NYISO-PJM JOA Revisions for M2M

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Agenda

- Overview of Market-to-Market Redispatch Coordination
- Background on the Waiver Filing with FERC
- Proposed JOA Revisions
  - Abbreviations, Acronyms, and Definitions
  - Schedule D – Market-to-Market Coordination
  - Miscellaneous Sections
- Timeline and Next Steps
- Questions
- Appendix

Market-to-Market (M2M) Redispatch Coordination

Overview of Concepts and Definitions

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M2M Redispatch – Concepts

- A real-time process that allows the NYISO and PJM to manage transmission constraints that are impacted by generation dispatch changes in both markets.
  - Redispatch coordination is a tool for regional congestion management and provides coordinated pricing at market boundaries.

- When redispatch coordination on a flowgate occurs, the flowgate is jointly managed in the economic dispatch models of both RTO's.

- Settlements may accrue between the RTOs as a result of redispatch coordination.

M2M Redispatch – Definitions

- **M2M Redispatch Flowgate**
  - A transmission constraint existing in either RTO's market qualified for M2M Redispatch Coordination.
- **Monitoring RTO (MRTO)**
  - The RTO that has operational control of the M2M Redispatch Flowgate.
- **Non-Monitoring RTO (NMRTO)**
  - The RTO that does not have operational control of the M2M Redispatch Flowgate.
- **M2M Market Flow**
  - The market flow impacts of the NMRTO on the M2M Redispatch Flowgate.
- **M2M Entitlement**
  - A measure of the NRMTO's historic market flows over a M2M Redispatch Flowgate. It is equivalent to financial rights for the NMRTO to use the MRTO's transmission system, with respects to the flowgate.

Background

Waiver Filing with FERC

The Need for a Waiver

- **NYISO and PJM continue to observe contingency overloads on the East Towanda – Hillside 230kV tie line during periods of transmission outages coincident with the operation of the Liberty Asylum Unit in PJM.**

- **PJM's ability to take controlling actions is limited under the PJM Tariff because:**

  1. The limiting element of the facility is on the New York side of the border and is therefore considered external to the PJM control area. NYISO expects facility upgrades to be completed in 2019. Following completion of the upgrades, NYISO and PJM will be securing the facility to the same rating.
  2. Prior to the waiver request, the East Towanda – Hillside line was not coordinated as a M2M Redispatch Flowgate.
  3. The current NYISO-PJM JOA provides that activating redispatch coordination will only occur when the Non-Monitoring RTO's market flows are above their Entitlement.

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Waiver Details (ER18-2442-000)

- The waiver allows the NYISO and PJM to coordinate on M2M Redispatch Flowgates for the East Towanda – Hillside facility, and grants waiver of the JOA provisions related to M2M Redispatch Coordination. Namely, it allows:
  - M2M Redispatch Coordination on East Towanda – Hillside flowgates, even when NYISO's market flows are less than NYISO's Entitlement.
  - NYISO and PJM not to apply M2M redispatch settlements for coordination on the East Towanda – Hillside flowgate.

- During the waiver period, the NYISO and PJM have agreed to work through the necessary JOA revisions. NYISO and PJM are also required to provide quarterly reports to FERC addressing their progress.

- The NYISO and PJM are also proposing to make JOA improvements that are not directly related to addressing the concern that prompted the joint waiver request.

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Conceptual Changes to the JOA to Address the FERC Waiver

The JOA changes below are being proposed to capture coordination on flowgates similar to East Towanda – Hillside Flowgates:

- Allow redispatch coordination to occur on a constrained flowgate, even when the Non-Monitoring RTO's market flows are below their entitlement.

- Introduce concept of an "Other Coordinated Flowgate" which :
  a) Is subject to all protocols of a M2M Redispatch Flowgate, but
  b) Is excluded from Redispatch Settlements

Proposed JOA Revisions

OATT 35 Attachment CC JOA Between and Among NYISO and PJM

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Revisions in Response to Stakeholder Feedback

Following the initial presentation, the revisions below were made, but do not alter the substance of the affected sections:

- **Last paragraph of Section 6.1 (M2M Entitlement Calculation)**
  - Removed reference to the M2M Entitlement's "frequency" to avoid confusion.
- **Last paragraph of Section 6.2 (M2M Entitlement Calculation)**
  - Clarified that the M2M Entitlement Calculation is determined for all M2M Entitlement groups.
- **Section 8.1 (M2M Settlements)**
  - For scenarios that are newly accounted for, revised language more clearly describes the relationship between the Non-Monitoring RTO's M2M Entitlement and net market flows.

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Names, Definitions, and Terminology

- Revisions were made throughout Schedule D of the JOA that change naming conventions, but do not alter the substance of existing language.

- These name changes will not be covered in this presentation.

- A complete redlined version of the JOA is available in the posted meeting materials.

35.2.1 OATT Attachment CC
Abbreviations, Acronyms, and Definitions

- NY-NJ PAR Coordinated Flowgate shall mean Flowgates where constraints, impacted by the NY-NJ PARs, are jointly monitored and coordinated as defined and set forth in Schedule D to this Agreement.
  - This type of flowgate already exists in the JOA, but was not yet explicitly defined in this section.

- Other Coordinated Flowgate shall mean a Flowgate where constraints are jointly monitored and coordinated as defined and set forth in Schedule D to this Agreement.
  - This is the new type of flowgate that was added to address the East Towanda – Hillside facility.

- Qualified Resource shall mean a generator that can be effectively committed, decommitted and/or redispatched to relieve a M2M Redispatch Flowgate or Other Coordinated Flowgate. Generators that cannot or do not follow commitment or dispatch instructions, including but not limited to generators with no difference between their historically offered minimum and maximum operating limits and generators with intermittent fuel sources, are not considered Qualified Resources.

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35.23 OATT Schedule D
Section 3 - Flowgate Studies

- The GLDF thresholds for an Other Coordinated Flowgate with one or more monitored elements are defined as:
    - i. Single monitored element, 5% GLDF on any resource;
    - ii. Two monitored elements, 7.5% GLDF on any resource; and
    - iii. Three or more monitored elements, 10% GLDF on any resource.
- Even if a potential Other Coordinated Flowgate passes the above GLDF criteria, NYISO and PJM must still mutually agree to add it as an Other Coordinated Flowgate.
- The same criteria applies to M2M Redispatch Flowgates and NY-NJ PAR Flowgates, but shift factor thresholds must be met for a Qualified Resource.

35.23 OATT Schedule D
Section 4 – Removal of Flowgates

4.3 – Special Rule for Other Coordinated Flowgates

- An Other Coordinated Flowgate shall be removed two weeks after either Party provides a Notice to the other party that it withdraws its agreement to the Other Coordinated Flowgate, or at a later or earlier date that the Parties mutually agree upon.
- The Notice must include an explanation of the reason(s) why the agreement to the Other Coordinated Flowgate was withdrawn.

35.23 OATT Schedule D

Section 6 – M2M Entitlement Determination Method

6.1 – The NYISO and PJM propose M2M Entitlements for each M2M Redispatch Flowgate be calculated as follows :

- At least once every calendar year, to incorporate the impact of upgrades on both parties systems. The parties may mutually agree to not recalculate entitlements in a given year.
- Using the most recently completed three calendar years, weighted as follows:
  - Most recent year 20%, middle year 30%, and oldest year 50%
  - This ensures that changes to entitlements year-to-year are implemented more gradually.
- Entitlements may not exceed the facility's rating.
- Entitlements may be adjusted, as necessary, if either of the following occur:
  - If the Non-Monitoring RTO upgrades the Monitoring RTO's system resulting in a rating increase
  - If the Non-Monitoring RTO's market flow on the Monitoring RTO's system decreases due to a Non-Monitoring RTO upgrade on its own transmission system

35.23 OATT Schedule D

Section 6 – M2M Entitlement Determination Method

6.1 – The NYISO and PJM propose Entitlements for each M2M Redispatch Flowgate be calculated with the following granularity:

- Twelve Entitlement periods (one for each month in the year)
- Four groups of hours
  - Group 1: Hours 0 – 5
  - Group 2: Hours 9 – 14
  - Group 3: Hours 15 – 20
  - Group 4: Hours 6 – 8, and 21 – 23
- The new granularity will produce more accurate entitlements by reducing the number of entitlement values per flowgate, from 672 to 48, and increasing the sample size per entitlement value.
- The proposed grouping of hours more closely aligns with trends in historic hourly market flows. Variations in seasonal and monthly flows will also be more accurately captured.

35.23 OATT Schedule D Section 6.3 and 6.4

- **The NYISO and PJM have agreed to entirely remove sections 6.3 and 6.4 from the JOA because these provisions are unduly complex and are obviated by proposed changes to the M2M Entitlement calculation process.**
  - 6.3 : M2M Entitlement Adjustment for New Transmission Facilities, Upgraded Transmission Facilities or Retired Transmission Facilities
  - 6.4 : M2M Entitlement Adjustment for a New Set of Generation, Load and Interchange Data
- **Sections 6.3 and 6.4 discussed the criteria for incorporating Entitlement updates in response to impacts from system topology changes.**
- **The revised M2M Entitlement calculation rules provide the ability to update Entitlements annually and inherently capture:**
  - Impacts to the M2M Entitlement calculation from changes in transmission facilities.
  - Modeling changes required to reflect changes in generation, load, and interchange data for use in the M2M Entitlement calculation.

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35.23 OATT Schedule D Section 7 – Real-Time Energy Market Coordination

Redispatch coordination for a M2M Redispatch Flowgate or Other Coordinated Flowgate, will occur if the following conditions are met:

- The Flowgate is constrained by a non-transient system condition and the Monitoring RTO sends a request to initiate redispatch coordination on the constrained Flowgate.
- The Non-Monitoring RTO's market flows are above their Entitlement or the Non-Monitoring RTO agrees to initiate and to continue coordination
  - The Non-Monitoring RTO's agreement to initiate coordination, even if below their Entitlement, is required to address the East Towanda – Hillside facility.
- If the Non-Monitoring RTO later withdraws its agreement to activate redispatch coordination on a Flowgate, then the Non-Monitoring RTO notifies the Monitoring RTO of the reason for its decision and the Monitoring RTO shall terminate the redispatch coordination process and set the M2M State to "Refused".

35.23 OATT Schedule D Section 8.1 – Information Used to Calculate M2M Settlements

The determination of redispatch settlements will now account for the following circumstances :

- When the Non-Monitoring RTO's M2M Entitlement is negative and the net market flow of the Non-Monitoring RTO is greater than or equal to zero, the M2M Entitlement will be set to zero .
- When the Non-Monitoring RTO's M2M Entitlement is negative and the net market flow of the Non-Monitoring RTO is also negative, but exceeds the M2M Entitlement, both the M2M Entitlement and market flow will be set to zero.
- Redispatch coordination for Other Coordinated Flowgates is <u>not</u> subject to redispatch settlement.
- Other Coordinated Flowgates <u>are</u> subject to NY-NJ PAR coordination settlement.

35.23 OATT Schedule D Section 9 – When One of the RTOs Does Not Have Sufficient Redispatch

The following proposal will apply to an RTO that does not have sufficient redispatch for a M2M Redispatch Flowgate or Other Coordinated Flowgate :

- If the Monitoring RTO cannot provide sufficient relief, then the Monitoring RTO will be allowed to develop a shadow price for the Flowgate using rules specific to that RTO's Tariff language.
  - Previously, this rule was not explicitly stated in the JOA.

- If the Non-Monitoring RTO cannot provide sufficient relief, then the Non-Monitoring RTO will then be able to develop a shadow price up to, but not exceeding, that of the Monitoring RTO. This provisions supports price convergence on the Flowgate.
  - This is a pre-existing provision that remains unchanged.

Additional JOA Revisions

OATT Att CC : Various Sections

35.7.2 OATT Attachment CC
Exchange of Information - Confidentiality

The following addition is intended to explicitly confirm the authority of NYISO and PJM to provide shared modeling data to their respective Transmission Owners:

- Notwithstanding anything to the contrary in this Agreement, EMS models and the data used for EMS modeling exchanged pursuant to Section 35.7.1 may be released by the receiving party to its Transmission Owners for operational and reliability compliance purposes. The respective Party's Transmission Owners shall be required to maintain the EMS models and the data as confidential in a manner consistent with or superior to the terms and conditions contained herein.

35.23 OATT Schedule D Section 8.3 – NY-NJ PARs Settlements

A redundant time-weighting was removed from the equation below. This error was limited to the JOA language, and was never implemented in production settlements logic.

$$M2MPARSettlement_i = \left(Min\left(\sum^{All\ NY-NJ\ PARs} NYImpact_{PARx_i}, 0 \right) - Min\left(\sum^{All\ NY-NJ\ PARs} PJMImpact_{PARx_i}, 0 \right) \right) \times {}^{S_t}/_{3600sec}$$

35.23 OATT Schedule D Section 10.1.10
Suspension of NY-NJ PAR Settlement due to a Stuck PAR

The Parties shall suspend PAR settlements for a NY-NJ PAR when the NY-NJ PAR cannot be adjusted due to physical or SCADA failure and either of the following two conditions occur:

1. The failure is on one of the A, B, C, 3500, or 4500 PARs and the flow on the PAR is below the Target flow for that PAR, or

2. The failure is on one of the E, F or O PARs and the flow on the PAR is above the Target flow for that PAR.

This allows both parties to avoid unjust exposure to NY-NJ PAR Settlements during a stuck PAR condition, while retaining financial incentives to restore the PAR's full operational capability.

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Next Steps

Anticipated Timeline

Date	Event / Meeting	Comments/Links
09-17-18	Initial Filing for Waiver Request	https://www.pjm.com/-/media/documents/ferc/filings/2018/20180917-er18-2442-000.ashx
11-19-18	FERC Approval of Waiver	https://www.ferc.gov/CalendarFiles/20181119172229-ER18-2442-000.pdf
04-10-19	MIWG Presentation to NYISO Stakeholders	PJM is presenting to Stakeholders at this time as well.
05-13-19	BIC Presentation	Received BIC approval for the proposed revisions.
05-20-19	MC Presentation for Final Stakeholder Approval	
06-02-19	Seek NYISO Board Approval	
(TBD)	Joint Filing with FERC for Tariff Revisions	
09-17-19	FERC Waiver Expiration	

Questions?

We are here to help. Let us know if we can add anything.

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- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

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Appendix

Relevant Tariff Provisions for M2M

- **PJM's Open Access Transmission Tariff ("PJM Tariff") authorizes PJM to take the necessary actions, including redispatching resources, to maintain system reliability in response to constraints in PJM's Transmission System.**
  - PJM Open Access Transmission Tariff – Network Integration Transmission Service, Section 33.2 (Transmission Constraints)

- **The PJM Tariff allows PJM to redispatch generation to control constraints on neighboring systems for Redispatch Flowgates established per the NYISO-PJM JOA.**
  - PJM Open Access Transmission Tariff ("PJM Tariff") – Attachment K-Appendix, Section 1.7.6 (a) (Scheduling and Dispatch)

- **Schedule D of the Joint Operating Agreement (JOA) between NYISO and PJM outlines requirements for the operation and settlement of M2M Coordination.**
  - Open Access Transmission Tariff (OATT) - 35 OATT Attachment CC- Joint Operating Agreement Among And Between NYISO and PJM - 35.23 OATT Att CC Schedule D - M2M Coordination

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Settlements During Redispatch Events

Existing Calculation for a given M2M Redispatch Flowgate (Prior to proposal changes)

- When NMRTO Market Flow > NMRTO Entitlement then Settlement Calculation is :

$$MRTO\ Shadow\ Price\ x\ (NMRTO\ Market\ Flow\ -NMRTO\ Entitlement)\ x\ \frac{s_i}{3600}\ sec$$

- When NMRTO Market Flow < NMRTO Entitlement then Settlement Calculation is :

$$NMRTO\ Shadow\ Price\ x\ (NMRTO\ Market\ Flow\ -NMRTO\ Entitlement)\ x\ \frac{s_i}{3600}\ sec$$

- Where
  - s_i = number of seconds in interval *i*
  - Shadow Prices are always positive.
  - A positive settlement indicates a payment to the MRTO
  - A negative settlement indicates a payment to NMRTO