Western New York Transmission Constraints

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Introduction

- This presentation identifies recent infrastructure changes and operational factors that contribute to real-time congestion

Infrastructure Changes

Date	Infrastructure Change	Impact
September 2012	Dunkirk 3 & 4 (370 MW) Mothball	Increase western NY transmission flows
June 2013	Dunkirk 1 (75 MW) Mothball	Increase western NY transmission flows
January - May 2015	2,605 MW of Western PJM Coal Station Retirements; Eastlake 1-3, Ashtabula 5, Lake Shore 18, Will County, Big Sandy 2, Clinch River 3, Shawville 1-4	Increase western NY transmission flows
June 2015	PJM Four Mile Station 230/115 kV tap 230 kV S. Ripley-Erie 69 (serving PJM load)	Increase western NY transmission flows
October 2015	PJM Mainsburg Station 345/115 kV tap 345 kV Homer City-Watercure 30 (serving PJM load)	Increases western NY transmission flows
December 2015	National Grid Five Mile Load Serving Substation	No material impact to flows Avoids need for local commitment

Infrastructure Changes

Date	Infrastructure Change	Impact
December 2015	Dunkirk 2 (75 MW) Mothball	Increase western NY transmission flows
December 2015	230 kV Dunkirk – S Ripley out-service to address pre & post contingency reliability issues	Reduces western NY transmission flows
March 2016	Huntley 67 & 68 Mothball (380 MW)	Increase western NY transmission flows
May 2016	Western NY 230 kV Reactors	Reduces western NY transmission flows Results in balance of Niagara 230 & 115 kV unit generation.
Spring 2016	PJM Piercebrook (Farmers Valley) load serving substation, PJM 115 kV load served from 345 kV transmission	Increase western NY transmission flows
Spring 2016	Liberty Panda Generation 800 MW connected to PJM E Towanda, south end of NY-PJM 230 kV	Increase western NY transmission flows

Lake Erie Loop Flow

- **Actual Lake Erie Loop Flow is a function of many factors:**
  - ***Inter-Regional RTO-RTO transactions (fluctuate hourly)***
  - ***Actual IESO-MISO PAR performance and associated assumptions for hourly transaction evaluations***
  - ***External RTO generation-to-load dispatch (fluctuates in real time)***
  - ***IESO overgeneration (fluctuates in real time)***
- **Hour Ahead Lake Erie Loop Flow forecasting is critical for efficiently evaluating next-hour transactions and avoiding unnecessary real-time market pricing volatility**

Operational Factors

Operational Factor	Impact
Hour-Ahead Forecasting of Lake Erie Loop Flow: If more physical loop flow occurs in real time than was predicted when RTC evaluated economic transactions with IESO & PJM, then RTD may have insufficient or inefficient resources available to solve transmission constraints, resulting in unnecessary Western NY congestion pricing <u>On June 28, NYISO made the following enhancement</u>: 1. Cap the max value of loop flow to initialize RTC; do not allow the initialized CCW loop flow to exceed 0 MW 2. Cap the delta of loop flow between successive RTD initialization to +/- 75 MW	Decrease western NY congestion and unnecessary pricing volatility Decrease western NY congestion and unnecessary pricing volatility

Operational Factors

Operational Factor	Impact
Eastern NY-PJM PAR Operation: Broader Regional Market protocols utilize Ramapo PAR operations to minimize central or eastern NY congestion. The NYISO modified this practice when ISO experiences western congestion	Reduce western NY transmission flows and congestion
St Lawrence PAR Operation: NYISO & IESO utilize St Lawrence PARs to mitigate congestion	Reduce western NY transmission flows and congestion
Intra-day Load Forecast Performance: Under-forecasted intra-day loads results in RTC under-scheduling all resources. Transmission constraints can then develop that can only be solved by the limited units available to RTD (sometimes in western NY)	Increase western NY congestion
Higher Western NY Loads: High western loads increase western 230 kV & 115 kV transmission flows	Increase western NY transmission flows and congestion

Operational Factors

Operational Factor	Impact
Wind Forecast: If western wind is under-forecasted between RTC and RTC, then RTD may have insufficient or inefficient resources	Increase western NY congestion
Western Transmission Outages: Western transmission outages result in increased power flows on the in-service transmission aggravate western congestion	Increase western NY congestion
Summer Thermal Ratings: Lower thermal asset ratings reduce the 230 kV & 115 kV transfer capability	Increase western NY congestion
Transmission with Terminal Limitations: Transmission terminal equipment thermal ratings lower than conductor ratings aggravate constraints * 230 kV Gardenville-Stolle Road 66 terminal thermal limitation has been identified in local transmission plans and plans are underway to upgrade terminal equipment	Increase western NY congestion Upgrades in terminal equipments will reduce western NY congestion

Future Enhancements

Future Enhancements	Impact
Infrastructure Western NY Public Policy Projects: Increase western NY transmission capability	Reduces western congestion, reduce productions costs, increase reliability.
Improved OH Proxy Modeling: Currently the OH-Michigan PARs are modeled as not controlling flows. One enhancement under consideration would be to represent the actual performance of these PARs.	Decrease western NY congestion during IESO transaction ramp periods

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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