



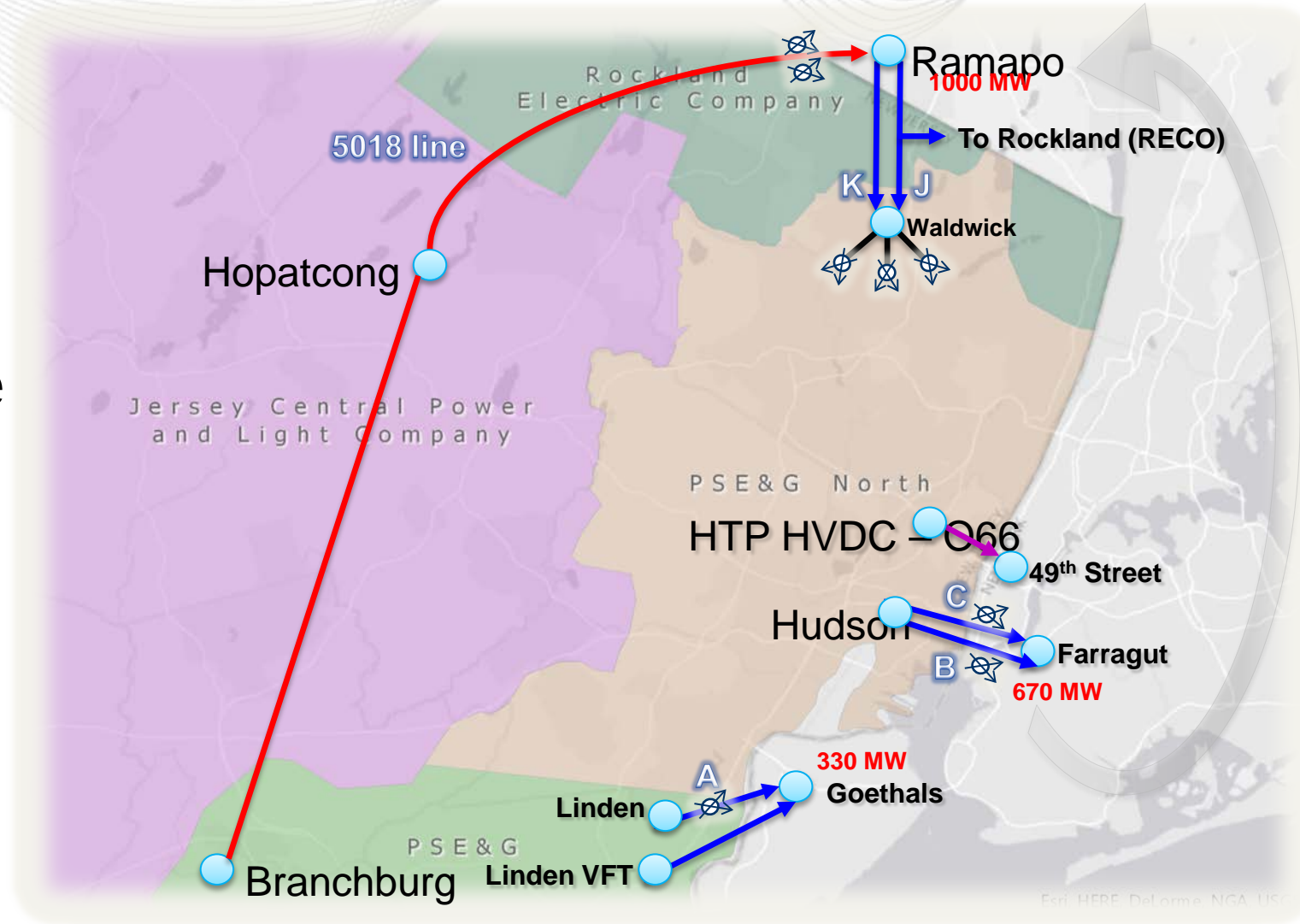
PJM/NYISO Wheel Replacement Market Impacts

August 15, 2016

- ConEd notified involved parties of intention to terminate non-conforming wheeling service on April 28, 2016.
- Current wheeling service will end on April 30, 2017.
- New protocol must be in place for use on May 1, 2017.
- PJM and NYISO are working on a replacement protocol.

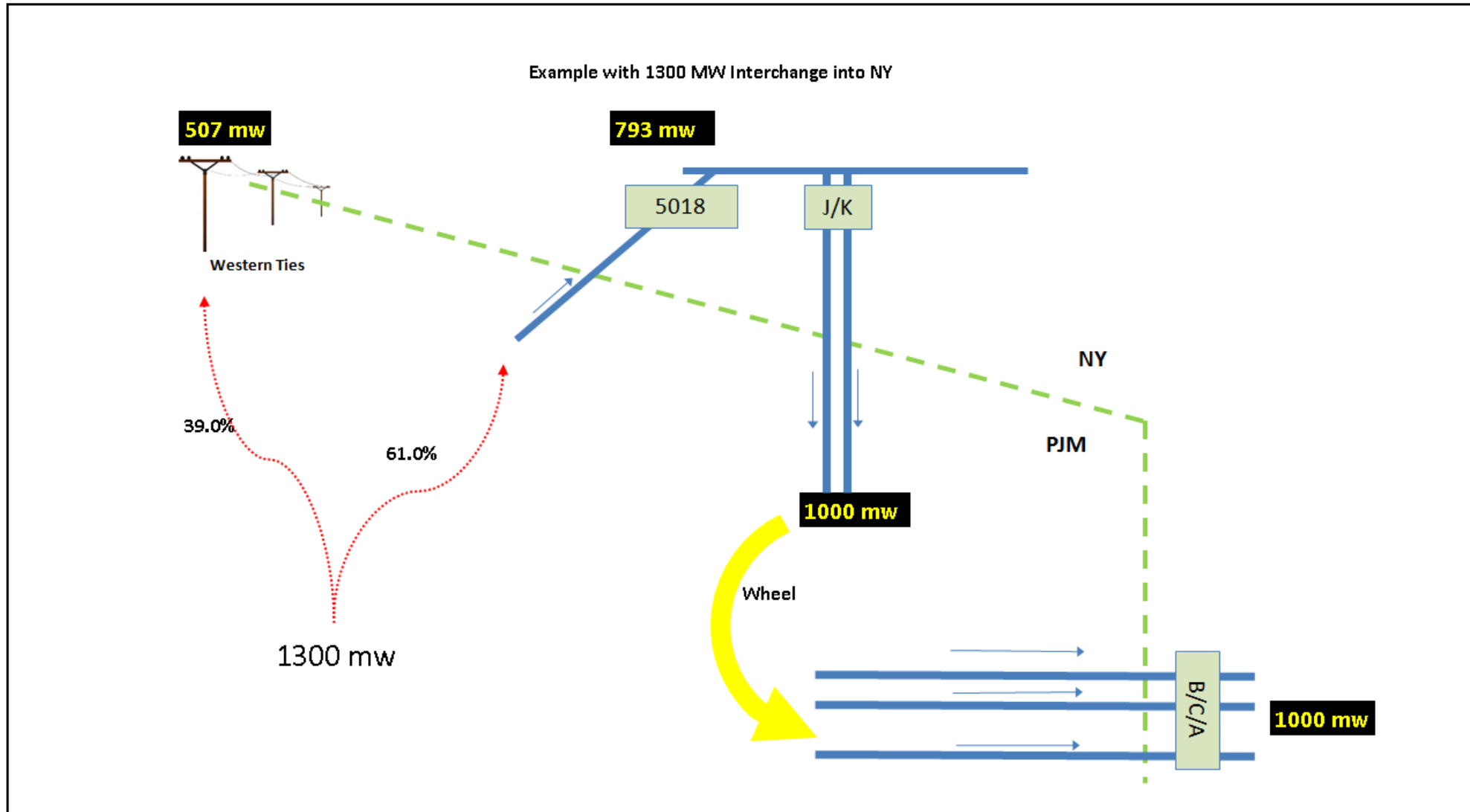
PJM NYISO Wheel Overview

- 1,000 MW from NYISO to PJM at the J and K interface
- 1,000 MW to NYISO from PJM at the A, B and C interfaces



- 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
- 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

- PJM NYISO interface definition
 - Existing definition defined as 20% of Dunkirk + 80% Roseton
 - See Appendix A for example
 - Interchange between NY and PJM is expected to flow 61% over 5018 and 39% over the Western ties
- NYISO PJM interface Proxy
 - Existing Proxy located at PJM Keystone bus
 - 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)
 - The congestion impacts of 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





Markets – Post-Wheel Proposal



- PJM and NYISO propose to add the JK and ABC lines into the single PJM-NY AC Interface
- PJM and NYISO 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 Interface 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.

- **PJM NYISO interface definition**

- Post Wheel definition to be determined

- Impacted by final Operations protocol and appropriate percentage allocation of AC interchange on the 5018, JK, and ABC interfaces

- **NYISO PJM interface Proxy**

- The proposal leverages the same modeling concepts used in the NYISO Markets 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. Market Participants will continue to utilize a single bidding point for PJM-NY AC Interchange in each respective market.

- **M2M Impacts**

- Existing M2M PAR Coordination is only on the 5018 Line PARs for a subset of facilities that are significantly impacted by the operation of those PARs.
http://www.nyiso.com/public/webdocs/markets_operations/market_data/reports_info/CoordinatedFlowgatesandEntitlements.mht
- 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

- Market Analysis
 - PJM and NYISO to perform an analysis using a previous production market outcome modified with the new operational protocol to provide insight into market impacts.
 - Impacts on congestion, production costs, and load payments
 - Results expected at September 16th joint meeting

- NYISO created and posted a Whitepaper for the Wheel Replacement effort on their website. The concepts in this paper were based on discussions between PJM and NYISO over the past four months
 - http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_miwg/meeting_materials/2016-07-21/Paper%20on%20ConEd%20PSEG%20Wheel%20Replacement%20Proposal_v_1_FINAL.pdf
- PJM reviewed the whitepaper and offered edits
- Second version of the whitepaper will be posted jointly with NYISO and will include PJM-specific concepts and additional proposal details
- Final version expected in September

- Joint PJM/NYISO Stakeholder meeting
 - September 16, 2016 @ NYISO
- Updates at future PJM and NYISO market meetings
 - PJM Market Implementation Committee
 - NYISO Market meetings

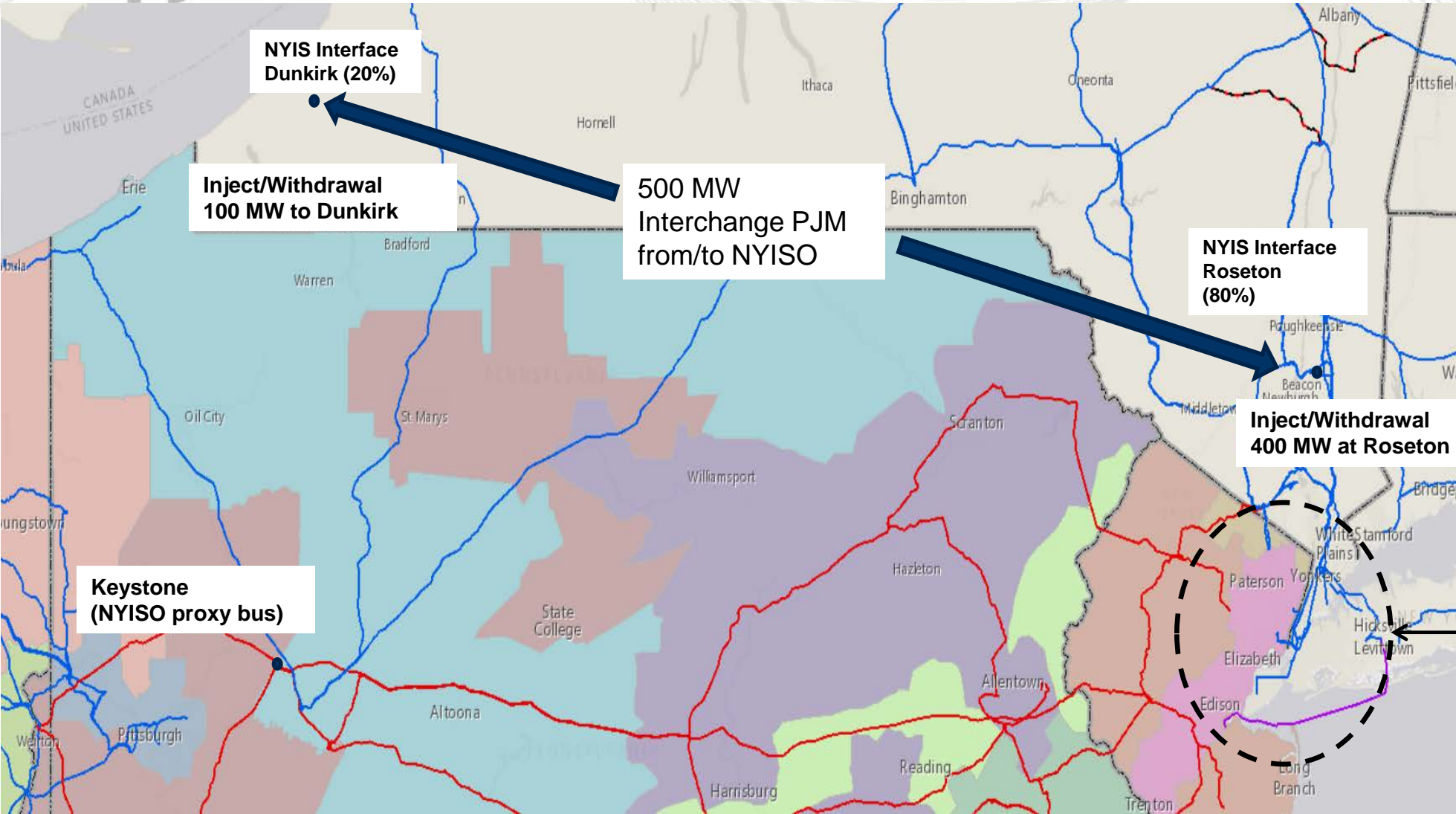


Appendix A

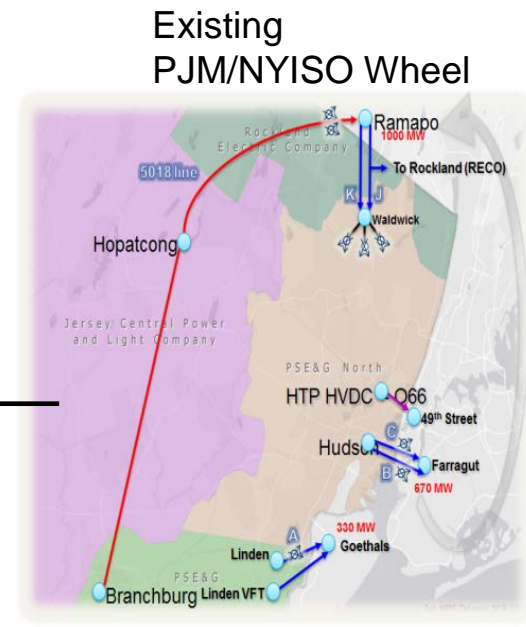
PJM NYISO Interface Pricing Example



Example: Existing Interface Pricing (NYIS)



PJM's NYISO Interface Pricing:
80% Roseton + 20% Dunkirk



Appendix B

NYISO PJM Interface Pricing Example

Example: Existing Interface Pricing (Keystone)

NYISO's method of modeling power flows scheduled through the PJM Control Area to New York

NYISO's Interface Price for PJM is also based on this modeling

