

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

<b>Implementation of Dynamic Line Ratings</b>	: : :	<b>Docket No. RM24-6-000</b>
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**COMMENTS OF PJM INTERCONNECTION, L.L.C.**

Pursuant to the Federal Energy Regulatory Commission’s (“Commission”) Advanced Notice of Proposed Rulemaking,<sup>1</sup> PJM Interconnection, L.L.C. (“PJM”) submits these comments on questions and issues relating to the implementation of dynamic line ratings (“DLR”).

PJM appreciates the opportunity to comment on the Commission’s continued exploration of the potential value of DLR implementation. As referenced in Docket No. AD22-5-000, PJM remains committed to assist any Transmission Owner that elects to implement DLR on its transmission lines.<sup>2</sup> This readiness builds upon PJM’s history of collaboration with its Transmission Owners and other stakeholders in support of exploring DLR technology. With the benefit of operational experience on DLR implementation, PJM’s comments here remain consistent in supporting transparent, cost-effective, targeted and reliable DLR deployment.

PJM has consistently supported strategic DLR implementation in high-congestion areas, as a real-time optimization tool.<sup>3</sup> The benefits of Order No. 881 implementation should be realized to provide quantifiable data to support strategic DLR deployment.<sup>4</sup> Accordingly, PJM’s Comments are focused on Order No. 881 implementation and related timing considerations,

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<sup>1</sup> See *Implementation of Dynamic Line Ratings*, 187 FERC ¶ 61,201 (2024) (“ANOPR”).

<sup>2</sup> *Implementation of Dynamic Line Ratings*, PJM’s Motion for Leave to Comment and Supplemental Comments, Docket No. AD22-5-000 (Jan. 17, 2024) (“January 2024 Motion for Leave to Comment”).

<sup>3</sup> *Transmission Line Ratings and Related Practices*, PJM’s Post-Technical Conference Comments, Docket No. AD19-15-000 (Nov. 5, 2019).

<sup>4</sup> See generally January 2024 Motion for Leave to Comment.

vendor implications and actual historical DLR experiences within the PJM region. With careful consideration of these and other factors, DLR implementation can be strategically targeted and timed, such that meaningful congestion mitigation benefits are ultimately realized.

PJM looks forward to continued engagement with the Commission and stakeholders on these issues.

## **I. COMMENTS**

The Commission's proposal considers the need to establish requirements for transmission providers to use DLR to improve the accuracy of transmission line ratings.<sup>5</sup> The Commission has asked for comment on various issues in this proceeding. PJM's Comments offer reactions to general timing and testing concerns that should be considered for effective implementation.

### **A. Order No. 881 Implementation and Timing Considerations**

#### *1. Realization of Order No. 881 benefits*

In the ANOPR, the Commission recognizes that most commenters do not support the transition to DLR implementation until after Ambient-Adjusted Ratings ("AARs") are implemented on or about July 2025.<sup>6</sup> PJM supports delaying DLR implementation until after Order No. 881 requirements are implemented, such that Transmission Providers and Transmission Owners will have the data needed to identify changed transmission line congestion patterns. The potential benefits of DLR cannot be reliably estimated before implementation of Order No. 881.

In an effort to promote cost beneficial DLR deployment, the benefits of Order No. 881's mandated use of AARs should be accounted for in the analysis used to inform DLR deployment

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<sup>5</sup> ANOPR at P 4.

<sup>6</sup> ANOPR at P 176.

decisions.<sup>7</sup> This is true particularly with identifying candidate transmission lines, which the ANOPR identifies as the first step in DLR implementation.<sup>8</sup> Congestion related benefits become increasingly marginal when comparing the various methodologies (traditional seasonal ratings, the expanded granularity required within Order No. 881 AARs,<sup>9</sup> this ANOPR's DLR approach and that of true conductor-measured DLR). While there are potential opportunity gains between that of true conductor-measured DLR and an Order No. 881-implementation, those are only beneficial to reliability and markets when simultaneously experiencing congestion upon the given Transmission Facility. Such gains would largely fall somewhere in between a true conductor-measured DLR implementation and that of Order No. 881 AARs. In other words, projecting the cost benefit of using an ANOPR-adjusted rating on a congested facility as compared to the congestion using a traditional seasonal rating may grossly inflate the benefits if not adjusted for the efficiencies gained using an Order No. 881 AAR.

## *2. PJM's use of Look-up Tables*

Additionally, under Order No. 881, the Commission permitted the continued use of look-up tables and PJM has continued to leverage this approach.<sup>10</sup> As such, PJM and its members have worked towards expanding its longstanding look-up table practice. PJM recognizes that the look-up tables may not be sufficient given the expanded wind and solar requirements within this ANOPR proposal, given the substantive expansion beyond that of the

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<sup>7</sup> *Implementation of Dynamic Line Ratings*, PJM's Motion for Leave to Comment and Comments, Docket No. AD22-5-000, at 7 (May 9, 2022) ("May 2022 Motion for Leave to Comment").

<sup>8</sup> ANOPR at P 24.

<sup>9</sup> The expanded granularity references the hourly and 5-degree minimum ambient condition adjustments required by Order No. 881.

<sup>10</sup> *Managing Transmission Line Ratings*, Order No. 881, 177 FERC ¶ 61,179, at P 142 (2021); *Managing Transmission Line Ratings*, PJM's Comments, Docket No. RM20-16-000, at 3-6 (Mar. 22, 2021); *PJM Interconnection, L.L.C.*, PJM's Order Nos. 881 and 881-A Compliance Filing, Docket No. ER22-2359-000, at 6 (July 12, 2022).

ambient condition requirements within Order No. 881. Consistent with Order No. 881 directives, PJM and its members have made considerable investments (time and financial) in the look-up table approach. PJM has concerns that a broad DLR mandate would require a significant departure from the look-up table practice. If the ANOPR's wind and solar requirements are effectuated, PJM would seek to transfer those obligations to Transmission Owners by treating any ANOPR impacted facility as DLR, preserving the look-up table framework as a backup for the ANOPR facilities and as a primary for any remaining non-DLR facilities. Accordingly, PJM supports targeted, cost-effective DLR implementation that will build upon the successful methodologies leveraged and lessons learned through Order No. 881 implementation.

## **B. Considerations of a Singular vs. Diversified Approach**

### *1. Applicability of NERC Facility Ratings Reliability Standard FAC-008-5*

The ANOPR's expanded wind and solar requirements mark a fundamental shift in Transmission Owner responsibilities under FAC-008-5, as the existing process allows Transmission Owners to have a diversity in approach as opposed to a singular North American Facility Rating methodology.<sup>11</sup> Under NERC's framework, Transmission Facility Rating methodologies are the responsibilities of the Transmission Owner and not the RTO. However, the contemplated ANOPR requirements are focused on the Transmission Provider, while the impact largely falls on the Transmission Owners. This is distinguished from the Order No. 881 approach, whereby Transmission Providers were required to respect DLR if that was the preferred Transmission Owner methodology.<sup>12</sup> The ANOPR's suggested mandated Facility

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<sup>11</sup> Reliability Standard FAC-008-5 (Facility Ratings), <https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-008-5.pdf>.

<sup>12</sup> ANOPR at P 80; Order 881 at P 255.

Rating methodology practice would fundamentally alter the Transmission Owners' ability to have a diversity in approach allowing individual Transmission Owners to employ a preferred methodology. PJM urges the Commission to consider whether or not the ANOPR is overriding the benefit of diversity and learning that comes from FAC-008's framework.

## *2. Vendor Availability and Related Impacts*

PJM also recognizes that a shift towards a singular Facility Rating methodology would dictate technological requirements and resulting operating and maintenance costs. Given the involvement of many vendors (Energy Management Systems ("EMS"), weather, markets, ratings, etc.), timing considerations around any future changes should be realistic in light of historical readiness and availability of software solutions. Order No. 881 implementation required tremendous work in coordination with PJM, stakeholders and vendors. The Commission should consider that similarly extraordinary efforts would be required if broad DLR implementation were required. Additionally, PJM urges the Commission to consider potential data and communication challenges in making such volumes of rolling data transparent, were that to be the Commission's intent.

### **C. Proposed 48-hour Time Horizon**

PJM agrees that the forecast uncertainty for wind speed and direction likely increases at longer time durations.<sup>13</sup> The Commission requests comment on the appropriateness of its proposed 48-hour time horizon.<sup>14</sup> While the Commission cites PJM's existing use-case, it should be noted that PJM's DLR-forecast minimum requirement is 38 hours.<sup>15</sup> PJM's DLR-forecast

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<sup>13</sup> ANOPR at P 103.

<sup>14</sup> *Id.*

<sup>15</sup> PJM, *Manual 3: Transmission Operations*, § 2.1.1.2 (rev. 66, May 22, 2024), <https://www.pjm.com/~media/documents/manuals/m03.ashx> ("Forecasted hourly dynamic ratings must be provided via PJM's eDART TERM ticketing processes that extend out to cover the current day operations time horizon and

minimum requirement is based on PJM's timing around its day-ahead processes and desire to ensure alignment between Transmission Facility Rating methodology approaches for the day-ahead time horizon with that of the Real-time and Same-day Operations NERC time horizons.

PJM's approach regarding Order No. 881 extends our existing DLR Facility Owner hourly forecast option out to cover the entire 10-day (240-hour) window, but the minimum required window for DLR-facilities remains at 38 hours, to address the day-ahead need and not force an owner to supply a DLR-rating outside said window. Any gaps between Order No. 881's 10-day (240-hour) forecast hourly requirement and PJM's 38-hour minimum shall be closed via AAR projections for a given DLR facility.

Rather than dictating an hourly requirement, PJM urges the Commission to consider the hourly requirements which address the day-ahead time horizon and allow for DLR Transmission Owners, Transmission Providers and ISOs/RTOs to extend beyond such requirements as the technology advances and their reliability and markets needs dictate. In any final rule, the Commission should remain open to justifiable deviations from the 48-hour time horizon based on operational experience and consistency with good utility practice.

#### **D. General Principles for Consideration Regarding DLR**

##### *1. DLR Implementation in Light of PJM's Operational Experience*

While DLR has enhanced specificity over less dynamic methodologies, the Commission should consider the relatively small sample size (time and number) PJM has experienced to date.<sup>16</sup> DLR alone does not tell a full story for the facilities upon which it has been deployed. For example, the ANOPR references PJM's use of DLR on PPL transmission lines during

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the next day operations time horizon while meeting PJM reliability and day ahead market time obligations. (i.e., rolling 48 hourly forecasts, with a minimum of 38 hourly projections ahead of Day Ahead market window.”).

<sup>16</sup> PJM has had limited operational experience with DLRs, as the initial go-live date was October 6, 2022.

Winter Storm Elliott.<sup>17</sup> The ANOPR cites PJM's reference that DLR on the PPL transmission lines proved higher than the AARs, eliminating the need to re-dispatch the system to maintain reliability during Winter Storm Elliott.<sup>18</sup> PJM supplements the record to note that a major contributing factor to the DLR success was that station-based upgrades were necessary for the conductor to be the most limiting element. Additionally, congestion was experienced and managed on nearby Transmission Facilities and thus not reduced by the DLR installation alone. In sum, while helpful, more than the installation of DLR factored into PJM's operational flexibility during Winter Storm Elliott.

## *2. Appropriate Congestion Cost Thresholds*

The Commission is correct to consider criteria that would assist it in determining whether the benefits of broader DLR implementation outweigh the associated operating and maintenance costs. On this point, the Commission seeks comment on the appropriate congestion cost threshold to use in the RTO/ISO regions.<sup>19</sup> PJM previously recommended DLRs on transmission lines with annual congestion costs of at least \$2 million, which the ANOPR documents at the high end of range suggestions.<sup>20</sup> If a final rule is issued for DLR implementation, PJM requests an opportunity to propose an appropriate congestion threshold on compliance, based on continued learning, technology and available data post Order No. 881.

## *3. DLR Implementation is not a Substitute for Reliability Upgrades*

PJM sees DLR as a Transmission Owner Facility Rating Methodology appropriate situationally for Transmission Owners positioned to utilize them, but not as a replacement for

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<sup>17</sup> ANOPR at PP 58 and 76.

<sup>18</sup> *Id.*

<sup>19</sup> ANOPR at P 123.

<sup>20</sup> *Id.*; January 2024 Motion for Leave to Comment at 3.

system upgrades.<sup>21</sup> Any resultant congestion mitigation is situational, weather dependent and potentially ethereal at times when it is most needed. Put simply, DLR will reduce congestion upon a targeted facility when the conductor is the most limiting element; it will neither remedy nor serve as a replacement for the benefits of a comprehensive assessment that identifies potential planning solutions to address area congestion. Further, when placed upon transmission lines for which no congestion is or will be experienced, or when placed upon a transmission line for which the most limiting element is not the conductor, DLR will not be ideally positioned to provide benefits but would serve as an additional cost to customers with no added benefit. DLR should not be viewed as a substitute for comprehensive regional transmission planning.

## II. CONCLUSION

PJM thanks the Commission for this opportunity to submit comments in this matter to provide a potential path forward towards implementing and optimizing the operational benefits of DLR.

Respectfully Submitted,

/s/ Erin Lai

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<sup>21</sup> See May 2022 Motion for Leave to Comment at 4.