

# RTC-RTD Convergence Analysis Overview

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**MIWG**

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# Agenda

- **Background**
- **Analysis conducted for study**
- **Overview of conclusions**
- **2016 SOM recommendations**
- **Considerations for future work**
- **Next steps/Timeline**
- **Questions**
- **Appendix-I**

# Background

## ■ Problem Statement

- Stakeholders and the Market Monitor have expressed concern about price divergences between RTC and RTD.
- NYISO staff conducted an extensive analysis in 2017 to understand how often price divergences occur and what their primary drivers are.

## ■ Project Deliverable

- The 2017 deliverable for the RTC-RTD Convergence project is a completed study.
- The study aims to identify primary causes of systematic price divergences between RTC and RTD.
- The NYISO will publish a whitepaper by December 20, 2017 that explains the analysis the NYISO performed and includes recommendations to improve RTC-RTD price convergence.

# Analysis

## ■ Study Period

- One year's worth of real-time production data was studied (July 1, 2016 - July 1, 2017)
- This study period bridges recent market design changes.
  - Niagara Generation Modeling Improvements – May 2016
  - Lake Erie Loop flow modifications – June 2016
  - Initialization of Lake Success and Valley Stream PAR's (901/903 lines) – May 2016

## ■ Data and Correlations Reviewed:

- Magnitude and frequency of differences between LBMPs in RTC and RTD
- Correlation between RTC-RTD congestion differences and LBMP differences
- Correlation between load forecast differences and LBMP divergences
- Correlation between Desired Net Interchange(DNI) changes and LBMP divergences
- Correlation between regulation shortages and DNI changes
- Case studies of three specific occurrences of high price divergences

# Overview of Conclusions

- **Price divergences are not a significant problem**
  - Price divergences between RTC and RTD are normally <\$10 (~86% of the time).
- **No single driver of price divergences identified:**
  - Timing latency between RTC and RTD can result in price divergences when conditions change in real time
  - Weak correlations between:
    - LBMP divergences and corresponding congestion component for N.Y.C zone and PJM Linden VFT proxy
    - Load forecast differences and LBMP divergences in the fall months
    - DNI differences and LBMP divergences in any season (high correlation during certain hours)
    - Changes in DNI and regulation shortages in any season
  - Strong correlation between LBMP divergences and corresponding congestion component of LBMP in the West zone.
- **Identified overnight load forecast discrepancy between RTC and RTD**
- **Identified process improvement to accommodate Long Island PAR schedule changes**

# 2016 SOM Recommendations

- Offered potential enhancements:
  - Add two near-term look-ahead evaluation periods to RTC and RTD around the quarter hour
  - Adjust the timing of the look-ahead evaluations of RTC and RTD to be more consistent with the ramp cycle of external interchange
  - Enable RTD to delay the shut-down of a gas turbine for five minutes when it is economic to remain on-line
  - Better align the ramp rate assumed in the look-ahead evaluations of RTC and RTD for steam turbine generators with the actual demonstrated performance
  - Address inconsistencies between the ramp assumptions used in RTD's physical pass and RTD's pricing pass when units are ramping down

# Considerations for Future Work

- **Recent Work**
  - Graduated Transmission demand curve enhancements – June 2017
  - Hybrid GT pricing improvements – Feb 2017
  - External Total Transfer Capability Interface limits – March 2017
  - ConEd/PSEG wheel replacement - May 2017
  - Made improvements to the overnight load forecast between RTC and RTD – June 2017
- **The NYISO is currently considering the following market design enhancements that may improve convergence between RTC and RTD:**
  - Lake Success and Valley Stream PAR schedule changes
  - Constraint Specific Transmission Demand Curves
  - 100+kV Constraint Modeling
  - RTD Pricing Improvements for External Interfaces
  - Allowing flexible shutdown of DAM committed generation
  - Enhancing RTD's evaluation window
  - Treatment of resource ramping between physical and ideal dispatch
  - 5-minute Interchange Scheduling

# Next Steps/Timeline

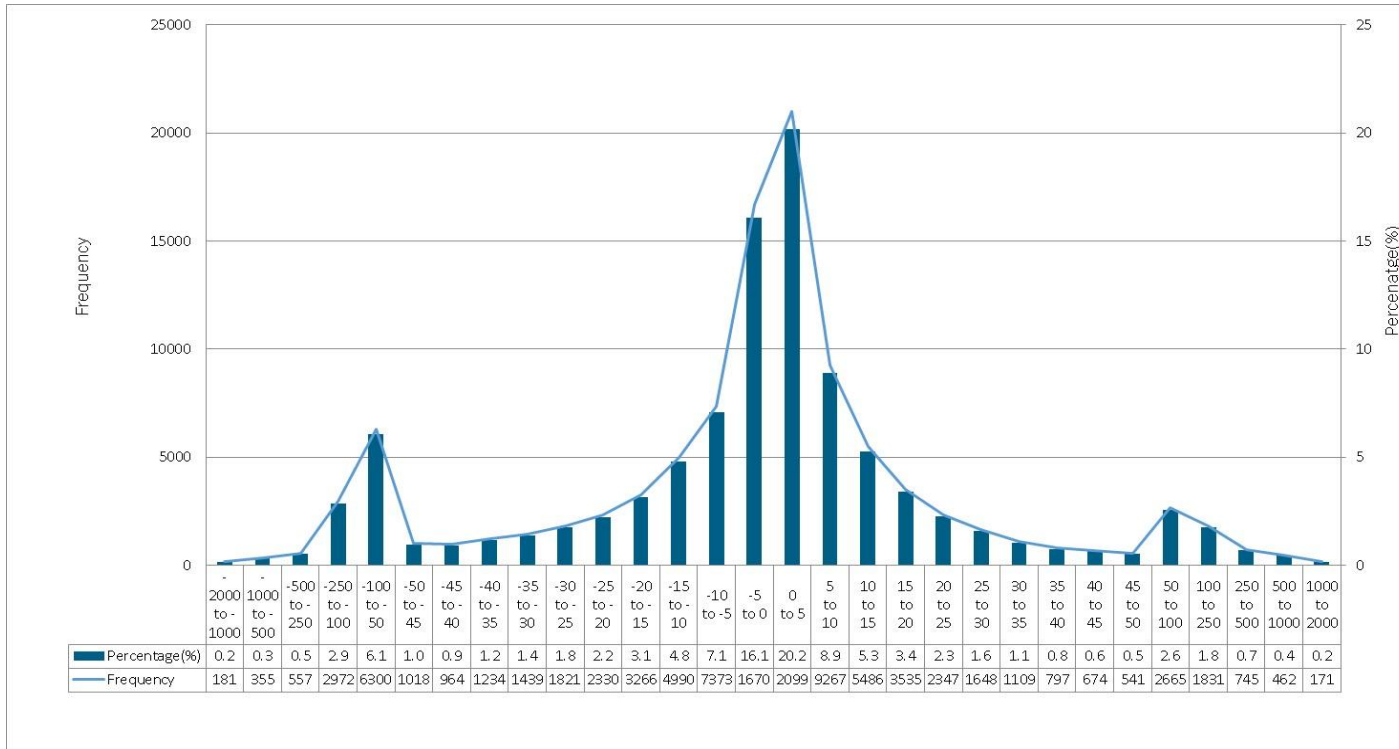
- **Whitepaper detailing RTC-RTD convergence analysis**
  - Will be posted by December 20, 2017 under the 12/5 MIWG materials.
  - Email announcement will be made when the report is posted on the NYISO public website
- **Future Discussions**
  - Discuss findings and recommendations with stakeholders at January 16, 2018 MIWG
- **Ongoing Work**
  - Project has been prioritized for next year with a deliverable of Market design concept proposed
- **Please e-mail any questions or feedback to: [pjain@nyiso.com](mailto:pjain@nyiso.com)**



# Questions?

# Appendix - I

Price divergences between RTC and RTD in percentages from Jul 2016-Jul 2017



- Percentage change between RTC and RTD is calculated using :  
$$\frac{((RTC-RTD))/RTD*100}$$

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- Maintaining and enhancing regional reliability
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- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system



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