



Joint and Common Market

FUTURE M2M ENHANCEMENTS



Background

- MISO and PJM are pursuing two enhancements to Market to Market in 2019
- Implementation of Power Swings software
 - Used to mitigate power swings when the Non-Monitoring RTO (NMRT0) has significant impact on M2M flowgates
 - MISO and SPP implemented similar software in 2018
- Removal of constraint relaxation logic on M2M flowgates
 - MISO implemented Transmission Constraint Demand Curves in 2013
 - PJM implemented Transmission Constraint Penalty Factors in 2019

Reasons for Power Swings

- Power swings can occur on M2M flowgates when the NMRTO has a significant amount of total flow on a constraint compared to the MRTO
 - Amplified with NMRTO impact is from fast ramping resources
- NMRTO generally only binds on a flowgate when the MRTO is also binding
 - If MRTO stops binding, NMRTO will not limit its future dispatch allowing its impact to be unconstrained
- M2M is designed to allow both RTOs to solve the constraint at the same time, leading to over control if both RTOs have significant impact
- If MRTO has less control, then they may generate a higher shadow price with relaxation causing the NMRTO to provide even more relief

Power Swings Mitigation

- MISO and PJM to implement similar Power Swings software that MISO and SPP developed in 2016, and put into production in January 2018
- Software has two main features:
 - Enhanced Shadow Price Override
 - Typically used when NMRTO has fast moving generation
 - When MRTO stops binding, the NMRTO continues to bind for a fixed period gradually releasing constrained market flow
 - Physical Flow Control Exchange
 - Designed for flowgates where the NMRTO has significant market flow impacts
 - MNRTO would control to physical flow, and MRTO would control their market flows to a target determined by the NMRTO
 - MISO and PJM have implemented this on some flowgates without software by swapping ownership
- Enhancement will require Tariff changes

Constraint Relaxation Logic

- Constraint relaxation logic sets the shadow price based on the marginal resource less the Marginal Value Limit, even when SCED cannot control the constraint
 - When constraint relaxation is off, if SCED cannot control the constraint, the shadow price is set to the Marginal Value Limit (MVL)
 - Both MISO and PJM utilize constraint relaxation logic on M2M flowgates
- MISO's Transmission Constraint Demand Curves implemented in 2013 (Tariff Schedule 28A) turned off constraint relaxation for all non-M2M constraints and set the maximum MVL based on voltage
- PJM implemented Transmission Constraint Penalty Factors in 2019 (FERC approved on 1/8/2019, implemented 2/1/2019), that sets the shadow price of a transmission constraint when the constraint cannot be adequately controlled on internal constraints

Turning off Constraint Relaxation for M2M

- MISO and PJM plan to turn off constraint relaxation on M2M flowgates in late 2019
 - Requires logic changes in MISO and PJM systems
 - Requires Tariff/JOA changes
- Will impact shadow price for M2M flowgates, interface prices, and impact the hourly shadow price used in M2M settlements
- Stakeholders have raised concerns to MISO and PJM with this change
 - Have requested data analysis on impact of change
- MISO and PJM are reviewing potential data analysis options
 - Provide flowgates that experience relaxation for the MRT0 and the average number of cases relaxation occurs
 - Provide expected Marginal Value Limits that will be used for M2M flowgates

Tentative Timeline

Due Date	Action
Summer 2019	Proposed Tariff Changes for Power Swings and Constraint Relaxation
Next JCM	Provide Data Analysis on constraint relaxation and present JOA language changes
Fall 2019	File Tariff changes
Winter 2019	Implement constraint relaxation changes for M2M flowgates
Q1 2020	Implement power swing mitigation solution

Contacts

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