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BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reliability Technical Conference	)	AD23-9-000

COMMENTS OF THE AMERICAN COUNCIL ON RENEWABLE ENERGY

The American Council on Renewable Energy ("ACORE"), a national nonprofit organization dedicated to advancing the critical importance of renewable energy and to advocating for the market structures, policies and financial innovations designed to advance renewable energy deployment, hereby submits these comments in response to the Federal Energy Regulatory Commission's ("FERC" or "Commission") *Notice Inviting Post-Technical Conference Comments*, issued on November 14, 2023 ("Notice").

I Overview

These comments address a subset of the questions in first topic area, *State of Bulk Power System Reliability with a Focus on the Changing Resource Mix and Resource Adequacy*, beginning with the following introductory questions:

What should the Commission's top reliability priorities be for the next one to three years? What are potential actions the Commission could take to improve reliability regarding these priorities?

The critical role that transmission plays in ensuring reliability cannot be overstated. ACORE agrees with those panelists at the Reliability Technical Conference who addressed the need for transmission. Pam Sporberg from Portland General Electric pointed out that "[w]hile many of the challenges facing the grid are new, transmission's role in ensuring reliability is

not."[1] Ms. Sporberg further stated that transmission is "a key dimension of resource adequacy—not to supplant generation, but rather to ensure access to a wide range of resources, in order to leverage load diversity, access resource diversity, and leverage weather diversity."[2]

Although many transmission projects take longer than the one-to-three-year time frame referenced in this question, there are actions the Commission can take in the near term to lay the essential groundwork for the needed transmission buildout. Ric O'Connell of GridLab identified requiring improved long-term regional transmission planning and establishing a minimum transfer capacity standard as two of the steps the Commission can take to ensure reliability.[3] The important role of transmission was also highlighted in the comments of Robert W. Bradish from American Electric Power and Joseph Goffman from the Environmental Protection Agency.

The important role of transmission, and especially interregional transmission, in ensuring reliability and grid resilience was further confirmed in a December 5 webinar hosted by ACORE in which Jonathon Monken, a principal at Converge Strategies and Thomas Coleman, executive director of SAFE's Grid Security Project both emphasized the threats to defense and national security resulting from the potential for power outages resulting from extreme weather, and the critical role of transmission in mitigating those reliability risks.[4]

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[1] Statement Of Pam Sporborg, Director of Transmission and Market Services, Portland General Electric, Company, at 1, https://ferc.gov/media/pam-sporberg-comments.

[2] *Id.* at 6.

[3] Prepared Statement of Ric O'Connell, Executive Director, GridLab at 2, https://ferc.gov/media/ric-oconnell-executive-director-gridlab.

[4] See for example, Robert Walton, *As US defense facilities face rising outage risks, regional transmission could help: ACORE panel*, Utility Dive (Dec. 6, 2023), https://www.utilitydive.com/news/grid-reliability-issues-threaten-national-defense/701674/.

Another near-term priority would be for the Commission to use its authority to expand and accelerate the use of both Grid Enhancing Technologies (GETs) and high-performance conductors to achieve shorter term and cost-effective expansions to the capacity and the resilience of the existing and future grid and are an essential part of future planning efforts. For example, the Commission should advance rulemakings in its Notice of Inquiry on the Implementation of Dynamic Line Ratings (Docket No. AD22-5) and the proposed implementation of shared savings incentives (Docket Nos. RM20-10 and AD19-19), among other actions.

The important role of GETs is described in a September multi-party letter to the Commission, as follows:

> Bringing GETs (Advanced Power Flow Control, Topology Optimization, and Dynamic Line Ratings) into common practice in the United States will save transmission owners, ratepayers, and generators millions or even billions of dollars every year, supporting the Commission's mandate to ensure just and reasonable rates. Studies by the Brattle Group, the U.S. Department of Energy and national laboratories, and utilities around the world demonstrate capacity increases of up to 40% and payback periods of weeks or months.[5]

Moreover, a recent white paper demonstrates the beneficial role of GETs in expanding transmission capacity before, during and after the construction of new transmission.[6] The use of GETs also improves the resilience of the grid, because these technologies, "especially DLR systems, will naturally increase the situational awareness of the weather and asset conditions by location at a much more granular level than is currently available" and "some GETs provide

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[5] WATT Coalition, et al., *September 20 2023 Letter to FERC on Grid Enhancing Technologies*, (footnotes removed), https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230920-5083&optimized=false.

[6] T. Bruce Tsuchida, et al., *Building a Better Grid: How Grid-Enhancing Technologies Complement Transmission Buildouts*, Brattle Group (April 20, 2023), https://watt-transmission.org/wp-content/uploads/2023/04/Building-a-Better-Grid-How-Grid-Enhancing-Technologies-Complement-Transmission-Buildouts.pdf.

means to control the flow for purposes exclusively to address extreme conditions, providing resiliency benefits."[7]

Reconductoring or rebuilding with high-performance conductors can also allow for a significant expansion of transmission. A recent analysis by the University of California-Berkeley and GridLab found that "reconductoring enables nearly four times as much transmission capacity to be added at only slightly higher total transmission cost because it circumvents the extensive planning and permitting processes that impede new lines which require new ROW and cross regional boundaries."[8] Including superconductors in the study would have enabled an even greater increase of transmission capacity, given that the maximum current-carrying capacity of superconductors is up to ten times that of conventional conductors.[9] Moreover, Grid Strategies found that advanced conductors can improve the resilience of the transmission system because they "have much higher loading limits compared to traditional conductors which could accommodate critically important transfers from one or two systems away. The bottlenecks to large interregional transfers can easily be identified in reliability analyses to identify candidate lines where incremental capacity associated with high-performance conductors can mitigate load loss and support rapid restoration if necessary."[10]

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[7] *Id.* at 25.

[8] Chojkiewicz, Emilia, et al, *Accelerating Transmission Expansion by Using Advanced Conductors in Existing Right-of-Way*, (Nov. 2023) at 7-8, https://haas.berkeley.edu/energy-institute/research/abstracts/wp-343/

[9] *Advanced Transmission Technologies*, US Department of Energy (Dec. 2020) at 26, https://www.energy.gov/sites/default/files/2021/03/f83/Advanced%20Transmission%20Technologies%20Report%20-%20final%20as%20of%2012.3%20-%20FOR%20PUBLIC_0.pdf

[10] Jay Caspary and Jesse Schneider, *Advanced Conductors on Existing Transmission Corridors to Accelerate Low Cost Decarbonization*, Grid Strategies, LLC, prepared for the American Council on Renewable Energy (March 2022), at 9, https://acore.org/wp-content/uploads/2022/03/Advanced_Conductors_to_Accelerate_Grid_Decarbonization.pdf

ACORE therefore recommends that the Commission issue a strong final transmission planning rule that includes (1) a prescribed set of benefits that include the full value of transmission, including during extreme weather and other causes of system stress; (2) a mechanism to determine a cost allocation method when the states are unable to agree; (3) the use of long-term scenarios that plan for the energy mix and demand of the future, including scenarios for a high energy demand and penetration of renewable resources; and (4) the incorporation of grid-enhancing technologies (GETs), high performance conductors and other technologies that increase delivery capacity over existing assets and rights of way.[11]

Because interregional transmission plays a critical role in reliability, we also further recommend that the Commission issue a proposed rulemaking or rulemakings on a minimum transfer capability standard and a more robust interregional transmission planning process.[12]

ACORE also agrees with Mr. O'Connell's additional recommendation for a technical conference to develop consistent capacity accreditation of all resources, as proposed by the American Clean Power Association.[13] As extreme weather events become more commonplace, the availability of generating resources has become more uncertain – largely due to unplanned outages that are correlated with extreme weather.

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[11] ACORE Letter to FERC on Transmission Planning Rule, Docket RM21-17 (Dec. 13, 2023), https://acore.org/resources/acore-letter-to-ferc-on-transmission-planning-rule/

[12] Comments of the American Council On Renewable Energy**,** Establishing Interregional Transfer Capability, Transmission Planning and Cost Allocation Requirements, Docket AD23-3, (May 15, 2023), https://acore.org/resources/acore-comments-to-ferc-on-interregional-transmission/

[13] Petition of the American Clean Power Association for Technical Conference on Capacity Accreditation, Docket AD23-10 (Aug. 22, 2023), https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230822-5183&optimized=false; Comments of the American Council on Renewable Energy, Docket AD23-10 (Oct. 2, 2023), https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20231002-5347&optimized=false

II Responses to Specific Questions

a) What trends and risks identified in NERC's 2023 State of Reliability Report and the 2023 ERO Reliability Risk Priorities Report warrant the most attention and effort?

A key finding of NERC's 2023 State of Reliability (SOR) Report is that in 2022, "conventional generation experienced its highest level of unavailability (8.5%) overall since NERC began gathering GADS data in 2013."[14] NERC reports that those days with the highest severity risk index (SRI) "have shifted to days when generation unavailability and load loss occur simultaneously, such as during the February 2021 and December 2022 time periods. This suggests that generation capability during periods of extreme weather is now the greatest indicator of risk for the BES."[15] Further, the top eight SRI days "all occurred within the last two years, seven of which were due to cold-weather-related events."[16]

This trend of increasingly impactful extreme events and associated correlated outages necessitates larger, interregional transmission lines to ensure reliability. Such longer distance lines can balance the variability in resource availability and demand, while also increasing the use of renewable resources that are not as susceptible to extreme weather events and associated restrictions of fuel and water availability. This benefit of interregional transmission is demonstrated in a recent white paper by Grid Strategies that calculates the multiple benefits of interregional transmission between PJM Interconnection and the Midcontinent ISO, including a reduction in the total capacity need of 6,900 megawatts due to the ability of such transmission to capture the diversity in the output of renewable resources, patterns of demand and correlated

[14] 2023 NERC State of Reliability Technical Assessment (June 2023) at 3.

[15] *Ibid.*

[16] *Id.* at 15.

outages of conventional resources.[17] In particular, longer transmission lines greatly increase the value of renewable resources by balancing factors such as variations in wind speeds and time zone variation that impacts solar output.[18]

In its Winter Reliability Assessment, NERC observed that: "Wide-area events can also concurrently render multiple grid BA areas energy deficient and thus preclude an impacted BA from importing the electricity it requires to meet BA load even when transmission to support such transfers is available."[19] This finding further highlights the need for longer, interregional transmission lines that can access generation outside of the areas impacted by extreme events.

b) Resource adequacy traditionally has been characterized in terms of planning reserve margin, which assesses the excess generating capacity required to meet peak load. NERC and industry have recently been discussing the notion of energy adequacy, which assesses whether there is sufficient energy – power over time - to meet customers' energy needs. Is energy adequacy a more appropriate metric to characterize reliability risks given the changing grid?

The changing resource mix, increasingly frequent extreme events, and shifting demand patterns have all rendered the traditional peak load plus reserve margin insufficient to address resource adequacy measurement and planning. For example, a 2023 study by Lawrence Berkeley National Laboratory reports that:

> All studies and interviewees agreed that basing RA assessments on the peak hour of the year or season, or on a few select top load hours, is insufficient. The reasoning is that

[17] Michael Goggin and Zach Zimmerman, Billions In Benefits: A Path For Expanding Transmission Between MISO and PJM, Grid Strategies LLC, prepared for the American Council on Renewable Energy (Nov. 2023) at 8, https://acore.org/resources/billions-in-benefits-a-path-for-expanding-transmission-between-miso-and-pjm/.

[18] *Id.* at 7.

[19] 2023-2024 NERC Winter Reliability Assessment (Nov. 2023) at 10.

> peak demand may no longer predict the times when the power system is most stressed, as outages, load, and VRE production all depend on weather patterns.[20]

NERC also adopted this view in the 2023 ERO Reliability Risk Priorities Report:

> Recent extreme events show energy sufficiency to be a significant dimension of risk given the changing resource mix and actual performance of the grid versus assumptions used in previous assessments. It is now insufficient to assume that the system is adequately planned by comparing the peak load hours with the generation capacity."[21]

Measuring energy adequacy captures the ability of individual resources to perform when needed, given that their capacity value does not ensure generation output, which has become increasing uncertain. Determining energy adequacy should also include probabilistic planning that incorporates the possibility of extreme events and associated correlated outages, especially from conventional resources.

c) NERC has highlighted essential reliability services (e.g., frequency response, voltage control, and ramping capability) as core to maintaining reliable operation of the grid. How does the changing resource mix and characteristics of load affect the needed amount and provision of these essential reliability services? What actions, and by whom, are necessary to ensure adequate levels of these services?

A shift away from planning for peak capacity plus a reserve margin and towards ensuring the provision of energy and associated ancillary services should also be accompanied by efforts to improve the energy and ancillary service markets.

ACORE submitted comments in January, along with the American Clean Power Association and the Solar Energy Industries Association, in the Commission's docket on *Modernizing Wholesale Electricity Market Design.* These comments made several

[20] Juan Pablo Carvallo, et al, A Guide for Improved Resource Adequacy Assessments in Evolving Power Systems, Lawrence Berkeley National Laboratory (June 2023), at 13, https://eta-publications.lbl.gov/sites/default/files/ra_project_-_final.pdf.

[21] 2023 ERO Reliability Risk Priorities Report (Aug. 2023) at 24.

recommendations for improvements to the energy and ancillary services markets.[22] Central to these recommendations is to reduce out-of-market actions and in turn improve market signals, while ensuring that the market rules not reward resources for their inflexibility. Achieving this recommendation includes improving the accuracy of the minimum generation levels and ramp rates submitted by generators, allowing all resources capable of providing a product or service to do so and be fairly compensated, increasing price offer caps to better reflect reliability, allowing storage resources to manage their dispatch, permitting the inclusion of start-up and no-load costs in bids, and reducing capacity market over-procurement that dilutes energy price signals.

Non-discrimination is essential in the design of markets and requirements for the provision of essential reliability services. As these comments pointed out, renewable resources have the capability to power electronics that allow them to meet or exceed the ancillary services contributions of conventional generators. [23]

III. CONCLUSION

ACORE greatly appreciates the opportunity to submit comments on this technical conference and urges the Commission to move forward expeditiously on the recommended actions herein – especially steps to achieve sorely needed transmission expansion.

[22] Comments of Clean Energy Associations, Docket No. AD21-10 (January 18, 2023), https://acore.org/resources/clean-energy-associations-comments-on-energy-ancillary-service-markets/.

[23] See, for example: National Renewable Energy Laboratory, "Active Power Controls from Wind Power: Bridging the Gaps" (January 2014), available at: https://www.nrel.gov/docs/fy14osti/60574.pdf; National Renewable Energy Laboratory, "Demonstration of Essential Reliability Services by a 300-MW Solar Photovoltaic Power Plant" (March 2017), available at: https://www.nrel.gov/docs/fy17osti/67799.pdf.

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