UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reliability Standards to Address Inverter Based Resources	))	Docket No. RM22-12-000

COMMENTS OF THE EDISON ELECTRIC INSTITUTE, THE AMERICAN PUBLIC POWER ASSOCIATION, THE LARGE PUBLIC POWER COUNCIL, THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION, AND THE TRANSMISSION ACCESS POLICY STUDY GROUP

The Edison Electric Institute ("EEI"), the American Public Power Association ("APPA"), the Large Public Power Council ("LPPC"), the National Rural Electric Cooperative Association ("NRECA"), and the Transmission Access Policy Study Group ("TAPS") (collectively, "the Trade Associations") submit these comments in response to the Notice of Proposed Rulemaking issued by the Federal Energy Regulatory Commission ("FERC or "the Commission") on November 17, 2022, in the above-captioned docket ("the NOPR"). The NOPR proposes to direct the North American Electric Reliability Corporation ("NERC"), the Commission-certified Electric Reliability Organization ("ERO"), to develop new or modified Reliability Standards that address the following issues related to inverter-based resources ("IBRs"): data sharing; model validation; planning and operational studies; and performance requirements.

The Trade Associations agree with the Commission that new or revised standards are needed to manage the impact of the rapidly increasing presence of IBRs on the Bulk Electric System ("BES"). The Trade Associations recognize, as does the Commission, that the topics addressed in this NOPR are broad and impact issues within multiple jurisdictions, including those overseen by state and local retail regulators, and coordination among them is critical. Undoubtedly, there is a category of IBRs that should be subject to certain standards. Critical to

ensuring that the Reliability Standards properly apply to IBRs is identifying and registering the IBRs that have a material impact on the Bulk-Power System. In addition, because NERC and the industry have already been at work on a series of projects discussed below that are aimed at considering related new or revised standards, the Trade Associations ask the Commission to direct NERC to advance a work plan that addresses the scope of its ongoing related projects and discusses how each relates to the proposed directives advanced by FERC in the NOPR. The aim of this exercise would be to ensure that the directives ultimately associated with a final rule in this docket capitalize on and dovetail with the work in which NERC and the industry are already engaged.

The Trade Associations also ask the Commission to refrain from issuing a directive calling for distribution providers and transmission owners to collect and share data and model information supporting IBR-Distributed Energy Resources ("DERs") that they cannot reasonably obtain.[1] In the alternative, we ask that the Commission limit the obligations to be shouldered by distribution providers and transmission owners to what is feasible.

I. THE TRADE ASSOCIATIONS

EEI is the association that represents all U.S. investor-owned electric companies. EEI members provide electricity for about 235 million Americans and operate in all 50 states and the District of Columbia. Collectively, the electric power industry supports more than seven million jobs in communities across the United States. EEI's members are committed to providing affordable and reliable electricity to customers now and in the future. EEI and our member companies also are united in our commitment to get the energy we provide as clean as we can as fast as we can, without compromising on the reliability or affordability that our customers expect

[1] The NOPR describes IBR-DERs as those IBRs connected to the distribution system. NOPR at P 5 n.15.

and value. Since 2010, EEI's member companies have invested more than $1 trillion to build smarter energy infrastructure and to integrate new cleaner generation into the energy grid, including clean energy resources like IBRs. These investments are critical to helping protect the grid from extreme weather and cyberattacks; predict, mitigate, and prevent outages; and restore electricity faster when outages do occur. EEI members own and operate jurisdictional transmission facilities in all regions of the country and, as such, are directly impacted by and can provide a broad-based perspective on the issues raised in the NOPR. Thus, the issues raised in the NOPR are of vital importance to EEI and its members, and EEI appreciates the Commission's focus on these issues.

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. APPA utility members' primary goal is providing customers in the communities they serve with reliable electric power and energy at the lowest reasonable cost, consistent with good environmental stewardship. This orientation aligns the interests of APPA-member electric utilities with the long-term interests of the residents and businesses in their communities. Approximately 240 public power utilities are registered entities subject to compliance with mandatory NERC Reliability Standards.

LPPC represents 27 of the largest state and municipally owned utilities in the nation. LPPC's members are located throughout the nation, both within and outside the boundaries of RTOs and ISOs. The members comprise the larger, asset-owning utilities in the public power community, owning approximately 90 percent of the transmission assets owned by non-federal

public power entities.

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 power 1 in 8 Americans and serve as engines of economic development for 42 million Americans across 56 percent of the nation's landmass.

TAPS is an association of transmission-dependent utilities ("TDUs") in more than 35 states promoting open and non-discriminatory transmission access.[2] TAPS members have long recognized the importance of grid reliability. As TDUs, TAPS members are users of the Bulk-Power System and are highly reliant on the reliability of facilities owned and operated by others for the transmission service required to meet TAPS members' loads. In addition, many TAPS members participate in the development of and are subject to compliance with NERC reliability standards.

II. COMMENTS

1. The Trade Associations Support Revisions to the Reliability Standards to Address the Impacts of IBRs on the Reliable Operation of the Bulk-Power System.

As the Commission explains, the Reliability Standards were developed to apply nearly exclusively to synchronous generation resources. Consequently, in some cases, they do not account for the technological differences between the response characteristics of synchronous generation resources and those of IBRs. In particular, the Trade Associations agree that the Reliability Standards do not fully delineate the IBR-specific performance requirements that are

[2] Jane Cirrincione, Northern California Power Agency, is TAPS Chair. Dave Osburn, Oklahoma Municipal Power Authority, is Vice Chair. Terry Huval is TAPS Executive Director.

necessary to ensure that IBRs operate in a predictable and reliable manner. In addition, the existing Reliability Standards may not provide Bulk-Power System planners or operators with all of the criteria and metrics necessary to plan for and reliably integrate certain IBRs into the Bulk-Power System.

Developing new or modified Reliability Standards to comprehensively address the reliability impacts of certain IBRs will help ensure the reliable operation of the Bulk-Power System as the transition to a future resource mix that includes a high level of IBR penetration continues.

2. Given the Substantial Ongoing Work Addressing the Issues Raised in the NOPR, Trade Associations Emphasize the Importance of a Work Plan Which Integrates Ongoing IBR Projects.

Summarized below, NERC has launched a series of related initiatives aimed at the collection and sharing of IBR data, model validation, IBR planning and operational studies and needed IBR performance requirements. While this certainly does not mean the Commission's proposed directives are mislaid, it seems critical for NERC and the industry to be able to work cooperatively to shape these standards in ways that enhance the industry's ability to plan and operate the grid reliably. The Trade Associations recognize the NOPR's proposal is to direct NERC to make a compliance filing within 90 days explaining how it is "prioritizing its IBR Reliability Standard projects to meet the directive in the final rule."[3] We support that proposed directive, but also ask that NERC provide a plan ensuring that the significant work undertaken to date is not in vain; that the ensuing work of the drafting teams is fully informed by this work; and that the recommended standards be shaped by the work undertaken to date.

[3] NOPR at P 7.

Outlined below is the Trade Associations' review of these projects, organized according to the categories of directives in the NOPR.

a. IBR Data Sharing

Two NERC standards development projects are underway that address data sharing for IBRs. NERC Project 2020-06 (Verifications of Models and Data for Generators) includes proposed requirements that would obligate IBR generator owners to provide verified models and data to planning coordinators and transmission providers so that these planners have sufficient data to properly model IBR performance during disturbances. In addition, NERC Project 2022-02 (Modifications to Reliability Standards TPL-001-5.1 and MOD-032-1) includes three standard authorization requests ("SARs") that address planning and data collection. Notably, for the Reliability Standard MOD-032-1 SAR (Data for Power System Modeling & Analysis) the revisions are intended to address any gaps in data collection for the purpose of modeling aggregate levels of DERs in planning assessments. The revision to this standard is intended to provide clarity and consistency for data collection across planning coordinators and transmission planners when coordinating with distribution providers to gather aggregate load and aggregate DER data.

NERC Project 2021-04 (Modifications to Reliability Standard PRC-002) is a standard development project to modify the disturbance monitoring and reporting requirements so that BPS-connected IBRs are monitored to better assess resource performance during disturbances. Currently, disturbance monitoring equipment is installed near large synchronous resources.

b. IBR model validation

NERC Project 2022-04 (EMT Modeling) is intended to ensure that electromagnetic transient ("EMT") models are available to transmission planners and planning coordinators. The

Trade Associations acknowledge that EMT modeling for assessing IBR performance may be useful in some cases but underscore the importance for transmission planners and planning coordinators to have the flexibility to decide when EMT models are needed. To the extent EMT modeling is required, significant training, human capital and EMT modeling software are needed to address EMT modeling because much of the industry is currently not positioned to perform or verify EMT models at this time.

In addition, as mentioned above, NERC Project 2020-06 is an effort underway to modify Reliability Standard MOD-026 to ensure all BES resources' models accurately reflect in-service equipment. That project proposes to specifically add IBRs to the applicable resources and require EMT studies for IBR resources.

c. IBR planning and operational studies

NERC Project 2021-04 (Modifications to Reliability Standard PRC-002) is a standard development project to modify the disturbance monitoring and reporting requirements so that BPS-connected IBRs are monitored to better assess resource performance during disturbances. Currently, disturbance monitoring equipment is installed near large synchronous resources. NERC Project 2022-02 (Modifications to Reliability Standards TPL-001-5.1 and MOD-032-1) proposes to clarify how BPS-connected IBRs are modeled and studied in planning assessments and to ensure DER data and models are included in steady state and stability contingency analysis. This project includes efforts to develop standards to clarify that stability performance criteria are applicable to synchronous, asynchronous, and DER generation and require the inclusion of DER automatic operation in stability analyses.

d. Registered IBR performance requirements.

NERC Project 2020-02 (Modifications to PRC-024, Generator Ride-through) is a key project to address IBRs. In this effort, the standard drafting team is determining how to develop a performance-based standard to ensure that generators, including IBRs, remain connected during disturbances, address control and protection systems that can result in reduction or disconnection of resources during disturbances and how to mitigate the ongoing and systemic performance issues seen in most interconnections. EEI submitted comments on the SAR agreeing that performance issues, primarily with solar IBRs, need to be addressed and offered a comprehensive, detailed five-point proposal to address performance issues specifically affecting IBRs. This proposal is consistent with the NERC-issued Odessa Disturbance Report in December, 2022, which recommended that "the gravity and importance of enhancing this standard [PRC-024-3] to a comprehensive ride-through standard are amplified given the size of the 2022 Odessa Disturbance."[4] In addition, NERC Project 2021-02 (Modifications to VAR-002-4.1) proposes to modify Reliability Standard VAR-002 to ensure that the reactive support and voltage control obligations of IBRs are understood and provided in accordance with their capability.

Regarding the proposal (at P 95) requiring transmission planners and operators to develop mitigation activities regarding the performance of existing IBRs, such requirement should be solely the responsibility of registered generator owners. In addition, it is not clear what the Commission means by and "operator" mitigating events in this case.

[4] 2022 Odessa Disturbance Texas Event: June 4, 2022, Joint NERC and Texas RE Staff Report at 37 available at https://www.nerc.com/comm/RSTC_Reliability_Guidelines/NERC_2022_Odessa_Disturbance_Report%20(1).pdf.

e. Recently Approved NERC Projects to Address IBR Issues

More recently, NERC's Reliability Security and Technology Committee has approved two SARs for new projects to further address IBR integration. The first, a SAR proposing modifications to EOP-004/Event Reporting proposes to lower the generator loss threshold in Reliability Standard EOP-004 to encompass instances of widespread inverter-based resource losses. The second SAR proposes development of a new performance Reliability Standard to analyze and address mitigation of unexpected or unwarranted protection and control operations from IBRs following the identification of a performance issue.

3. The Commission Should Refrain from Issuing a Directive Calling for Distribution Providers and Transmission Owners to Collect and Share Data and Model Information supporting IBR-DERs That They Cannot Reasonably Obtain. In the Alternative, the Commission Should Limit the Obligations to be Shouldered by Distribution Providers and Transmission Owners to What is Feasible.

With respect to sharing of IBR data, the Commission proposes that transmission owners should provide planning coordinators and other entities with detailed modeling data and parameters for unregistered IBRs with an aggregate material effect on operation of the BPS.[5] The Commission would also require such information sharing by distribution providers for IBR-DERs.[6] Similarly, the Commission proposes to (1) require transmission owners to provide validated unregistered IBR models to the planning coordinators for interconnection-wide planning and operational models; and (2) require distribution providers to provide validated models of IBR-DERs in the aggregate to the planning coordinators for interconnection-wide planning and operational models.

[5] NOPR at P 79.

[6] *Id.*

The NOPR "recognize[s] that it may not be practical for distribution providers to provide modeling data and parameters to model individual IBR-DERs directly," in light of the "small size and location of many of the IBR-DERs on the distribution system."[7] The NOPR thus proposes that distribution providers be permitted to "provide IBR-DER modeling data and parameters in the aggregate or equivalent . . . (e.g., IBR-DERs in the aggregate and modeled by resource type [or] by interconnection requirements performance to represent different steady-state and dynamic behavior)."[8]

The Trade Associations appreciate that the Commission recognizes the practical challenges of modeling individual IBR-DERs. But a more fundamental challenge must also be acknowledged: A registered entity cannot provide data that the registered entity itself does not have and has no ability to collect. In particular, it would be unrealistic to expect a transmission owner or distribution provider to have information about unregistered IBRs and IBR-DERs at the same level of detail and accuracy that registered generator owners can provide about their own facilities. In most if not all cases, the transmission owner or distribution provider has only the information provided to it during the interconnection approval process. Interconnection agreements may not require the IBRs to provide modeling data, and transmission owners and distribution providers may not have the contractual right to add such requirements unilaterally and retroactively. Furthermore, some IBR-DERs on the distribution system interconnect under utility retail tariffs without a separate interconnection agreement. To the extent a transmission owner or distribution provider does not have data that a standard may require, and the unregistered IBR owner does not or cannot provide the information, the transmission owner or

[7] NOPR at P 80.

[8] *Id*.

distribution provider cannot be held responsible. Nor can the transmission owner or distribution provider be held responsible for errors in the data received from an unregistered IBR owner. Any directives regarding unregistered IBR and IBR-DER data sharing and model validation should recognize this limitation on the information that distribution providers and transmission owners can be required to provide.

The practical limitations that transmission owners and distribution providers have to collect and model data regarding unregistered IBRs and IBR-DERs are unlikely to have a significant adverse impact on BPS reliability due to a number of factors. First, pursuant to the IBR Registration Order,[9] currently unregistered BPS-connected IBRs with a material aggregate impact on BPS reliability will be registered, thus significantly reducing the amount of generation for which planners and operators are reliant on second-hand data. That set might be narrowed further: The owners and operators of some "unregistered" IBRs and IBR-DERs are registered as generator owners and operators, based on their ownership and operation of other generation that meets the Bulk Electric System definition. A standard drafting team should consider whether data regarding those "unregistered" IBRs and IBR-DERs should be provided by their registered generator owners and operators, rather than by their host distribution providers and transmission owners. There is no basis for concluding that any shortcomings in the data available about the remaining subset of IBR-DERs[10] will have a material adverse impact on BPS reliability.

The NOPR's proposed directives present additional practical challenges, particularly for

[9] *Registration of Inverter-Based Resources*, 181 FERC ¶ 61,124 (2022) ("IBR Registration Order").

[10] The IBR Registration Order directs NERC to register all BPS-connected IBRs that, in the aggregate, materially impact Bulk-Power System reliability. It thus appears that any requirement for transmission owners "to provide modeling data and parameters . . . for unregistered [BPS-connected, see NOPR n.15] IBRs in their transmission owner areas where the unregistered IBRs . . . individually or in the aggregate materially affect the reliable operation of the Bulk-Power System" (NOPR at P 79) would be rendered all but obsolete within a few years by NERC's compliance with the IBR Registration Order, because all such IBRs are to be registered.

distribution providers, given the sheer number of distribution providers and unregistered IBR-DERs, the heterogeneity of distribution systems, and distribution providers' limited resources, including specialized staff. A distribution provider with a large number of customers will have the challenge of a large number of IBR-DERs to monitor and model. A smaller distribution provider will likely have limited resources and staff for these tasks. A distribution provider in a rural area will have the additional challenge of monitoring and modeling IBRs-DERs spread over a large, dispersed footprint. And common among all distribution providers is that most, if not all, of the IBR-DERs are interconnected behind-the-meter at the customer's property, which further complicates monitoring and modeling. From a cost, time, and technical viewpoint, it may be infeasible or impractical to develop, implement, and audit the proposed directives for aggregated IBR-DERs. The development and implementation costs may well exceed the incremental reliability benefits, especially with respect to customer behind-the-meter systems.

Accordingly, the Trade Associations ask the Commission to refrain from issuing a directive calling for distribution providers and transmission owners to collect and share data and model information supporting IRB-DERs that they cannot reasonably obtain. In the alternative, the Commission should limit the obligations to be shouldered by distribution providers and transmission owners to what is feasible. In ascertaining what it is realistic to require of transmission owners and distribution providers with respect to asset owners they do not control, the Commission may consider convening a forum to consider the relative benefits of directing new or revised Reliability Standards applying to distribution providers with IBR-DERs, or else

directing NERC to submit a study on the challenges of developing and implementing such standards.

Respectfully submitted,

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February 6, 2023