



Coordinating without the ConEd/ PSEG Wheel

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KCC

Agenda

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- **Critical Factors for a Near-Term Solution**
- **Current Process**
- **Proposal**
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 - *M2M Coordination*
- **Timeline**
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Background

- **ConEd has announced that it will be terminating the 1,000 MW long-term firm point-to-point transmission service agreement (commonly referred to as the ConEd PSEG wheel) with PSEG, effective May 1st, 2017**
 - *The NYISO has been working with PJM to develop alternative designs for modeling the ABC and JK interfaces upon expiration of the wheel*
- **The NYISO and PJM must determine how to provide open access transmission service between the two areas, and how to best utilize the ABC and JK interfaces**

Critical Factors for a Near-Term Solution

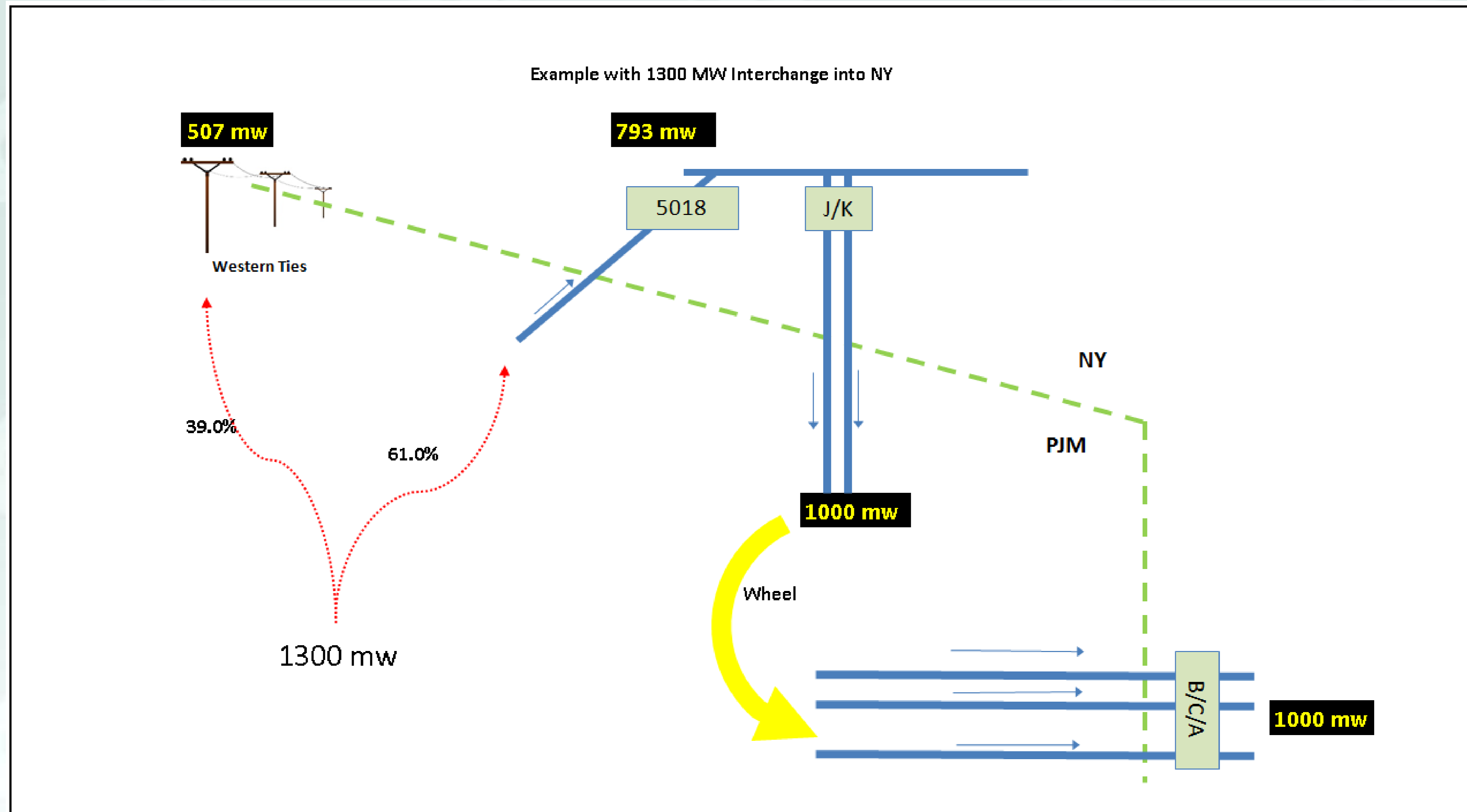
- **Supports reliable operation of the transmission system**
- **Can be facilitated with current Phase Angle Regulator (PAR) technology that exists at the ABC and JK interfaces**
- **Can be implemented in both PJM and NYISO market models by May 1st, 2017**
- **Provides for open access and utilization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

Current Process

Current Process

- **Currently, interchange between NY and PJM is expected to flow according to the pre-set distribution of 61% over 5018, and 39% over the Western ties**
 - *This distribution is explicitly modeled in the NYISO's Day Ahead and Real Time markets*
 - *Interchange is also automatically distributed from 5018 to the ABC and JK lines when the PARs on the transmission lines between New York and New Jersey are unable to maintain the desired flow (i.e., when flows across the 5018 are at limits)*
- **When a market participant submits an economic offer to schedule energy between PJM and NY, NYISO economically evaluates the offer against:**
 - *Offers from internal NY generators*
 - *Import/export offers at other proxy buses, and*
 - *Price sensitive load offers*
- **The congestion impacts of proposed imports and exports on the NY transmission system are considered in the NYISO's market evaluation and are reflected in the LBMPs at the Keystone proxy bus**

Current Process



Proposal

Proposal Overview

- **NYISO and PJM propose to add the JK and ABC lines into the single PJM-NY AC Proxy Bus definition (modeled at PJM Keystone in NYISO)**
 - *The PJM Keystone Proxy Bus already includes the 5018 line and the Western ties*
- **NYISO and PJM also propose to implement Market-to-Market PAR coordination using the PARs on the JK and ABC interfaces**
 - *This is similar to what is currently done with the Ramapo PARs at the 5018 line*
- **This proposal of combining ABC, JK, 5018 and the Western ties into one aggregate PJM-NY AC Proxy Bus presents several advantages**
 - *It leverages existing market constructs in both NYISO and PJM markets*
 - This increases the likelihood of implementation by May 1st, 2017
 - *It can be supported by the PAR technology currently installed on these interfaces*
 - These PARs are capable of facilitating an aggregate PJM-NY AC Proxy Bus interchange schedule across the ABC, JK, 5018, and the Western ties because when schedules are under- or over-delivered across one interface, the difference is made up across the other interfaces.

PAR Technology Considerations

- *Through Market-to-Market PAR coordination with aggregate scheduling, congestion can be managed at each of the individual interfaces*
- **Current PAR technology cannot effectuate individual interchange schedules at ABC, JK, or 5018**
 - *May quickly exhaust 20 tap/day & 400 tap/month limitations*
 - *Schedules could not be effectively aligned with flows if individual interchange schedules are allowed under the current PAR technology, which could present gaming opportunities*
- **If the PARs on these lines were upgraded in a manner that allowed them to effectively implement an individual interchange schedule, then such modeling would be possible within the NYISO's market structure**

Current PAR Technology for an Aggregate AC Proxy Bus Interchange Schedule

Tap changes require manual operator actions

Tap step changes are relatively high—approximately 80 MW per change

Lack of necessary angle capability to adequately implement interchange at the ABC or the JK interface

Necessary PAR Technology for Individual Interchange Schedules

Automatic tap change capabilities

Significantly smaller tap step sizes (approximately 20 MW)*

No limit on the number of taps that can be taken

Improved angle capability

*See PJM PAR task force on PAR criteria necessary to be considered a controllable AC facility:

<http://www.pjm.com/~media/committees-groups/committees/pc/20151203/20151203-item-05-partf-final-proposal-report.ashx>

Proposed Process

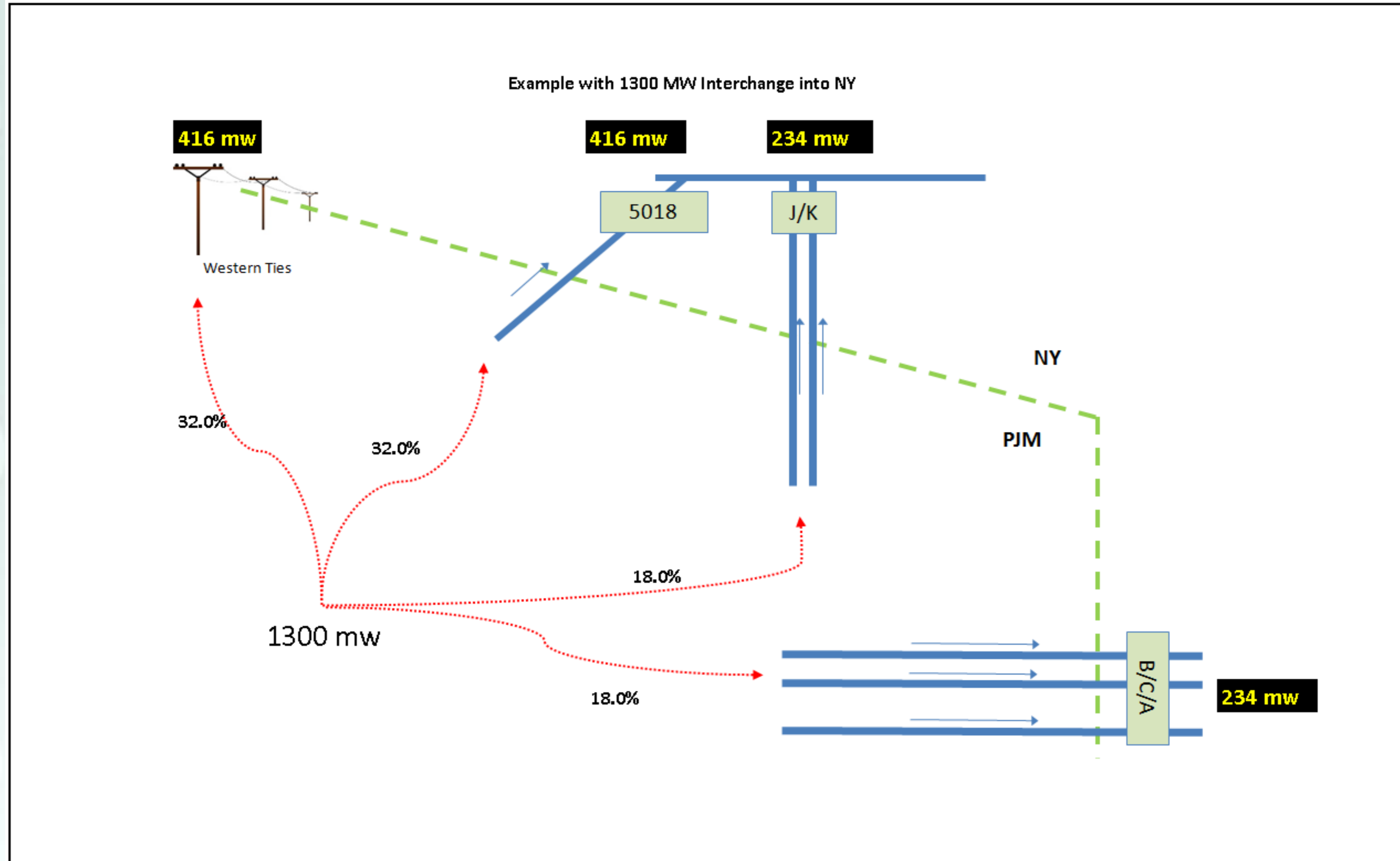
- The proposal leverages the same modeling concepts used today by including ABC and JK in the distribution of expected PJM-NY AC interchange
 - *Instead of the 61%/39% over 5018 and the Western ties respectively, as is done today, the proposal will result in a determination of expected flows over the 5018, ABC, JK and Western Ties*
- The NYISO and PJM are currently considering several scenarios to determine the distribution percentages that can reliably fulfill PJM-NY AC interchange
 - *For example, 32%, 18%, 18%, and 32% could be used for the distribution over the 5018, ABC, JK and Western ties, respectively*
 - The NYISO and PJM are also considering whether the distribution percentages should be at the individual PAR level for some lines
 - *In this case, the NYISO market models would assume that for every MW injected at its PJM Keystone Proxy Bus, 32% of that MW is directed over the 5018 line, 18% of that MW is directed over ABC, 18% of that MW is directed over JK, and the remainder is distributed across the Western ties*

Proposed Process

- **Market Participants will continue to utilize a single bidding point for PJM-NY AC Interchange**
 - *In the NYISO Day-Ahead and Real-time Markets, this will continue to be at the PJM Keystone Proxy Bus*
 - *While the bidding location for PJM-NY AC interchange will not change, the scheduling and pricing of this Proxy Bus will change to include ABC and JK*
- **Consistent with the current methodology, LBMPs at PJM Keystone would be weighted according to the proposed distribution, similar to how these LBMPs are weighted to include the 5018 line today**

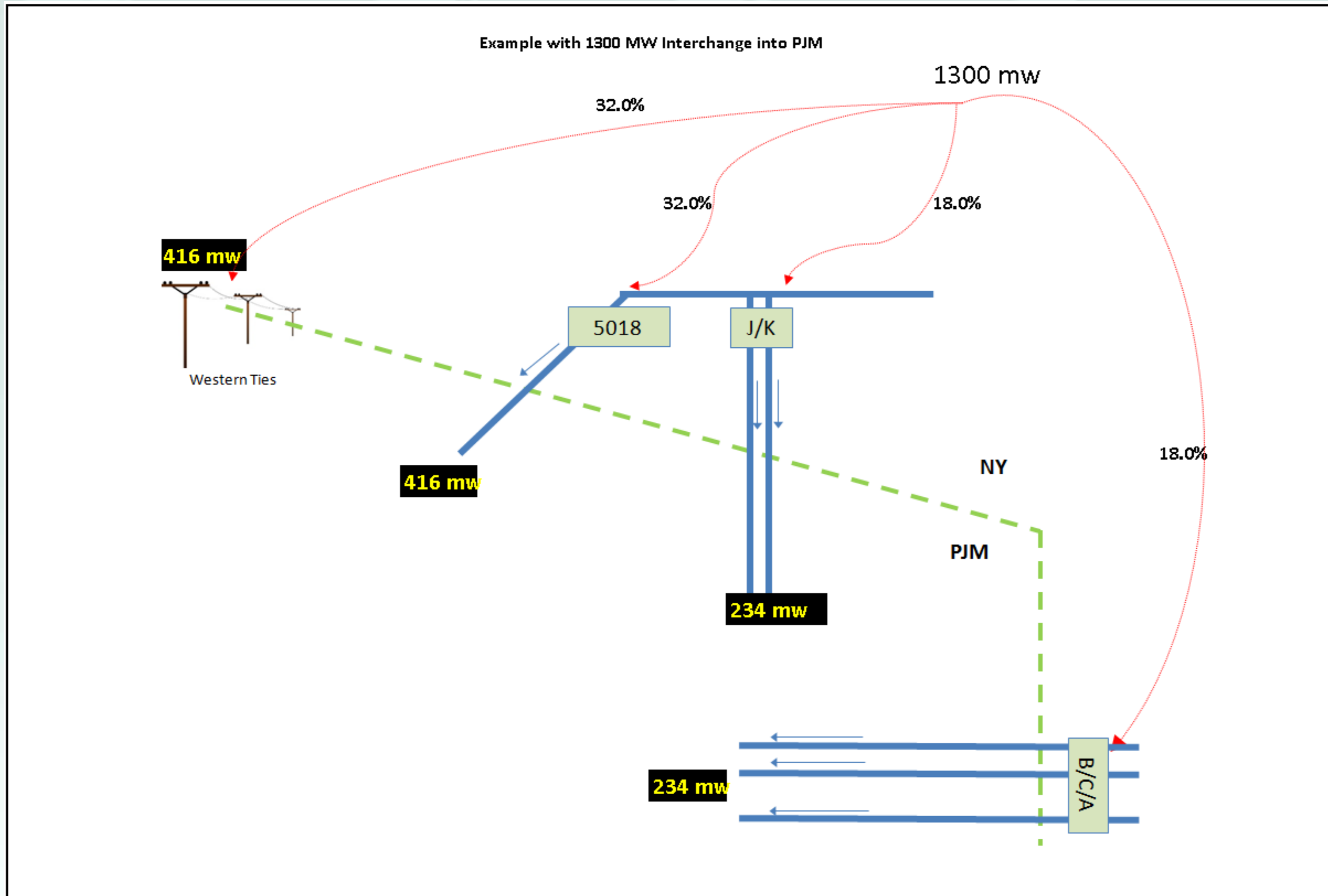
Proposed Process

- Example of 1300 MW interchange into NY
 - *Distribution percentages are for illustrative purposes only*



Proposed Process

- Example of 1300 MW interchange into PJM
 - *Distribution percentages are for illustrative purposes only*



M2M Coordination

- This proposal will add the ABC and JK PARs into the M2M PAR Coordination program between NYISO and PJM
- M2M PAR coordination is a real-time operations mechanism that signals to the NYISO and PJM operators when and in which direction that taps should be taken on PAR Controlled lines in order to minimize regional congestion
 - *This process includes rules governing settlements between the NYISO and PJM in the event that the operation of the PARs is causing congestion in one or both regions*
- After retirement of the Wheel, it will be possible to more effectively utilize the ABC and JK PARs and interfaces to help minimize congestion in the PJM and NYISO regions
 - *This is currently done using the Ramapo PARs and the 5018 line*

M2M Coordination

- Key steps in M2M PAR Coordination are outlined below
 - *A complete description of these rules is included in Section 35.23 of the NYISO's OATT*

RT Target Flow Calculated for each PAR

- Derived in part based on the static interchange percentage distributions modeled in the market software



Cost of Congestion

- RT cost of congestion at each PAR Controlled line is the sum of the products of the PAR's shift factor on the shadow price of each active constraint



TAP signals

- The software will indicate to Ops the direction in which tap moves would be beneficial to minimize regional congestion by redistributing flows across the various AC interfaces between NY and PJM



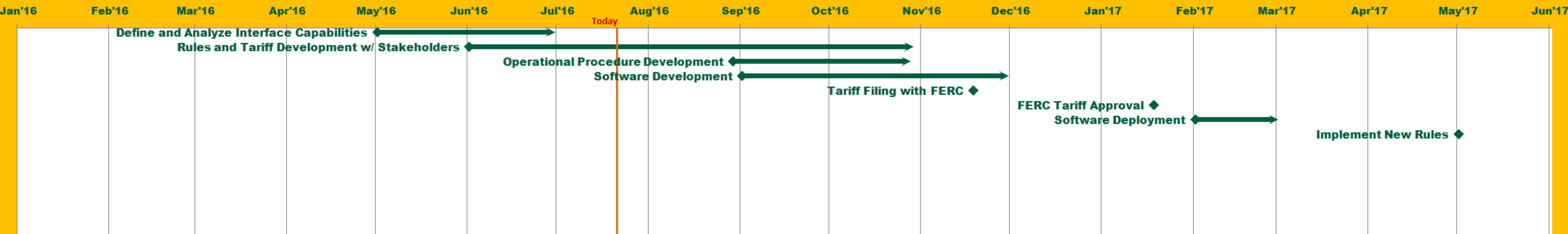
RTO-to-RTO settlements

- Settlements between NYISO and PJM may occur when any over/under deliveries on the PAR controlled lines are increasing congestion in one region (compared to target flows)

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
11/18/2016	Tariff Filing with FERC
1/18/2017	FERC Tariff Approval
February 2017	Software Deployment
5/1/2017	Implement New Rules

Next Steps

- **August MIWG**
 - *Continue discussion on the NYISO's proposal*
- **September MIWG**
 - *Discuss draft tariff language*
- **October BIC/MC**
 - *Vote on draft tariff language*

The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by:

- *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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