FTR Forfeiture Implementation

MIC

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Objective

- **If a holder of an FTR has an inc or a dec with delivery or receipt points at or near delivery or receipt points of the FTR**
  - **At or near means that the difference between the dfax of the inc or dec on a constraint affecting the FTR and the worst case withdrawal or injection dfax on the constraint is greater than .75**
  - **This means that 75 percent or more of the energy injected or withdrawn, and withdrawn or injected at any other bus, is reflected on the constrained path**
- **If congestion is greater in DA than in RT**
- **The profits of the FTR are forfeited for the hour**

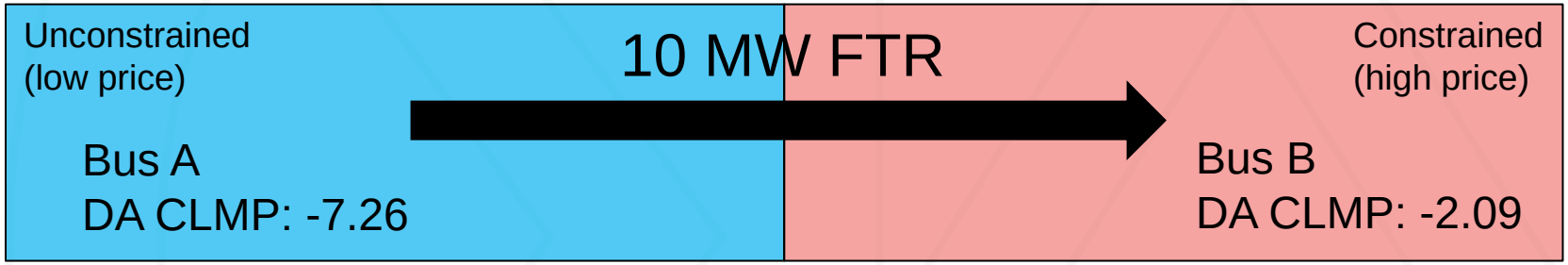
Current Inc/Dec Implementation

1. Define bid locations and dfax of all incs/decs affecting a constraint
   - Exclude incs with dfax < 0, decs with dfax > 0
2. Determine max and min dfax for all injections and withdrawals affecting the constraint
3. Calculate absolute difference between inc/dec dfax and the max/min dfax of withdrawal/injection on the constraint
   - If this difference is >= 75%, potential violation
   - Calculates flow across constraint due to incs/decs

Example

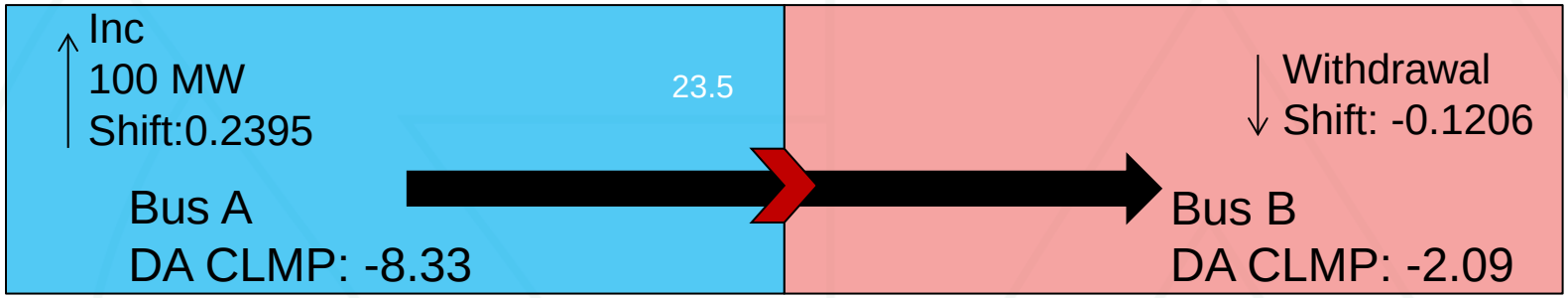
- A 5-bus model is used to evaluate the impact of virtuals on the FTR Target Allocation
- The forfeiture threshold is set at 0.30 rather than 0.75 due to model size
- FTRs are represented
  - CLMP: congestion component of LMP
  - TA: target allocation = FTRMW * ($CLMP_B$ – $CLMP_A$)
  - Shift: shift factor or distribution factor or dfax
- The current method is modeled
- PJM's proposed approach is modeled

Base case



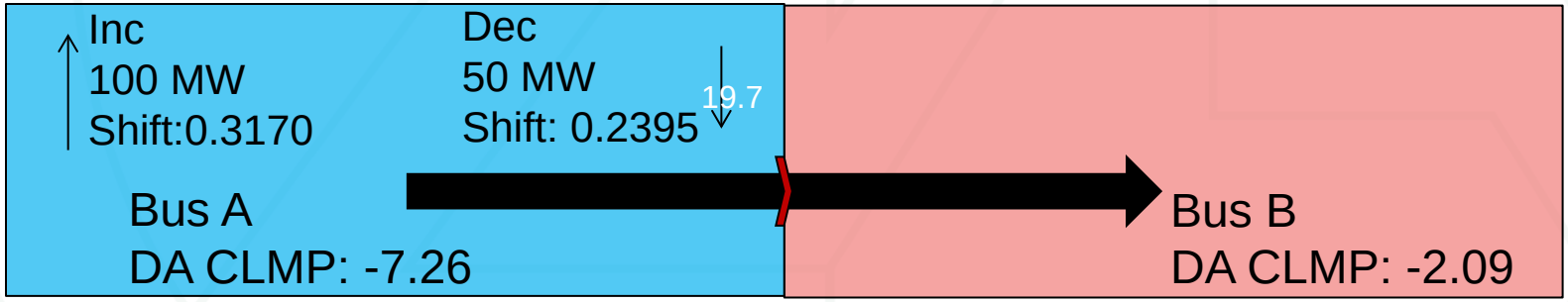
$$TA_{base} = (-2.09 - -7.26)10 = 51.70$$

Impact of Incs and Decs



TA = (-2.09 - -8.33)*10 = 62.40

Δ_{base} = 10.7



TA = (-2.09 - -7.26)*10 = 51.70

Δ_{base} = 0

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Example results

- **The current method is modeled**
- **PJM's proposed approach is modeled**
- **PJM's method matches the current method in two cases**
- **PJM's method inappropriately flags a forfeiture in one case**
- **PJM's method inappropriately fails to flag a forfeiture in one case**

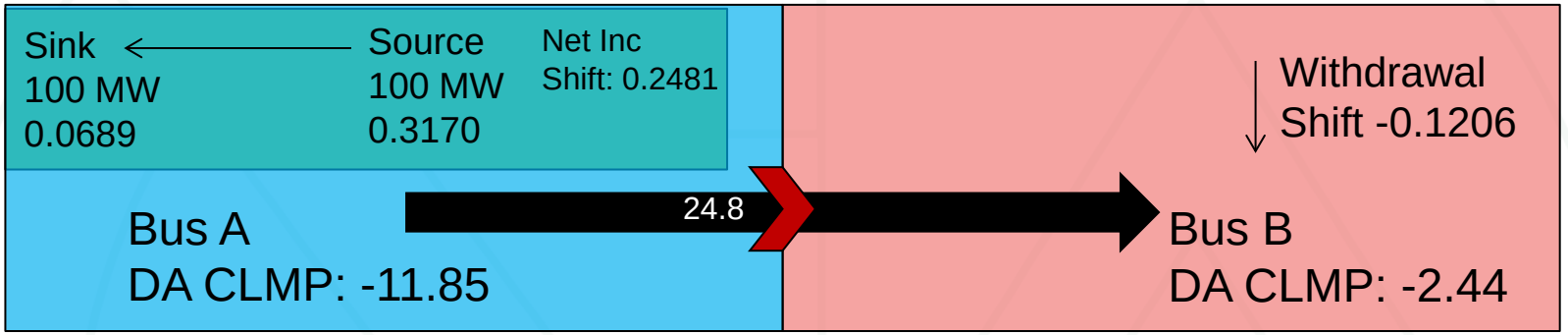
Inc Forfeiture Summary

Case	Dfax at INC location	Dfax at Dec Location	Forfeiture Dfax PJM	Forfeiture Dfax IMM	PJM Flag (Thrld = 0.30)	IMM Flag (Thrld = 0.30)	FTR Sink CLMP	FTR Source CLMP	FTR TA (per MW)	FTR TA Change
Base Case	-	-	-	-	-	-	($2.09)	($7.26)	$5.17	$0.00
Only INC	0.31700	-0.1206	0.31700	0.43760	FLAG	FLAG	($2.51)	($8.72)	$6.21	$1.04
INC (A); DEC (D) Crossing	0.31700	-0.1206	0.31700	0.43760	FLAG	FLAG	($2.93)	($10.18)	$7.25	$2.08
INC (E); Dec (D) Crossing	0.23950	-0.1206	0.23950	0.36010	NO FLAG	FLAG	($2.09)	($8.33)	$6.24	$1.07
INC (A); DEC (E) Same	0.31700	0.2395	0.31700	0.07750	FLAG	NO FLAG	($2.09)	($7.26)	$5.17	$0.00

Proposed UTC Implementation: Same Side

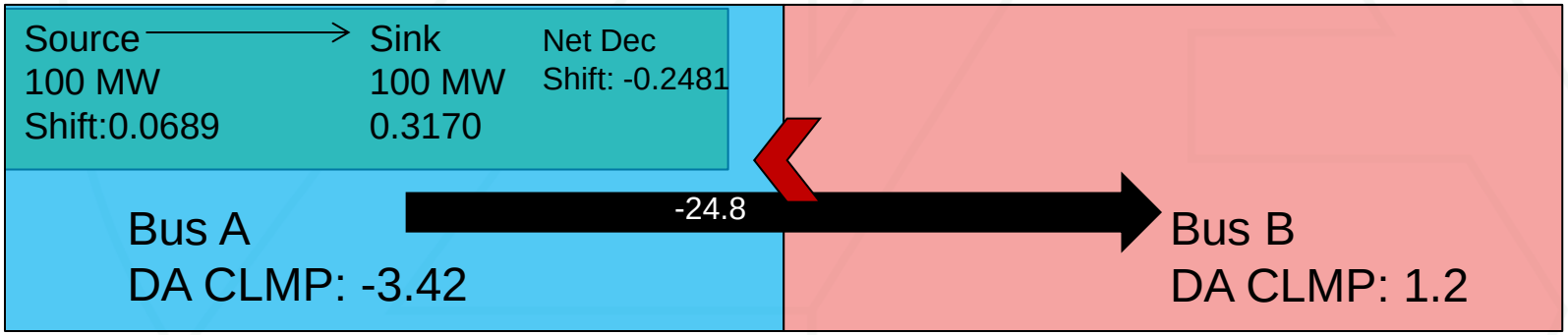
1. **Define UTC source/sink and dfax of all sources/sinks affecting a constraint**
2. **Calculate net effect of UTC on constraint**
   - **Source dfax – Sink dfax**
   - **Classify net effect as equivalent to inc/dec**
   - **Exclude "inc" UTC when net dfax< 0, "dec" UTC when net dfax> 0**
3. **Determine max and min dfax for all injections and withdrawals on the constraint**
4. **Calculate absolute difference between inc UTC/dec UTC dfax (net UTC) and the max/min dfax of withdrawals/injections on the constraint**
   - **If this difference is >= .75, inc/dec exceeds threshold**

UTC Forfeiture: Same Side



TA = (-2.44 - -11.85)*10 = 94.10

Δ_{base} = 42.4



TA = (1.2 - -3.42)*10 = 46.20

Δ_{base} = -5.5

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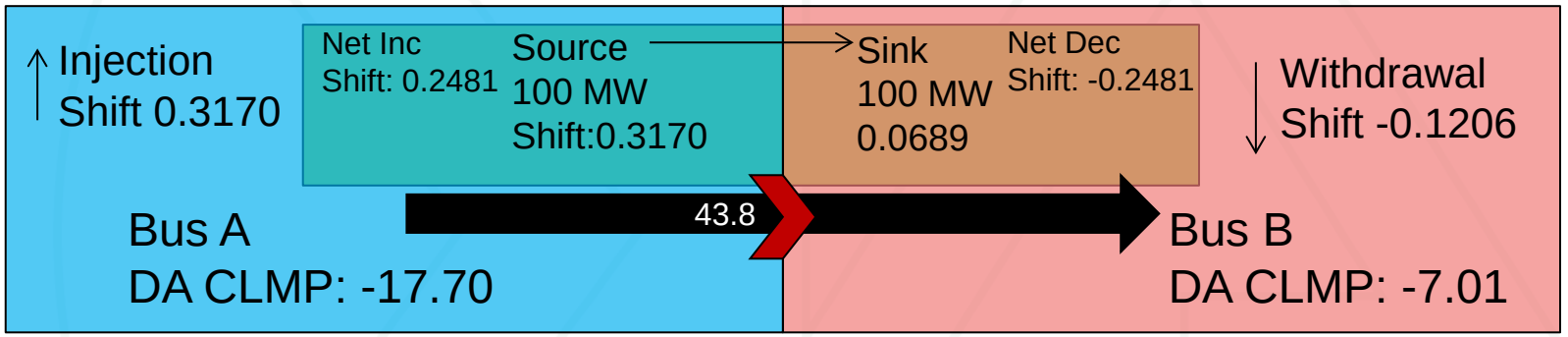
Proposed UTC Implementation: Different Side

1. Define UTC source/sink and dfax of all sources/sinks affecting a constraint
2. Calculate net effect of UTC on constraint
   - Source dfax – Sink dfax
3. Use both positive and negative net dfax
   - Equivalent to both an inc offer and a dec bid on the constraint
4. Determine max and min dfax for all injections and withdrawals on the constraint
5. Calculate absolute difference between inc UTC/dec UTC dfax (net UTC) and the max/min dfax of withdrawals/injections on the constraint
   - If this difference is >= .75, inc/dec is potentially in violation

UTC Forfeiture: Different Side



TA= (-7.01 - -17.70)10 = 106.90

Δ_{base} = 55.20

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UTC Example Results

- **The proposed method is modeled**
- **PJM's proposed method is modeled**
- **PJM's method does not flag any UTC transactions for forfeiture**
- **The IMM's method flags two UTC transactions that increase day ahead price separation**
- **The IMM's method does not flag one UTC transaction that decreases day ahead price separation**

UTC Forfeiture Summary

Case	Dfax at Source location	Dfax at Sink Location	Net Dfax	Injection / Withdrawal Dfax	PJM Flag (Thrld = 0.30)	IMM Dfax (Net)	IMM Flag (Thrld = 0.30)	FTR Sink CLMP	FTR Source CLMP	FTR TA (per MW)	FTR TA Change
Base Case								($2.09)	($7.26)	$5.17	$0.00
UTC Source (A) Sink (C) Same	0.3170	0.0689	0.2481	-0.1206	NO FLAG	0.36870	FLAG	($2.44)	($11.85)	$9.41	$4.24
UTC Source (C) Sink (A) Same	0.0689	0.3170	-0.2481	0.3170	NO FLAG	-0.24810	NO FLAG	$1.20	($3.42)	$4.62	($0.55)
UTC Source (A) Sink (D) Cross	0.3170	-0.1206	0.2481/-0.2481	-0.1206/0.317	NO FLAG	0.3687/0.5651	FLAG	($7.01)	($17.70)	$10.69	$5.52

Forfeiture Example Summary

- An Inc/Dec/UTC transaction that fails the threshold on a constraint affecting an FTR path should be subject to forfeiture when DA congestion > RT congestion
- Using load weighted reference bus (PJM's proposed method) results in 3 false negatives and 1 false positive for these examples

Case	PJM Flag	IMM Flag	FTR TA Change
Inc (A); Dec (D)	Flag	Flag	$2.08
Inc (E); Dec (D)	No Flag	Flag	$1.07
Inc (A); Dec (E)	Flag	No Flag	$0.00
UTC A-C	No Flag	Flag	$4.24
UTC C-A	No Flag	No Flag	($0.55)
UTC A-D	No Flag	Flag	$5.52

Impact of PJM's proposed approach

- Example calculations for forfeiture of only increment offers for December 2012
- Using load weighted reference bus (PJM's proposed method) in place of current method would have decreased forfeiture amounts by 98 percent in December 2012

	PJM Proposed Implementation	Current Implementation
Number of Companies	1	65
Forfeiture Amount	$1,485.84	$75,384.73

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