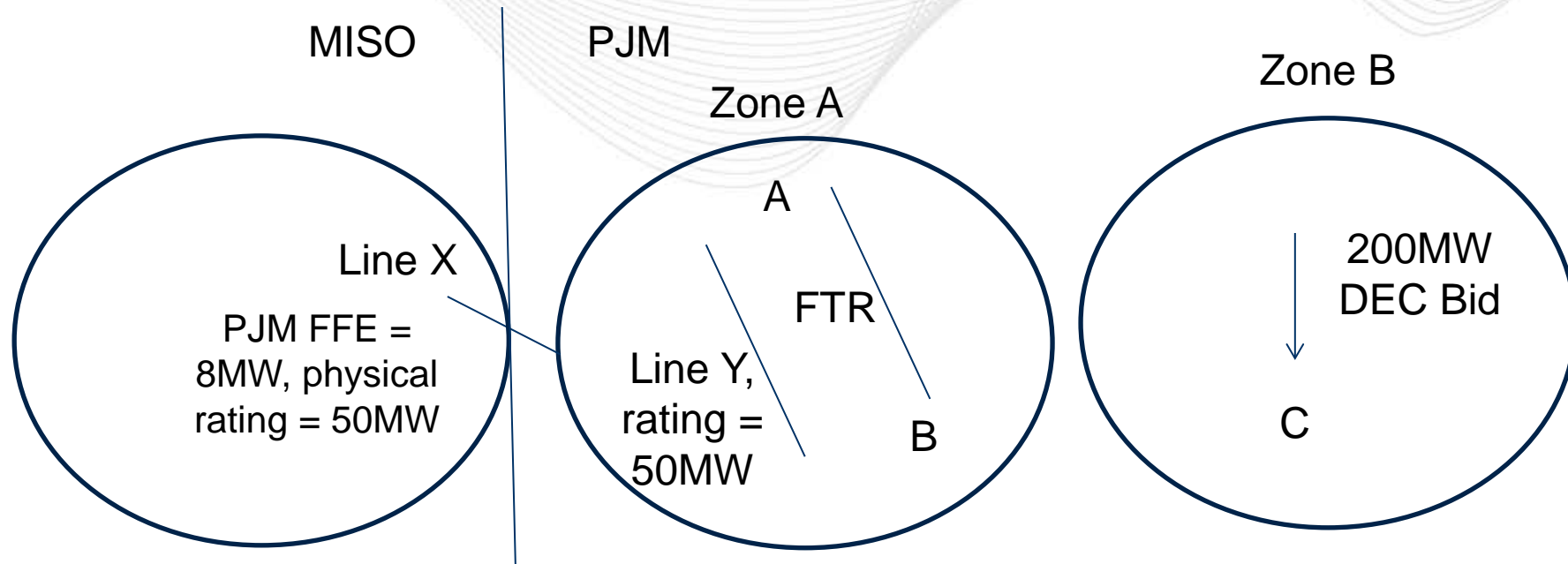# FTR Forfeitures

Brian Chmielewski

Manager, Market Simulation

Market Implementation Committee

August 8, 2018

- The purpose of this presentation is to explain a potential inconsistency in the FTR forfeiture rule

- Inconsistency arises from the modeling of Loop Flow impacts for coordinated M2M flowgates versus internal constraints in the Day-ahead market

- Day-ahead binding limit is used by forfeiture calculation to determine virtual impact on a constraint
  - Participant flagged if net virtual bid mw * dfax / DA binding limit >= 10%

MISO

PJM

Zone A

Zone B

A

Line X

PJM FFE = 8MW, physical rating = 50MW

FTR

Line Y, rating = 50MW

B

200MW DEC Bid

C

Step 3: If step 2 meets threshold, determine if DA Constraints X and Y increase the FTR value from A-B ($0.01)

Step 1: Determine if FTR Path A-B is more congested DA vs. RT

Step 2: Determine impact on DA Constraints X and Y from Virtual transaction at bus C (10% of limit)

Line X and Line Y have different limits due to DA m2m loop flow methodology vs. DA internal loop flow methodology

- The total flow across any constraint has two components:
  - Market Flow – flow from internal PJM resources
  - Loop Flow – flow from external resources
- Therefore, a constraint can only bind as a result of both Market Flow and Loop Flow impacts
- This is straight-forward for internal PJM facilities but a little less clear for coordinated market-to-market flow gates
  - FTR Forfeiture rule potentially is inconsistent due to the binding limits being utilized

- The DA market model incorporates Loop Flow impacts by modeling fixed injections and withdrawals at specific locations along PJM borders, similar to the FTR model
  - Based on historical, average inadvertent interchange
  - Impossible to predict RT LF impacts on a specific facility
- Loop Flow impacts are inherently captured in the total flow and binding limit when a constraint binds in the DA market
  - Market Flow + Loop Flow = Total Flow = Binding Limit used in Forfeiture code
  - Loop Flow impacts for internal facilities are assumed to be minimal, otherwise the facility would qualify for market-to-market coordination
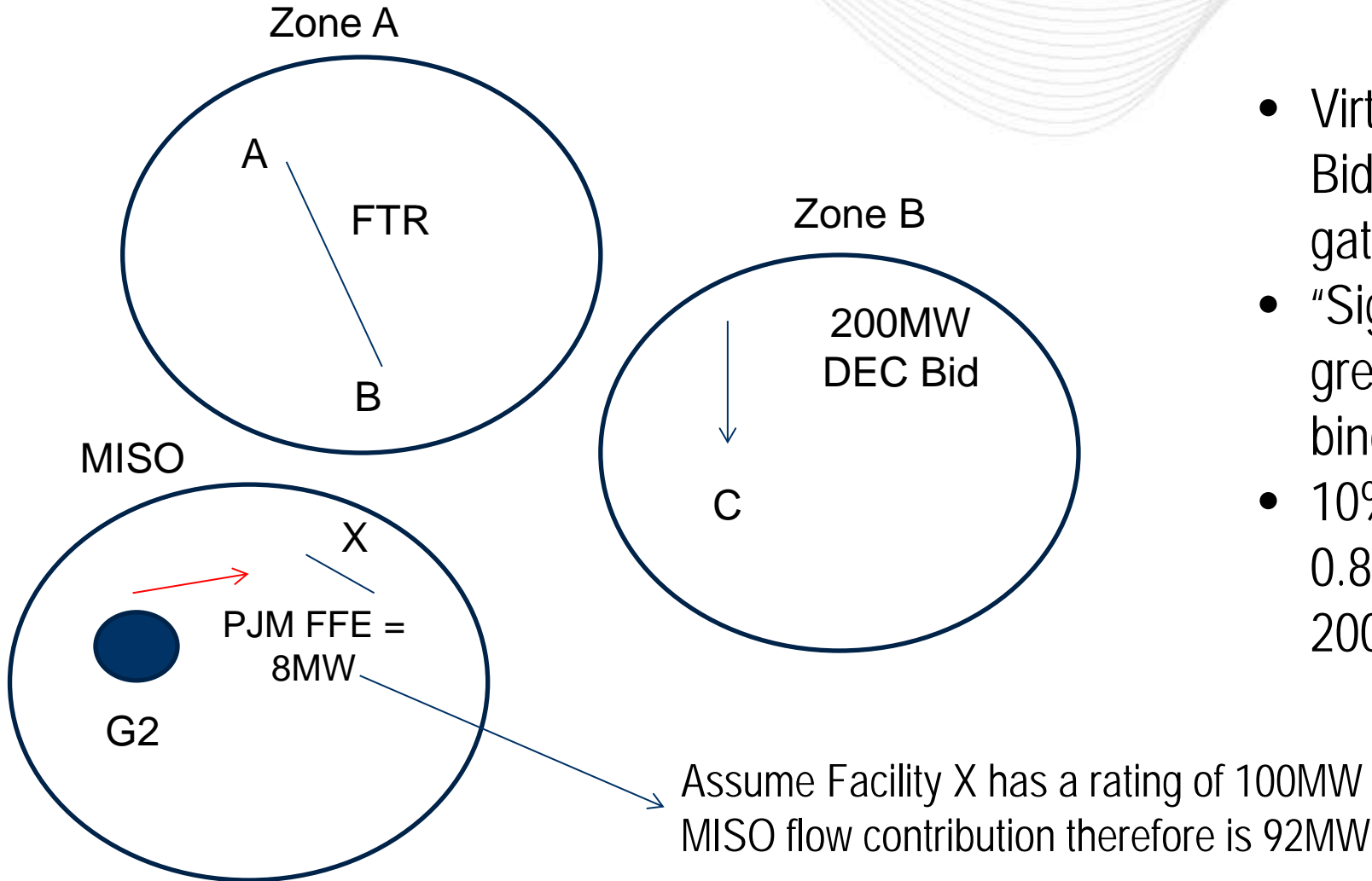
- A market-to-market flow gate is coordinated if it is expected to bind in both PJM market and external market

  – Significant Loop Flow impacts

- PJM DA Market Operations must operate MISO-monitored coordinated flow gates to the allowable firm flow entitlement (FFE) and PJM-monitored coordinated flow gates to the facility rating minus MISO FFE, per the PJM-MISO Joint Operating Agreement

- This means DA must operate market-to-market flow gates strictly on Market Flow

  – Market Flow ~~+ Loop Flow~~ = Total Flow = Binding Limit used in Forfeiture Code

  – Loop Flow is dropped from this equation for the Forfeiture calculation

- Total costs for congestion on coordinated market-to-market flow gates consists of PJM costs and non PJM costs
  - PJM costs result from Market Flow plus M2M payments
  - Non-PJM costs result from Loop flow component (M2M congestion)
- External Areas contribute to the total congestion because the same constraint is binding in both areas
  - Should the FTR holder cost impact on total congestion be considered or just PJM market congestion?

MISO

PJM

X

G2

G1
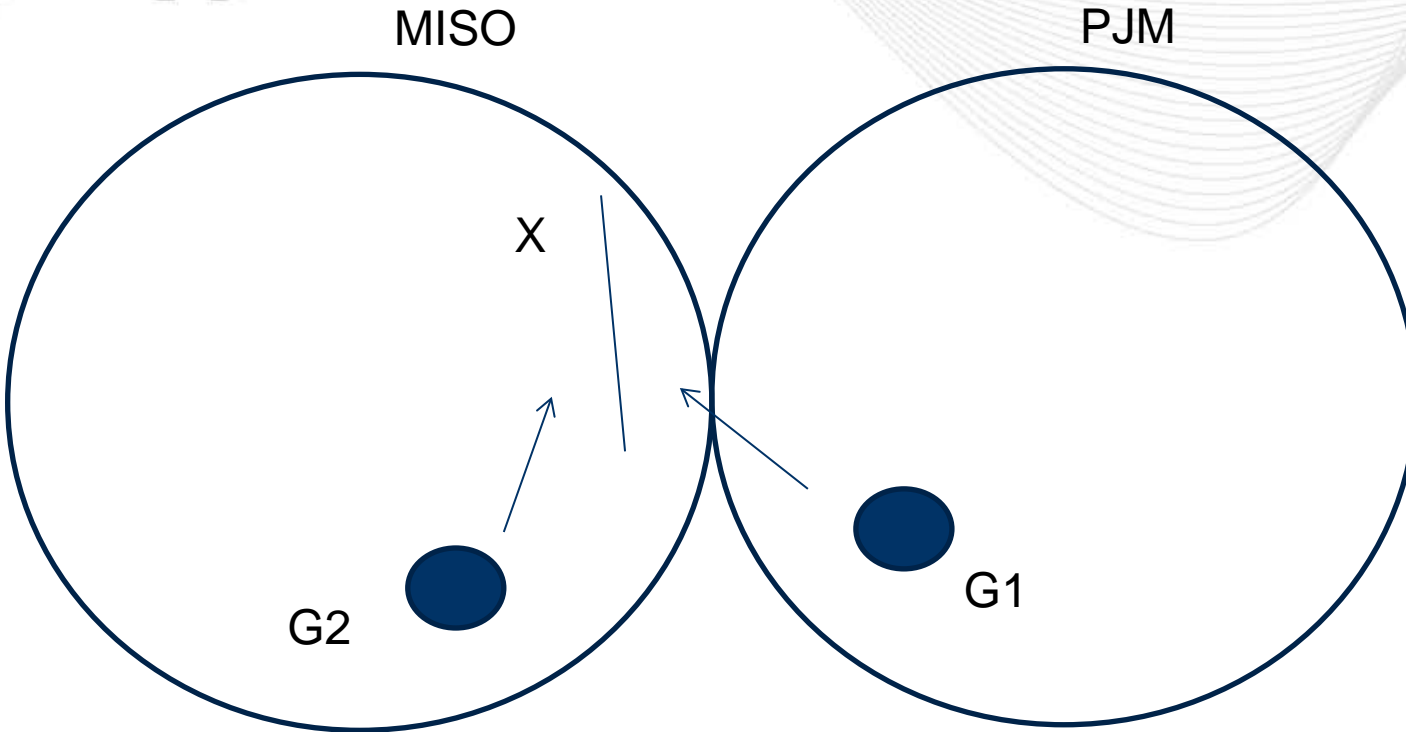
Facility X rating = 100 MW
PJM FFE = 40 MW
MISO Flow = 60 MW

- Flow gate X is congested in the PJM DA Market
- The rating is the FFE (miso owned)
- Since this is a coordinated FG, it is also assumed this constraint is binding in the MISO DA market
- That flow will be the rating – PJM FFE, or "Loop Flow"
- There may be M2M payments associated with this FG
- Consider the Total Flow (MF+LF) for the forfeiture virtual impact test?
  - 100MW, not 40MW

Zone A

A

FTR

B

Zone B

200MW
DEC Bid

C

MISO

X

PJM FFE =
8MW

G2

Assume Facility X has a rating of 100MW
MISO flow contribution therefore is 92MW

- Virtual Test determines if Decrement Bid at point C significantly impacts flow gate X (DA constraint)
- "Significantly" is determined to be greater than or equal to 10% of DA binding limit
- 10% impact for this flow gate would be 0.8MWs or roughly 0.4% dfax given 200MW dec bid

- Adjust the FTR Forfeiture rule to include Loop Flow impacts in the coordinated market-to-market flowgate DA binding limit
  - Loop Flow contributes to the total congestion
  - Use facility rating (MF + LF) for all coordinated M2M flowgates
  - Align with how internal constraints are handled by the forfeiture calculation
- Adjust the FTR Forfeiture rule to exclude Loop Flow impacts on internal constraints
  - Again, relatively small by definition but would be consistent with m2m flowgates
- Status Quo

Appendix

- **Convergence Test** – DA cLmp > RT cLMP for FTR path
  - Determines Hour where DA congestion is greater than RT along a path
- **Virtual Test** – Net virtual activity across all affiliates must be greater than or equal to 10% of DA constraint limit
  - Determines Constraints virtual flow is significantly impacting
- **FTR Impact Test** – (dfax*Shadow Price)FTR Sink – (dfax*Shadow Price)FTR Source >= $0.01
  - Determines FTR paths (direction accounted for counter flow)
- **FTR Forfeiture** – DA Value – FTR Cost