UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Implementation of Dynamic Line Ratings	Docket No. RM24-6-000

COMMENTS ON ADVANCED NOTICE OF PROPOSED RULEMAKING OF THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION, THE AMERICAN PUBLIC POWER ASSOCIATION, AND THE LARGE PUBLIC POWER COUNCIL

The National Rural Electric Cooperative Association (NRECA), the American Public Power Association (APPA), and the Large Public Power Council (LPPC) (collectively, "Cooperatives and Public Power") jointly submit these comments in response to the Advanced Notice of Proposed Rulemaking (ANOPR).[1]

As not-for-profit, consumer-owned utilities, Cooperatives and Public Power support the use of advanced transmission line ratings when it makes economic sense for their consumers and is consistent with providing safe and reliable electric service. Advanced transmission line ratings present distinct costs and risks, however, which must be accounted for in deciding whether and how to use them to achieve consumer benefits and to mitigate consumer risks.

In Order No. 881, the Commission adopted a new Attachment M to the Commission's *pro forma* open access transmission tariff (OATT) requiring, among other things, that public utility transmission providers use ambient adjusted ratings (AARs) for

[1] 187 FERC ¶ 61,201 (June 27, 2024), 89 Fed. Reg. 57,690 (July 15, 2024). These comments are intended to provide the broad perspective of NRECA's member electric cooperatives. Individual cooperatives may file comments reflecting their specific views and experiences, and NRECA respectfully commends those comments for the Commission's consideration.

near-term transmission service on their transmission lines.[2] But the Commission declined to mandate the use of dynamic line ratings (DLRs) and instead incorporated the rulemaking record into a new docket to explore DLR implementation.[3] The Commission then issued a Notice of Inquiry (NOI) requesting comments on whether and how the required use of DLRs might be needed to ensure just and reasonable wholesale rates.[4]

Cooperatives and Public Power opposed DLR requirements in their comments on the proposed rule in the Order No. 881 rulemaking[5] and in their comments in response to the NOI.[6] In the latter comments, Cooperatives and Public Power submitted that the Commission should allow the industry to implement Order No. 881's AAR requirements before considering whether DLR requirements are warranted. They were hardly alone in this position; most comments in response to the NOI opposed additional DLR mandates,[7] particularly before AARs are even implemented and their impact can be studied.[8]

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[2] *Managing Transmission Line Ratings*, Order No. 881, 177 FERC ¶ 61,179 (2021), 87 Fed. Reg. 2244 (Jan. 13, 2022), *order on reh'g*, Order No. 881-A, 179 FERC ¶ 61,125 (2022), 87 Fed. Reg. 31712 (May 25, 2022).

[3] *See id.* at PP 252–254.

[4] *Implementation of Dynamic Line Ratings*, 178 FERC ¶ 61,110 at P 1 (2022), 87 Fed. Reg. 10349 (Feb. 20, 2022).

[5] Comments of National Rural Electric Cooperative Association and Large Public Power Council, Docket No. RM20-16-000 (Mar. 23, 2021) (NRECA/LPPC RM20-16 Comments).

[6] Comments of National Rural Electric Cooperative Association, Docket No. AD22-5-000 (Apr. 25, 2022); Comments of American Public Power Association and Large Public Power Council, Docket No. AD22-5-000 (Apr. 25, 2022);

[7] *See* Reply Comments of the MISO Transmission Owners, Docket No. AD22-5-000 at 2–5 (May 25, 2022) (citing and quoting initial comments).

[8] *See id.* at 5–7 (citing and quoting initial comments); Reply Comments of American Electric Power Service Corporation, Docket No. AD22-5-000 at 3 & n.7 (May 25, 2022) (citing and quoting initial comments); Reply Comments of Edison Electric Institute, Docket No. AD22-5-000 at 6 (May 25, 2022) ("The Commission should not consider imposing DLR requirements when efforts to implement AARs in accordance with Order No. 881 have just begun, and before the impacts of such widespread AAR implementation can be fully studied and analyzed."). We note that in Order No. 1920, the Commission required the *consideration*, but not implementation, of DLRs, along with advanced power flow control devices, advanced conductors and

The position of Cooperatives and Public Power on that issue is unchanged—DLR requirements are unwarranted and premature at this time. The Commission should allow the industry to implement AARs as required by Order No. 881 by July 2025 and then gather the necessary information to assess the effectiveness of that rule before considering whether to replace it with potential DLR requirements. The ANOPR does not demonstrate a basis for a finding that the not-yet-implemented requirements of Order No. 881 will not result in just and reasonable rates. At present, Cooperatives and Public Power support the voluntary implementation of DLRs only where they provide clear consumer benefits and where they can be implemented consistent with maintaining safe and reliable electric service. The Commission should not trade public safety or system reliability for uncertain consumer benefits from conjectural improvements in the efficiency of wholesale electricity markets.

As for the proposed framework for potential DLR requirements in the ANOPR, the position of Cooperatives and Public Power is as follows.

- A requirement that transmission line ratings reflect solar heating based on the sun's hourly position may produce more accurate ratings than the simpler daytime/nighttime AAR requirement in Order No. 881, but whether the added complexity produces net benefits for consumers is not demonstrated.
- A requirement that transmission line ratings also reflect solar heating based on forecastable cloud cover is more problematic, since it would introduce more complexity, more uncertain consumer benefits, and greater safety and reliability risks.

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transmission switching. *See Building for the Future Through Electric Regional Transmission Planning & Cost Allocation*, Order No. 1920, 187 FERC ¶ 61,068 at P 1198, *reh'g denied by operation of law*, 188 FERC ¶ 62,025 (2024), *pets. for review pending sub nom. Appalachian Voices v. FERC*, Nos. 24-1650 (L) *et al.* (4th Cir.). LPPC has not objected to this requirement, though it has asked for clarification that transmission owners may use sound engineering judgment in determining which transmission elements should be studied as candidates for the use of grid enhancing technologies. *See* Request for Clarification and Rehearing of the Large Public Power Council, filed June 12, 2024 in Docket No. RM21-17.

- A requirement that transmission line ratings reflect wind speed and direction should not be imposed on all transmission lines because it would be costly and burdensome to implement and would have potential consumer benefits only on congested lines where the extra thermal capability might provide actual value to consumers.
- A wind-speed threshold is appropriate.
- A congestion threshold is essential, but the appropriate threshold may vary between different transmission providers.
- A wind requirement should be limited to Bulk Electric System (BES) lines.
- A phased-in implementation of a wind requirement must be fair to all transmission providers, large and small, and take into consideration line direction, length, and terrain.
- The self-exception process adopted in Order No. 881 is appropriate and should be retained for any DLR requirements.
- Attachment M's Safety Reliability section is essential and should be retained for any DLR requirements.
- Transparency and adequate data are essential to determining the scope of any proposed DLR requirements and to ensure just and reasonable and non-discriminatory implementation of any DLR requirements.

Cooperatives and Public Power's Interests in This Proceeding

NRECA is the national trade association representing nearly 900 local electric cooperatives and other rural electric utilities. America's electric cooperatives are built by and owned by the people that they serve and comprise a unique sector of the electric industry. Electric cooperatives operate at cost and without a profit incentive. From growing regions to remote farming communities, electric cooperatives serve 42 million people (one of every eight electric consumers), powering 21 million businesses, homes, schools and farms in 48 states and across 56 percent of the nation's landmass.[9]

[9] Except as noted, the facts and figures in this description of NRECA member cooperatives, and their sources, are posted on the NRECA public website. See https://www.electric.coop/electric-cooperative-fact-sheet (visited October 11, 2024).

NRECA's members include 832 distribution cooperatives and 64 generation and transmission (G&T) cooperatives. Distribution cooperatives are the foundation of the electric cooperative network; they were built by their communities and deliver electric service and other services to their consumer-members. The G&T cooperatives generate or purchase wholesale power on behalf of their distribution-cooperative members. Collectively, G&T cooperatives serve 80 percent of the nation's distribution cooperatives. Other distribution cooperatives obtain wholesale power from other sources in the electric-power sector. Distribution and G&T cooperatives share an obligation to serve their members by providing safe, reliable, and affordable electric service.

Eight G&T cooperatives currently are Commission-jurisdictional public utilities.[10] Section 201(f) of the Federal Power Act (FPA)[11] provides that most of Part II of the Act,[12] including sections 205 and 206,[13] do not apply the vast majority of electric cooperatives. NRECA's member cooperatives also include Registered Entities subject to the Reliability Standards developed by the North American Electric Reliability Corporation (NERC) and approved by the Commission pursuant to FPA section 215.[14] Moreover, regardless of their jurisdictional status, distribution and G&T cooperatives are "load serving entities" protected by FPA section 217.[15]

[10] 16 U.S.C. § 824(e) (2018) (defining public utility).

[11] 16 U.S.C. § 824(f) (2018).

[12] 16 U.S.C. §§ 824–824w (2018).

[13] 16 U.S.C. §§ 824d & 824e (2018).

[14] 16 U.S.C. § 824o (2018).

[15] 16 U.S.C. § 824q (2018). Section 217(b)(4) requires the Commission to exercise its authority under Part II of the FPA "in a manner that facilitates the planning and expansion of transmission facilities to meet the reasonable needs of load-serving entities to satisfy the service obligations of the load-serving entities, and enables load-serving entities to secure firm transmission rights (or

Electric cooperatives generate about five percent and deliver about 12 percent of the nation's electricity. Cooperatives also comprise an outsized part of the nation's transmission and distribution infrastructure. Cooperatives own and maintain 2.6 million miles, or 42 percent of the nation's electric transmission and distribution lines, including over 44,000 miles of transmission lines. In 2021, cooperatives served an average of 7.98 customers per mile of line and collected annual revenue of approximately $19,135 per mile; other utility sectors averaged 32.4 customers and $79,298 in annual revenue per mile.[16]

APPA is the national service organization representing the interests of not-for-profit, state, municipal, and other locally owned electric utilities in the United States. More than 2,000 public power systems provide over 15 percent of all kilowatt-hours sales to ultimate customers and serve over 49 million people, doing business in every state except Hawaii.

LPPC is an association of 28 of the nation's largest municipal and state-owned utilities, representing the larger, asset-owning members of the public power community and approximately 90% of the transmission assets owned by public power. Located throughout the nation, many of LPPC's members are transmission-owning members of independent system operators ("ISOs") and regional transmission organizations ("RTOs"), while others are considering membership in regions of the nation in which ISOs/RTOs and other organized markets are yet being developed.

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equivalent tradable or financial rights) on a long-term basis for long-term power supply arrangements made, or planned, to meet such needs." *Id.* § 824q (b)(4).

[16] NRECA calculations from Energy Information Administration public data for the last year available.

Comments

I. Potential Need for Reform

The ANOPR proposes potential changes to the Commission's regulations and Attachment M of the *pro forma* OATT to require public utility transmission providers to implement certain DLR practices. Cooperatives and Public Power oppose these potential DLR requirements as unwarranted and premature.

These actions would be undertaken pursuant to the Commission's authority under FPA section 206.[17] Section 206 authorizes the Commission, whenever it finds that an existing jurisdictional rate or "practice … affecting such rate" is "unjust, unreasonable, unduly discriminatory or preferential," the Commission "shall determine the just and reasonable rate [or] practice … to be thereafter observed and in force, and shall fix the same by order."[18] The statute thus requires two distinct findings—that existing rates are unjust and unreasonable and that the replacement rates are just and reasonable.[19] The Commission must find "the existing rates … to be entirely outside the zone of reasonableness" before it may impose new rates pursuant to section 206.[20]

The Commission adopted Order No. 881 pursuant to section 206 and found that the transmission line rating reforms adopted in that order "are necessary to ensure just and reasonable wholesale rates."[21] The Commission found that "transmission line ratings

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[17] ANOPR at P 1.

[18] 16 U.S.C. § 824e (a). The Commission's authority to regulate a "practice" is limited to those "that directly affect the rate or are closely related to the rate." *Cal. Independent System Operator v. FERC*, 372 F.3d 395, 403 (D.C. Cir. 2004). *See FERC v. Elec. Power Supply Ass'n*, 577 U.S. 260, 278 (2016) (adopting this limitation).

[19] *See, e.g., Atlantic City Elec. Co. v. FERC*, 295 F. 3d 1, 10 (D.C. Cir. 2002).

[20] *City of Winnfield v. FERC*, 744 F.2d 871, 875 (D.C. Cir. 1984).

[21] Order No. 881 at P 29.

directly affect wholesale rates and, concomitantly, that inaccurate transmission line ratings result in unjust and unreasonable wholesale rates."[22] Order No. 881 contains three main remedies. First, it requires each public utility transmission provider to revise its OATT to incorporate a new *pro forma* OATT Attachment M.[23] Attachment M requires a transmission provider to use AARs for near-term transmission service (ending within 10 days of the date of the request) and in calculating unique emergency ratings; to use seasonal line ratings otherwise; to post certain transmission line ratings information on a password-protected OASIS or web page; and to share certain transmission line ratings with other transmission providers.[24] Second, Order No. 881 revises the Commission's regulations to require any public utility that owns transmission facilities that are not under the public utility's control to share with the public utility that controls such facilities (and its market monitoring units) the public utility's transmission line ratings and written transmission line rating methodologies.[25] Third, Order No. 881 revises the Commission's regulations to require each regional transmission organization (RTO) and independent system operator (ISO) to establish and maintain systems and procedures necessary to allow any public utility whose transmission facilities are under the independent control of the ISO or RTO to electronically update transmission line ratings

[22] Order No. 881 at 30.

[23] Order No. 881 at P 12. The Commission's regulations require each public utility transmission provider to have on file the *pro forma* OATT or other tariff approved by the Commission as consistent with that requirement. 18 C.F.R. § 35.28(c)(1) (2021).

[24] Order No. 881, Appx. B (*pro forma* OATT Attachment M).

[25] *Id.* at PP 330, 331 (to be codified at 18 C.F.R. § 35.28(c)(5)).

for such facilities at least hourly.[26] The Commission allowed three years for full compliance with these requirements—i.e., until July 12, 2025.[27]

In the ANOPR, the Commission preliminarily finds that "transmission line ratings that do not reflect solar heating based on the sun's position and up-to-date forecasts of forecastable cloud cover may result in unjust and unreasonable wholesale rates," and that "transmission line ratings that do not reflect up-to-date forecasts of wind conditions on certain transmission lines may also result in unjust and unreasonable wholesale rates."[28] Stated differently, the ANOPR preliminary finds that the AAR requirements in existing Attachment M to the *pro forma* OATT adopted in Order No. 881 will result in unjust and unreasonable wholesale rates absent the reforms described in the ANOPR. But the ANOPR does not demonstrate a basis for such a preliminary finding.

A. The Commission does not show that Order No. 881 will result in unjust and unreasonable rates.

In making the preliminary findings in the ANOPR, the Commission lists various benefits that the use of DLRs may produce. First, the ANOPR cites selected pilot projects where the use of DLRs increased transmission capacity and reduced congestion costs in RTO/ISO wholesale markets.[29] But these DLR examples do not represent the solar and wind proposals in the ANOPR, nor can they reasonably be said to be comprehensive or geographically diverse. More importantly, these examples do not use the AARs required

[26] *Id.* at P 255 (to be codified at 18 C.F.R. § 35.28(g)(13)).

[27] *Id.* at PP 360–361. The final rule's effective date of March 14, 2022. *See* 87 Fed. Reg. at 2244. Compliance filings were due in 120 days, and full compliance is required three years after that.

[28] ANOPR at P 72. The Commission also preliminarily finds that "transmission line ratings that better reflect solar heating and, where appropriate, wind conditions would result in more accurate system transfer capability, thereby resulting in just and reasonable rates." *Id.* at P 73.

[29] *Id.* at PP 55–61, 73.

by Order No. 881 as the baseline for computing the increases in transmission capacity or the savings in congestion costs.[30] Moreover, these examples do not purport to constitute a representative sample of the congestion savings that would be realized by implementing the ANOPR's proposals. The ANOPR contains no quantitative analysis of the relationship between transmission line ratings and wholesale market prices and no way to judge the potential magnitude of the incremental avoided congestion costs from adopting the ANOPR's DLR proposals in place of Order No. 881's AAR requirements—even in RTO/ISO markets, much less in non-RTO/ISO regions. In fact, because congestion costs in non-RTO/ISO regions are unknown, the ANOPR proposes to construct from the ground up a mechanism to quantify congestion and congestion costs to determine the congestion thresholds that would be used to implement a potential wind requirement in non-RTO/ISO regions.[31] In short, the avoided congestion costs from the few pilot projects cited in the ANOPR cannot reliably be extrapolated to a general finding that the AARs required by existing Attachment M will result in unjust and unreasonable rates.

The ANOPR also claims that DLRs may benefit consumers "by mitigating the need for more expensive upgrades," pointing to instances where the use of DLRs obviated, in whole or in part, the reconductoring of transmission lines.[32] Again, the

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[30] The ANOPR cites instances where DLRs are sometimes "above AARs." *See id.* at PP 57, 59, 60, 61. But these AARs are not the AARs required by Order No. 881. For example, PJM used AARs with increments of nine degrees Fahrenheit, while Order No. 881 requires five- degree increments. *See* Order No. 881-A at PP 51, 52. The Commission found this difference to be "meaningful." *Id.* at P 52. Moreover, the ANOPR notes that DLRs may be *below* AARs for substantial periods and thus may result in more congestion. *See id.* at P 59. This may occur when weather conditions are less favorable than those used in establishing the AARs.

[31] *See id.* at PP 78, 128–139.

[32] *See id.* at PP 62, 74. This can occur only if the assumptions used when originally designing and rating the line do not align with the weather conditions actually experienced by the line.

ANOPR gives no indication of the magnitude of the upgrade costs that might be avoided by adopting the ANOPR's DLR proposals in place of Order No. 881's AAR requirements. Thus, these avoided upgrade costs do not provide a basis to find that existing wholesale rates (including transmission rates in this instance) are unjust and unreasonable without the adoption of the ANOPR's proposals.

Moreover, the ANOPR's simple comparison of DLR costs to reconductoring costs implies that DLRs can substitute for a reliability-driven line upgrade. But the benefits of DLRs are in the operational horizon, not in the planning horizon. At most, DLRs may provide an operational tool for increasing thermal ratings to temporarily defer line upgrades and smooth out the "lumpiness" in transmission investment.[33] But they are not a less-expensive alternative to a reliability-driven line upgrade.[34] The ANOPR thus overstates the likely benefits of the proposed DLR requirements in "mitigating the need for more expensive upgrades.[35]

The ANOPR also claims that DLRs may provide operational reliability benefits.[36] But again these benefits remain uncertain and unquantified. Moreover, the ANOPR tells

[33] For example, a regional transmission plan might call for an upgrade of a line in 10 or 15 years to meet load growth. DLRs might be used to accommodate near-term load-growth until the long-term upgrade is made. This obviates the need to accelerate the upgrade or make more costly interim upgrade to meet the interim load growth. But DLRs are not a permanent reliability solution.

[34] Base ratings used in planning focus on probable conditions that stress the line, whereas DLRs focus on weather conditions that are less stressful on the lines, such that the rating can be higher. Therefore, DLRs will not mitigate the need for upgrades driven by probable weather conditions that stress the lines.

[35] In any event, one month after the ANOPR, the Commission issued Order No. 1920, which requires transmission providers to consider, in Long-Term Regional Transmission Planning and in existing Order No. 1000 regional transmission planning processes, DLRs for each identified transmission need. *See Building for the Future Through Electric Regional Transmission Planning & Cost Allocation*, Order No. 1920, 187 FERC ¶ 61,068 at P 1198.

[36] ANOPR at PP 76–77.

only half the story, because DLRs also pose operational reliability risks, as noted in Part I.C below.

The ANOPR also claims that DLRs may increase transmission import capacity to load pockets, reducing a transmission provider's reliance on local reserves inside load pockets and thus reducing consumer costs.[37] But the magnitude of this potential benefit is completely unknown at this point, and the ANOPR does not present any data to make that determination.

Thus, Cooperatives and Public Power agree with the ANOPR's preliminary finding that "certain transparency reforms are necessary to ensure accurate transmission line ratings."[38] But transparency reforms are needed not only to determine where congestion is occurring in non-RTO/ISO regions—the problem the ANOPR identifies—but also to determine the scope of any proposed DLR requirements and to ensure just and reasonable non-discriminatory implementation of any such requirements, an issue addressed in Part II.D below.

B. The Commission should allow the industry to implement Order No. 881's AAR requirements and evaluate their effectiveness before proposing DLR requirements.

Full compliance with Order No. 881 is not generally required until July 12, 2025. The Commission should allow the industry to implement and gain experience with Order No. 881's requirements for AARs before the Commission decides whether DLR requirements are necessary to ensure just and reasonable wholesale rates.

[37] *Id.* at P 75.

[38] *Id.* at P 78.

How can the Commission sustain a finding that the AAR requirements of Order No. 881 will result in unjust and unreasonable wholesale rates before those requirements are implemented and their effectiveness is evaluated? Order No. 881's AAR requirements will change dispatch and congestion patterns and thus change the baseline against which further transmission line rating reforms must be measured. Indeed, such dispatch changes are the very mechanism by which the Commission expects Order No. 881 to reduce wholesale energy rates and benefit consumers. As the Commission stated in Order Nos. 881-A, "AAR implementation itself will affect congestion patterns, as changes to transmission line ratings may change generation dispatch patterns and, by extension, congestion patterns."[39] Thus, only post-Order No. 881 congestion patterns will give a reliable picture of the potential cost savings that DLR requirements might produce.

In the ANOPR, the Commission notes that "[m]ost commenters argue that the Commission should not require implementation of any DLR requirements until after transmission providers have implemented AARs in July 2025 and gained experience with the use of AARs."[40] The Commission states that its preliminary proposal for a phased-in implementation of a wind requirement "is intended to reflect the importance of having adequate data for the purpose of identifying transmission lines where the wind requirement would be implemented, particularly in light of the likely changing congestion patterns after the implementation of Order No. 881."[41] But Cooperative and Public Power submit that the Commission cannot sustain a finding that Order No. 881

[39] Order No. 881-A at P 16 (citing Order No. 881 at P 95).

[40] ANOPR at P 176.

[41] *Id.*

will produce unjust and unreasonable wholesale rates until the Commission has obtained data on these changing congestion patterns and can assess whether they represent unjust and unreasonable rates.

Thus, the statutory requirements laid on the Commission mean the Commission should wait until Order No. 881 has been implemented and the Commission obtains adequate data—at least two or three years would seem to be necessary once full nationwide compliance has been achieved—before it can determine whether post-Order No. 881 wholesale rates are unjust and unreasonable and that DLR implementation is necessary for just and reasonable rates. The ANOPR's preliminary findings are thus ineluctably premature.

C. The Commission should prioritize safety and reliability of service, not uncertain marginal efficiency gains.

Finally, Cooperatives and Public Power reiterate the position in their comments in the Order No. 881 rulemaking and on the Commission's subsequent NOI that improvements in managing transmission line ratings are a means to an end—consumer benefits in the form of lower costs and improved service. The Commission's responsibility is not the elusive pursuit of perfect market efficiency but rather to ensure adequate, safe, and reliable electric service at just and reasonable rates.[42]

DLR requirements would be appropriate only if they will reduce the cost of delivered power to load-serving entities and end-use consumers while improving, or at least maintaining, the safety and reliability of facilities and service. Cooperatives and

[42] *See NAACP v. FPC*, 425 U.S. 662, 669–70 (1976) ("In the case of the [Federal] Power and [Natural] Gas Acts it is clear that the principal purpose of those Acts was to encourage the orderly development of plentiful supplies of electricity and natural gas at reasonable prices.").

Public Power do not oppose DLR implementation where there are consumer benefits to be gained without adversely affecting safety and reliability. But safety and reliability should remain the foremost consideration and should not be placed at risk in the hope of achieving marginal operating or market efficiencies.

As noted above, Cooperatives and Public Power members believe the principal benefits of DLRs are in the operational horizon, not in the planning horizon. Although the common purpose of the operating and planning horizons is to maintain system reliability, they use different assumptions. The operating horizon's goal is to maintain reliability for every moment in time, utilizing inputs based on real-time system conditions (*e.g.*, hundreds of concurrent outages, variable loads, variable generation outputs, etc.). The planning horizon's goal is to maintain reliability during the more extreme and stressful, but plausible, times of the year based on NERC planning criteria (e.g., a limited number of system outages, defined loads, defined generation outputs, etc.). Thus, the planning horizon provides time to act when the most limiting threshold condition is at risk, while the operating horizon is used to manage all conditions up to the limiting threshold.

The basic intent of DLRs is to squeeze more capability out of a transmission line by accounting for real-time conditions that may be more favorable (e.g., lower ambient temperature, higher wind speed, lower sun exposure, etc.) than the conditions used when designing a line (e.g., summer heat, low wind, direct sun exposure). However, if a line is not at risk of nearing or exceeding its design limit, then there is no need for additional capability and no value (consumer benefit) to using DLRs. Therefore, DLRs should only be used on lines that are at risk of being congested or constrained, and only when conditions allow for increased capability by using DLRs. Once a limiting condition

occurs, the line's capability is reached and DLR will not provide any additional capability. At that point, a line upgrade is required.

Thus, even with the implementation of DLRs, transmission facilities must continue to operate with an adequate safety and reliability margin that accounts for unanticipated conditions and human error. The widespread use of DLRs could well reduce this safety and reliability margin and require transmission providers to operate their systems closer to the edge and in a state of increased risk—while incurring additional costs to implement the DLRs (including additional equipment and personnel) with little to no discernable benefit.

In all events, however, any DLR requirements must be established and implemented consistent with public safety and ensure that the BES is operated in compliance with NERC Reliability Standards—including Critical Infrastructure Protection (CIP) Standards, given the physical and cybersecurity risks posed by DLR sensors and telemetry equipment. Cooperatives and Public Power understand that Registered Entities implementing AARs and DLRs already have the ability to establish new maximum line ratings under NERC Reliability Standard FAC-008-5. But if DLR requirements require changes to NERC Reliability Standards, the Commission should not implement the DLR requirements before the necessary revisions to the Reliability Standards are developed by NERC, approved by the Commission, and implemented by Registered Entities.

The cost of reliability problems resulting from too aggressive, misunderstood or miscommunicated transmission line ratings could be considerable—orders of magnitude greater than the incremental economic benefits of DLR implementation. One major

blackout may negate many years of marginal congestion savings.[43] The Commission should prioritize safety and reliability of service over the potential efficiency gains described in the ANOPR.

II. Potential Transmission Line Rating Reforms

While Cooperatives and Public Power believe that it is premature for the Commission to consider DLR requirements at this time, they will respond to some of the questions posed in the ANOPR concerning potential line rating reforms.

A. Potential Solar Requirement

The ANOPR's potential solar requirement would apply to all transmission lines and all requests for near-term transmission service under the existing Attachment M to the *pro forma* OATT (i.e., ending not more than 10 days after the request).[44] The potential requirement would reflect solar heating based on the sun's position and "up-to-date forecasts of forecastable cloud cover," subject to certain exceptions.[45] The potential solar requirement would be applied to near-term service "because the requirement effectively would subsume the daytime/nighttime solar heating requirement set forth in Order No. 881 …."[46]

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[43] Estimates of the cost in the United States of the August 2003 blackout range from $4 to $10 billion (in then-current dollars). *See* U.S.–Canada Power System Outage Task Force, Final Report of the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations (April 2004) (citing Electric Consumer Research Council, The Economic Impacts of the August 2003 Blackout (Feb. 2, 2004)), available at https://www.energy.gov/sites/prod/files/oeprod/DocumentsandMedia/BlackoutFinal-Web.pdf.

[44] ANOPR at PP 81, 83–84.

[45] *Id.* at P 83

[46] *Id.* at P 84.

If the Commission were to formally propose the ANOPR's potential solar requirement, Cooperatives and Public Power believe that the proposal should continue to be limited to near-term transmission service as defined in the currently effective Attachment M and should not be applied to longer duration service.

Under the ANOPR, transmission providers would continue to have the ability, provided in the currently effective Attachment M of the *pro forma* OATT, to take a "self-exception" to the potential solar requirement "for transmission lines for which the technical transfer capability of the limiting conductors and/or limiting transmission equipment is not dependent on solar heating, and for transmission lines whose transfer capability is limited by a transmission system limit that is not dependent on solar heating."[47] If the Commission were to formally propose the ANOPR's potential solar requirement, Cooperatives and Public Power believe the Commission should include the ANOPR's preliminary proposal to continue the "self-exception" process in the currently effective Attachment M under a potential solar requirement (for example, if a transmission line rating is not affected by solar heating because it is underground).[48]

1. Reflecting Solar Heating Based on Sun's Position

The potential solar requirement would require DLRs to reflect solar heating based on the sun's position for the relevant geographic location, date, and hour under a clear sky.[49] While not unreasonable on its face, this requirement is premature and unsupported. Order No. 881 requires AARs to account for solar heating by reflecting the lack of solar

[47] *Id. See also* Order No. 881, 177 FERC ¶ 61,179 at P 227.

[48] *See* ANOPR at P 84.

[49] *Id.* at P 85. It is unclear whether these factors, including "geographic location" and "clear sky," would permit solar heating to account for shading by topographic features (such as mountains or trees) or by artificial structures such as buildings.

heating in nighttime AARs (with sunrise/sunset times updated at least monthly).[50] Hourly clear-sky solar heating values would seem to be more precise than the simpler Order No. 881 daytime/nighttime calculation; but the Commission certainly has not shown that the added precision would be worth the added complexity and cost.

In Order No. 881, the Commission considered that very alternative but, "to balance the benefits and burdens," rejected it.[51] In the ANOPR, the Commission revisits the matter and preliminarily finds that "the benefits of more accurate transmission line ratings that reflect solar heating based on the sun's position are significant" and that "[t]his is particularly true during the hours right after sunrise and right before sunset—hours with relatively little solar heating."[52] The Commission notes that demand often peaks in the hours just before sunset and finds that "assuming midday solar heating during these hours may understate the amount of transfer capability available and increase the costs and challenges of reliably meeting peak demand."[53] The ANOPR cites modelling by the Commission and NOAA staff finding that "hourly clear-sky solar heating increased transmission line ratings (relative to the daytime/nighttime approach) in each of the four hours immediately after sunrise and before sunset by 4% to 12%."[54] But the ANOPR presents no estimate of the consumers savings from this potential requirement, and thus Cooperatives and Public Power do not see a basis for concluding that the Order No. 881 approach will produce unjust and unreasonable rates.

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[50] *See* Order No. 881 177 FERC ¶ 61,179 at PP 147–149.

[51] *Id.* at P 150. *See* ANOPR at P 86.

[52] ANOPR at P 87.

[53] *Id.*

[54] *Id.* at P 88.

2. Reflecting Solar Heating Based on Forecastable Cloud Cover

The ANOPR also presents no data to assess the incremental consumer benefits when hourly solar position is combined with hourly "up-to-date forecasts of forecastable cloud cover."[55] Thus, it is difficult to determine whether including forecasted cloud cover is worth the additional compliance cost and burden.

Even if "forecastable," cloud cover is inherently unpredictable and subject to forecast error. Including this variable in transmission line ratings will have uncertain economic benefits, at best, and clear safety and reliability risks.

Moreover, the ANOPR's definition of "forecastable cloud cover" is circular and subjective: "cloud cover that is reasonably determined, in accordance with good utility practice, to be forecastable to a sufficient level of confidence to be reflected in transmission line ratings."[56] The difficulty of accounting for the effect of cloud cover is underscored by the fact that the IEEE 738 standard for calculating the current-temperature relationship of bare overhead conductors accounts for solar heating relative to the sun's position, but it does not include (and commenters do not know of another industry formula that does) a way to measure the cooling effects to a transmission line from forecastable cloud cover.

B. Potential Wind Requirement

The ANOPR's potential wind requirement would require DLRs to account for wind speed and wind direction over a 48-hour time horizon.[57] But it would apply only to

[55] *Id.* at P 91.

[56] *Id.* at PP 92, 114–139.

[57] *Id.* at PP 99, 101–106.

certain transmission lines, not all jurisdictional lines.[58] The ANOPR preliminarily proposes to allow transmission providers to phase-in the implementation of the wind requirement over time[59] and to apply the wind requirement only to lines that meet both wind speed and congestion thresholds.[60]

For the reasons already stated, Cooperatives and Public Power believe that the ANOPR's potential wind requirement is premature and unsupported. The Commission should allow the industry to implement AARs as required by Order No. 881 before considering whether DLR requirements, including a potential wind requirement, is necessary to ensure just and reasonable rates.

That said, if the Commission were to formally propose a potential DLR wind requirement like that outlined in the ANOPR, Cooperatives and Public Power strongly agree with the Commission's determination in the ANOPR that such a wind requirement should not be applied to all jurisdictional transmission lines.[61] Cooperatives and Public Power believe that any such potential wind requirement should be applied only to transmission facilities where the requirement would be likely to produce net benefits to consumers in the form of lower costs while maintaining the safety and reliability of service. The costs of an across-the-board wind requirement for all transmission lines likely would exceed the benefits and thus would not result in net benefits for consumers. As described below, Cooperatives and Public Power believe that in addition to the

[58] *Id.* at PP 97, 114.

[59] *Id.* at PP 115–117.

[60] *Id.* at PP 118–139.

[61] *See id.* at P 114.

ANOPR's preliminary wind-speed and congestion threshold proposals, any potential wind requirement should be limited to BES transmission elements.

Moreover, if the Commission were to formally propose the ANOPR's potential wind requirement, Cooperatives and Public Power believe that the proposal should not extend beyond the 48 hours preliminarily proposed in the ANOPR.[62]

The Commission preliminarily proposes to require transmission providers to install sensors to measure wind speed and direction on lines subject to the proposed wind requirement.[63] Cooperatives and Public Power believe that the Commission should allow transmission providers to determine what sensors, if any, are required for a particular line. Detailed sensor requirements are unnecessary and would likely impose unnecessary costs on consumers. It may not be cost-effective to obtain the most precisely available wind speed and direction information for every subject line. For example, on a short line that runs in only one direction, a sensor may make sense; but on a longer line or one that changes direction, the limiting line section may shift throughout the day, installing multiple sensors may not provide much more useful information on the line's appropriate rating than simply averaging the forecasted wind speed over the entire line.

Given the complexity and cost of implementing a sensor-based wind requirement, Cooperatives and Public Power agree that implementation of any such requirement should be phased in over time.

Moreover, sensor requirements, line thresholds, and phase-in procedures for a potential wind requirement should be flexible enough to work fairly for all transmission

[62] *See id.* at PP 101, 103.

[63] *Id.* at P 107.

providers, whether large or small, urban or rural, and RTO/ISO or traditional vertically integrated transmission providers.

In addition, transmission providers' line thresholds and phase-in procedures must be applied on a non-discriminatory basis, and the Commission should consider what transparency and enforcement procedures may be necessary to deter and identify discriminatory treatment of different OATT customers, resources, and loads. (Cooperatives and Public Power comment below on the Commission's preliminary phase-in and transparency proposals.)

Cooperatives and Public Power also strongly believe that any potential wind requirement should incorporate the self-exception process and the Reliability Safety section in the currently effective Attachment M to the *pro forma* OATT.

1. Number of transmission lines subject to wind requirement

The ANOPR preliminarily proposes that transmission providers implement the requirement annually on at least 0.25% (1/400) of all their transmission lines—not just the lines meeting the proposed wind-speed and congestion thresholds—rounded up to the next whole number.[64] For this purpose, the Commission preliminarily proposes "to define a single transmission line as the transmission conductor that runs between its substation or switchyard start and end points (e.g., dead-end structures). Other transmission facilities and equipment, such as circuit breakers, line traps, and transformers, would not count toward the transmission provider's total number of transmission lines."[65]

[64] *Id.* at P 115.

[65] *Id.* at P 116.

Cooperatives and Public Power believe that, to treat large and small transmission providers fairly, a phased-in implementation should be based on a proportion of transmission elements rather than number of transmission elements. In this respect, Cooperatives and Public Power agree with the ANOPR's preliminary phase-in proposal. (A requirement to implement DLRs on a set number of transmission lines would disproportionately burden transmission-owning cooperatives, which generally own transmission lines that are longer and have lower customer densities than do other sectors of the industry.)

At the same time, however, the ANOPR is unclear as to the basis for the proposed 0.25% annual number, how many "single transmission lines" that would cover, and what such a phased-in implementation would mean in terms of the likely compliance costs and consumer benefits.

More importantly, to fairly impose the compliance burden, a phase-in of a wind requirement should be based on the proportion of the transmission provider's lines meeting the proposed wind-speed and congestion thresholds and not subject to a self-exception, not a proportion of all of its lines as the ANOPR proposes. Determining which lines meet the thresholds and which should be subject to self-exception is itself part of the implementation process and the compliance burden. A small transmission provider may have designed its transmission system with plenty of headroom so that it has few lines meeting the thresholds. Or it may have lines subject to self-exception because their rating is due to factors other than thermal limits affected by the wind. Such a prescient transmission provider should not be disadvantaged by having to accelerate the implementation of the wind requirement (and incur the start-up costs for hardware,

software, and additional personnel) because it has few lines subject to the wind requirement would even apply.

Finally, public utility transmission providers must conduct such phased-in implementation on a non-discriminatory basis. For example, a transmission owner should not selectively implement DLRs to relieve constraints in load pockets where the transmission owner has load but no local generation, while selectively failing to implement DLRs for comparable load pockets where it has local generation or where it has little or no load.

2. Wind-speed threshold

The ANOPR's preliminary wind-speed threshold would be that at least 75% of the length of the transmission line would be located in areas with historical average wind speeds of at least 3 meters/second (6.7 miles/hour).[66] But the ANOPR is unclear about the basis for this proposal and what it would mean in terms of the number or proportion of affected transmission lines, compliance costs, and consumer benefits. If the Commission formally proposes a wind-speed threshold, it should make available the assumptions and data on which its proposal is based and the likely impact the threshold would have on the published data.

3. Congestion threshold

Cooperatives and Public Power members believe that, generally speaking, limiting DLR implementation to congested, high-voltage lines is more likely to produce net consumer benefits. Mitigating congestion is the primary benefit associated with DLRs; this benefit will not occur from DLRs implemented on lines that experience only

[66] *Id.* at P 118.

temporary or small amounts of congestion associated with an outage event. Thus, Cooperatives and Public Power agree with the Commission that a congestion threshold is appropriate in any potential DLR wind requirement.

In RTO/ISO regions, the ANOPR preliminarily proposes that it be based on congestion costs in the regional energy markets administrated by the RTO/ISO, although the Commission acknowledges it has a limited record and does not propose a specific number.[67] If the Commission were to propose a potential wind requirement embodying a congestion threshold, Cooperatives and Public Power believe that each RTO/ISO should be given the flexibility to develop a proposed congestion threshold in consultation with its stakeholders and propose this threshold in a compliance filing. A one-size-fits-all threshold would not be appropriate for all regions given the differences in topography, transmission-grid topology, market designs, and resources and loads.

Moreover, it may be appropriate to require a periodic re-evaluation and re-setting of the congestion threshold after a reasonable period of some years.

The ANOPR's preliminary proposal for a congestion threshold for non-RTO/ISO regions, however, is much more complicated and problematic. In non-RTO/ISO regions, the ANOPR preliminarily proposes a brand new proxy measure called the Limiting Element Rate (LER), expressed as an average megawatt-hour/year rate of adverse impacts on transmission service where the line's thermal rating is the limiting element.[68] In order to implement this proposal, the ANOPR also contains preliminary proposals for

[67] *Id.* at PP 123–127.

[68] *Id.* at P 128.

defining certain "triggering events," for collecting data on these events, and then developing the LER congestion threshold.[69]

The Commission notes that the data requirements to implement this part of its preliminary proposal would be aided by the full implementation of AARs pursuant to Order No. 881.[70] The Commission is correct on that point. But the present lack of reliable congestion data in non-RTO/ISO regions is not just an implementation issue, but is also an indication that the entire ANOPR is premature at this time. Simply put, the Commission is not in a position at this time to determine whether the congestion remaining after implementation of Order No. 881 will require the further transmission line rating reforms preliminarily proposed in the ANOPR. By focusing on the need for data to implement the ANOPR's preliminary proposal, rather than need for data to determine whether the proposal is needed and how it should be fashioned, the ANOPR puts the cart before horse.

4. Additional BES threshold

As noted earlier, Cooperatives and Public Power members generally believe that limiting DLR implementation to congested, *high-voltage* lines is more likely to produce net consumer benefits. Implementing these advanced technologies on lower-voltage facilities is far less likely to produce net economic benefits, while at the same time increasing these facilities' operating risks and the risks to safe, reliable electric service.

In the comments in Docket No. RM20-16-000, NRECA and LPPC recommended that the Commission limit the proposed AAR requirements to transmission lines that are

[69] *Id.* at PP 129–139.

[70] *See id.* at P 176.

BES Transmission Elements operated at 100 kV or higher. The purpose of this proposed limitation was to improve the expected cost-benefit ratio of the final rule and eliminate undue compliance burdens.[71] A voltage threshold at this level (or initially even higher in the case of DLRs) would serve the same purpose when applied to DLR implementation.

The Commission declined to impose a voltage threshold for AAR implementation in Order No. 881, finding that comments had "not explained why transmission line ratings from lower voltage transmission facilities cannot be rate using AARs" and the same principles apply to AARs regardless of voltage.[72] Given the substantially greater implementation costs of a potential wind requirement, however, the balance of potential benefits and burdens weighs in favor of imposing a BES voltage threshold.

Applying the potential DLR wind requirement to lower voltage transmission lines would be likely to greatly increase the compliance burden without much additional benefit. Compliance costs are likely to greatly increase when DLRs are implemented on all transmission lines rather than only on BES Transmission Elements. One of NRECA's member G&T cooperatives reported that its preliminary calculations indicate that both the initial sensor costs and the yearly operating costs of implementing DLRs on all its transmission lines 69 kV and above would be more than triple the costs of implementing DLRs only on its BES transmission lines. NRECA does not have any reason to believe these numbers are atypical.

If non-BES lines are potentially subject to the wind requirement, then the Commission should provide an exemption for smaller transmission owners that have less

[71] NRECA/LPPC RM20-16 Comments at 17.

[72] Order No. 881 at P 231.

than 20 transmission lines, less than 200 line-miles, or have no historically congested transmission facilities. If such a small transmission provider/owner exemption is not provided up front, then the Commission should allow such small transmission providers/owners to take self-exceptions to effectively achieve this result on a case-by-case basis.

5. Self-exceptions

The ANOPR proposes two self-exceptions from the wind requirement—for lines that are not affected by wind speed and for lines where applying the wind requirement does not produce net benefits in light of the costs and burdens.[73] Transmission providers would have to document and post on OASIS or other protected website any such exceptions taken, and they would have to re-evaluate and re-log them every year during the proposed annual wind requirement implementation cycles.[74] These self-exceptions could be challenged by filing a complaint pursuant to FPA section 206.[75]

Cooperatives and Public Power believe that these two self-exceptions, including an ability to audit and challenge them, should be incorporated in any potential wind requirement. The Commission should provide a mechanism to allow a transmission provider to obtain a waiver of the wind requirement for a particular line or circuit where DLR implementation is particularly challenging or costly and the commensurate benefits are likely to be limited. For instance, it may be difficult and costly to implement DLRs on long, rural transmission lines. Where a transmission provider can document unusual

[73] ANOPR at PP 143–144.

[74] *Id.* at PP 145, 147.

[75] *Id.* at P 149.

challenges and the lack of offsetting benefits, the Commission should provide a means to obtain a waiver of the wind requirement.

Similarly, Cooperatives and Public Power also believe that a transmission provider should have the ability to take a self-exception for a particular line or circuit where the transmission provider can document that DLR implementation poses a distinct risk to public safety or reliability. For example, a self-exception may be appropriate in connection with older transmission lines that may have annealed or degraded so that it would impose an undue safety or reliability risk to implement the wind requirement on them due to additional annealing beyond minimum clearance requirements.

The ANOPR preliminarily proposes that a self-exception may be challenged by filing a section 206 complaint with the Commission. In RTO/ISO regions, there may be dispute-resolution procedures that could be employed short of filing a complaint with the Commission, but the right to file a complaint is appropriate. In non-RTO/ISO regions, contacting the Commission's enforcement hotline and filing a section 206 complaint would appear to be appropriate means to challenge a self-exception; however, there is no distinct time-frame for resolution to such complaint.

6. Lines formerly subject to the wind requirement

The Commission preliminarily proposes that there would be a process to "decommission" lines where the wind requirement no longer should apply.[76] Cooperatives and Public Power believe that such a process is reasonable, again provided that the decisions are made transparently and on a non-discriminatory basis.

[76] *Id.* at P 150.

7. Transparency proposals related to the wind requirement

Cooperatives and Public Power support the ANOPR's preliminary proposals for transparency requirements associated with implementing the potential wind requirement for RTO/ISO and non-RTO/ISO regions.[77]

C. Attachment M's Safety Reliability section

In Order No. 881, the Commission adopted a "Safety Reliability" section of *pro forma* OATT Attachment M, which permits a transmission provider to use a temporary alternative rating (in place of what would otherwise be required by Attachment M) if the transmission provider reasonably determines such an alternative rating is necessary to ensure the safety and reliability of the transmission system.[78] This mechanism "provides transmission owners with the flexibility to ensure reliability and safety."[79]

In the ANOPR, the Commission preliminary proposes that the Reliability Safety section in Attachment M to the *pro forma* OATT would be preserved to allow a different, temporary rating to be used to preserve reliability.[80] Cooperatives and Public Power support including the Reliability Safety section if the Commission formally proposes DLR requirements like those outlined in the ANOPR. As noted above, safety and reliability should remain the foremost consideration and should not be traded for uncertain marginal operating or market efficiencies. Any DLR requirements should allow

[77] *See id.* at PP 151–159.

[78] Order No. 881, 177 FERC ¶ 61,179 at P 228 (adopting exception that "will allow a transmission provider to temporarily use a transmission line rating different than would otherwise be required under *pro forma* OATT Attachment M in instances when the transmission provider reasonably determines, consistent with good utility practice, that the use of such a temporary alternate rating is necessary to ensure the safety and reliability of the transmission system").

[79] Order No. 881-A, at P 19.

[80] ANOPR at P 148.

a transmission provider temporarily to use a transmission line rating other than a DLR when necessary to ensure the safety and reliability of the transmission system.

D. Additional transparency and data issues

The Commission should consider obtaining better data on public utility transmission providers' existing DLR practices before proposing further reforms. This information will be important in determining the scope of any remedial action the Commission may decide to formally propose with respect to DLRs pursuant to FPA section 206 in this docket.

At present, there is little transparency about public utility transmission providers' and transmission owners' existing DLR practices, making it difficult to determine whether those practices are unjust, unreasonable, unduly discriminatory or preferential and, if so, what remedies are appropriate. In Order No. 881, the Commission required transmission providers to maintain a database of their transmission owners' transmission line ratings and methodologies on the password-protected section of their OASIS site or other password-protected website—a requirement that also applies to voluntarily implemented DLRs as well as the mandatory AARs and seasonal line ratings.[81] The information gained from this requirement may assist the public and the Commission in assessing whether existing DLR deployment by public utility transmission providers is proceeding on a just and reasonable and nondiscriminatory basis at this time.

[81] See Order No. 881 at P 339 ("Finally, while we are not requiring implementation of DLRs at this time, we note that if a transmission provider implements DLRs on any of its transmission lines, then under this requirement it would document the DLR ratings on such transmission lines in the same way that it documents its AAR ratings, as discussed above.

Moreover, if the Commission were to formally propose DLR requirements like the preliminary proposals in the ANOPR, the Commission should consider whether to include additional transparency provisions to ensure that any DLR requirements, including a phased-in implementation and self-exceptions, are implemented on a just and reasonable and non-discriminatory basis.

Conclusion

The Commission should not propose additional DLR requirements as outlined in the ANOPR at this time. The Commission should allow the industry to implement Order No. 881's AAR and related requirements and gather the necessary information to determine whether additional requirements related to DLRs are necessary to ensure just and reasonable rates. The Commission should maintain a focus on safe, reliable, and affordable electric service to consumers and should not trade public safety or reliability for uncertain consumer benefits from conjectural improvements in economic efficiency.

Respectfully submitted,

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