of System/Marginal Zone Approach

Area	Generator	Original MWs	Import or Export Change (MWs)	Final MWs	Flowgate Impact	M2M Market Flow Impact (MWs)
MISO	G6	400	0	400	4%	16
MISO	G7	400	0	400	6%	24
MISO	G8	200	0	200	-2%	-4
MISO	G9	400	0	400	0%	0
MISO	G10	200	0	200	0%	0
MISO	L4	1200	-285.7	914.3	0%	0
MISO	L5	700	-166.7	533.3	-4%	21.3
MISO	L6	200	-47.6	152.4	2%	-3.0

MISO M2M Market Flow	54.3
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Area	Generator	Original MWs	Import or Export Change (MWs)	Final MWs	Flowgate Impact	M2M Market Flow Impact (MWs)
PJM	G1	700	-184.2	515.8	5%	25.8
PJM	G2	300	-78.9	221.1	-3%	-6.6
PJM	G3	100	-26.3	73.7	0%	0.0
PJM	G4	500	-131.6	368.4	0%	0
PJM	G5	300	-78.9	221.1	0%	0
PJM	L1	800	0	800	1%	-8
PJM	L2	400	0	400	0%	0
PJM	L3	200	0	200	4%	-8

PJM M2M Market Flow	11.2
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Note: Load decreased for Importing RTO

Proposed Method: Map to settled LMP PJM-MISO Common Interface Pricing location

Area	Generator	Original MWs	Import or Export Change (MWs)	Final MWs	Flowgate Impact	M2M Market Flow Impact (MWs)
PJM-MISO	Com Int	0	500	500	2%	7.5
MISO	G6	400	0	400	4%	16
MISO	G7	400	0	400	6%	24
MISO	G8	200	0	200	-2%	-4
MISO	G9	400	0	400	0%	0
MISO	G10	200	0	200	0%	0
MISO	L4	1200	0	1200	0%	0
MISO	L5	700	0	700	-4%	28.0
MISO	L6	200	0	200	2%	-4.0

MISO M2M Market Flow	67.5
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Area	Generator	Original MWs	Import or Export Change (MWs)	Final MWs	Flowgate Impact	M2M Market Flow Impact (MWs)
PJM-MISO	Com Int	0	-500.0	-500	2%	-7.5
PJM	G1	700	0.0	700	5%	35.0
PJM	G2	300	0.0	300	-3%	-9.0
PJM	G3	100	0.0	100	0%	0.0
PJM	G4	500	0.0	500	0%	0.0
PJM	G5	300	0.0	300	0%	0.0
PJM	L1	800	0	800	1%	-8
PJM	L2	400	0	400	0%	0
PJM	L3	200	0	200	4%	-8

PJM M2M Market Flow	2.5
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Note: Importing RTO injects the appropriate amount of imports and Exporting RTO withdraws the appropriate amount of exports to model transactions between RTOs.

- Interface Pricing Discussions

- MISO and SPP comment on PJM proposal document
 - Refine document
 - Joint language



Market Flow Enhancement Milestones

#	Status	Activity	By
1		PJM, MISO, and SPP initial review of PJM proposed market flow document	January 2014
2		PJM Finalize and Post Market flow proposal document	October 2014
		MISO and SPP Comment on PJM Market flow proposal document	December 1, 2014
3		Develop preliminary JOA language changes	December 1, 2014
4		Final JOA language changes presented to stakeholders	December 1, 2014
5		File JOA language changes to ensure approval before annual ARR/FTR process	December 1, 2014
6		Implementation	June 1, 2015