Proposal for Improved PJM Proxy Bus Scheduling and Pricing

Prepared for the
ISO Scheduling & Pricing
Working Group

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General Proxy Bus Discussion

- All Northeast ISO/RTOs have a single LMP settlement price for each transaction 'scheduling interface'
  - *Each 'scheduling interface' represents a unique scheduling path between two control areas (typically all AC interconnections between two adjacent control areas constitute a single path)*
  - *There may be multiple scheduling interfaces between two control areas so long as each interface is separately scheduled and priced in each of the interconnected control areas (e.g. NY/NE AC Proxy Bus + CSC Proxy Bus)*
  - *Gaming issues may arise when multiple settlement prices exist for a single transaction scheduling interface*
- NYISO Energy Market Operations
  - *Day-Ahead and Real-Time Market scheduling of external transactions is consistent with settlement price at each proxy bus*
  - *Import/export/wheel-through bid offers are used to allocate scarce inter-ISO transfer capability when congestion occurs*

Recent Related Matters

- *Last year's FERC Order, which approved a new operating protocol related to the administration of the ConEd-PSEG wheeling agreement, has materially changed the operation of the NYISO-PJM interconnections*

- *Additionally, differences in the NYISO and PJM Proxy Bus clearing price calculations, including the underlying phase angle regulator modeling assumptions, have been identified as a possible Seams issue*

- *Accordingly, the ISO has reviewed its historical treatment of the PJM Proxy Bus scheduling and pricing and offers this proposal improvement for stakeholders' consideration*

Historical PAR Modeling Treatment

- *Phase angle regulated (PAR) controlled transmission facilities have been historically modeled as fixed power flow devices because this treatment arguably better reflects how PARs are operated for the two common operational applications;*
  - *Contractual [wheeling] obligations and,*
  - *Maximizing transmission capability (minimizing congestion)*

- *Contractual [wheeling] obligations typically specify fixed power flow levels as a function of time of day or as otherwise prescribed by operating agreements. The PAR fixed power flow levels are normally maintained by adjusting PAR tap positions either automatically or by operator action.*

- *Maximizing capability into transmission constrained areas (e.g. NYC load pockets, Long Island area) is normally achieved by operating PARs at optimal fixed power flow levels to minimize transmission congestion. NYTO operating procedures ensure that such PAR actions are taken to minimize transmission congestion prior to the need for generation re-dispatch. These expected operator actions are accounted for by SCUC and RTS through the use of PAR optimization for PARs under unilateral ISO or NYTO control.*

Current Operating Practices: NY-PJM Interconnections

- The July 2005 implementation of the FERC Order associated with the ConEd-PSEG interconnections defines the related scheduling and operating practices
  - *Utilizes a desired flow methodology to schedule transmission service for the ConEd-PSE&G "600/400MW Contracts" and to determine desired flow targets for actual power flows at the JK and ABC interfaces*
  - *Assumes 13% of PJM-NY transaction schedules flow over Ramapo-S.Mahwah 345kV interconnections (JK interface)*
  - *Assumes 13% of PJM-NY transaction schedules flow over Farragut-Hudson/Linden-Goethals 345kV interconnections (ABC interface)*
- The Branchburg-Ramapo 500kV Operating Agreement defines the related scheduling and operating practices
  - *Utilizes a desired flow methodology to determine a desired flow target for actual power flows over the #5018 500kV interconnection*
  - *Assumes up to 62% of PJM-NY transaction schedules flow over the 5018 interconnection*
  - *The up to 62% assumption may be modified to address PJM/NYISO internal constrained system operation and for certain recognized reliability concerns (e.g. Lake Erie circulation power flows)*

Proposal – General

- *The existing modeling treatment of PAR controlled transmission facilities should be modified to better represent the current operation of the ABC/JK/5018 interconnections*
- *The proposed treatment will allow the NYISO to more accurately represent the operation of the PJM-NYISO interconnections in SCUC, RTC, and RTD*
- *The proposed modifications will enable SCUC/RTC/RTD to better represent any incremental impacts that PJM-NYISO transaction schedules have on exacerbating or relieving internal NY transmission constraints*
- *As a result, PJM Proxy Bus scheduling and pricing will more accurately reflect the impact that PJM-NYISO transaction schedules have on NY transmission constraints*

Proposal – Specific PAR Scheduling

- *Day-Ahead Market– SCUC desired flows will be established for the ABC/JK/5018 interconnections based on:*
  - *the ConEd Day-Ahead Market hourly election for the "600/400MW Contracts" and;*
  - *a defined percentage (13% ABC, 13% JK, and up to 62% 5018) of the Day-Ahead Market PJM-NYISO hourly interchange schedules*

- *Real-Time Market - RTC/RTD desired flows will be established for ABC/JK/5018 interconnections based on:*
  - *the current level of ABC/JK/5018 flows (based on telemetered PAR MW values) and;*
  - *a defined percentage (13% ABC, 13% JK, and up to 62% 5018) of the expected schedule changes to PJM-NYISO interchange within the next two and one-half hour scheduling horizon*

Example – Real-Time Dispatch PAR Scheduling

- ***Assumptions:***
  - *Current Hour PJM-NYISO Schedule: 300MW to NY*
  - *Next Hour PJM-NYISO Schedule: 1000MW to NY*
  - *Telemetered ABC Interface MW value (three PARs): 1040MW into NY*
  - *Telemetered JK Interface MW value (three PARs): 960MW out of NY*
  - *Telemetered 5018 Interface MW value (two PARs): 500MW into NY*

- ***Current ABC/JK/5018 interface scheduling for RTD***
  - Telemetered PAR MW value:
    - *Current Hour; ABC: 1040MW, JK: 960MW, 5108: 500MW*
    - *Next Hour: ABC: 1040MW, JK: 960MW, 5108: 500MW*

- ***Proposed ABC/JK/5018 interface scheduling for RTD***
  - Telemetered PAR MW value + expected % of PJM-NYISO transaction schedule changes
    - *Current Hour: ABC: 1040MW, JK: 960MW, 5108: 500MW*
    - *Next Hour:*
      - *ABC: 1040MW + (0.13)(700MW) = 1131MW*
      - *JK: 960MW + (-0.13)(700MW) = 869MW*
      - *5018: 500MW + (0.40)(700MW) = 780MW*

Example - Pricing

- ***Assumptions:***
  - Marcy LMP energy price = $100/MW
  - Leeds-Pleasant Valley constraint (#91) for loss of Athens-Pleasant Valley (#92) binding with a shadow cost of $200/MW
  - No LMP marginal loss component for simplicity
  - No PJM-NYISO transaction schedule changes

- ***Current PJM Proxy Bus pricing = Energy – Congestion***
  - PJM Proxy Bus clearing price = $100 - (0%)($200) = $100/MW
    - *Based on 0% generation shift factor for PJM Proxy Bus on Leeds-PV constraint using current PAR modeling treatment*

- ***Proposed PJM Proxy Bus pricing = Energy – Congestion***
  - PJM Proxy clearing price = $100 - (-0.175)($200) = $135/MW
    - *Based on 17.5% generation shift factor for PJM Proxy Bus on Leeds-PV constraint assuming the following PAR interconnection percentages for PJM-NYISO interchange schedules (13% ABC, 13% JK, and 40% 5018)*

Next Steps

- *Solicit stakeholder input on proposal*
- *Obtain stakeholder consensus on proposal (as modified by stakeholder input)*
- *Determine necessary stakeholder approval process*
- *Determine potential implementation timeframe*