

Pseudo Ties – Market Impacts

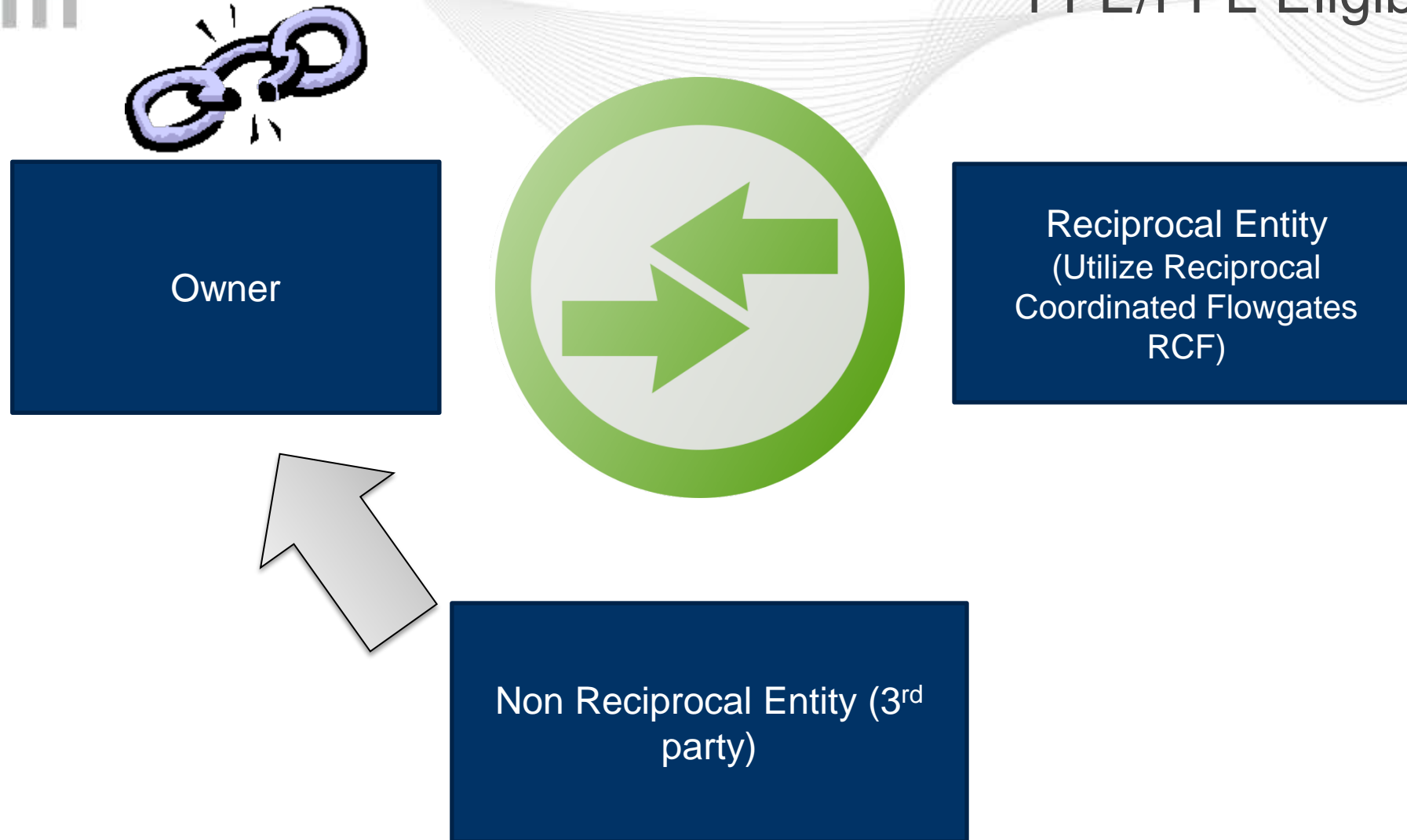
- CMP was initiated by MISO and PJM
 - Additional entities joined CMP over the years
- Intent is to coordinate and take actions to minimize MF
- In order to minimize MF, entities agreed to the following:
 - Certain levels of MF would be considered as firm flow
 - MF beyond firm flows are liabilities



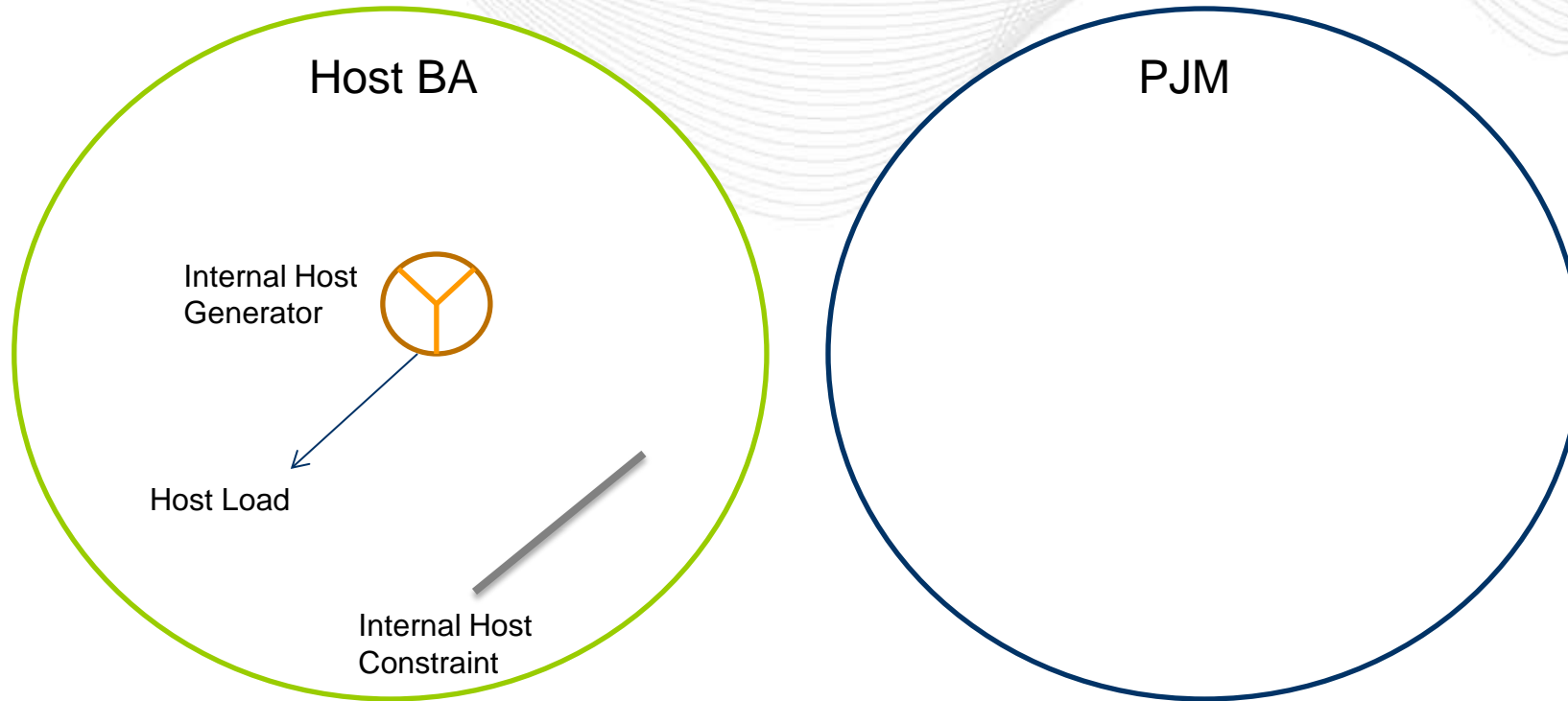
- In M2M, PJM and MISO's entitled firm usage is classified as FFE
- In TLR*, Market Entities' entitled firm usage is classified as FFL
- FFE/FFL is used as financial limits in FTR, DA and RT

Process	MF	FFE / FFL	Firm MF	Non Firm MF
M2M / TLR	100	75	75	25

*TLR utilized for non-market entities



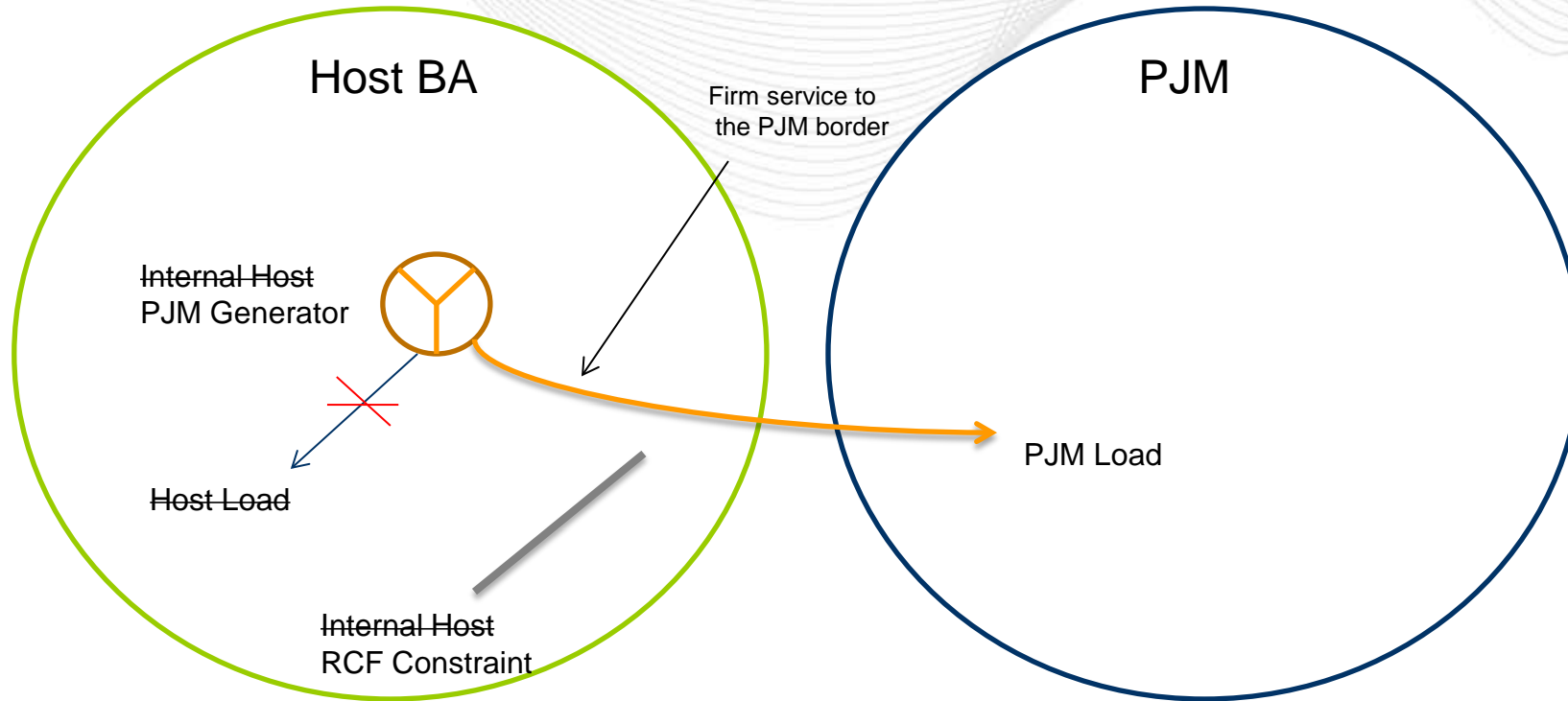
Before Pseudo Tie in PJM (RCF example)



PJM has no units with impacts >5% on Host BA constraint and therefore no RCF exists

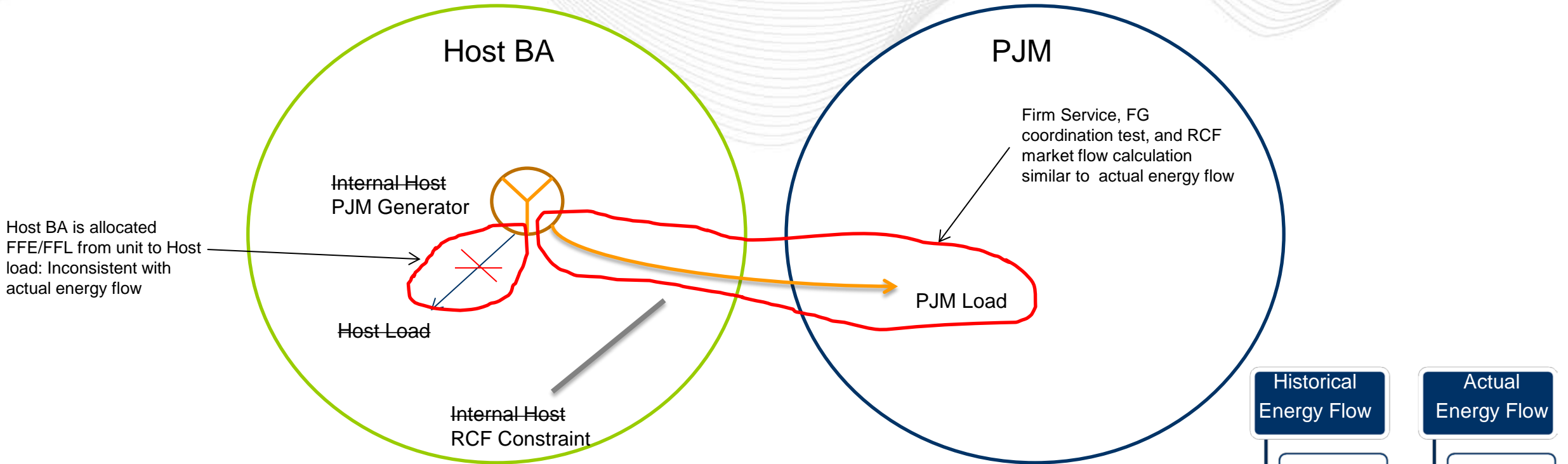
*RCF are Reciprocal Coordinated flowgates managed through the CMP Entities (PJM, MISO, SPP, TVA, Manitoba Hydro, Minnkota Power)

After Pseudo Tie in PJM (RCF example)



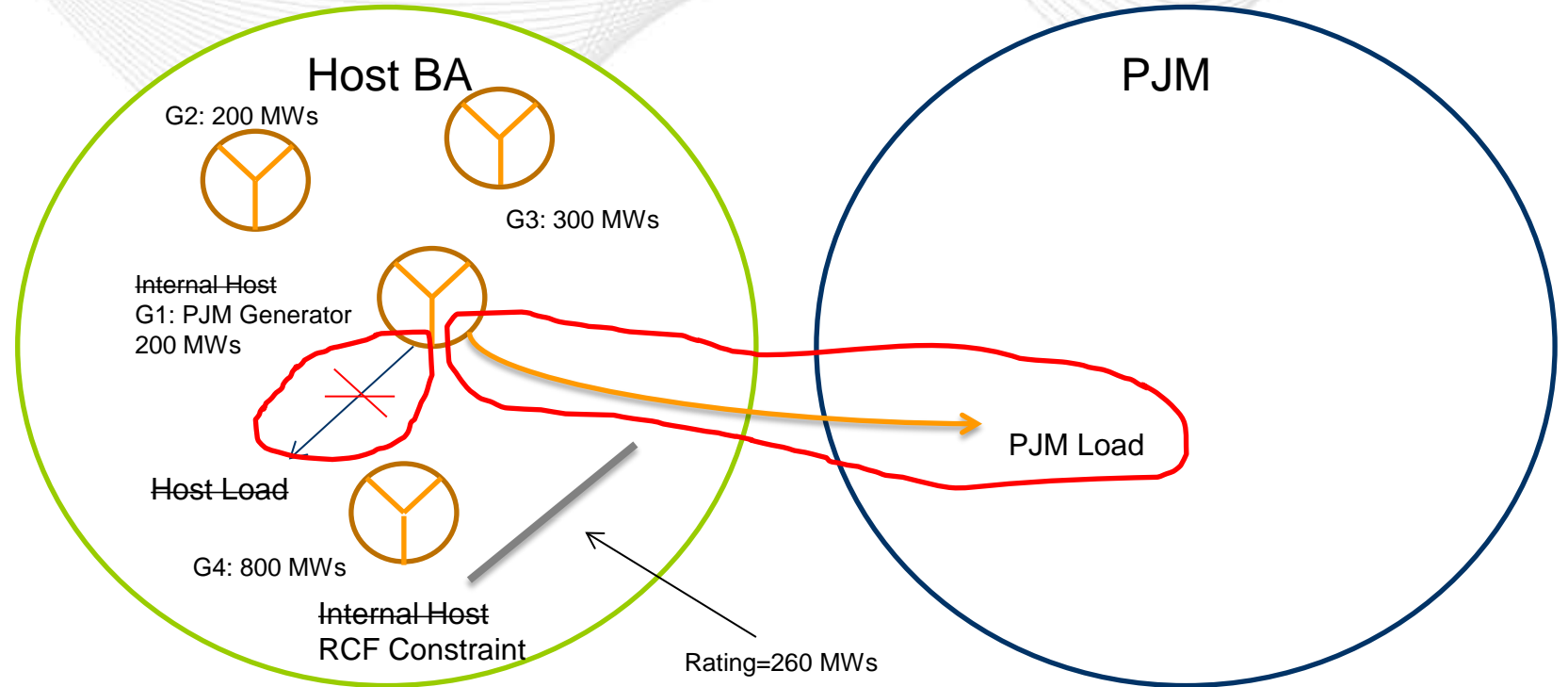
PJM pseudo tie unit has impact >5% on Host BA constraint and therefore the internal Host BA constraint becomes a coordinated RCF constraint

FFE/FFL After Pseudo Tie in PJM (RCF example)



- Firm Flow Entitlements (FFE)/Firm Flow Flow (FFL) on new RCF constraint currently allocated to Host BA because unit designated to serve Host load at time of freeze date (2004)
- Allocation to Host BA based on unit impacts to local Host BA load which is inconsistent with the actual energy delivery, Firm Service, FG coordination test, and RCF market flow calculation

Total impacts on constraint (RCF example)



PJM must try to limit FTR and DA to 0 flow because Host BA is allocated impacts (FFE/FFL) from unit to Host load

Actual Market flow if unit runs results in exceeding FFE/FFL

Unit	Output	FG Impact	Host FFE/FFL	PJM FFE/FFL FTR/DA rating	PJM Market Flow
G1 (PJM pseudo tie)	200 MWs	10% to Host load 6% to PJM load	20 MWs	0	12 MWs
G2 (Host)	200 MWs	8% to Host load	16 MWs		
G3 (Host)	300 MWs	8% to Host load	24 MWs		
G4 (Host)	800 MWs	25% to Host load	200 MWs		
Total			260 MWs	0	12 MWs



Settlements: Pseudo Tie Scenario: (RCF example-MISO constraint)*

	RCF constraint Shadow Price	MISO Flow (MWs)	MISO Settlement	PJM Flow (MWs)	PJM Settlement
FTR	-	260	-\$2600 (FTR TA)	0	-
DA	\$10	260	\$2600	0	\$0
Balancing**	\$10	248	-\$1200	12	+\$1200
M2M Payment***	-	248	+\$1200 (PJM pays MISO)	12	-\$1200 (PJM pays MISO)
Total			\$0		\$0

	MISO	PJM
FFE	260 MW	0 MW

*Assume MISO shadow price = PJM shadow price, Flowgate rating = 260 MW, and M2M market flow=RT market flow

** Balancing settlement = (RT-DA)*Shadow price

***M2M payment=(FFE - Market flow)*Shadow price

The M2M payment offsets the imbalances caused by balancing congestion in MISO/PJM.

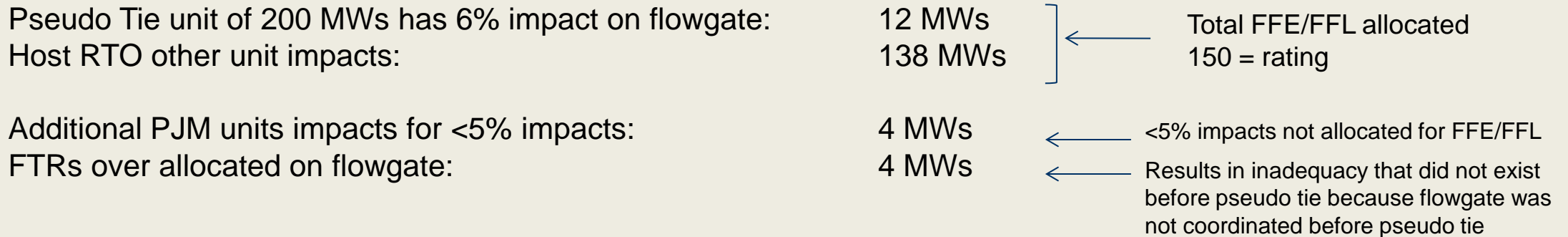
Pseudo Tie Scenario – Why is zero FFE/FFL a problem?

- Day-ahead market (DA) uses FFE/FFL as limit on RCF flowgates and therefore existing rules result in a zero FFE/FFL on flowgates added because of only pseudo tie impacts.
- Different Scenarios that can occur in DA:
 - PJM cannot turn on pseudo tie in DA market even though it was economic and has capacity rights.
 - If unit submits DA Must Run the FFE/FFL may be violated or Must Run invalid because the combined PJM/Host BA flow may exceed rating
 - Flowgate not monitored in DA b/c congestion not expected in RT. Unexpected congestion occurs in RT and FFE/FFL is violated b/c pseudo tie was committed in DA.
- Both scenarios could be prevented if PJM was allocated FFE/FFL for the M2M flowgate impacted by pseudo tie
- Points to note:
 - Pseudo tie has paid for firm transmission service to the PJM border.
 - Pseudo tie has passed PJM deliverability tests for segment from PJM border to PJM load. Segment from unit to PJM border not evaluated using PJM deliverability standards.

Pseudo Tie Scenario – Other Challenges?

- FTR Market: FFE/FFL limit of zero results in stage 1A infeasibilities and reduced ARR allocations for PJM non pseudo tie units with impacts <5%
 - Flowgates only pass coordination test if at least one unit has >5% impacts.
 - If new flowgate is added because of a Pseudo tie unit but there are additional PJM units with less than 5% impacts than PJM may not be allocated FFE/FFL for the units with <5% impacts.
 - >5% allocated to FFE/FFL as priority 1 based on Freeze date (2004)
 - <5% only allocated if have excess

Example: Flowgate rating=150



- Third Party flowgates: PJM needs to limit flow to FFL to support TLR process

Reciprocal and M2M Coordinated Flowgates

1. PJM Obtain FFE/FFL Allocation (Requires host RTO and CMPC approval) **(Preferred)**
 - Allocation based on impact of unit to PJM load(matches energy flow, firm service, DA/RT market flow)
 - Allows unit to run in DA without exceeding FFE/FFL
 - FTR capability allocated by PJM
2. PJM Obtain FFE Allocation through DA Exchange (MISO only)
 - Allocation purchased at Host RTO Shadow Price
 - Forces potential non economic exchange
3. No change
 - Unit not picked up in DA if zero FFE/FFL
 - May not be picked up in RT

Third Party Flowgates

- DA FFL Process ensures PJM limits flow impacts
- Requires third party agreement
 - Already exist for some pseudo ties

