



# **Coordinating without the ConEd/ PSEG Wheel**

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*KCC*

# Agenda

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# Background

# Background

## PJM/NYISO Wheel Replacement Protocol Project Overview

### Why was the project started?

ConEdison notified involved parties of intention to terminate non-conforming wheeling service on April 28, 2016. PJM and NYISO are working jointly to develop a replacement protocol to address the operational, planning, and market impacts.

### What is the wheeling service that is currently in place?

The non-conforming wheeling service has historically been implemented by NYISO and PJM by modeling a fixed 1000 MW flowing from NYISO to PJM over the JK (Ramapo-Waldwick) interface and from PJM to NYISO over the ABC (Hudson-Farragut and Linden-Goethals) interface

### When does the replacement protocol have to be in place?

- Current non-conforming wheeling service will end on April 30, 2017.
- New protocol must be in place for use on May 1, 2017

### What is the impact to Market Participants?

- Primary impact to PSE&G and ConEdison as facility owners
- Beyond the revised protocol/ market impacts, no changes to OASIS/ Energy Transaction bidding processes

# Background

- **Current protocol**
  - ***Real-time Operations***
    - 61% of NY-PJM AC interchange, and 80% of RECo load is applied to the 5018 desired (i.e., target) flow calculation in Real-time Operations
  - ***Markets:***
    - NYISO Markets model 61% of the NY-PJM AC Interchange injected at 5018, and 39% at the Western Ties for scheduling and pricing
    - PJM Markets model 80% of the NY-PJM AC Interchange injected at the Roseton bus, and 20% injected at the Dunkirk bus for scheduling and pricing
  - ***Planning:***
    - Both NYISO and PJM Planning consider NY-PJM interchange and RECo load deliveries consistent with their market models

# **Critical Factors for a Near-Term Solution**

- **Supports reliable operation of the transmission system**
- **Effectively manages congestion across the region**
- **Provides for open access and utilization of the facilities to serve the public interest and provide benefit to consumers**
- **Does not hinder use of the facilities to respond to emergencies in real-time**
- **Preserves competitive market behaviors**
- **Can be facilitated with the Phase Angle Regulator (PAR) technology at the ABC, JK, and 5018 interfaces (current equipment for May 1, 2017 implementation)**
- **Can be implemented in both PJM and NYISO market models**

# Proposal Summary

# Proposal Summary

- **Include ABC and JK as part of the NY-PJM AC interface for interchange scheduling**
  - *A percentage of the NY-PJM AC interchange\* will be modeled in the NYISO and PJM Day-Ahead (DA) and Real-Time (RT) markets*
    - In RT, the percentages are applied to the expected incremental impacts of changes to interchange schedules over the forward scheduling horizon
  - *A flow offset, the Operational Base Flow (OBF), will be modeled in the DA Market and applied to the Market-to-Market (M2M) target in RT*
- **Add the PARs on ABC and JK to the Market-to-Market PAR coordination process between NYISO and PJM, which takes place in RT**
  - *The OBF will be applied to the JK and ABC Interfaces as part of each Interface's M2M target flow, in addition to each Interface's Interchange Percentage*
- **The NYISO and PJM proposal is based on current grid equipment**
  - *If the technology in use changes, then the NYISO and PJM would have to revisit this design*
  - *In the future, if the PARs at the ABC, JK, and 5018 interfaces are upgraded in a manner that allowed them to effectively implement interface-specific interchange schedules, then such modeling is possible within the NYISO's market structure*

**\*See Appendix I for the proposed Interchange Percentage values**



# Tariff Revisions

# Tariff Revisions

- **Minor additional updates to MST 17.1 since the October 19, 2016 meeting**
- **The NYISO discussed Joint Operating Agreement revisions with PJM**
  - ***These include revisions to the following sections:***
    - **35.2, 35.6, 35.12, 35.21, 35.22, 35.23**

# MST 17.1

- **Section 17.1.1.1.2**
  - *Delete reference to ConEdison's DA market hourly election under OATT 35.22 Attachment CC, Schedule C*
  - *Update reference from Branchburg-Ramapo to Hopatcong-Ramapo throughout*
  - *Include that the expected flow over the ABC and JK interfaces will be adjusted by the Operational Base Flow (OBF) as described in the JOA*
    - **Minor revisions to this language since the October 19, 2016 MIWG meeting**
  - *Include that the NYISO will post the interchange percentages and OBF*

# Joint Operating Agreement (JOA)

- **OATT 35.2**
  - *Delete reference to Schedule C of the JOA*
  - *Provide new definitions for:*
    - **3500 PAR, 4500 PAR, A PAR, ABC Interface, ABC PARs, Available PAR, B PAR, C PAR, E PAR, F PAR, JK Interface, NY-NJ PARs, O PAR, Operational Base Flow, Ramapo Interface, Ramapo PARs and Waldwick PARs**

# Joint Operating Agreement (JOA)

- **OATT 35.6**
  - *Describe expectations for PAR operation during emergencies*
  - *Include language to ensure the agreement does not limit the ISO/RTO's ability to respond to emergencies*
- **OATT 35.12**
  - *Update references from Ramapo PARs to NY-NJ PARs throughout*

# Joint Operating Agreement (JOA)

- **OATT 35.21**

- *Add two additional interconnection facilities*

PJM	NYISO	Designated	(kV)	Common Meter Point(s)
Homer City	Mainesburg	47	345	Homer & Mainesburg
Homer City	Pierce Brook	48	345	Homer & Pierce Brook

- *Update the names of four existing interconnection facilities*

PJM	NYISO	Designated	(kV)	Common Meter Point(s)
Hopatcong	Ramapo	5018	500	Ramapo
Mainesburg	Watercure	30	345	Mainesburg
Pierce Brook	Five Mile Rd.	37	345	Pierce Brook
Marion	Farragut	C3403	345	Farragut

- **OATT 35.22**

- *Delete this section, as it describes the operating protocol for the implementation of the ConEd/ PSEG Wheel*

# Joint Operating Agreement (JOA)

- **OATT 35.23**
  - *Update references from Ramapo PARs to NY-NJ PARs where appropriate throughout*
  - *Delete reference to Schedule C of the Joint Operating Agreement*
  - *At section 7 - Real-Time Energy Market Coordination*
    - Specify that operation of the ABC PARs, Ramapo PARs, and Waldwick (JK) PARs shall be coordinated by the RTOs
    - Change reference from Ramapo to  $PAR_x$  throughout the equations in 35.23
    - Replace *PJMRamapoPayment* and *NYRamapoPayment* with the term *M2MPARSettlement* throughout 35.23

# Joint Operating Agreement (JOA)

- **OATT 35.23 (Continued)**
  - ***At section 7.2 – Real-Time NY-NJ PAR Coordination***
    - Delete reference to the interchange schedules under outage conditions (included in section 7.2.1)
    - Include language differentiating operational control from physical control of the PARs
    - Include an operational bandwidth of +/- 50 MW around each NY-NJ PAR's target flow to limit tap movements and to maintain actual flows at acceptable levels (this operational bandwidth will not impact the settlements rules discussed in section 8.3)
    - Specify that if the maximum number of PAR tap changes are exceeded, then the operational bandwidth shall be increased in 50 MW increments until these maximums are no longer exceeded
  - ***At section 7.2.1 – NY-NJ PAR Target Values***
    - Express the calculation of the NY-NJ PAR Target Values as made up of the Interchange Factor, Operational Base Flow and RECo Load
    - At Interchange Factor term definition, include that if a NY-NJ PAR is unavailable, the percentage of interchange normally assigned to that NY-NJ PAR will be modeled as flowing over the western ties
    - At the definition of the Operation Base Flow term, include that the NYISO will post the OBF normally applied to each PAR when the ABC PARs and Waldwick PARs are in service; the methodology to reduce the OBF under certain outage conditions will be posted
    - At the definition of the RECo load term, include that in the event one of the Ramapo PARs is out of service the full RECo Load Percentage (80%) will be applied to the in service Ramapo PAR
    - Include a table listing the interchange percentages and RECo load percentages applied to each PAR



# Joint Operating Agreement (JOA)

- **OATT 35.23 (Continued)**
  - ***At section 8.3 – NY-NJ PAR Settlements\****
    - Update the equations to calculate *NYImpact* and *PJMImpact* for each PAR
    - Calculate the minimum of either, the summation of the congestion impact for the respective RTO or zero
      - *Take the delta of these values for each RTO to arrive at the M2MPARSettlement*
  - ***At section 8.3.1 – NY-NJ PAR Settlements During Storm Watch Events***
    - Replace reference to desired flows for the JK interface and ABC interface from Schedule C with reference to the Target flows for those interfaces
    - Clarify that during the first 15-minutes when a Storm Watch is in effect, section 8.3.1 excuses Parties from paying an *M2MPARSettlement* to each other

**\*See Appendix II – M2M PAR Settlements Example**

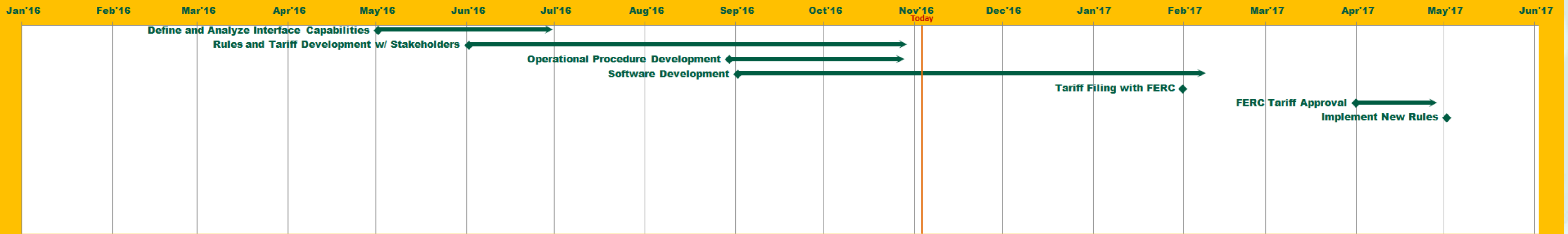
# Joint Operating Agreement (JOA)

- **OATT 35.23 (Continued)**
  - *At section 10.1.8 – Suspension of M2M Settlement when a Request for Taps on NY-NJ PARs to Prevent Overuse is Refused*
    - Delete the statement that “the refusing Party shall not be relieved of any of its M2M settlement obligations”
  - *At section 10.1.9 – Suspension of NY-NJ PAR Settlement due to Transmission Facility Outage(s)*
    - State that the Parties shall suspend PAR Settlements for a NY-NJ PAR when that NY-NJ PAR is out of service, is bypassed, or the RTOs mutually agree that a NY-NJ PAR is incapable of facilitating interchange

# **Timeline/ Next Steps**

# Timeline

## Coordinating without ConEd/PSEG Wheel



Date	Task
5/1/2016	Define and Analyze Interface Capabilities
6/1/2016	Rules and Tariff Development w/ Stakeholders
8/29/2016	Operational Procedure Development
9/1/2016	Software Development
1/31/2017	Tariff Filing with FERC
3/31/2017	FERC Tariff Approval
5/1/2017	Implement New Rules

# Next Steps

- **November 29, 2016 MIWG**
  - *Continue discussion of draft tariff language*
- **PJM's November/ December Committee Meetings**
  - *Review PJM/NYISO JOA language updates*
- **December BIC/MC**
  - *Vote on draft tariff language*
- **January 2017**
  - *Seek Board Approval*
  - *File with FERC (Joint Filing)*
- **May 1, 2017 Implementation**

# **Appendix I – Proposed Interchange Percentages**

# Interchange Percentages

- Proposing a combination of two concepts:
  - Account for an Operational Base Flow (OBF) as a starting point
  - Apply an interchange percentage distributed to each PAR:

Line	Line Percent Distribution	PAR	PAR Percent Distribution
5018	32%	3500	16%
		4500	16%
A	21%	A	7%
B		B	7%
C		C	7%
JK	15%	E	5%
		F	5%
		O	5%
Western Ties	32%	N/A	N/A

- The percentages above would change absent an OBF based on current system topology

# **Appendix II – M2M PAR Settlement Example**



# Example: OATT 35.23 Section 7.2.2, Determination of Cost of Congestion at each NY-NJ PAR

PAR	NYISO Active Constraints				PJM Active Constraints	
	NYISO Constraint 1		NYISO Constraint 2		PJM Constraint 1	
	Shadow Price	MCC	Shadow Price	MCC	Shadow Price	MCC
PAR 1	-0.50	-175.00	0.30	232.50	-0.50	-50.00
PAR 2	0.10	35.00	0.05	38.75	0.15	15.00

- **Congestion  $\$_{(PAR1,NY)} = -\$175 + \$232.50 = \$57.50/MWh$**
- **Congestion  $\$_{(PAR2,NY)} = \$35 + \$38.75 = \$73.75/MWh$**
- **Congestion  $\$_{(PAR1,PJM)} = -\$50/MWh$**
- **Congestion  $\$_{(PAR2,PJM)} = \$15/MWh$**

# Example: OATT 35.23 Section 8.3, NY-NJ PARs Settlements

<i>PAR</i>	<i>Actual Flow (MW)</i>	<i>Target Flow (MW)</i>	<i>Congestion\$NY</i>	<i>Congestion\$PJM</i>
PAR 1	110	100	\$57.50	-\$50.00
PAR 2	170	175	\$73.75	\$15.00

- **Actual<sub>PAR1</sub> > Target<sub>PAR1</sub>**
  - $NYImpact_{PAR1} = (MAX(\$57.50 * (100 - 110)), 0) * (3600/3600) = \$0/hour$
  - $PJMImpact_{PAR1} = (-\$50.00 * (110 - 100)) * (3600/3600) = -\$500/hour$
- **Actual<sub>PAR2</sub> < Target<sub>PAR2</sub>**
  - $NYImpact_{PAR2} = (\$73.75 * (175 - 170)) * (3600/3600) = \$368.75/hour$
  - $PJMImpact_{PAR2} = (MAX(\$15.00 * (170 - 175)), 0) * (3600/3600) = \$0/hour$

# Example: OATT 35.23 Section 8.3, NY-NJ PARs Settlements

<i>PAR</i>	<i>NYImpact</i>	<i>PJMImpact</i>
PAR 1	\$0.00	-\$500.00
PAR 2	\$368.75	\$0.00

- **M2MPARSettlement =**  
 **$((\text{Min}(\$0.00 + \$368.75), 0) - (\text{Min}(-\$500.00 + \$0.00), 0)) * 3600 / 3600$**
- **M2MPARSettlement = -\$500/hour**

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- *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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