100

ppl

A century of people **powering life.**

Agenda

1) What is Dynamic Line Rating (DLR)?
2) Dynamic Line Ratings Process
3) Why DLR?
4) Expected rating gain
5) Next Steps

What is DLR?

System of line sensors installed to measure conductor and environmental real time data to determine a real time rating for the line based on live measurements instead of assumed condition values.

- Static Line Ratings

Assumes:

- Wind speed
- Ambient Temp
- Solar Radiation
- 2 Seasons (Summer & Winter)

Conservatively Calculates Ratings

- Dynamic Line Ratings

Measures:

- Actual Wind Speed
- Actual Ambient Temp
- Actual Conductor Temp
- Actual Conductor Sag

Provides Accurate Real Time Ratings

Allows for Forecasted Ratings

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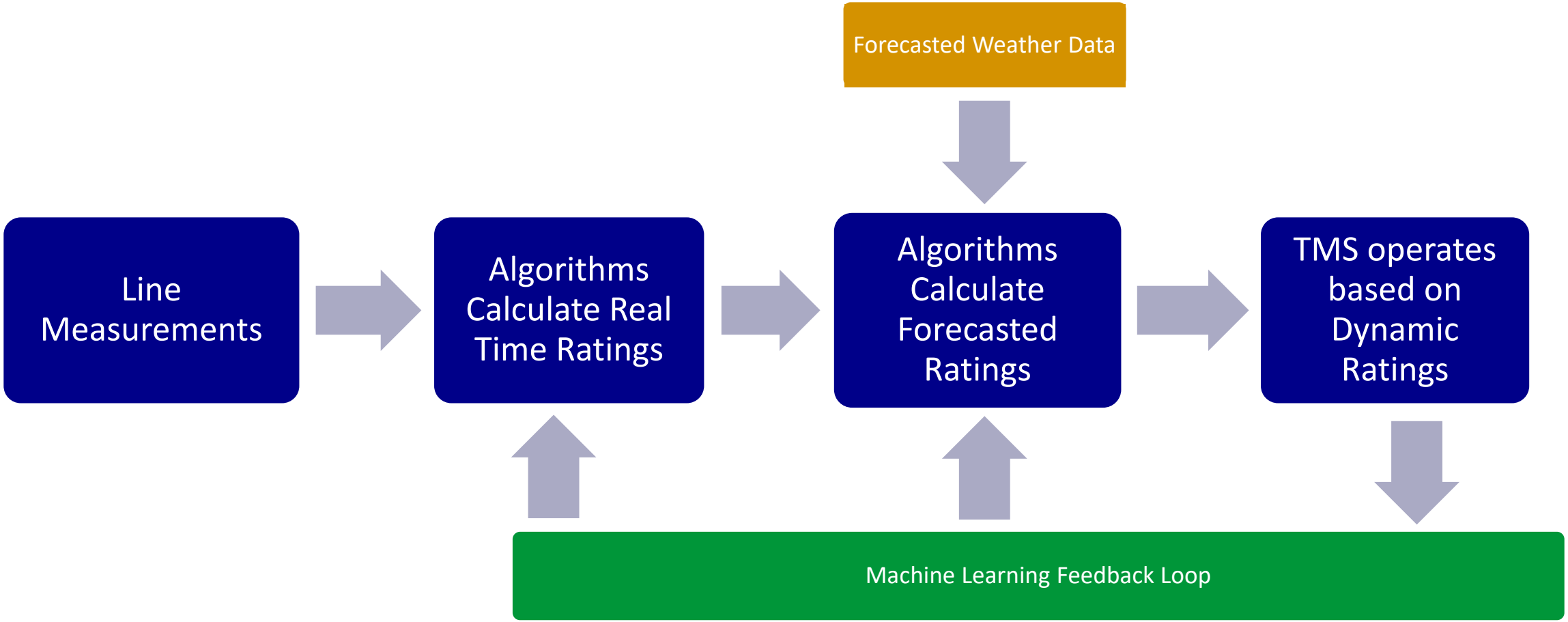
Dynamic Line Ratings Process



- DLR would be installed on lines to relieve network congestion by utilizing real time and forecasted ratings that are typically higher than the static rating

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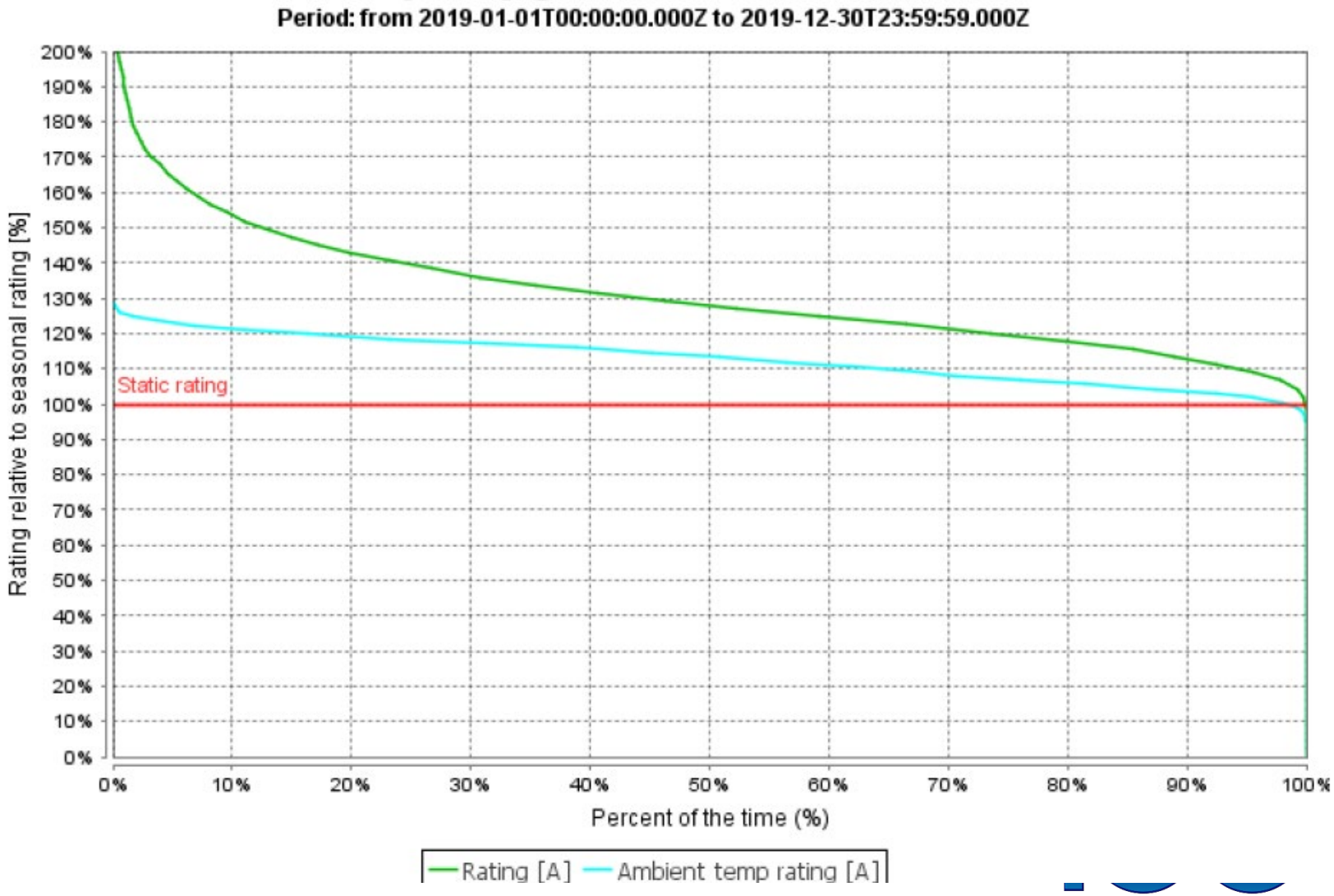
Why DLR?

- Asset health monitoring of conductors
  - Enable data analytics trending
- Potential to provide up to a 100% increase in line ratings based on the real time conditions
- A low cost and easily installable solution to address real time market congestion and operational constraints
  - Real time constraints are often driven by temporary outages, change in generation mix, etc.
  - DLR allows better utilization of assets and can either postpone or eliminate the need to invest more than $10s of million of dollars in transmission
- Ensures NESC clearances are maintained real-time

Potential Rating Gain

- Used historical temperature and wind speed to estimate the impact of the dynamic lines ratings system
- Based on calculated conductor temperature
- Expected average ratings gain of almost 30%
- Actual rating increase incorporating the real time conductor data is expected to be greater than the estimated ratings using historical data



Next Steps

- PPL is deploying DLR on a line with high real time congestion and potential asset health needs. We consider the installation of the sensors as permanent for the life of the line.

- The objective is to integrate DLR into PJM's operations and day ahead market to fully utilize available line capacity

- PPL to install a DLR project within Q4 2020 and continues to seek additional lines to install the technology on