

# Dynamic Line Ratings (DLRs) – Frequently Asked Questions

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This document provides answers to the most commonly asked questions related to the Dynamic Line Ratings project at PJM. Please reach out to the PJM [Dynamic Line Ratings Team](#) with any questions not answered in this list. Questions answered in this document are organized into the following categories:

Q1–Q5     *General Technology Questions*

Q6–Q8     *Procedural Impacts to PJM Operations, Markets and Planning*

Q9–Q10    *PPL DLR Deployment Project Questions*

## General Technology Questions

### Q1    What are dynamic line ratings?

**A1**    Dynamic line ratings (DLRs) are an advanced grid technology that utilize real-time measurement data collected from local monitoring sensors installed at strategic locations along the length of an existing transmission line. Rather than utilize assumed conservative weather conditions used to derive traditional ambient-adjusted ratings (AARs), DLR systems monitor and report real-time weather conditions surrounding line conductors to continuously assess and determine real-time equipment ratings with improved accuracy. These systems also utilize forecasted weather data to develop short-term rating forecasts for use in near-term operations planning and day-ahead generation dispatch. Because these DLR systems do not rely on conservative weather assumptions, dynamic ratings are often higher than traditional AARs, thereby identifying additional transmission capacity on the monitored transmission line. More information on the coordination of AAR information with PJM can be found in [Manual 3, Section 2.1](#). Additional information on how utilities develop AARs can be found in [IEEE Std. 738](#).

### Q2    What are the reliability benefits of DLRs?

**A2**    In instances where the DLR is lower than the AAR due to extreme weather conditions (low wind, high ambient temperature, direct sunlight), this indicates that the transmission conductor is experiencing heightened thermal stress, and operating the transmission facility to its AAR would place the equipment at a greater operational risk. In instances where the DLR is higher than the AAR, this can delay the occurrence and/or reduce severity of a particular system constraint, and thereby allow operators to avoid use of certain constraint mitigation actions such as “radializing” switching schemes, and potentially reduce long-term equipment wear associated with generation and phase angle regulator adjustments, etc.

**Q3** What are the economic benefits of DLRs?

**A3** Because DLR systems often identify incremental transmission capacity above that of traditional AAR line ratings, the increased transmission capacity provides additional “room” on the line, thereby allowing for more power to be imported across the DLR-monitored transmission asset before congestion occurs. The amount of congestion alleviated by DLRs (as compared to AARs) will vary based on weather conditions surrounding the dynamically rated line.

**Q4** On which transmission lines should DLR systems be installed?

**A4** Generally speaking, DLR system deployments are most valuable on historically congested transmission lines where the line conductor is the most thermally limiting element.

**Q5** Who determines the location of a DLR installation and initiates its deployment in the PJM footprint?

**A5** Because a potential DLR deployment requires detailed design information associated with a particular transmission line, the transmission owner will initiate the DLR deployment project. For more information on regulatory standards related to transmission owner’s development of transmission line ratings, see [NERC FAC-008](#).

***Procedural Impacts to PJM Operations, Markets and Planning*****Q6** How will DLRs be used in real-time Operations and Markets?

**A6** Real-time rating information collected by the transmission owner’s DLR system will be periodically sent to the transmission owner, who will then relay this information to PJM in real time via ICCP link. PJM’s Energy Management System will receive and process this information. Then, this rating information will propagate to other downstream systems, including real-time market systems.

**Q7** How will DLRs be used in PJM’s Day-Ahead Market and reliability studies?

**A7** Commercial DLR systems calculate dynamic rating forecasts based on locational weather forecast information. These ratings will be transmitted to PJM on a periodic basis, where forecasted DLRs will be incorporated into the Day-Ahead Market, as well as operational reliability studies used in developing PJM’s operational planning assessments.

**Q8** How will DLRs be used in the Market Efficiency planning process?

**A8** Upon request of a transmission owner, PJM will utilize hourly DLR information calculated from historical weather data in the Market Efficiency planning process. To reduce modeling complexity and to correctly model the unique benefit of DLR technologies, this modeling approach will isolate incremental transmission

capacity brought by convective cooling from rating increases associated with ambient temperature. More information on this modeling approach can be found in a recent white paper<sup>1</sup> published by PJM. It is the responsibility of the transmission owner to provide all weather-based ratings required for this modeling process.

## ***PPL DLR Deployment Project Questions***

**Q9** What transmission lines are involved in the initial DLR deployment project?

**A9** As of the publication of this FAQ document, the following transmission lines will be outfitted with DLR systems. Note that each of these transmission lines are within the PPL transmission zone:

- Juniata-Cumberland 230 kV line
- Susquehanna-Harwood 1 230 kV line
- Susquehanna-Harwood 2 230 kV line

**Q10** When will these DLR systems be in operational use at PPL and PJM?

**A10** Use of dynamic ratings in real-time Operations and Markets will require completion and testing of various software enhancements, process updates and staff training. It is PJM's expectation that full use of dynamic ratings for the three transmission lines listed above will occur at some point in the fourth quarter of 2021. **This estimate is subject to change**, and PJM will provide further stakeholder notifications as this project continues.

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<sup>1</sup> <https://pjm.com/-/media/library/reports-notice/special-reports/2021/20210401-incorporating-dlr-into-market-efficiency.ashx>