PJM/NYISO Wheel Replacement Protocol Update

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November 3, 2016
**PJM/NYISO Wheel Replacement Protocol Project Overview**

<table>
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<th>Why was the project started?</th>
<th>ConEd 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.</th>
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<td>What is the wheeling service that is currently in place?</td>
<td>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</td>
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| 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 ConEd as facility owners  
• No changes to OASIS/Bidding Energy Transaction processes |
• 61% of AC interchange and 80% of RECO load applied to the 5018 desired flow calculation
• 1,000 MW non-conforming wheel service
  – Imported to PJM from NY on the J & K
  – Exported to NY from PJM on the A, B, & C
• Example Assumptions:
  – Net AC Interchange schedule: 1,000 MW to NYISO
  – RECO load: 300 MW
• 5018 = 850 MW
  – 61% of AC Interchange + 80% RECO load
• JK = 1,000 MW to PSE&G (PJM)
• ABC = 1,000 MW to ConEd (NYISO)
Guidelines for New Protocol

• 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
• Minimize impacts to PJM and NYISO load
Guidelines for New Protocol

- 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

Note: The guidelines above will be evaluated with equal consideration.
Proposed Solution

• Considering a combination of two concepts:
  – Apply a Operational Base Flow in PJM Operations as a starting point
  – Do not apply a base flow in planning
  – Apply an Interchange percentage distribution:
    • 5018: 32%
    • JK: 15%
    • ABC: 21%
  – RECO Load: no change from current process
    • 80% applied to the 5018 Target Flow
    • 20% considered to flow over Western ties
Protocol Comparison – PJM Planning

Current Planning Protocol

Proposed Future Planning Protocol

1000 MW

1000 MW

61% AC + 80% RECO

30% AC + 80% RECO +15% AC
• Operational Base Flow: Baseline value used as part of the JK/ABC target flow calculations in PJM Operations. The OBF accounts for “loop flow” across the JK/ABC interfaces.
  – Loop flow determined using EMS & PSS/e study applications
• Interchange Percentage: percentage of net scheduled interchange applied to each interface (5018, JK, and ABC)
• Interface Target Flow: target flow PJM and NYISO System Operators will meet during real-time operations
• Operational base flow will not be used in PJM Planning

Note: OBF value in PJM Operations will be evaluated annually by PJM and NYISO. OBF will be reduced as system upgrades allow.
Interchange/OBF Target Flow Example – 1,000 MW to NYISO

• Assumptions:
  – Net AC interchange to NYISO = 1,000 MW
  – RECO load = 300 MW
  – RECO load treatment:
    • 80% applied to 5018
    • 20% flows over western PJM/NYISO ties
  – Operational Base Flow: 0 MW
  – Applied Interface percentages:
    • 5018 – 32% of AC interchange
    • JK – 15% of AC interchange
    • ABC – 21% of AC interchange
  – Western Ties: 32% of net AC Interchange
• 5018 = 560 MW to NYISO  
  – 32% of AC Interchange + 80% RECO load  
• JK = 150 MW to NYISO  
  – 15% of AC interchange  
• ABC = 210 MW to NYISO  
  – 21% of AC interchange  
• Western Ties = 380 MW to NYISO  
  • 32% of AC Interchange + 20% RECO load
Interchange Target/OBF Flow Example - 1,000 MW to PJM

• Assumptions:
  – Net AC interchange to PJM = 1,000 MW
  – RECO load = 300 MW
  – RECO load treatment:
    • 80% applied to 5018
    • 20% flows over western PJM/NYISO ties
  – Operational Base Flow: 0 MW
  – Applied Interface percentages:
    • 5018 – 32% of AC interchange
    • JK – 15% of AC interchange
    • ABC – 21% of AC interchange
  – Western Ties: 32% of net AC Interchange
• 5018 = 80 MW to PJM
  – 32% of AC Interchange + 80% RECO load
• JK = 150 MW to PJM
• ABC = 210 MW to PJM
• Western Ties = 260 MW to PJM
  • 32% of AC Interchange + 20% RECO load
Cost Allocation Impact Due to Wheel Cancellation

- When the existing ConEd transmission service ends, the current PJM Tariff RTEP Schedule 12 cost allocations will be redistributed without ConEd
  - ConEd’s cost allocations will be redistributed to existing remaining stakeholders that share cost
  - Current cost allocations are available on PJM.com at http://pjm.com/planning/rtep-upgrades-status/cost-allocation-view.aspx

- If the ConEd transmission service is “duplicated,” PJM anticipates that the new service will assume the same costs at the existing service
• PJM and NYISO collaborated on the latest version of the Whitepaper
• Updated Version will be posted on the NYISO and PJM Websites
• Provides a high level overview of the wheel replacement effort
Future Meetings

- November 1\textsuperscript{st} OC meeting – Operational based topics
- November 2\textsuperscript{nd} MIC meeting – Market based topics
- November 3\textsuperscript{rd} PC meeting – Planning topics
- JOA changes will be reviewed during November/December Stakeholder meetings
Questions?