Benefits of Electric Power Transmission Ties and Interconnected System Operation

Joint Stakeholder Meeting

April 2, 2018

Introduction

- There are many mutual benefits of synchronous transmission ties between area
  - Real Time Operational Reliability Benefits
  - Market Efficiency Benefits
  - Higher Penetration of Renewable Generation Benefits
  - Resiliency Benefits

Transmission Tie Benefits

- **Real Time Operational Reliability Benefits**
  - **Frequency Response:** Inertial generator governor response mitigates frequency decline upon a generator contingency. Transmission ties provides real power governor response from generators in adjacent areas
  - **Reactive Power Response:** Generator Automatic Voltage Regulators (AVRs) provide immediate reactive power response to generator and transmission line contingencies. Transmission ties provide reactive power support from nearby generators in border areas
  - **Efficient Reserve Scheduling:** Transmission ties allow the scheduling of energy between areas during reserve shortage conditions via market transactions or emergency energy purchases.
  - **Efficient Energy Scheduling:** Transmission ties allow the scheduling of energy between areas in shortage conditions via market transaction or emergency purchases

Examples of Emergency Transmission Tie Benefits

- **Resilience Benefits**
  - **Severe Event Recovery:** Transmission and generation contingencies can exceed minimum planning and operating criteria. Such events include but not limited to ice storms, hurricanes, floods, fuel disruptions, forest fires, physical sabotage, etc. Transmission ties greatly improve resiliency and reliability for extreme events by providing access to resources located in other areas
  - **Fuel Diversity:** Transmission ties may allow the capability for a wider range of fuel diversity to be available to regions during fuel shortage conditions
  - **Heat Waves & Cold Snaps**: Transmission ties allow the scheduling of energy from areas with excess supply to regions that are facing shortage conditions during heat waves or extreme cold weather conditions
  - **Emergency Purchases:** Transmission ties facilitate the ability for areas to purchase emergency energy during energy or reserve shortage conditions, increasing the resilience of the interconnected transmission grid

Transmission Tie Market Efficiency Benefits

- **Least Cost Energy Transactions:** Transmission ties provide the transmission capability between areas that allow market systems to schedule least cost energy from one area to another, resulting in lower total costs to electric consumers (on net across both areas)
  - Transmission ties provide open access transmission service to allow suppliers and buyers to transact energy across regional boundaries
- **Renewable Intermittency & Diversity:** Transmission ties allow greater levels of total penetration of intermittent renewable resources because the market systems can schedule import and export transactions across the transmission ties as production of renewable power varies between areas
- **Capacity Purchases**

Controlled Transmission Tie Benefits

- Provides transmission constraint/congestion control which may:
  - Reduce congestion costs
  - Reduce upgrade costs
  - Reduce losses
  - Limit short circuit currents (direct current control)

Transmission Tie Benefits

- There may be situations following a significant failure of a transmission tie whereby it is not cost effective for the individual asset owner to repair the transmission line, yet there are total benefits to both regions that would justify repair of the transmission tie
- This presentation solicits comments and feedback from stakeholders to determine their interest in developing eligibility criteria to permit NYISO and PJM to enable an asset owner to maintain or restore transmission ties that directly interconnect the NYCA and PJM following a significant tie failure

Open Discussion