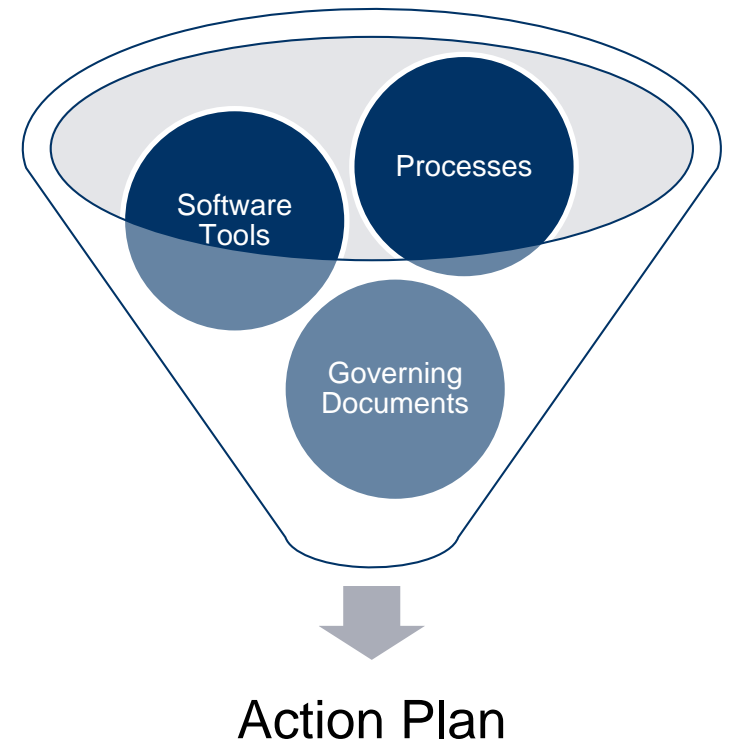# Dynamic Line Ratings – Impacts to PJM

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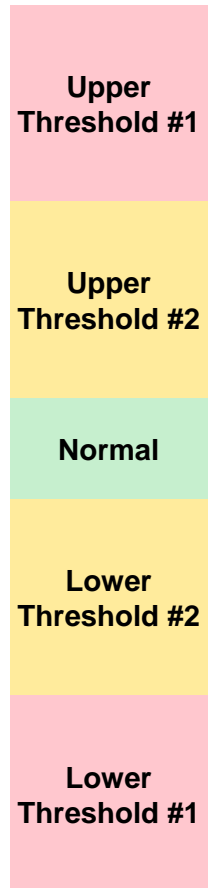
Emerging Technologies Forum

November 13, 2020

- In August, the Applied Innovation group began conducting interviews with various business areas of PJM to identify all:
  - Software tools requiring updates to handle Dynamic Line Ratings (DLR)
  - Processes affected by DLR
  - Governing documents and manuals requiring language modifications to support DLR
- Information was gathered and organized into an action and communication plan to initiate and structure stakeholder discussions.

Software Tools

Processes

Governing Documents

Action Plan

- Various groups were interviewed, including:
  - Transmission Planning
  - Market Simulation
  - Day-Ahead Markets
  - Real-Time Markets

  - EMS & Telemetry Support
  - eDART Support
  - Transmission Services
  - Settlements

✓ Most groups are consumers of upstream line ratings stored in eDART.

Dynamic Line Ratings are an existing feature of PJM's EMS SCADA system.

- DLR SCADA points[1] transmitted to PJM via ICCP.

- Points mapped to a particular transmission equipment end in EMS.

- Data points are validated against pre-configured quality thresholds.

- Two modes of operation:
  - Manual: Compare with Threshold 1. Await operator approval if successful.
  - Automatic: Compare with Threshold 1 & Threshold 2. Auto-approve if both comparisons are successful. Await operator approval if Threshold 2 comparison fails.

- Threshold comparisons based on default line ratings (Ambient Adjusted Ratings).

Upper Threshold #1
Upper Threshold #2
Normal
Lower Threshold #2
Lower Threshold #1

[1] – Normal, Short-term and Long-term Emergency and Load Dump ratings, consistent with PJM Manual 03

- eDART upgrades are needed to facilitate:
  - Auto ticketing & integration with workflow of EMS DLR functionality
  - Maintain an accurate rating historian
  - Maintain transparent rating postings
  - Receive and post next-day forecasted ratings

- eDART and EMS together handle the rating change and approval process. Real-time Operations and Markets applications are downstream consumers of this information.

- Market Efficiency modeling:
  - Model a DLR proposal using provided weather data
  - Isolate impact of convective cooling from dynamic ratings
- Utilizing next-day DLR forecasts in Day-Ahead market
  - Forecasted ratings collected from eDART
  - Manually input into Day-Ahead. Automation work to follow initial implementation
- Utilizing DLR in Real-time markets
- Operator approval and manual override process
- Operator training

- 2021 eDART upgrade project

- PJM & PPL Stakeholder Communications:

  – Emerging Technologies Forum

  – Transmission Expansion Advisory Committee

  – Planning Committee

  – Operating Committee

  – Markets Implementation Committee

- PJM's Target go-live date (subject to change): June 1, 2021

PJM has identified that the following manuals **may** require guidance language on Dynamic Line Ratings:

- Manual 03, Section 2: Thermal Operating Guidelines

- Manual 03A, Appendix A: TERM Equipment Ratings Update Process

Additionally, PJM will develop a Dynamic Line Ratings desk reference guide to be used by control room staff.

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Dynamic Line Ratings

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