UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)**	**Docket No. _____**
	)	

PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION FOR APPROVAL OF A NEW TERM "INVERTER-BASED RESOURCE" USED IN NERC RELIABILITY STANDARDS

Lauren A. Perotti
Assistant General Counsel
Alain Rigaud
Associate Counsel
North American Electric Reliability Corporation
1401 H Street, N.W., Suite 410
Washington, D.C. 20005
(202) 400-3000
(202) 644-8099 – facsimile
lauren.perotti@nerc.net
alain.rigaud@nerc.net

Counsel for the North American Electric Reliability Corporation

November 4, 2024

TABLE OF CONTENTS

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)**	**Docket No. _____**
	)	

PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION FOR APPROVAL OF A NEW TERM "INVERTER-BASED RESOURCE" USED IN NERC RELIABILITY STANDARDS

Pursuant to Section 215(d)(1) of the Federal Power Act ("FPA")[1] and Section 39.5[2] of the Federal Energy Regulatory Commission's ("FERC" or "Commission") regulations, the North American Electric Reliability Corporation ("NERC")[3] hereby submits for Commission approval a new definition of the term Inverter-Based Resource ("IBR"), for inclusion in the *Glossary of Terms used in NERC Reliability Standards*.[4]

The proposed definition for inclusion in the NERC Glossary is:

- **Inverter-Based Resource:** A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

---

1 16 U.S.C. § 824o.

2 18 C.F.R. § 39.5 (2023).

3 The Commission certified NERC as the electric reliability organization ("ERO") in accordance with Section 215 of the FPA on July 20, 2006. *N. Am. Elec. Reliability Corp.*, 116 FERC ¶ 61,062 (2006), *order on reh'g & compliance*, 117 FERC ¶ 61,126 (2006), *aff'd sub nom. Alcoa, Inc. v. FERC*, 564 F.3d 1342 (D.C. Cir. 2009).

4 The *Glossary of Terms used in NERC Reliability Standards* ("NERC Glossary" or "Glossary") is available on the NERC website at https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf. Unless otherwise indicated, all capitalized terms used in this petition shall have the meaning set forth in the NERC Glossary.

The proposed definition was developed through NERC's Commission-approved standard development process. NERC Board of Trustees adopted the proposed IBR definition on October 8, 2024.

NERC requests that the Commission approve the proposed IBR definition, as shown in **Exhibit A**, as just, reasonable, not unduly discriminatory or preferential, and in the public interest. NERC also requests that the Commission approve the proposed implementation plan (**Exhibit B**), under which the proposed IBR definition would become effective on the first day of the first calendar quarter following regulatory approval.

As required by Section 39.5(a)[5] of the Commission's regulations, this petition presents the technical basis and purpose of the proposed IBR definition, along with relevant background (**Sections II** and **III**), a demonstration that the proposed IBR definition meets the criteria identified by the Commission in Order No. 672[6] (**Exhibit D**), and a summary of the development history for the proposed IBR definition (**Exhibit E**).

[5] 18 C.F.R. § 39.5(a).

[6] The Commission specified in Order No. 672 certain general factors it would consider when assessing whether a particular Reliability Standard is just and reasonable. *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, 114 FERC ¶ 61,104, at P 262, 321-37 [hereinafter Order No. 672], *order on reh'g*, Order No. 672-A, 114 FERC ¶ 61,328 (2006).

I. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[7]

Lauren A. Perotti
Assistant General Counsel
Alain Rigaud
Associate Counsel
North American Electric Reliability Corporation
1401 H Street NW
Suite 410
Washington, D.C. 20005
(202) 400-3000
(202) 644-8099 – facsimile
alain.rigaud@nerc.net
lauren.perotti@nerc.net

Soo Jin Kim
Vice President, Engineering and Standards
Jamie Calderon
Director, Standards Development
North American Electric Reliability Corporation
3353 Peachtree Road, N.E.
Suite 600, North Tower
Atlanta, GA 30326
(404) 446-2560
(404) 446-2595 – facsimile
soo.jin.kim@nerc.net
jamie.calderon@nerc.net

II. BACKGROUND

A. Regulatory Framework

By enacting the Energy Policy Act of 2005,[8] Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Bulk-Power System ("BPS"), and with the duties of certifying an ERO that would be charged with developing and enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)[9] of the FPA states that all users, owners, and operators of the BPS in the United States will be subject to Commission-approved Reliability Standards. Section 215(d)(5)[10] of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standard. Section

[7] NERC requests waiver of 18 C.F.R. § 385.203(b) to permit the inclusion of more than two people on the service list.

[8] 16 U.S.C. § 824o.

[9] *Id.* § 824o(b)(1).

[10] *Id.* § 824o(d)(5).

39.5(a)[11] of the Commission's regulations requires the ERO to file with the Commission for its approval each new Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission is vested with the regulatory responsibility to approve Reliability Standards that protect the reliability of the BPS and to ensure that Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. Pursuant to Section 215(d)(2) of the FPA[12] and Section 39.5(c)[13] of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard.

B. NERC Reliability Standards Development Procedure

NERC develops Reliability Standards and definitions of terms used in Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC Standard Processes Manual.[14] In its order certifying NERC as the Commission's ERO, the Commission found that NERC's rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards,[15] and thus satisfy several of the Commission's approval criteria.[16] The development process is open to any person or entity with a legitimate interest in the reliability of

---

11 18 C.F.R. § 39.5(a).

12 16 U.S.C. § 824o(d)(2).

13 18 C.F.R. § 39.5(c)(1).

14 The NERC Rules of Procedure, including Appendix 3A, NERC Standard Processes Manual, are available at https://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx.

15 *N. Am. Elec. Reliability Corp.*, 116 FERC ¶ 61,062 at P 250 (2006).

16 Order No. 672*, supra* note 7, at PP 268, 270.

the BPS. NERC considers the comments of all stakeholders. Stakeholders must approve, and the NERC Board of Trustees must adopt, a new or revised Reliability Standard or definition before NERC submits the Reliability Standard or definition to the Commission for approval.

C. *Glossary of Terms used in NERC Reliability Standards*

NERC maintains a comprehensive, up-to-date document on its web site that reflects all defined terms used in Reliability Standards that have been adopted by the NERC Board of Trustees: the *Glossary of Terms used in NERC Reliability Standards* ("Glossary" or "NERC Glossary"). The NERC Glossary reflects the status of Commission approval and effective dates and contains links to the archive of the development of each definition. In Order No. 693[17] approving the first mandatory and enforceable Reliability Standards and defined terms, the Commission highlighted the role the NERC Glossary plays in promoting a consistent and clear understanding of terms used throughout the Reliability Standards:

> The terms defined in the glossary have an important role in establishing consistent understanding of the Reliability Standards Requirements and implementation. The approval of the glossary will provide continuity in application of the glossary definitions industry-wide, and will eliminate multiple interpretations of the same term or function, which may otherwise create miscommunication and jeopardize Bulk-Power System reliability.[18]

The Commission further stated, "The glossary should be updated through the Reliability Standards development process whenever a new or revised Reliability Standard that includes a new defined term is approved, or as needed to clarify compliance activities."[19]

---

[17] *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, 118 FERC ¶ 61,218 (2007) [hereinafter Order No. 693].

[18] *Id.* at P 1893.

[19] *Id.*

Since the NERC Glossary was first approved in 2007, the Commission has approved new defined terms and revisions to the definitions of existing terms developed through the standard development process, as well as the retirement of previously effective terms and definitions. While defined terms typically accompany the new or revised Reliability Standards that will use those terms, NERC has on occasion proposed new or revised defined terms independent of a proposed Reliability Standard.[20]

D. Procedural Development of the Proposed Inverter-Based Resource (IBR) Definition

NERC developed the proposed IBR definition through Project 2020-06 Verifications of Models and Data for Generators. NERC initiated Project 2020-06 in 2021 to address a Standard Authorization Request ("SAR") submitted by the NERC Inverter-Based Resource Performance Task Force ("IRPTF"). In 2020, the IRPTF published a white paper summarizing the results of its review of NERC Reliability Standards.[21] The IRPTF undertook this review to determine if there were opportunities to address gaps or otherwise improve the standards to assure reliability considering the unprecedented growth of IBRs on the Bulk Power System. Among other things, the IRPTF recommended revisions to MOD-026-1 and MOD-027-1 to address issues related to model verification for IBRs.[22]

---

[20] *See, e.g.*, *Petition of NERC for Approval of Revised Definitions of Terms used in Reliability Standards,* Docket No. RD16-3-000 (Dec. 7, 2015); *Petition of NERC for Approval of New, Revised, and Retired Definitions of Terms used in Reliability Standards,* Docket No. RD24-6-000 (March. 8, 2024).

[21] NERC IRPTF, *IRPTF Review of NERC Reliability Standards White Paper* (March 2020), https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/Review_of_NERC_Reliability_Standards_White_Paper.pdf [hereinafter IRPTF White Paper].

[22] IPRTF White Paper at 4.

On October 19, 2023, while work was underway on Project 2020-06, the Commission issued Order No. 901.[23] In Order No. 901, the Commission directed NERC to develop new or modified Reliability Standards addressing reliability concerns related to IBRs at "all stages of interconnection, planning, and operations,"[24] and to develop new or revised Reliability Standards addressing IBR reliability issues as follows:

- IBR disturbance monitoring data sharing and post-event performance validation[25] and ride-through performance requirements[26] by November 4, 2024;
- IBR data and model validation[27] by November 4, 2025; and
- planning and operational studies[28] for IBRs by November 4, 2026.

The Commission also directed NERC to develop and submit a work plan to develop new and revised Reliability Standards to address these issues in accordance with the specified timeframes above.[29]

On January 17, 2024, NERC submitted its Order No. 901 Work Plan[30] outlining a comprehensive work plan with key milestones to address the directives by the deadlines set in Order No. 901. The Order No. 901 Work Plan consists of four key milestones with associated dates for completion, which are consistent with the Commission's direction in Order No. 901. These milestones are summarized below:

---

23 *Reliability Standards to Address Inverter-Based Resources*, Order No. 901, 185 FERC ¶ 61,042 (2023) [hereinafter Order No. 901].

24 *Id.* at P 25.

25 *See id.* at PP 66-109 (discussing directives related to data sharing requirements).

26 *See id.* at PP 178-211 (discussing directives related to performance requirements).

27 *See id.* at PP 110-161 (discussing directives related to data and model validation requirements).

28 *See id.* at PP 162-177 (discussing directives related to planning and operational studies requirements).

29 *See id.* at P 222.

30 *Informational Filing of the North American Electric Reliability Corporation Regarding the Development of Reliability Standards Responsive to Order No. 901,* Docket No. RM22-12-000 (Jan. 17, 2024) [hereinafter Order No. 901 Work Plan].

- **Milestone 1:** Submission of Order No. 901 Work Plan (completed: January 17, 2024)
- **Milestone 2**: Development and filing of Reliability Standards to address disturbance monitoring data sharing, IBR performance requirements, and post-event performance validation for registered IBRs (completion: November 4, 2024)
- **Milestone 3**: Development and filing of Reliability Standards to address data sharing and model validation for all IBRs (completion: November 4, 2025)
- **Milestone 4**: Development and filing of Reliability Standards to address planning and operational studies requirements for all IBRs (completion: November 4, 2026)

Within Milestone 2 of the workplan, NERC identified several active standards development projects to address disturbance monitoring, performance-based ride-through requirements, and post-event performance validation for registered IBRs. These projects are:

- Project 2020-06 Verifications of Models and Data for Generators
- Project 2021-04 Modifications to PRC-002-2 Disturbance Monitoring
- Project 2020-02 Modifications to PRC-024 (Generator Ride-through); and
- Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues.

Relevant to this filing, NERC determined that, given the multiple standards development projects underway to address the risks related to IBRs, a single drafting team should move forward with a definition of IBR that would be leveraged by all other projects. NERC selected Project 2020-06 to coalesce development efforts for the definition and coordinate the proposed definition with the other NERC projects addressing IBR issues.

NERC developed the proposed definition using NERC's standard development process. The proposed definition of IBR was developed in an open and fair manner and in accordance with the Commission-approved development process for Reliability Standards and definitions of terms used in Reliability Standards, which included multiple comment and ballot periods. The proposed definition of was adopted by the NERC Board of Trustees on October 8, 2024. A summary of the

development history and the complete record of development is attached to this petition as **Exhibit E**.

III. JUSTIFICATION FOR APPROVAL

The addition of IBR as a defined term within the NERC Glossary will establish a consistent understanding of the meaning of the term across all NERC Reliability Standards going forward. This term is used in the Order No. 901 Work Plan Milestone 2 Reliability Standards being proposed in the projects listed in Section II(D), above, and will be used in other Reliability Standards addressing IBR-related reliability risks. The addition of a single defined term to the NERC Glossary would promote consistency, avoid confusion, and facilitate efficiency for drafting teams addressing IBR issues.

As outlined above, NERC proposes the Commission approve the following definition of IBR for inclusion in the NERC Glossary:

> **Inverter-Based Resource:** A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

In developing the proposed IBR definition, the drafting team referred to the IEEE 2800-2022 definition of inverter-based resource (IBR),[31] as well as definitions of the term reflected in

[31] IEEE, *Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems,* IEEE 2800-2022 (2022), https://standards.ieee.org/ieee/2800/10453/ (establishing uniform technical minimum requirements for the interconnection, capability, and performance of IBRs for reliable integration onto the electric system).

both NERC[32] and Commission documents.[33] Inverter-based resources have commonly been referred to as generating resources. Consistent with this common understanding, the proposed IBR definition refers to a type of generation resource.

Under the proposed IBR definition, a resource (i.e., a plant or facility) would be considered an IBR based on the technology it uses to export Real Power. The NERC *Glossary* defines Real Power as "the portion of electricity that supplies energy to the Load." For an IBR, the technology consists of: (1) individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter; and (2) that are operated together as a single resource at a common point of interconnection to the electric system.

The first part of the proposed definition refers to individual devices, such as turbines, solar panels, batteries, or other devices, which are capable of exporting Real Power through a power electronic interface. The phrase "power electronic interface" refers to the technology used to convert the power that is generated by the devices to power that can be used on the electric system. An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A converter is a power electronic device that performs inversion (i.e. inverts DC power to AC sinusoidal power) or rectification (i.e. rectifies AC sinusoidal power to DC power). Generating resources that do not have a "power electronic device" are not considered to be IBR, as their power

---

[32] *See, e.g.*, NERC, *An Introduction to Inverter-Based Resources on the Bulk Power System* (June 2023) at 3 (describing inverter-based resources as dispersed power-producing resources consisting of several components), available at https://www.nerc.com/pa/Documents/2023_NERC_Guide_Inverter-Based-Resources.pdf. *See also* NERC Rules of Procedure Appendix 2, Definitions used in the NERC Rules of Procedure (definitions of Generator Owner and Generator Operator include owners and operators of certain "inverter based *generating* resources" (emphasis added) https://www.nerc.com/AboutNERC/RulesOfProcedure/Appendix%202%20eff%2020240627_signed.pdf.

[33] *See, e.g.*, *Registration of Inverter Based Resources*, 181 FERC ¶ 61,124 (2022) at note 1 (describing the term IBR "to include all generating facilities that connect to the electric power system using power electronic devices that change direct current (DC) power produced by a resource to alternating current (AC) power compatible with distribution and transmission systems.")

output is based on inherent qualities of the induction motor (Type 1), or they have a variable rotor resistance (Type 2) that cannot dynamically control reactive power.

The inclusion of the phrase "capable of exporting Real Power" in the proposed IBR definition is to clarify that IBRs are considered generating resources that provide Real Power to load; loads connected to the electric system through power electronic devices are not generating resources and are not to be considered IBRs. This would include, for example, resources that only perform transmission functions, such as stand-alone flexible AC transmission systems ("FACTS") devices. These resources do not pose the same impact on the reliability of the Bulk-Power system as IBR generation.

The second part of the definition refers to how the resource is connected to the electric system. An IBR consists of individual devices (often many devices) that must be individually modeled for accurate dynamic simulations and model quality analysis, but are operated by system operators as a single, aggregated resource at a common point of interconnection to the electric system. An IBR can be connected to any part of the transmission system, sub-transmission system, or distribution system.

To illustrate, the proposed IBR definition includes several examples of IBRs that would meet this definition, including plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS),[34] and fuel cell devices. This list is not intended to be exhaustive, nor is it intended to exclude from the definition resource types with IBR technological characteristics that are developed in the future. Under the proposed IBR definition, IBRs may also

[34] As explained in the Technical Rationale, battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. *See* Exhibit C Technical Rationale at 2.

include any hybrid combination of IBR resources such as PV and BESS, which includes portions of a facility that have IBR resources like a BESS located at synchronous generation facility.[35]

For clarity, the Technical Rationale includes examples of resources that would not be considered IBRs under the proposed definition. Such examples include synchronous generators or condensers, including gas and steam power plants. Other examples include stand-alone FACTS, including static synchronous compensators ("STATCOM") and static VAR compensators ("SVC") or voltage source converter high-voltage direct current ("VSC HVDC") systems, unless the VSC HVDC equipment is a dedicated point of connection for an IBR to the electric system.

The figure below shows an example diagram of an IBR. The IBR (red box) includes the devices (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the IBR plant. As noted above, If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system would be considered part of the IBR.

[35] See Exhibit C Technical Rationale at 1. The Technical Rationale contains non-exhaustive lists of examples of technologies that may be considered IBRs and that are not considered IBRs under the proposed IBR definition.

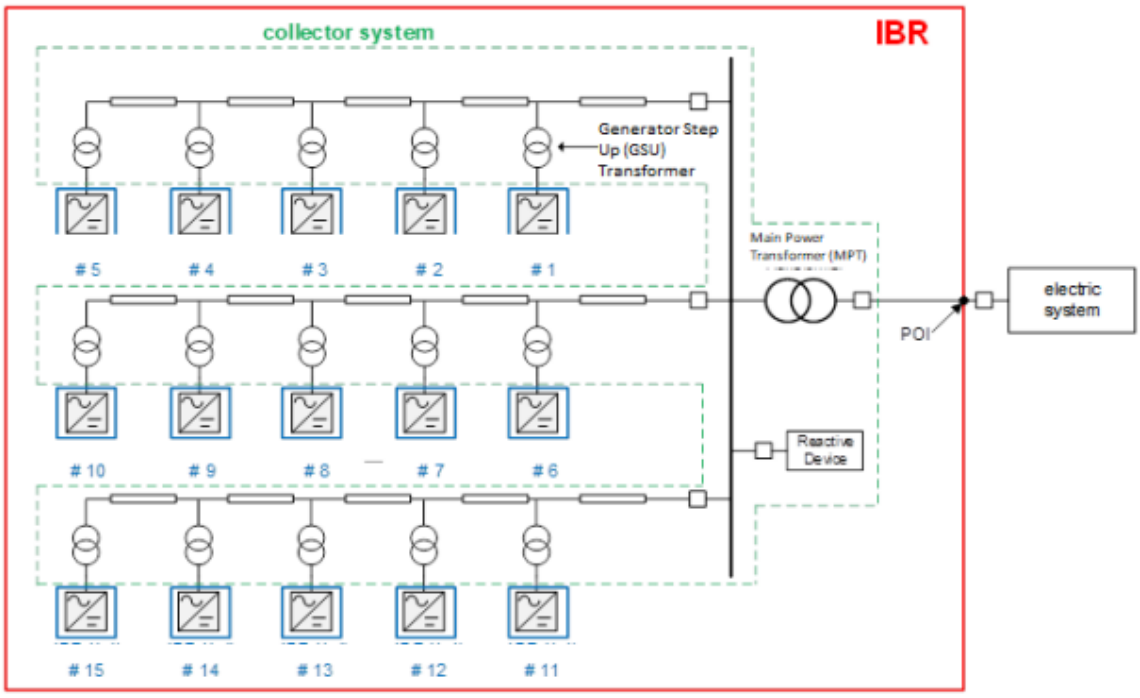

Figure 1: Example Diagram of an IBR

In developing the proposed IBR definition, the drafting team considered stakeholder comments suggesting the definition contain other limiting factors not related to the technology used, such defining IBR based on voltage connection level (kV) or facility capability level (MW/MVA).[36] The drafting team considered these comments and determined that the proposed IBR definition should describe only the technology used, and should not include factors that could prescribe or limit the applicability of Reliability Standards using the definition. The determination of which IBRs to include in a Reliability Standard would remain the responsibility of the drafting team developing that standard. For example, the drafting team developing a standard applicable to IBRs may specify that it applies to BES IBR Facilities or to both BES IBR Facilities and non-BES

[36] *See, e.g.*, Exhibit E Summary of Development and Complete Record of Development at item 22, February 22, 2024 Consideration of Comments, at 16 et seq. (responses to Question 1).

IBRs meeting the criteria for inclusion under the recently approved NERC Rules of Procedure registry criteria.[37]

As discussed in **Exhibit D**, the proposed IBR definition meets the Commission's criteria for approval in Order No. 672. It would improve clarity and advance reliability in the Reliability Standards in which it is used. Commission approval of the proposed IBR definition would be just, reasonable, not unduly discriminatory, and in the public interest. NERC respectfully requests that the Commission approve the proposed IBR definition, to become effective in accordance with the proposed implementation plan discussed in **Section IV.**

IV. EFFECTIVE DATE OF THE PROPOSED INVERTER-BASED RESOURCE (IBR) DEFINITION

NERC respectfully requests that the Commission approve the implementation plan attached to this petition as **Exhibit B**. The proposed implementation plan provides that the proposed IBR definition would become effective on the first day of the first calendar quarter after applicable regulatory approval. Any proposed standards using this term would become effective in accordance with their respective implementation plans.

[37] *Order Approving Revisions to North American Electric Reliability Corporation Rules of Procedure and Requiring Compliance Filing,* 187 FERC ¶ 61,196 (2024) (the Commission approved revisions to the Generator Owner and Generator Operator functions in the Registry Criteria to include a new category, Category 2 Generator Owner and Category 2 Generator Operator, that own or operate non-BES IBRs).

V. CONCLUSION

For the reasons set forth above, NERC respectfully requests that the Commission approve:

- The proposed IBR definition, as shown in **Exhibit A**; and
- The implementation plan included in **Exhibit B**.

Respectfully submitted,

/s/ Alain Rigaud

Lauren A. Perotti
Assistant General Counsel
Alain Rigaud
Associate Counsel
North American Electric Reliability Corporation
1401 H Street, N.W., Suite 410
Washington, D.C. 20005
(202) 400-3000
(202) 644-8099 – facsimile
alain.rigaud@nerc.net
lauren.perotti@nerc.net

Counsel for the North American Electric Reliability Corporation

November 4, 2024

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit A

Proposed Definition for Inclusion in the *Glossary of Terms used in NERC Reliability Standards*

Description of Current Draft

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024
45-day formal comment period with additional ballot	February 22 – April 8, 2024
Standards Committee approved Standards Authorization Request (SAR)	May 15, 2024
30-day formal comment period with additional ballot	July 12 – August 12, 2024

Anticipated Actions	Date
10-day final ballot	September 3 – September 12, 2024
NERC Board adoption	October 8-9, 2024

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The term proposed below is intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

Version History

Version	Date	Action	Change Tracking
1	TBD	New IBR Definition	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit B

Implementation Plan

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource Definition

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definition must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the drafting team (DT) that would coalesce development efforts for the definition and coordinate proposed definition with the other NERC developers. The DT proposes the definition of IBR to be used in Reliability Standard MOD-026-2, as well as other IBR related standards development projects.

General Considerations

Multiple standards in development will use the definition, and the proposed implementation time frame is intended to reflect that any one of those standards may be the first to use the definition. Additionally, this implementation plan only affects the date that this new definition will become an effective term in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use the proposed definition.

Effective Date

The effective date(s) for the proposed definition for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed definition shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the definition, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed definition shall become effective on the first day of the first calendar quarter after the date the definition are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit C

Technical Rationale

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Technical Rationale

Project 2020-06 Verification of Models and Data for Generators
IBR Definition | August 2024

Inverter-based Resource Definition

The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted, as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions. The DT also used recent FERC and NERC documents, which included inverter-based resource related terms and descriptions, as the basis for the IBR definitions.

The IBR definition is intended to describe technologies that shall be considered IBR. An IBR is defined by technology, thus voltage connection level (kV), facility capability level (MW/MVA), or other factors do not impact the inclusion as an IBR. An IBR can be connected to any part the transmission system, sub-transmission system, or distribution system. For Reliability Standards that use the IBR term, the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable. Each of these Reliability Standards, including the Applicability Section(s) will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section. For example, an Applicability Section may specify that IBR Facilities (BES), IBRs that are owned by a Generator Owner (Category 2), or IBRs that are operated by a Generator Operator (Category 2), are considered applicable.

IBRs have commonly been referred to as “generating resources.” An IBR is not a HVDC system (except for a high-voltage direct current (VSC HVDC) with a dedicated connection to an IBR, as this is part of the IBR facility), stand-alone flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. A list of IBRs is provided in Table 1 below.

IBRs may include any hybrid combination of IBR types (e.g., BESS and solar PV). IBRs also include co-located portions of a facility that are IBR technologies (e.g., a BESS, which is co-located at synchronous generation facility), see table below.

Examples	
IBR	**Not an IBR**
• Solar photovoltaic • Type 3 wind • Type 4 wind • Battery energy storage system (BESS) • Fuel cell(s) • Hybrid combination of IBRs • Portions of co-located facility that are IBR • VSC HVDC with dedicated connection to IBR • This is not an all-inclusive list.	• Stand-alone FACTS device (e.g., STATCOM or SVC) • Flywheels • Synchronous generator • Synchronous condenser • VSC HVDC • Line-Commutated Converters (LCC) HVDC • This is not an all-inclusive list.

An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.

Figure 1 shows an example diagram of an IBR. The IBR (red box) includes the devices (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the IBR plant. If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system is part of the IBR.

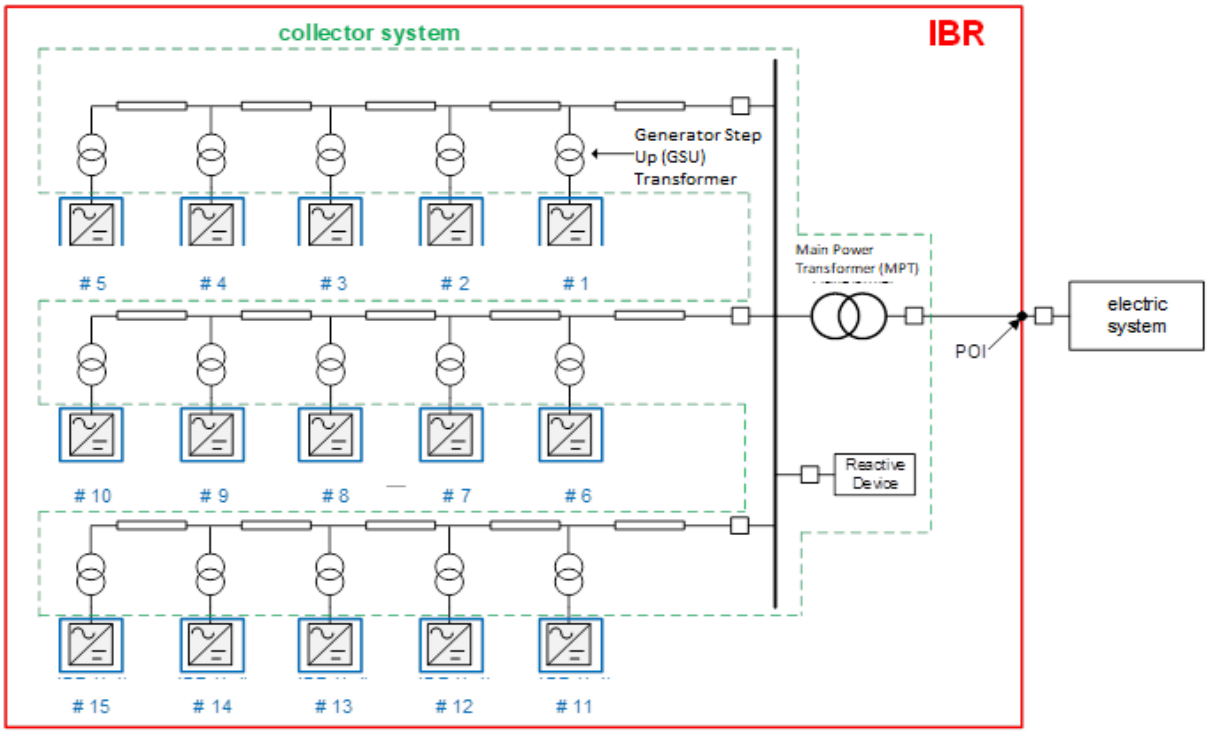

Figure 1 Example diagram of an IBR depicting the IBR (red box), collector system (green box), and devices (blue boxes).

The inclusion of 'capable of exporting Real Power' is to clarify that loads connected to the electric system via power electronics are not IBRs. IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power. The DT contemplated adding the phrase "may also be capable of providing Reactive Power" in the definition(s). However, the DT believed this may be misinterpreted that IBRs include technologies such as FACTS devices or HVDC.

Battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. Within each Reliability Standard, a DT may draft operating mode-specific Requirements, as needed.

The Project 2020-06 DT intends to use the Glossary Term of IBR for MOD-026-2. Additional standard development projects and related standards that may use this defined term include:

- Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)

- Project 2021-01 Modifications to PRC-019 and MOD-025
- Project 2021-04 Modifications to PRC-002 (new PRC-028)
- Project 2022-04 EMT Modeling
- Project 2023-01 EOP-004 IBR Event Reporting
- Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues (new PRC-030)

Distributed Energy Resources (DER) related projects that may or may not need to use IBR (if they end up with their own definition)

- Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
- Project 2023-05 Modifications to FAC-001 and FAC-002 (DER)
- Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit D

Order No. 672 Criteria

EXHIBIT D

Order No. 672 Criteria

In Order No. 672,[1] the Commission identified a number of criteria it will use to analyze Reliability Standards proposed for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors and explains how the proposed new definition of Inverter-Based Resource ("IBR") has met or exceeded the criteria.

1. Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.[2]

The proposed definition of IBR within the NERC Glossary will establish consistency and common understanding of what an IBR is for all standards projects and Reliability Standards going forward. The IBR definition is intended to describe technologies that shall be considered IBR. The addition of a single defined term to the NERC Glossary would promote consistency, avoid confusion, and facilitate efficiency for drafting teams addressing IBR issues.

---

[1] *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, 114 FERC ¶ 61,104, *order on reh'g*, Order No. 672-A, 114 FERC ¶ 61,328 (2006) [hereinafter Order No. 672].

[2] *See* Order No. 672, *supra* note 1, at P 321 ("The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the FPA. That is, it must provide for the reliable operation of Bulk-Power System facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection.").

See Order No. 672, *supra* note 1, at P 324 ("The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons.").

The proposed definition of IBR is thus designed to achieve a specific reliability goal and contain a technically sound means to achieve that goal.

2. Proposed Reliability Standards must be applicable only to users, owners, and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.[3]

The proposed definition of IBR is clear and unambiguous as to what is required and who is required to comply and support clear and consistent application in the Reliability Standards in which it is used, in accordance with Order No. 672. The proposed definition of IBR will help clearly articulate the actions that applicable entities must take to comply with the standards.

3. A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.[4]

The proposed IBR definition will help support the clear and consistent application of Reliability Standards in which it is used. No changes are proposed to those Reliability Standards; thus, no changes are proposed to the approved Violation Severity Levels or Violation Risk Factors for those Reliability Standards.

4. A proposed Reliability Standard must identify clear and objective criteria or measures for compliance, so that it can be enforced in a consistent and non-preferential manner.[5]

The proposed definition of IBR will help support the clear and consistent application of Reliability Standards in which it is used. No changes are proposed to those Reliability Standards;

---

[3] *See* Order No. 672, *supra* note 1, at P 322 ("The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others.").

See Order No. 672, *supra* note 1, at P 325 ("The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk-Power System must know what they are required to do to maintain reliability.").

[4] *See* Order No. 672, *supra* note 1, at P 326 ("The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply.").

[5] *See* Order No. 672, *supra* note 1, at P 327 ("There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.").

thus, no changes are made to the measures[6] in those Reliability Standards that support each requirement by clearly identifying what is required and how the requirement will be enforced.

5. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently, but do not necessarily have to reflect "best practices" without regard to implementation cost or historical regional infrastructure design.[7]

The proposed definition of IBR achieves the reliability goals of Project 2020-06 Verifications of Models and Data for Generators effectively and efficiently in accordance with Order No. 672. The proposed definition of IBR would establish consistency and common understanding of what an IBR is for all standards projects and Reliability Standards going forward.

6. Proposed Reliability Standards cannot be "lowest common denominator," i.e., cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.[8]

---

[6] These measures help provide clarity regarding how the requirements would be enforced and help ensure that the requirements would be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

[7] *See* Order No. 672, *supra* note 1, at P 328 ("The proposed Reliability Standard does not necessarily have to reflect the optimal method, or 'best practice,' for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently.").

[8] *See* Order No. 672, *supra* note 1, at P 329 ("The proposed Reliability Standard must not simply reflect a compromise in the ERO's Reliability Standard development process based on the least effective North American practice—the so-called 'lowest common denominator'—if such practice does not adequately protect Bulk-Power System reliability. Although the Commission will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability.").

See Order No. 672, *supra* note 1, at P 330 ("A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a 'lowest common denominator' Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it.").

The proposed definition of IBR does not reflect a "lowest common denominator" approach. The proposed definition of IBR will be used in Order No. 901 Work Plan Milestone 2 Reliability Standards, as well as other standards development projects addressing IBR reliability concerns. For Reliability Standards that use the IBR term, the Applicability Section for those Reliability Standards would specify which IBRs are applicable. Each of these Reliability Standards, including the Applicability Sections, will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section.

7. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.[9]

The proposed definition of IBR would continue to apply consistently throughout North America and does not favor one geographic area or regional model.

[9] *See* Order No. 672, *supra* note 1, at P 331 ("A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.").

8. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.[10]

The proposed definition of IBR would have no undue negative effect on competition and would not unreasonably restrict the available transmission capacity or limit the use of the BPS in a preferential manner. The Reliability Standards in which the proposed definition of IBR is used are unchanged and would continue to require the same performance by each of the applicable entities.

9. The implementation time for the proposed Reliability Standard is reasonable.[11]

The proposed effective date for the proposed definition of IBR is just and reasonable and appropriately balances the urgency in the need to implement the standard against the reasonableness of the time allowed for those who must comply to develop necessary procedures or other relevant capability. The proposed implementation plan provides that the proposed definition of IBR would become effective on the first day of the first calendar quarter following regulatory approval. This implementation timeline appropriately balances the urgency in the need to implement the standards against the time allowed for those who must comply to develop necessary procedures and other relevant capabilities. The proposed implementation plan is attached as **Exhibit B** to this petition.

---

[10] *See* Order No. 672, *supra* note 1, at P 332 ("As directed by section 215 of the FPA, the Commission itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another.").

[11] *See* Order No. 672, *supra* note 1, at P 333 ("In considering whether a proposed Reliability Standard is just and reasonable, the Commission will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability.").

10. The Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved Reliability Standard development process.[12]

The proposed definition of IBR was developed in accordance with NERC's Commission-approved processes for developing and approving Reliability Standards. **Exhibit E** includes a summary of the development proceedings for the proposed definition of IBR, and details the processes followed to develop the proposed definition of IBR. These processes included, among other things, comment periods, pre-ballot review periods, and balloting periods. Additionally, all meetings of the standard drafting team were properly noticed and open to the public.

11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.[13]

NERC has identified no competing public interests regarding the request for approval of the proposed definition of IBR. No comments were received that indicated that the proposed definition of IBR conflicts with other vital public interests.

12. Proposed Reliability Standards must consider any other appropriate factors.[14]

No other negative factors relevant to whether the proposed definition of IBR is just and reasonable were identified.

---

[12] *See* Order No. 672, *supra* note 1, at P 334 ("Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by the Commission.").

[13] *See* Order No. 672, *supra* note 1, at P 335 ("Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard.").

[14] *See* Order No. 672, *supra* note 1, at P 323 ("In considering whether a proposed Reliability Standard is just and reasonable, we will consider the following general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed.").

Exhibit E

Summary of Development and Complete Record of Development

Summary of Development History

The following is a summary of the development record for the proposed definition of the term Inverter-Based Resource ("IBR"), developed under Project 2020-06 Verifications of Models and Data for Generators. Initially, Project 2020-06 proposed two defined terms: "Inverter-Based Resource (IBR)" and "IBR Unit". However, following two failed ballots of the term "IBR Unit", the drafting team revised the definition of "Inverter-Based Resource (IBR)" to discontinue use of the embedded term "IBR Unit" and determined to move forward only with a proposed definition of Inverter-Based Resource (IBR).

I. Overview of the Drafting Team

When evaluating a proposed Reliability Standard (to include definitions used in Reliability Standards), the Commission is expected to give "due weight" to the technical expertise of the ERO.[1] The technical expertise of the ERO is derived from the drafting team selected to lead each project in accordance with Section 4.3 of the NERC Standard Processes Manual.[2] For this project, the drafting team consisted of industry experts, all with a diverse set of experiences. A roster of the Project 2020-06 drafting team members is included in **Exhibit E**.

II. Definition Development History

A. Project Initiation

In 2021, NERC initiated Project 2020-06 to address a Standard Authorization Request ("SAR") submitted by the NERC Inverter-Based Resource Performance Task Force ("IRPTF"). In 2020, the IRPTF published a white paper summarizing the results of its review of NERC

[1] Section 215(d)(2) of the Federal Power Act; 16 U.S.C. § 824(d)(2) (2018).

[2] The NERC *Standard Processes Manual* is available at https://www.nerc.com/AboutNERC/RulesOfProcedure/Appendix_3A_SPM_Clean_Mar2019.pdf.

Reliability Standards.[3] Among other things, the IRPTF recommended revisions to MOD-026-1 and MOD-027-1 to address issues related to model verification of IBRs.

B. Standard Authorization Request Development

On September 24, 2020, the Standards Committee accepted the Standards Authorization Request proposing to clarify requirements related to IBRs and to require model verification through a revision to NERC Reliability Standards MOD-026-1 and MOD-027-1, and authorized posting the SAR for a 30-day informal comment period from December 16, 2020 through January 14, 2021, and the solicitation of SAR drafting team members.[4] On July 21, 2021, the Standards Committee accepted the Project 2020-06 SARs – Verifications of Models and Data for Generators, and Transmission-Connected Dynamic Reactive Resources. The Standards Committee authorized drafting revisions to the Reliability Standards identified in the SARs and appointed the Project 2020-06 SAR Drafting Team as the Project 2020-06 Standard Drafting Team.[5]

C. Informal Comment Period

From September 18, 2023 through October 24, 2023, an early draft of the terms "Inverter-Based Resource (IBR)" and "Power Electronic Device (PED)" were posted for an informal

[3] NERC IRPTF, *IRPTF Review of NERC Reliability Standards White Paper* (March 2020), https://www.nerc.com/comm/PC/InverterBased%20Resource%20Performance%20Task%20Force%20IRPT/Review_of_NERC_Reliability_Standards_White_Paper.pdf.

[4] *See* NERC, Standards Committee September 24, 2020 Meeting Minutes at 3, https://www.nerc.com/comm/SC/Agenda%20Highlights%20and%20Minutes/SC%20September%20Meeting%20Minutes%20Approved%20November%2019,%202020.pdf.

[5] *See* NERC, Standards Committee July 21, 2021 Meeting Minutes at 3, https://www.nerc.com/comm/SC/Agenda%20Highlights%20and%20Minutes/SC_July_Meeting_Minutes_Approved_September_23_%202021.pdf.

comment period.[6] The comments were reviewed and the definitions revised; the use of the term "Power Electronic Device" was discontinued.

D. Issuance of Federal Energy Regulatory Commission Order No. 901

On October 19, 2023, the Commission issued Order No. 901[7] directing NERC to develop new or modified Reliability Standards addressing reliability concerns related to IBRs. With the issuance of Order 901, NERC determined that a single drafting team should move forward with a definition of IBR. The Project 2020-06 drafting team was selected to lead this effort.

E. First Formal Posting – Comment Period and Initial Ballot

On November 15, 2023, the Standards Committee authorized the initial posting of the proposed definitions for Inverter-Based Resource and IBR Unit and the associated Implementation Plan for a 45-day formal comment period.[8] The initial posting took place from November 16, 2023 through January 9, 2024, with parallel initial ballots conducted during the last 12 days of the comment period from December 29, 2023 through January 9, 2024.[9] The results for the initial ballot are summarized below:

- Proposed definition of Inverter-Based Resource (IBR) received 43.82 percent approval, reaching quorum at 89.36 percent of the ballot pool.[10]
- Proposed definition of IBR Unit received 45.04 percent approval, reaching quorum at 89.68 percent of the ballot pool.[11]

---

6 *See* Exhibit D, Complete Record of Development at items 12,14.

7 *Reliability Standards to Address Inverter-Based Resources*, Order No. 901, 185 FERC ¶ 61,042 (2023).

8 *See* NERC, Standards Committee November 15, 2023 Meeting Minutes at 2, https://www.nerc.com/comm/SC/Agenda%20Highlights%20and%20Minutes/SC%20November%20Minutes%20-%20Approved%20December%2013,%202023.pdf.

9 *See* Exhibit D, Complete Record of Development at item 20.

10 *Id.* at item 25.

11 *Id.* at item 26.

- Proposed IBR-related Definitions Implementation Plan received 58.52 percent approval, reaching quorum at 88.93 percent of the ballot pool.[12]

There were 73 sets of responses, including comments from approximately 179 different individuals and approximately 113 companies, representing all 10 industry segments.[13]

F. Second Formal Posting - Comment Period and Additional Ballot

The second draft of the proposed definitions of Inverter-Based Resource and IBR Unit and the associated Implementation Plan were posted for a 47-day formal comment period from February 22, 2024 through April 8, 2024, with a parallel additional ballot held from March 29, 2024 through April 8, 2024.[14] The results for the ballots are summarized below:

- Proposed definition of Inverter-Based Resource (IBR) received 67.55 percent approval, reaching quorum at 83.33 percent of the ballot pool.[15]
- Proposed definition of IBR Unit received 61.07 percent approval, reaching quorum at 83.27 percent of the ballot pool.[16]
- Proposed IBR-related Definitions Implementation Plan received 70.04 percent approval, reaching quorum at 83.21 percent of the ballot pool.[17]

There were 49 sets of responses, including comments from approximately 144 different individuals and approximately 102 companies, representing all 10 industry segments.[18] Following this posting, the drafting team determined to discontinue the proposed definition of IBR Unit.

---

12 *Id.* at item 27.

13 *Id.* at items 21, 22.

14 *Id.* at item 33.

15 *Id.* at item 38.

16 *Id.* at item 39.

17 *Id.* at item 40.

18 *Id.* at items 34, 35.

G. Third Posting – Comment Period and Additional Ballot

The proposed definition of Inverter-Based Resource (IBR) and the associated Implementation Plan were posted for a 32-day formal comment period from July 12, 2024 through August 12, 2024, with a parallel additional ballot held from August 2, 2024 through August 12, 2024. [19] The results for the ballots are summarized below:

- Proposed definition of Inverter-Based Resource received 91.57 percent approval, reaching quorum at 85.46 percent of the ballot pool.[20]
- Proposed IBR-related Definitions Implementation Plan received 92.45 percent approval, reaching quorum at 85 percent of the ballot pool.[21]

There were 52 sets of responses, including comments from approximately 147 different individuals and approximately 100 companies, representing all 10 industry segments.[22]

H. Final Ballot

The proposed definition of Inverter-Based Resource (IBR) and the associated Implementation Plan were posted for a 10-day final ballot period from September 3, 2024 through September 12, 2024.[23] The final ballot for the proposed definition of Inverter-Based Resource (IBR) reached quorum at 90.07 percent of the ballot pool, receiving support from 92.82 percent of the voters.[24] The final ballot for the Implementation Plan reached quorum at 89.64 percent of the ballot pool, receiving support from 96.66 percent of the voters.[25]

---

19 *Id.* at item 53.

20 *Id.* at item 59.

21 *Id.* at item 60.

22 *Id.* at items 55, 56.

23 *Id.* at item 68.

24 *Id*. at item 69.

25 *Id*. at item 70.

I. Board of Trustees Adoption

The NERC Board of Trustees adopted the proposed definition of Inverter-Based Resource (IBR) on October 8, 2024.[26]

[26] *See* NERC Board of Trustees October 8, 2024 Agenda Package, Agenda Item 2a (Project 2020-06 Verifications of Models and Data for Generators), https://www.nerc.com/gov/bot/Agenda%20highlights%20and%20Mintues%202013/Board%20of%20Trustees%20Open%20Meeting%20Agenda%20Package%20October%208%202024%20Attendees.pdf.

Complete Record of Development

(Items 43-46, pertaining to a Standard Authorization Request for this project to address later FERC Order No. 901 milestones, are omitted from this filing.)

Project 2020-06 Verifications of Models and Data for Generators

Related Files

Status

The final ballot for the **Inverter-Based Resource Glossary Term** concluded **8 p.m. Eastern, Thursday, September 12, 2024.** The voting results can be accessed via the links below. The definition and its implementation plan will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

Background

The NERC Inverter-based Resource (IBR) Performance Task Force (IRPTF) undertook an effort to perform a comprehensive review of all NERC Reliability Standards to determine if there were any potential gaps or improvements. The IRPTF identified several issues as part of this effort and documented its findings and recommendations in the "IRPTF Review of NERC Reliability Standards White Paper," which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed. The RSTC endorsed the SAR on June 10, 2020.

Consistent with the IRPTF recommendations, the scope of the proposed SAR includes revisions to NERC Reliability Standards MOD-026-1 and MOD-027-1. Standards MOD-026-1 and MOD-027- 1 require, among other things, Generator Owners to provide verified dynamic models to their Transmission Planner for the purposes of power system planning studies. Both standards contain language that is specific to synchronous generators that is not applicable to IBRs. The IRPTF recommended revisions to clarify the applicable requirements for synchronous generators and IBRs. As such, the SAR proposes revisions to MOD-026-1 and MOD-027-1 to clarify requirements related to IBRs and to require sufficient model verification to ensure accurate generator representation in dynamic simulations. The Standards Committee accepted the SAR and authorized posting at its September 24, 2020 meeting.

Standard(s) Affected – MOD-026-1 Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions | MOD-027-1 Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

Purpose/Industry Need

Project 2020-02 Transmission-connected Dynamic Reactive Resources SAR was posted from March 30 to May 13, 2020, and members of a SAR DT were solicited. However, Project 2020-02 was paused indefinitely, and a SAR DT was not appointed. Subsequently, a second SAR involving similar standards, namely MOD-026 and MOD-027, was being drafted by the IRPTF and approved for posting in September 2020 by the Standards Committee. The Project 2020-06 Verifications of Models and Data for Generators SAR will be posted for industry comment, and additional nominees with MOD-026/027 background will be sought. A single SAR DT will be charged with determining whether to combine the two projects and drafting a combined SAR.

See Project 2020-02 Transmission-connected Dynamic Reactive Resources for additional purpose statement.

Subscribe to this project's observer mailing list

Select "NERC Email Distribution Lists" from the "Service" drop-down menu and specify "Project 2020-06 Verifications of Models and Data for Generators" in the Description Box.

Draft	Actions	Dates	Results	Consideration of Comments
Final Ballot **Inverter-Based Resource Glossary Term** **(63)** Clean Implementation Plan **(64)** Clean | **(65)** Redline **Supporting Materials** Technical Rationale **(66)** Clean | **(67)** Redline	Final Ballot **(68)** Info Vote	09/03/24 - 09/12/24	Ballot Results **(69)** IBR Definition **(70)** Implementation Plan	
(61) Inverter-based (IBR) Definition **(62)**Implementation Plan	For informational purposes. These documents will be presented to the Board of Trustees	08/15/24		
Draft 3 **Inverter-based Resource Glossary Term** **(47)** Clean | **(48)** Redline **(49)** Implementation Plan **Supporting Materials** **(50)** Unofficial Comment Form (Word) Technical Rationale **(51)** Clean | **(52)** Redline	Additional Ballots **(57)** Updated Info **(58)** Info Vote	08/02/24 - 08/12/24 (updated)	Ballot Results **(59)** IBR Definition **(60)** Implementation Plan	**(56)** Consideration of Comments
	Comment Period **(53)** Updated Info **(54)** Info Submit Comments	07/12/24 - 08/12/24 (updated)	**(55)** Comments Received	
(43)Standard Authorization Request Supporting Materials **(44)** Unofficial Comment Form (Word)	Comment Period **(45)** Info Submit Comments	05/23/24 - 06/26/24	**(46)**Comments Received	
Drafting Team Nominations **Supporting Materials** **(41)** Unofficial Nomination Form (Word)	Nomination Period **(42)** Info Submit Nominations	05/23/24 - 06/26/24		
Draft 2 **Inverter-based Resource Glossary Terms** **(28)** Clean | **(29)** Redline to Last Posted **(30)** Implementation Plan **Supporting Materials** **(31)** Unofficial Comment Form (Word) **(32)** Technical Rationale	Additional Ballots **(36)** Ballot Open Reminder **(37)** Info Vote	03/29/24 - 04/08/24	Ballot Results **(38)** Inverter-based Resource (IBR) **(39)** IBR Unit **(40)** IBR-related Definitions Implementation Plan	
	Comment Period **(33)** Info Submit Comments	02/22/24 - 04/08/24	(34) Comments Received	**(35)** Consideration of Comments
Draft 1 **(17)** Inverter-based Resource Glossary Terms **(18)** Implementation Plan **Additional Materials** **(19)** Unofficial Comment Form (Word)	Initial Ballots **(23)** Ballot Open Reminder **(24)** Info (Updated 11/20/23) Vote	12/29/23 - 01/09/24	Ballot Results **(25)** Inverter-Based Resource (IBR) **(26)** IBR Unit IBR-related Definitions **(27)** Implementation Plan	
	Join Ballot Pools	11/16/23 - 12/15/23		
	Comment Period **(20)** Info(Updated 11/20/23) Submit Comments	11/16/23 - 01/09/24	**(21)** Comments Received	**(22)** Consideration of Comments

(12) Inverter-based Resource Glossary Terms **Additional Materials** **(13)** Unofficial Comment Form (Word)	Comment Period **(14)** Info Submit Comments	09/18/23 - 10/24/23	**(15)** Comments Received	**(16)** Summary Response to Comments

Standard Authorization Request (IBR) **(8)** Clean | **(9)** Redline **Standard Authorization Request (transmission-connected dynamic reactive resources)** **(11)** Clean | **(12)** Redline	Accepted by the Standards Committee	07/21/21		
Drafting Team Nominations **Supporting Materials** **(6)** Unofficial Nomination Form (Word)	Nomination Period **(7)** Info Submit Nominations	12/16/20 - 01/14/21		
(1)Standard Authorization Request **Supporting Materials** **(2)** Unofficial Comment Form (Word)	Comment Period **(3)** Info Submit Comments	12/16/20 - 01/14/21	**(4)** Comments Received	**(5)** Summary Response to Comments

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	MOD-026-1 Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions, MOD-027-1 Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions		
Date Submitted:	June 10, 2020		
SAR Requester			
Name:	Allen Shriver, Chair Jeffery Billo, Vice Chair		
Organization:	Inverter-Based Resource Performance Task Force (IRPTF)		
Telephone:	Allen: 561-904-3234 Jeffery: 512-248-6334	Email:	Allen.Schriver@NextEraEnergy.com Jeff.Billo@ercot.com

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☐ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☐ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☐ Regulatory Initiation	☒ NERC Standing Committee Identified
☐ Emerging Risk (Reliability Issues Steering Committee) Identified	☐ Enhanced Periodic Review Initiated
☐ Reliability Standard Development Plan	☒ Industry Stakeholder Identified

Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

The NERC Inverter-based Resource Performance Task Force (IRPTF) undertook an effort to perform a comprehensive review of all NERC Reliability Standards to determine if there were any potential gaps or improvements based on the work and findings of the IRPTF. The IRPTF identified several issues as part of this effort and documented its findings and recommendations in a white paper. The "IRPTF Review of NERC Reliability Standards White Paper" was approved by the Operating Committee and the Planning Committee in March 2020. Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed.

Requested information
MOD-026-1 and MOD-027-1 require, among other things, GOs to provide verified dynamic models to their Transmission Planner (TP) for the purposes of power system planning studies. Both standards contain language that is specific to synchronous generators and is not applicable to inverter-based resources (IBRs). For example, sub-requirement 2.1.3 in MOD-026-1 states that each verification shall include "model structure and data including, but not limited to reactance, time constants, saturation factors, total rotational inertia…" The standards should be revised to clarify the applicable requirements for synchronous generators and IBRs. For example, total rotational inertia should not be required for IBRs, while voltage ride-through control settings should only be required of IBRs and not synchronous generators. Additionally, to some degree, all dynamic model parameters affect the response of a represented resource in dynamic simulations performed by power engineers. Accurate model response is required for the engineers to adequately study system conditions. Hence, it is crucial that all parameters in a model be verified in some way. However, a significant number of parameters in the models are not verified in the typical verification tests used to comply with MOD-026-1 and MOD-027-1. For example, the test currently used to comply with MOD-026-1 does not verify the model parameters associated with voltage control behavior during large disturbance conditions.
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
This SAR proposes to revise MOD-026-1 and MOD-027-1 and/or create a new standard to clarify requirements related to IBRs and to require sufficient model verification to ensure accurate generator representation in dynamic simulations.
Project Scope (Define the parameters of the proposed project):
The proposed scope of this project is as follows: a. Update requirement language to better reflect all types of generation resources and not just synchronous resources. b. Consider ways to require sufficient model verification to ensure accurate generator representation in dynamic simulations of typical phenomena that would be studied by power system engineers, including large disturbances.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
NERC MOD-026-1 focuses on verification of data for generator excitation control system or plant volt/var control functions and MOD-027-1 focuses on verification of data for turbine-governor and load control or active power-frequency control functions. Specifically, MOD-026-1 states in footnote 1 that the excitation control system for aggregate generating plants (i.e., wind and solar PV) includes the volt/var control system including the voltage regulator and reactive power control system controlling and coordinating

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information
plant voltage and associated reactive capable resources. This language is slightly ambiguous on whether the verification activities include the inverter-level parameter values of the dynamic models. Various testing engineers and entities have stated that they are uncertain as to whether the standard applies to the plant-level parameters or the aggregate representation of the inverter-level settings. Most commonly, verification test reports for inverter-based resources involve a small set of small disturbance tests including, but not limited to, the following: • Capacitor switching test • Plant-level voltage or reactive power reference step test • Plant-level frequency reference step test • Plant-level frequency play-in or step test These tests do not perturb the generating resource such that the parameter values that dictate the large disturbance behavior of the resource are verified in any way. While some incorrect model parameters may be identified during these tests, the tests do not verify that the parameters selected for the model accurately capture the full dynamic behavior of the resource. This gives a false impression to TPs and PCs that the full set of parameters are verified for use in planning studies. This issue is one of the predominant reasons why ride-through operation modes such as momentary cessation were able to persist and promulgate in IBRs without the knowledge of planners and system operators until the Blue Cut Fire and Canyon 2 Fire events exposed them. The dynamic models did not accurately represent this large disturbance behavior due to the model deficiency and because certain key parameters that govern large disturbance response were incorrectly parameterized. However, many of the same plants that entered momentary cessation mode during these events were able to provide verification reports that demonstrated that the small disturbance behavior driven mainly by plant-level control settings reasonably matched modeled performance in compliance with these standards.
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The SAR proposes to clarify and address gaps in the requirements in MOD-026-1 and MOD-027-1. The cost impact is unknown.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
The abovementioned reliability gap exists for both synchronous generators and IBRs. However, it is potentially more severe for IBRs since their behavior is based more on programmable control functions than for synchronous generators which have behavior that is based more on the physical characteristics of the machine. Additionally, the IRPTF noted that it is not feasible to stage large disturbances for verification purposes, so other methods for verification of model performance under large disturbance conditions may need to be developed.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission

Requested information
Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
Transmission Planner, Generator Owner, Planning Coordinator
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
This issue was captured in the "IRPTF Review of NERC Reliability Standards White Paper" which was approved by the Operating Committee and the Planning Committee. Additionally, the issue was discussed in the IRPTF-produced "Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources" reliability guideline.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
N/A
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.
The IRPTF did not identify any alternatives since there are gaps in the existing language for MOD-026-1 and MOD-027-1 that need to be resolved.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
None	N/A

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☐ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Project 2020-06 Verification of Models and Data for Generators Standard Authorization Request

Do not use this form for submitting comments. Use the Standards Balloting and Commenting System to submit comments on the **Project 2020-06 Verification of Models and Data for Generators Standard Authorization Request** by **8 p.m. Eastern, Thursday, January 14, 2021.**

Additional information is available on the project page. If you have questions, contact Senior Standards Developer, Chris Larson (via email), or at 404-446-9708.

Background

The NERC Inverter-based Resource (IBR) Performance Task Force (IRPTF) undertook an effort to perform a comprehensive review of all NERC Reliability Standards to determine if there were any potential gaps or improvements. The IRPTF identified several issues as part of this effort and documented its findings and recommendations in the "IRPTF Review of NERC Reliability Standards White Paper," which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed. The RSTC endorsed the SAR on June 10, 2020.

Consistent with the IRPTF recommendations, the scope of the proposed SAR includes revisions to NERC Reliability Standards MOD-026-1 and MOD-027-1. Standards MOD-026-1 and MOD-027- 1 require, among other things, Generator Owners to provide verified dynamic models to their Transmission Planner for the purposes of power system planning studies. Both standards contain language that is specific to synchronous generators that is not applicable to IBRs. The IRPTF recommended revisions to clarify the applicable requirements for synchronous generators and IBRs. As such, the SAR proposes revisions to MOD-026-1 and MOD-027-1 to clarify requirements related to IBRs and to require sufficient model verification to ensure accurate generator representation in dynamic simulations. The Standards Committee accepted the IRPTF SAR and authorized posting at its September 24, 2020 meeting.

Project 2020-02 Transmission-connected Dynamic Reactive Resources SAR was posted from March 30 to May 13, 2020, and members of a SAR DT were solicited. However, Project 2020-02 was paused indefinitely, and a SAR DT was not appointed. Subsequently, a second SAR involving similar standards, namely MOD-026 and MOD-027, was being drafted by the IRPTF and approved for posting in September 2020 by the Standards Committee. The Project 2020-06 Verifications of Models and Data for Generators SAR will be posted for industry comment, and additional nominees with MOD-026/027 background will be sought. A single SAR DT will be charged with determining whether to combine the two projects and drafting a combined SAR.

Questions

1. Do you agree with the proposed scope as described in the SAR? If you do not agree, or if you agree but have comments or suggestions for the project scope please provide your recommendation and explanation.

   ☐ Yes
   ☐ No

   Comments:

2. In your opinion, should the project scopes of Project 2020-02 Transmission-connected Dynamic Reactive Resources (MOD-026/027 portions only) and Project 2020-06 be combined under a single project, with a single standard drafting team? Please explain.

   ☐ Yes
   ☐ No

   Comments:

3. Provide any additional comments for the SAR drafting team to consider, if desired.

   Comments:

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Standard Authorization Request

Informal Comment Period Open through January 14, 2021

Now Available

An informal comment period for the **Project 2020-06 Verifications of Models and Data for Generators Standard Authorization Request (SAR)**, is open through **8 p.m. Eastern, Thursday, January 14, 2021**.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. Contact Linda Jenkins regarding issues using the SBS. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Background

Project 2020-02 Transmission-connected Dynamic Reactive Resources SAR was posted from March 30 to May 13, 2020, and members of a SAR DT were solicited. However, Project 2020-02 was paused indefinitely, and a SAR DT was not appointed. Subsequently, a second SAR involving similar standards, namely MOD-026 and MOD-027, was being drafted by the IRPTF and approved for posting in September 2020 by the Standards Committee. The Project 2020-06 Verifications of Models and Data for Generators SAR will be posted for industry comment, and additional nominees with MOD-026/027 background will be sought. A single SAR DT will be charged with determining whether to combine the two projects and drafting a combined SAR.

Next Steps

The SAR drafting team will review all responses received during the comment period and determine the next steps of the project.

For more information on the Standards Development Process, refer to the Standard Processes Manual.

Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify "Project 2020-06 Verifications of Models and Data for Generators" in the Description Box. For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Comment Report

Project Name:	2020-06 Verification of Models and Data for Generators | Standard Authorization Request
Comment Period Start Date:	12/16/2020
Comment Period End Date:	1/14/2021
Associated Ballots:	

There were 35 sets of responses, including comments from approximately 112 different people from approximately 87 companies representing 10 of the Industry Segments as shown in the table on the following pages.

Questions

1. Do you agree with the proposed scope as described in the SAR? If you do not agree, or if you agree but have comments or suggestions for the project scope please provide your recommendation and explanation.

2. In your opinion, should the project scopes of Project 2020-02 Transmission-connected Dynamic Reactive Resources (MOD-026/027 portions only) and Project 2020-06 be combined under a single project, with a single standard drafting team? Please explain.

3. Provide any additional comments for the SAR drafting team to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
MRO	Dana Klem	1,2,3,4,5,6	MRO	MRO NSRF	Joseph DePoorter	Madison Gas & Electric	3,4,5,6	MRO
					Larry Heckert	Alliant Energy	4	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jodi Jensen	Western Area Power Administration	1,6	MRO
					Andy Crooks	SaskPower Corporation	1	MRO
					Bryan Sherrow	Kansas City Board of Public Utilities	1	MRO
					Bobbi Welch	Omaha Public Power District	1,3,5,6	MRO
					Jeremy Voll	Basin Electric Power Cooperative	1	MRO
					Bobbi Welch	Midcontinent ISO	2	MRO
					Douglas Webb	Kansas City Power & Light	1,3,5,6	MRO
					Fred Meyer	Algonquin Power Co.	1	MRO
					John Chang	Manitoba Hydro	1,3,6	MRO
					James Williams	Southwest Power Pool, Inc.	2	MRO
					Jamie Monette	Minnesota Power / ALLETE	1	MRO
					Jamison Cawley	Nebraska Public Power	1,3,5	MRO
					Sing Tay	Oklahoma Gas & Electric	1,3,5,6	MRO
					Terry Harbour	MidAmerican Energy	1,3	MRO

					Troy Brumfield	American Transmission Company	1	MRO
PJM Interconnection, L.L.C.	Elizabeth Davis	2	RF	ISO/RTO Council (IRC) Standards Review Committee (SRC)	Mike Del Viscio	PJM Interconnection	2	RF
					Becky Davis	PJM Interconnection	2	RF
					Gregory Campoli	New York Independent System Operator	2	NPCC
					Charles Yeung	Southwest Power Pool, Inc. (RTO)	2	MRO
					Kathleen Goodman	ISO-NE	2	NPCC
					Helen Lainis	IESO	2	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	RF
					Jamie Johnson	California ISO	2	WECC
Duke Energy	Kim Thomas	1,3,5,6	FRCC,RF,SERC,Texas RE	Duke Energy	Laura Lee	Duke Energy	1	SERC
					Dale Goodwine	Duke Energy	5	SERC
					Greg Cecil	Duke Energy	6	RF
FirstEnergy - FirstEnergy Corporation	Mark Garza	1,3,4,5,6		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Ann Carey	FirstEnergy - FirstEnergy Solutions	6	RF
					Mark Garza	FirstEnergy- FirstEnergy	4	RF
Southern Company - Southern Company Services, Inc.	Pamela Hunter	1,3,5,6	SERC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company -	3	SERC

						Alabama Power Company		
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Jim Howell	Southern Company - Southern Company Services, Inc. - Gen	5	SERC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC Regional Standards Committee	Guy V. Zito	Northeast Power Coordinating Council	10	NPCC
					Randy MacDonald	New Brunswick Power	2	NPCC
					Glen Smith	Entergy Services	4	NPCC
					Alan Adamson	New York State Reliability Council	7	NPCC
					David Burke	Orange & Rockland Utilities	3	NPCC
					Michele Tondalo	UI	1	NPCC
					Helen Lainis	IESO	2	NPCC
					David Kiguel	Independent	7	NPCC
					Paul Malozewski	Hydro One Networks, Inc.	3	NPCC
					Nick Kowalczyk	Orange and Rockland	1	NPCC
					Joel Charlebois	AESI - Acumen Engineered Solutions International Inc.	5	NPCC
					Mike Cooke	Ontario Power Generation, Inc.	4	NPCC

Salvatore Spagnolo	New York Power Authority	1	NPCC
Shivaz Chopra	New York Power Authority	5	NPCC
Deidre Altobell	Con Ed - Consolidated Edison	4	NPCC
Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
Cristhian Godoy	Con Ed - Consolidated Edison Co. of New York	6	NPCC
Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
Nurul Abser	NB Power Corporation	1	NPCC
Randy MacDonald	NB Power Corporation	2	NPCC
Michael Ridolfino	Central Hudson Gas and Electric	1	NPCC
Vijay Puran	NYSPS	6	NPCC
ALAN ADAMSON	New York State Reliability Council	10	NPCC
Sean Cavote	PSEG - Public Service Electric and Gas Co.	1	NPCC
Brian Robinson	Utility Services	5	NPCC
Quintin Lee	Eversource Energy	1	NPCC
Jim Grant	NYISO	2	NPCC

					John Pearson	ISONE	2	NPCC
					John Hastings	National Grid USA	1	NPCC
					Michael Jones	National Grid USA	1	NPCC
					Nicolas Turcotte	Hydro-Qu?bec TransEnergie	1	NPCC
					Chantal Mazza	Hydro-Quebec	2	NPCC
Southwest Power Pool, Inc. (RTO)	Shannon Mickens	2	MRO,SPP RE	SPP RTO	Shannon Mickens	Southwest Power Pool Inc.	2	MRO
					Sunny Raheem	Southwest Power Pool Inc.	2	MRO
					Doug Bowman	Southwest Power Pool Inc.	2	MRO
OGE Energy - Oklahoma Gas and Electric Co.	Sing Tay	1,3,5,6	SPP RE	OKGE	Sing Tay	OGE Energy - Oklahoma	6	MRO
					Terri Pyle	OGE Energy - Oklahoma Gas and Electric Co.	1	MRO
					Donald Hargrove	OGE Energy - Oklahoma Gas and Electric Co.	3	MRO
					Patrick Wells	OGE Energy - Oklahoma Gas and Electric Co.	5	MRO

1. Do you agree with the proposed scope as described in the SAR? If you do not agree, or if you agree but have comments or suggestions for the project scope please provide your recommendation and explanation.

Kelsi Rigby - APS - Arizona Public Service Co. - 1,3,5,6

Answer	No
Document Name	

Comment

AZPS generally agrees with the proposed scope of the SAR. However, the testing methodology needs to be based on standard industry practices. Also, in some cases, modeling can be performed using information obtained from the generator owner without requiring a model verification test.

AZPS agrees with the SAR that reliability gaps are much less for synchronous generators which have behavior that is based more on the physical characteristics of the machine. Therefore, AZPS does not support significant changes or more prescriptive requirements with regards to model validation for synchronous generators.

Likes 0	
Dislikes 0	

Response

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC

Answer	No
Document Name	

Comment

No evidence is provided in the SAR or the referenced white papers that the existing method of model verification as required by MOD-026/027 is insufficient for synchronous generators, yet the SAR proposes a significant time and cost increase on synchronous generator GOs to perform additional verification.

Likes 0	
Dislikes 0	

Response

Richard Jackson - U.S. Bureau of Reclamation - 1,5

Answer	No
Document Name	

Comment

Please see the response to question 2 regarding scope. Prior to proposing additional modifications, Reclamation recommends the SDT take additional time to completely identify the scope of the Standard Authorization Request to account for future potential compliance issues. This will provide economic relief for entities by minimizing the costs associated with the planning and adjustments required to achieve compliance with frequently changing standard versions. NERC should foster a compliance environment that will allow entities to fully implement technical compliance with current standards before moving to subsequent versions.

Likes 0	
Dislikes 0	

Response

Douglas Webb - Evergy - 1,3,5,6 - MRO

Answer	No
Document Name	

Comment

Evergy incorporates by reference the Edison Electric Institute's response to Question 1.

Likes 0	
Dislikes 0	

Response

Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC

Answer	No
Document Name	

Comment

Tacoma Power does not agree that changes to MOD-026 and MOD-027 are justified. The modeling standards are all encompassing and do not directly address any specific type of asset. There are specific models for the various resources. If additional models are required to account for new resources such as inverter-based, then new models should be developed to account for such resources. The intent of the proposed changes seem to be focused on performance and should be addressed by other standards such as BAL or VAR standards.

Likes 0	
Dislikes 0	

Response

Daniel Gacek - Exelon - 1,3,5,6

Answer	No

Document Name	
Comment	
Exelon generally supports the SAR, however we agree with the concerns regarding the scope of the SAR as stated in the comments submitted by the EEI. .	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	No
Document Name	
Comment	
OKGE agrees with the concerns as stated in the comments submitted by EEI.	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	

EEI generally supports the proposed scope in principle but recommends that the scope reflect the gap(s) identified in the referenced white papers. Additionally, if Project 2020-02 and Project 2020-06 are combined as described in question 2 (below), additional industry review and comment will be necessary. Relative to the current SAR, we offer the following suggestions:

1. Project Scope language for Item a.: Develop requirements that provide Transmission Planning (TP) and Generator Owners (TO) needed direction and latitude in specifying and delivering generating unit resource data that can be used for the development of dynamic models that reflect resource performance regardless of the resource type.
2. Project Scope language for Item b: Develop requirements that provide Transmission Planners the flexibility to specify model parameters that align with the resource types that are used in their dynamic simulations so that BES reliability under their purview can be accurately assessed.
3. Replace phrases such as “consider ways” in the SAR because such terms are open ended and not actionable.

4. Remove the phrase “all types” and provide Transmission Planners the ability to define the needed model parameters that align with the resource types under their purview. This will ensure model parameters are based on good engineering judgement.
5. Replace the term “sufficient” because the term is too vague to provide needed direction and scope to the SDT.

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 3,5,6

Answer	Yes
Document Name	

Comment

AEP agrees in principle with the overall scope and direction of this proposed SAR. AEP also believes there is merit in developing new standard(s) rather than modifying the existing MOD-026 and MOD-027 standards. The technological difference of IBRs as compared to synchronous generators is obviously significant, and as alluded to in the draft SAR, the modeling information needed would be quite different as well. This difference is significant enough that modifying MOD-026 and MOD-027 to accommodate new IBR obligations will result in overly complex versions of those two standards. Therefore, AEP recommends that new standards be pursued for IBRs rather than modifying MOD-026 and MOD-027, though MOD-026/027 may need to be modified to remove the present references to IBRs.

Likes 0	
Dislikes 0	

Response

Leonard Kula - Independent Electricity System Operator - 2

Answer	Yes
Document Name	

Comment

N/A.

Likes 0	
Dislikes 0	

Response

Rachel Coyne - Texas Reliability Entity, Inc. - 10

Answer	Yes
Document Name	

Comment
Yes Texas RE agrees with the scope of the Project 2020-06 as described in the Standard Authorization Request (SAR). Texas RE notes that the SAR states “the IRPTF noted that it is not feasible to stage large disturbances for verification purposes, so other methods for verification of model performance under large disturbance conditions may need to be developed.” The Standard drafting team (SDT) could consider modifying the MOD-026 and MOD-027 testing requirements to include large disturbances, both inside and outside the GOs’ planning areas, in addition to the small disturbances as is required currently. As an alternative, the SDT should consider modifying MOD-033 as an alternative for large disturbance verification. MOD-033-1 only requires the Planning Coordinator (PC) to perform one comparison of the performance of the PC’s portion of the existing system in a planning dynamic model to actual system response once every 24 months, and allows the PC to select the dynamic local event for which the comparison is performed. The standard could be modified to require comparisons for a defined subset of large disturbances, and require notification to the GO and GO model parameter verification when the comparison identifies issues. Texas RE encourages the drafting team to work with the IRPTF (now IRPWG) to develop methods for this type of test.

Likes 0	
Dislikes 0	

Response

Jamie Prater - Entergy - 5,6	
Answer	Yes
Document Name	

Comment
Entergy's primary comment would be to support this SAR. Most models for the Inverter-based Resources that we initially receive from the Interconnection Customers use generic parameters. We can identify obvious errors with some modeling parameters; however, sufficient MOD-026/027 model verification is needed to ensure the models are parameterized such that they provide accurate dynamic responses for small and large disturbances. As outlined in this SAR, the existing MOD-026/027 requirements do not allow for adequate verification of the IBR model particularly for large disturbances. For improved clarity, Requirement 2 of MOD-026/027 should specifically mention data needs associated with frequency/voltage ride through, momentary cessation, low/high voltage logic, and active/reactive power control settings although all parameters of acceptable models still need to be verified and provided. Also, given that most inverter-based resources operate in plant-level control, to verify the appropriate plant level controller parameters, multiple solar cells or wind turbines should be online during the test and specified as a requirement for MOD-026/027 verification.

Likes 0	
Dislikes 0	

Response

Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	

While the MRO NSRF understands the FERC and NERC concern that existing small disturbance testing does not adequately verify model parameters to capture the full dynamic behavior of the generation resource, it has concerns on mandating the scope of large disturbance testing that includes:

1. Testing of commercial and utility scale inverter-based systems should not mandate testing of individual inverters as this would be cost prohibitive and inefficient which are contrary to good standards development. Testing at the individual inverter level should be explicitly excluded in the MOD-026 / and MOD-027 applicability section similar to PRC-005.

2. Staged voltage testing greater than nearby capacitor bank switching or voltage reference step testing for MOD-026 is problematic. Creating a disturbance larger than nearby capacitor bank switching could induce a transmission system disturbance.

3. Staged frequency testing beyond frequency reference step tests and outside of deadbands for MOD-027 is problematic and could induce a transmission system disturbance. Only distribution / transmission system disturbances have capability to move interconnection level frequencies outside of deadbands unless the inverter-based system is very small.

4. The MRO NSRF agrees with the NERC IRPTF that it's not feasible to stage large disturbances for verification purposes. Therefore, any mandatory requirements of modifications should include alternatives such as operational recording of voltage and frequency responses due to nearby system disturbances. Any large disturbance testing should not have the potential to cause damage to the generator or the transmission system.

Likes 0	
Dislikes 0	
Response	

Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	Yes
Document Name	
Comment	

MPC supports comments submitted by the MRO NERC Standards Review Forum.

Likes 0	
Dislikes 0	
Response	

Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	
Answer	Yes

Document Name	
Comment	
Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	Yes
Document Name	
Comment	
MISO supports comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC). MISO agrees with requiring testing to verify parameters to be used in modeling and agrees with ensuring all technologies are included. The concern is ensuring the proposed scope of such testing is practical and does not introduce an undue testing burden that requires difficult field testing without the intended results. In addition, future test windows should be conducted in a timelier manner than the required ten years for Generator Owners/Operators to initially implement and report on these new tests.	
Likes 0	
Dislikes 0	
Response	
Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) comments for this project.	
Likes 0	
Dislikes 0	
Response	
Carl Pineault - Hydro-Qu?bec Production - 1,5	
Answer	Yes

Document Name	2020-06_Unofficial_Comment_Form_SAR_HQP_completed.docx
Comment	
Please send comments attached.	
Likes 0	
Dislikes 0	
Response	
Christopher McKinnon - Eversource Energy - 1,3	
Answer	Yes
Document Name	
Comment	
Eversource agrees with the SAR and adds that the Standards Committee should priortize this since there are several sizable IBR generation projects planned for New England in the near future. Please see comments in question 3.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	Yes
Document Name	
Comment	
The ISO/RTO Council (IRC) Standards Review Committee (SRC) agrees with requiring testing to verify parameters to be used in modeling and agrees with ensuring all technologies are included. The concern is ensuring the proposed scope of such testing is practical and does not introduce an undue testing burden that requires difficult field testing without the intended results. In addition, future test windows should be conducted in a timelier manner than the required ten years for Generator Owners/Operators to initially implement and report on these new tests.	
Likes 0	
Dislikes 0	
Response	
Brandon Gleason - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	

Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
See comments in #3 below.	
Likes 0	
Dislikes 0	
Response	
Amber Parker - Unisource - Tucson Electric Power Co. - NA - Not Applicable - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kjersti Drott - Tri-State G and T Association, Inc. - 1,3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anton Vu - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO, Group Name SPP RTO	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	

2. In your opinion, should the project scopes of Project 2020-02 Transmission-connected Dynamic Reactive Resources (MOD-026/027 portions only) and Project 2020-06 be combined under a single project, with a single standard drafting team? Please explain.

Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC

Answer	No
Document Name	

Comment

While Tacoma Power agrees that transmission connected Dynamic Reactive Resources that qualify as BES elements and meet the requirements of MOD-026 and MOD-027 should be modeled, modifications to the existing MOD standards are not required. MOD-026 as currently written sufficiently addresses Dynamic Reactive Resource response for various assets. MOD-027 does not have any implications to Dynamic “Reactive” Resources. Tacoma Power recommends that these deficiencies should be addressed by performance standards and not modeling standards. Any changes based on IBRs should also not be limited to “Reactive” capability since Real power capability is equally important to system reliability.

Likes 0	
Dislikes 0	

Response

Bobbi Welch - Midcontinent ISO, Inc. - 2

Answer	No
Document Name	

Comment

MISO recommends **Project 2020-02: Transmission Connected Resources** and **Project 2020-06: Verifications of Models and Data for Generators** be approved and tracked separately. While we support the SAR for **Project 2020-02: Transmission Connected Resources**, we would prioritize the work of **Project 2020-06: Verifications of Models and Data for Generators** to clarify required tests for generators, particularly ride-through capability of inverter-based resources, as a good first step prior to adding more equipment as that under **Project 2020-02.** In tying **Project 2020-06** to **Project 2020-02**, we are concerned that adding Transmission Owners and a host of additional transmission equipment to the scope of **MOD-026** and **MOD-027**, currently not covered under the scope of these standards, may delay the specifications needed for generator testing. That said, we are supportive of the same SDT working on both projects.

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 3,5,6

Answer	No
Document Name	

Comment
AEP recommends against combining the drafting teams of Project 2020-02 and 2020-06 for the efforts related to MOD-026 and MOD-027. While combining these two projects may appear to make logical sense from a topical standpoint, there are a number of reasons why these efforts should remain distinct: (1) the implementation plan of MOD-026 and MOD-027 is well-underway with obligations already being phased-in over time. Attempting to merge a new implementation plan involving dynamic reactive device requirements into the same standards would result in confusion. (2) There is technical merit in keeping the two projects and resulting standards separate because even though IBRs and dynamic reactive devices are both electronic-based, they are different enough in function and configuration to justify their own distinct efforts and resulting standards. (3) Differing Applicable Entities are involved: GOs in the case of IBRs, TOs in the case of dynamic reactive devices.

Likes 0	
Dislikes 0	

Response

Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company

Answer	Yes
Document Name	

Comment
By combining the two projects into a single project and a single standard drafting team could eliminate potential conflict between the two projects. Moreover, it should also improve the efficiency of the overall project.

Likes 0	
Dislikes 0	

Response

Constantin Chitescu - Ontario Power Generation Inc. - 5

Answer	Yes
Document Name	

Comment
OPG supports the comments from NPCC Regional Standards Committee

Likes 0	
Dislikes 0	

Response

Brandon Gleason - Electric Reliability Council of Texas, Inc. - 2

Answer	Yes
Document Name	
Comment	
ERCOT sees value in combining the projects, provided focus remains on model verification in the event the projects are combined.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	Yes
Document Name	
Comment	
The IRC SRC agrees in combining the scope of both Project 2020-02 and 2020-06, under Project 2020-06. We request the SAR Drafting Team to consider also combining MOD-026 and MOD-027 under one new dynamics Standard to allow for efficient and effective management of the documentation and testing that meets the Standard Requirements, along with the Subject Matter Expert's time / resources allocated to this Project work. *(Please note: MISO does not support the response to Question #2, thank you)*	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI supports the concept of combining the MOD-026/027 portions of Project 2020-02 into Project 2020-06, noting that the scope of Project 2020-02 includes addressing "all varieties of transmission-connected dynamic reactive resources that are utilized in providing ERS in the BES" (*see P20202-02 Scope*). This change represents a significant expansion of the Project 2020-06, so the revised SAR will need to be resubmitted for Industry review and comment.	
Likes 0	
Dislikes 0	

Response	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Exelon concurs with the Question 2 comment submitted by the EEI.	
Likes 0	
Dislikes 0	
Response	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC Regional Standards Committee	
Answer	Yes
Document Name	
Comment	
As both projects relate to the same standards, combining both projects would result in only one revision of MOD-026/027 standards. Each update of MOD-026/027 standards generates a considerable amount of work for stakeholders.	
Likes 0	
Dislikes 0	
Response	
Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO, Group Name SPP RTO	
Answer	Yes
Document Name	
Comment	
The SPP RTO supports a single project for the standards. We feel this effort will promote consistency and efficiency due to their requirement similarities in model verification.	
Likes 0	
Dislikes 0	
Response	

Douglas Webb - Evergy - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Evergy incorporates by reference the Edison Electric Institute's response to Question 2.	
Likes 0	
Dislikes 0	
Response	
Carl Pineault - Hydro-Qu?bec Production - 1,5	
Answer	Yes
Document Name	2020-06_Unofficial_Comment_Form_SAR_HQP_completed.docx
Comment	
Please find attached comments	
Likes 0	
Dislikes 0	
Response	
Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) comments for this project.	
Likes 0	
Dislikes 0	
Response	
Larry Heckert - Alliant Energy Corporation Services, Inc. - 4	

Answer	Yes
Document Name	
Comment	
No comments	
Likes 0	
Dislikes 0	
Response	
Leonard Kula - Independent Electricity System Operator - 2	
Answer	Yes
Document Name	
Comment	
N/A.	
Likes 0	
Dislikes 0	
Response	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	Yes
Document Name	
Comment	
To minimize churn among standard versions, Reclamation recommends the standard drafting team coordinate changes with other existing drafting teams for related standards; specifically, MOD-025, MOD-032, PRC-019, PRC-024, Project 2017-07, and the Standards Efficiency Review Phase 2.	
Likes 0	
Dislikes 0	
Response	
Kjersti Drott - Tri-State G and T Association, Inc. - 1,3,5	
Answer	Yes
Document Name	

Comment	
It is reasonable to combine the two projects under a single project to avoid redundant work.	
Likes 0	
Dislikes 0	
Response	
Bruce Reimer - Manitoba Hydro - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
In MH there are Transmission-connected Dynamic Reactive Resources (Ponton and Birchtree SVC stations) and Generation owned synchronous condenser machines, which all need to be modeled and validated for Transmission and Operations.	
Likes 0	
Dislikes 0	
Response	
Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
MOD-026 and MOD-027 have slight differences that complicate implementation in part because they were drafted by different teams. A single team to oversee revisions to both standards is recommended to ensure consistency.	
Likes 0	
Dislikes 0	
Response	
Kelsi Rigby - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	Yes
Document Name	
Comment	

APS supports combining the MOD-026/027 portions of Projects 2020-02 into 2020-06 and forming a single drafting team for MOD-026/027. APZS requests clarity that the Project 2020-02 drafting team will remain in place for MOD-025, PRC-019, and PRC-024 changes only.	
Likes 0	
Dislikes 0	
Response	
Sing Tay - OGE Energy - Oklahoma Gas and Electric Co. - 1,3,5,6, Group Name OKGE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Christopher McKinnon - Eversource Energy - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Cantwell - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
James Baldwin - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anton Vu - Los Angeles Department of Water and Power - 1,3,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Anthony Jablonski - ReliabilityFirst - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Amber Parker - Unisource - Tucson Electric Power Co. - NA - Not Applicable - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE does not have comments on this question.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	
Document Name	
Comment	
FirstEnergy supports the path of either combined or separate; whatever is chosen should offer the most efficient and expeditious means of completing this process.	
Likes 0	
Dislikes 0	
Response	

3. Provide any additional comments for the SAR drafting team to consider, if desired.

Kelsi Rigby - APS - Arizona Public Service Co. - 1,3,5,6

Answer	
Document Name	

Comment

AZPS generally agrees with the proposed scope of the SAR. However, the testing methodology needs to be based on standard industry practices. Also, in some cases, modeling can be performed using information obtained from the generator owner without requiring a model verification test.

Likes 0	
Dislikes 0	

Response

Matthew Nutsch - Seattle City Light - 1,3,4,5,6 - WECC

Answer	
Document Name	

Comment

Seattle City Light feels that there is not enough information to be able to agree with what is being proposed for verifying how a generator will respond to a large system disturbance. The following sentence from the SAR is concerning:

Additionally, the IRPTF noted that it is not feasible to stage large disturbances for verification purposes, so other methods for verification of model performance under large disturbance conditions may need to be developed.

There is seemingly no consideration of what the cost of these verifcations tests will be. Seatlle would like to know what the proposed methods are for this testing before agreeing with the SAR. That way potential cost of testing can be estimated. Testing generators is expensive and time consuming and generally the operating staff don't like it when we test units near their limits. magine what their response would be if we said we wanted to simulate a large system disturbance on this machine to see how it will behave.

Based on the current construciton of the SAR, Seattle feels that there has not been sufficient reason shown for additional testing on the synchornous machines. The SAR notes that the problem exists for inverter based equipment during disturbances but does not speak to the same problems occurring on synchronous equipment. This wholesale approach to the SAR seems to encumber synchronous units with testing that does not benefit them and undue costs.

Likes 0	
Dislikes 0	

Response

Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter

Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Richard Jackson - U.S. Bureau of Reclamation - 1,5	
Answer	
Document Name	
Comment	
Reclamation recommends the SAR drafting team thoughtfully assess the cost impacts (Cost Impact Assessment, page 3) associated with this SAR to effect changes in a cost-effective manner. The SAR proposes a significant increase in the scope of the affected standards, which will have a substantial impact on affected entities and should not be taken without appropriate cost consideration. Reclamation observes the Reliability Coordinator's new BES reliability constraints for outages and generation operations (not accounting for ramp testing or other generation system testing) and the new Energy Imbalance Market make testing generator resources in a dynamic model difficult without impacting those constraints. NERC Standards are beginning to conflict with daily operations and the Registered Entities are caught in the middle.	
Likes 0	
Dislikes 0	
Response	
Leonard Kula - Independent Electricity System Operator - 2	
Answer	
Document Name	
Comment	
N/A.	
Likes 0	
Dislikes 0	
Response	

Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	
Document Name	
Comment	
Consider reevaluating applicability of the Eastern Interconnection 100 MVA rating for generating units based on current and anticipated future influx of IBR's by considering a lower MVA threshold for NERC Standards MOD-026 and MOD-027.	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	
Document Name	
Comment	
After review of the Project 2020-06 SAR and its inclusion of IBR, BPA observed that our comments were not considered from the previous SAR comment period for Project 2020-02, Transmission Connected Resources. BPA would like to reiterate our recommendation in our comments below, as BPA believes revisiting the applicability threshold is needed to capture the renewable generation capability that is currently planned/projected to be introduced to the Bulk Power System (BPS). BPA is raising this concern and recommendation again, recognizing that once this SAR moves to the Standard Development phase, it will be difficult to introduce the concept of capturing the small renewable generation influx on the BPS, as it may fall outside the scope of the SAR. BPA believes this would bolster the reliability of the BPS by allowing for more accurate models that reflect a comprehensive data set. BPA Comments from 5/13/20: Project 2020-02 - TCR SAR BPA believes this is a timely and much needed effort to ensure transmission-connected reactive resources have validated dynamic models, and appropriate system performance. The Western Interconnection is undergoing significant transformation with its generation mix. Many of the large coal-fired and nuclear power plants have retired or are scheduled to retire. These generators are replaced with renewable plants, which are usually smaller in size. The current 75 MW threshold represented 80% of generating capacity in the Western Interconnection in 2007. However, with the retirement of large synchronous generators and addition of smaller renewable plants, the threshold is now lower. As such, BPA requests the drafting team to revisit the applicability threshold in MOD-026/27 Reliability Standards for the Western Interconnection as additional scope to this SAR.	
Likes 0	
Dislikes 0	
Response	
Dana Klem - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF	

Answer	
Document Name	

Comment

1. *Purpose or Goal:* We are not supportive of providing the SDT with the option of "creating a new standard."
2. *Cost Impact Assessment*: Suggest removing "The SAR proposes to clarify and address gaps in the requirements in MOD-026-1 and MOD-027-1." The statement does not provide insight to costs.
3. *Project Scope* (a): "…better reflect all types of generation resources and not just synchronous resources."
4. The concern is that the language is without limitation. "All types" when the SAR attempting to address a specific, limited issue. Also, does "not just synchronous" exclude potential synchronous resources or assumes the standards already address synchronous resources?
5. *Project Scope* (b): "Consider ways" is not actionable to revising a standard. Suggest language like, "Develop and incorporate methods to recognize generator representation in dynamic simulations…"
6. *Purpose or Goal* and *Project Scope*: The word "sufficient" is vague in the context of the SAR.

To Illustrate. I may be driving down the street and my brake warning light comes on but still have "sufficient" power to stop.

Suggestion, or something along these lines: "…to IBRs and to require [Registered Entities to develop model verifications to represent generation in dynamic simulations.]"

7. General Note: It looks as if language from the white paper was dumped into the SAR. That's fine but white paper language does not necessarily translate well to the purpose of the SAR—scoping the SDT.

Likes 0	
Dislikes 0	

Response

Andy Fuhrman - Minnkota Power Cooperative Inc. - 1 - MRO

Answer	
Document Name	

Comment

MPC supports comments submitted by the MRO NERC Standards Review Forum.

Likes 0	
Dislikes 0	

Response

Larry Heckert - Alliant Energy Corporation Services, Inc. - 4

Answer	
Document Name	

Comment

Alliant Energy supports the comments submitted by the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	
Document Name	
Comment	
MISO supports comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and agrees with the proposed language in the SAR. In addition, we recommend the scope of the SAR be expanded to allow entities with a reliability need to request modeling data from GOs. We believe this aligns with the White Paper's intent to require the provision of GO data in support of accurate models.	
Likes 0	
Dislikes 0	
Response	
Jamie Monette - Allete - Minnesota Power, Inc. - 1	
Answer	
Document Name	
Comment	
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) comments for this project.	
Likes 0	
Dislikes 0	
Response	
Douglas Webb - Evergy - 1,3,5,6 - MRO	
Answer	
Document Name	
Comment	

None.

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO, Group Name SPP RTO

Answer	
Document Name	

Comment

The SPP RTO agrees with proposed language in the SAR. However, we recommend that the SAR's scope includes language that requires GOs to provide modeling data to entities that have a reliability need and make a request. We feel this recommendation would properly align with the White Paper's language suggesting these efforts would help produce quality models.

The propose scope language can be seen as follows:

Consider including language in both standards and/or new standard that would require the GO to make modeling information available to entities that have a reliability related need and request the modeling data.

Likes 0	
Dislikes 0	

Response

Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC

Answer	
Document Name	

Comment

While Tacoma Power recognizes that there is room for improvement in the existing Standards that would improve system reliability for IBRs, the modeling Standards are not the best means of correcting these deficiencies. Modeling is a means of predicting how BES elements will dynamically respond to system disturbances but actual performance should be the metric used to determine true performance regardless of the resource type. This should include the resources ability to quickly respond to system disturbances including voltage and frequency excursions.

Likes 0	
Dislikes 0	

Response

Christopher McKinnon - Eversource Energy - 1,3	
Answer	
Document Name	
Comment	
It is important to note that real-power producing IBR sites can include reactive-only inverter-based compensation as part of their design. Eversource requests that the scope of this SAR include model verification of the models of these reactive-power-only IBRs (example: STATCOMs) as well as the real-power-capable IBRs. The impact of a generating site on the performance of the transmission system is a result of the operation of both types of IBRs. Additionally, other reactive-power-only resources such as synchronous condensers and SVCs should have requirements under these model verification standards. Finally, NERC needs to define a new term - Resource Owners - since the term Generator Owners is commonly interpreted to refer to the owners of watt-producing equipment whereas the MOD standards need to reflect model verification requirements for dynamic var-producing equipment (synchronous condenders, SVCs, STATCOMs) also.	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1,3,5,6	
Answer	
Document Name	
Comment	
The scope of Item b. should allow the drafting team to consider an exemption from the R2.1.1 model verification testing for generation resource types that cannot perform the required tests or can only safely perform tests that are of no practical value.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - PJM Interconnection, L.L.C. - 2 - RF, Group Name ISO/RTO Council (IRC) Standards Review Committee (SRC)	
Answer	
Document Name	
Comment	
The IRC SRC agrees with proposed language in the SAR. However, we recommend that the SAR's scope includes language that requires GOs to provide modeling data to entities that have a reliability need and make a request. We feel this recommendation would properly align with the White Paper's language suggesting these efforts would help produce quality models.	
Likes 0	
Dislikes 0	

Response

Brandon Gleason - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	

Response

Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	
a) The indication of the ability of IBR facilities to ride through voltage and frequency excursions (large disturbances) is required to be communicated to TPs via recent changes to PRC-024 and does not need to be separately addressed in MOD-026 & MOD-027. b) Performance of the field testing required to obtain a generating plant response to large system disturbance cannot be done. This inability raises concerns that GOs may be forced to perform multiple, iterative model parameter estimations for each facility each time that a system disturbance causes a facility to perform differently from the existing model. c) Overlap in the dynamic characteristics listed in the requirements of MOD-032 with the requirements of MOD-026 and MOD-027 exist. Some consideration of eliminating the duplicative requirements should be done. d) the transmission system interconnection requirements and interconnection agreements can be the sufficient and adequate governing regulation for transmission planning groups to obtain necessary modeling information.	
Likes 0	
Dislikes 0	

Response

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Project 2020-06 & 2020-02

Summary Response to SAR Comments | June 2021

Introduction

The Standard Authorization Request (SAR) drafting team thanks all who provided comments during the informal comment period. All comments received were reviewed and the identified common themes are addressed below. Some comments have been reserved for consideration during the standard drafting phase of the project. As the standard drafting phase begins, the financial impact question and risk will be considered.

Industry raised concern of the practicality for validation of large-signal response testing for Inverter Based Resources (IBR) if required within the standard.

The existing MOD-026/027 Standards do not explicitly require model verification using large-signal disturbance tests. In the revised standard(s), the SDT will consider reasonable testing including alternate means of model verification.

Given the change of generation mix (increase of IBRs) since the MOD-026/027 effective date, the current 75MVA/100MVA thresholds for applicability is too high.

The SAR Detailed Description has added language to include a review of the Applicability sections.

Besides MOD-026/027, revisions to MOD-032 or MOD-033 could also be made to improve dynamic model verification and model accuracy.

The SAR focuses on revisions to MOD-026/027 to include IBR model verification and clarify any important differences from synchronous resources. Though MOD-032/033 are related, the SAR DT believes the improvements can be achieved by revising MOD-026/027.

Questions/concerns about implementation plan(s) for MOD-026/027 R2 considering the ongoing phased approach.

The SDT will propose a reasonable implementation plan inclusive of IBRs and dynamic reactive resources that is considerate of current phased implementation MOD-026/027.

Revisions to MOD-026/027 are not necessary.

The Industry Need and Detailed Description sections articulate the need for revisions to MOD-026/027, especially considering the increased usage of both IBR's and transmission-connected reactive resources.

Consider adding requirement language to MOD-026/027 that a Registered Entity with a reliability related need (such as a PC) can request model information from a GO, and the GO be obligated to provide the information.

MOD-026/027 requires the GO to provide the TP verified modeling information. In addition, MOD-032 prescribes the Planning Coordinator (PC) & associated TPs to jointly develop dynamic modeling data

requirements and reporting procedures for the PC's planning area, which can then be requested of the GO. Therefore, the SAR DT does not see a need to expand the obligations of the GO.

It is unclear whether MOD-026/027 are applicable to EMT models.
The SDT will review and determine if revisions to MOD-026/027 are needed to clarify language related to EMT models.

(2020-02) There is needed definition or clarification of what is considered a transmission-connected dynamic reactive resource (TCDRR).
The revised standard language and/or applicability will make clear what is meant by a transmission-connected dynamic reactive resource and applicable MVA thresholds. The SAR allows the SDT to add, modify or retire Glossary Terms.

(2020-02) Majority of comments advocate the combination of scopes for Projects 2020-02 and 2020-06 under a single drafting team for the sake of efficiency and consistency.
Project 2020-06 SAR DT intends to maintain and address the scope outlined in two separate SAR's for revisions to MOD-026 and MOD-027. Revisions to the remaining standards MOD-025, PRC-019, and PRC-024 will be addressed by other drafting teams.

Resources

Project 2020-06 Verifications of Models and Data for Generators

- MOD-026-1 and MOD-027-1 SAR
- Industry Comments

Project 2020-02 Transmission-connected Reactive Dynamic Resources

- TCR SAR (MOD-026, MOD-027, MOD-025, PRC-019, PRC-024)
- Industry Comments

Unofficial Nomination Form

Project 2020-06 Verification of Models and Data for Generators Standard Authorization Request Drafting Team

Do not use this form for submitting nominations. Use the electronic form to submit nominations for **Project 2020-06 Verification of Models and Data for Generators** Standard Authorization Request (SAR) drafting team members by **8 p.m. Eastern, Thursday, January 14, 2021.** This unofficial version is provided to assist nominees in compiling the information necessary to submit the electronic form.

Additional information is available on the project page. If you have questions, contact Senior Standards Developer, Chris Larson (via email), or at 404-446-9708.

By submitting a nomination form, you are indicating your willingness and agreement to actively participate in face-to-face meetings and conference calls.

Previous drafting or review team experience is beneficial, but not required. A brief description of the desired qualifications, expected commitment, and other pertinent information is included below.

Background

The NERC Inverter-based Resource (IBR) Performance Task Force (IRPTF) undertook an effort to perform a comprehensive review of all NERC Reliability Standards to determine if there were any potential gaps or improvements. The IRPTF identified several issues as part of this effort and documented its findings and recommendations in the "IRPTF Review of NERC Reliability Standards White Paper," which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed. The RSTC endorsed the SAR on June 10, 2020.

Consistent with the IRPTF recommendations, the scope of the proposed SAR includes revisions to NERC Reliability Standards MOD-026-1 and MOD-027-1. Standards MOD-026-1 and MOD-027- 1 require, among other things, Generator Owners to provide verified dynamic models to their Transmission Planner for the purposes of power system planning studies. Both standards contain language that is specific to synchronous generators that is not applicable to IBRs. The IRPTF recommended revisions to clarify the applicable requirements for synchronous generators and IBRs. As such, the SAR proposes revisions to MOD-026-1 and MOD-027-1 to clarify requirements related to IBRs and to require sufficient model verification to ensure accurate generator representation in dynamic simulations. The Standards Committee accepted the IRPTF SAR and authorized posting at its September 24, 2020 meeting.

Project 2020-02 Transmission-connected Dynamic Reactive Resources SAR was posted from March 30 to May 13, 2020, and members of a SAR DT were solicited. However, Project 2020-02 was paused indefinitely, and a SAR DT was not appointed. Subsequently, a second SAR involving similar standards,

namely MOD-026 and MOD-027, was being drafted by the IRPTF and approved for posting in September 2020 by the Standards Committee. The Project 2020-06 Verifications of Models and Data for Generators SAR will be posted for industry comment, and additional nominees with MOD-026/027 background will be sought. A single SAR DT will be charged with determining whether to combine the two projects and drafting a combined SAR.

Standard(s) affected: MOD-026, MOD-027

Drafting Team activities include participation in technical conferences, stakeholder communications and outreach events, periodic drafting team meetings and conference calls. Approximately one face-to-face meeting per quarter can be expected (on average three full working days each meeting) with conference calls scheduled as needed to meet the agreed-upon timeline the drafting team sets forth. NERC is seeking individuals who possess experience in the following areas:

- Developing and verifying models involving Inverter Based Resources (IBR) and synchronous generators used in long-term planning assessments
- Understanding the large disturbance behavior of IBRs, modelling parameters associated with voltage control behavior during large disturbance conditions, and the associated verification methods and practices for IBRs
- Developing and verifying dynamic models used in long-term planning assessments, specifically for transmission-connected reactive resources*
- Modeling and studying transmission-connected reactive devices during interconnection studies or long-term planning assessments
- Performing equipment capability testing for transmission-connected reactive devices and rotating machines
- Understanding the large disturbance behavior of transmission-connected reactive devices, particularly the power electronic controls that govern the performance of these devices during abnormal grid conditions

* Transmission-connected reactive resources generally refers to FACTS (Flexible AC Transmission System) devices such as Static Var Compensators (SVCs) and Static Synchronous Compensator (STATCOMs) as well as other power-electronic devices that fall in this category such as HVDC circuits and synchronous condensers.

Name:	
Organization:	
Address:	

Telephone:	
Email:	

Please briefly describe your experience and qualifications to serve on the requested SAR Drafting Team (Bio):

If you are currently a member of any NERC drafting team, please list each team here:

☐ Not currently on any active SAR or standard drafting team.

☐ Currently a member of the following SAR or standard drafting team(s):

If you previously worked on any NERC drafting team please identify the team(s):

☐ No prior NERC SAR or standard drafting team.

☐ Prior experience on the following team(s):

Acknowledgement that the nominee has read and understands both the *NERC Participant Conduct Policy* and the *Standard Drafting Team Scope* documents, available on NERC Standards Resources.

☐ Yes, the nominee has read and understands these documents.

Select each NERC Region in which you have experience relevant to the Project for which you are volunteering:

☐ MRO ☐ NPCC ☐ RF	☐ SERC ☐ Texas RE ☐ WECC	☐ NA – Not Applicable

Select each Industry Segment that you represent:

☐	1 — Transmission Owners
☐	2 — RTOs, ISOs
☐	3 — Load-serving Entities
☐	4 — Transmission-dependent Utilities
☐	5 — Electric Generators
☐	6 — Electricity Brokers, Aggregators, and Marketers
☐	7 — Large Electricity End Users

☐	8 — Small Electricity End Users
☐	9 — Federal, State, and Provincial Regulatory or other Government Entities
☐	10 — Regional Reliability Organizations and Regional Entities
☐	NA – Not Applicable

Select each Function[1] in which you have current or prior expertise:	
☐ Balancing Authority	☐ Transmission Operator
☐ Compliance Enforcement Authority	☐ Transmission Owner
☐ Distribution Provider	☐ Transmission Planner
☐ Generator Operator	☐ Transmission Service Provider
☐ Generator Owner	☐ Purchasing-selling Entity
☐ Interchange Authority	☐ Reliability Coordinator
☐ Load-serving Entity	☐ Reliability Assurer
☐ Market Operator	☐ Resource Planner
☐ Planning Coordinator	

Provide the names and contact information for two references who could attest to your technical qualifications and your ability to work well in a group:			
Name:		Telephone:	
Organization:		Email:	
Name:		Telephone:	
Organization:		Email:	

Provide the name and contact information of your immediate supervisor or a member of your management who can confirm your organization's willingness to support your active participation.			
Name:		Telephone:	
Title:		Email:	

[1] These functions are defined in the NERC Functional Model, which is available on the NERC web site.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators

Nomination Period Open through January 14, 2021

Now Available

Nominations are being sought for SAR drafting team members through **8 p.m. Eastern, Thursday, January 14, 2021**.

Use the electronic form to submit a nomination. Contact Linda Jenkins regarding issues using the electronic form. An unofficial Word version of the nomination form is posted on the Standard Drafting Team Vacancies page and the project page.

By submitting a nomination form, you are indicating your willingness and agreement to actively participate in face-to-face meetings and conference calls. The time commitment for this project is expected to be one face-to-face meetings per quarter (on average two full working days each meeting) with conference calls scheduled as needed to meet the agreed upon timeline the team sets forth. Face-to-face meetings will be conducted only when CDC health guidelines permit. Team members may also have side projects, either individually or by sub-group, to present for discussion and review. Lastly, an important component of the team effort is outreach. Members of the team will be expected to conduct industry outreach during the development process to support a successful ballot.

Previous drafting team experience is beneficial but not required. See the project page and nomination form for additional information.

Background

Project 2020-02 Transmission-connected Dynamic Reactive Resources SAR was posted from March 30 to May 13, 2020, and members of a SAR DT were solicited. However, Project 2020-02 was paused indefinitely, and a SAR DT was not appointed. Subsequently, a second SAR involving similar standards, namely MOD-026 and MOD-027, was being drafted by the IRPTF and approved for posting in September 2020 by the Standards Committee. The Project 2020-06 Verifications of Models and Data for Generators SAR will be posted for industry comment, and additional nominees with MOD-026/027 background will be sought. A single SAR DT will be charged with determining whether to combine the two projects and drafting a combined SAR.

Next Steps

The Standards Committee is expected to appoint members to the Project 2020-06 SAR drafting team in March 2021. Nominees will be notified shortly after they have been appointed.

For more information on the Standards Development Process, refer to the Standard Processes Manual.

Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify "Project 2020-06 Verifications of Models and Data for Generators" in the Description Box. For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	MOD-026-1 Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions, MOD-027-1 Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions		
Date Submitted:	May 12, 2021		
SAR Requester			
Name:	Brad Marszalkowski (chair)		
Organization:	Project 2020-06 SAR Drafting Team; original SAR submitted by IRPTF (06/10/2020)		
Telephone:	413-535-4050	Email:	bmarszalkowski@iso-ne.com

SAR Type (Check as many as apply)

☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☐ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☐ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)

☐ Regulatory Initiation	☒ NERC Standing Committee Identified
☐ Emerging Risk (Reliability Issues Steering Committee) Identified	☐ Enhanced Periodic Review Initiated
☐ Reliability Standard Development Plan	☒ Industry Stakeholder Identified

Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

The NERC Inverter-based Resource Performance Task Force (IRPTF) undertook an effort to perform a comprehensive review of all NERC Reliability Standards to determine if there were any potential gaps or improvements based on the work and findings of the IRPTF. The IRPTF identified several issues as part of this effort and documented its findings and recommendations in a white paper. The *IRPTF Review of NERC Reliability Standards White Paper* was approved by the Operating Committee and the Planning Committee in March 2020. Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed.

MOD-026-1 and MOD-027-1 require, among other things, GOs to provide verified dynamic models to their Transmission Planner (TP) for the purposes of power system planning studies. Both standards contain language that is specific to synchronous generators and is not applicable to inverter-based resources

Requested information
(IBRs). For example, sub-requirement 2.1.3 in MOD-026-1 states that each verification shall include "model structure and data including, but not limited to reactance, time constants, saturation factors, total rotational inertia…" The standards should be revised to clarify the applicable requirements for synchronous generators and IBRs. For example, total rotational inertia should not be required for IBRs, while voltage ride-through control settings should only be required of IBRs and not synchronous generators. Additionally, to some degree, all dynamic model parameters affect the response of a represented resource in dynamic simulations performed by power engineers. Accurate model response is required for the engineers to adequately study system conditions. Hence, it is crucial that all parameters in a model be verified in some way. However, a significant number of parameters in the models are not verified in the typical verification tests used to comply with MOD-026-1 and MOD-027-1.
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
This SAR proposes to revise MOD-026-1 and MOD-027-1 and/or create a new standard to clarify requirements related to IBRs and to require sufficient model verification to ensure accurate generator representation in dynamic simulations.
Project Scope (Define the parameters of the proposed project):
a. Revise or develop requirements that provide Generator Owners (GO) needed direction to provide verified generating unit and/or generating plant resource models that can be used that reflect resource performance regardless of the resource type. b. Revise or develop requirements that provide Transmission Planners (TP) latitude and flexibility to specify the usability criteria of models submitted by the GO.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The SDT will address the following deliverables: 1) Review, and if necessary, update MOD-026/027 to be inclusive of IBRs with focus on the following: a) Applicability section(s) b) Similar to R2.1, identify what the Responsible Entity (GO) should provide for verifications plant-level and inverter-level model parameters, to include but not limited to documentation, equipment information, model structure and data, and compensation settings c) Other sections of MOD-026/027 pertinent to verification of models including periodicity 2) Review, and if necessary, update MOD-026/027 to clarify language for model verification of all resources types, including synchronous, IBRs, or any combination thereof. 3) Review, and if necessary, update requirement language to improve accuracy and usability of models. 4) In the alternative, develop a new MOD reliability standard that addresses the above.

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information

NERC MOD-026-1 focuses on verification of data for generator excitation control system or plant volt/var control functions, and MOD-027-1 focuses on verification of data for turbine-governor and load control or active power-frequency control functions. Specifically, MOD-026-1 states in footnote 1 that the excitation control system for aggregate generating plants (i.e., wind and solar PV) includes the volt/var control system including the voltage regulator and reactive power control system controlling and coordinating plant voltage and associated reactive capable resources. This language is slightly ambiguous on whether the verification activities include the inverter-level parameter values of the dynamic models. Various testing engineers and entities have stated that they are uncertain as to whether the standard applies to the plant-level parameters or the aggregate representation of the inverter-level settings.

Most commonly, verification test reports for inverter-based resources involve a small set of small disturbance tests including, but not limited to, the following:

- Capacitor switching test
- Plant-level voltage or reactive power reference step test
- Plant-level frequency reference step test
- Plant-level frequency play-in or step test

These tests do not perturb the generating resource such that the parameter values that dictate the large disturbance behavior of the resource are verified in any way. While some incorrect model parameters may be identified during these tests, the tests do not verify that the parameters selected for the model accurately capture the full dynamic behavior of the resource. This gives a false impression to TPs and PCs that the full set of parameters are verified for use in planning studies.

This issue is one of the predominant reasons why ride-through operation modes such as momentary cessation were able to persist and promulgate in IBRs without the knowledge of planners and system operators until the Blue Cut Fire and Canyon 2 Fire events exposed them. The dynamic models did not accurately represent this large disturbance behavior due to the model deficiency and because certain key parameters that govern large disturbance response were incorrectly parameterized. However, many of the same plants that entered momentary cessation mode during these events were able to provide verification reports that demonstrated that the small disturbance behavior driven mainly by plant-level control settings reasonably matched modeled performance in compliance with these standards.

Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The SAR proposes to clarify and address gaps in the requirements in MOD-026-1 and MOD-027-1. The cost impact is unknown.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
The abovementioned reliability gap exists for both synchronous generators and IBRs. However, it is potentially more severe for IBRs since their behavior is based more on programmable control functions

Requested information
than for synchronous generators which have behavior that is based more on the physical characteristics of the machine. Additionally, the IRPTF noted that it is not feasible to stage large disturbances for verification purposes, so other methods for verification of model performance under large disturbance conditions may need to be developed.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
Transmission Planner, Generator Owner, Planning Coordinator
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
This issue was captured in the *IRPTF Review of NERC Reliability Standards White Paper* which was approved by the Operating Committee and the Planning Committee. Additionally, the issue was discussed in the IRPTF-produced "Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources" reliability guideline.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
Yes, Project 2020-02 Transmission-connected Dynamic Reactive Resources may have overlapping scope.
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.
The IRPTF did not identify any alternatives since there are gaps in the existing language for MOD-026-1 and MOD-027-1 that need to be resolved.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Reliability Principles	
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
None	N/A

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff	☐ Final SAR endorsed by the SC
☒ Draft SAR presented to SC for acceptance	☐ SAR assigned a Standards Project by NERC
☒ DRAFT SAR approved for posting by the SC	☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised

2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	MOD-026-1 Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions, MOD-027-1 Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions		
Date Submitted:	May 12, 2021		
SAR Requester			
Name:	Brad Marszalkowski (chair)		
Organization:	Project 2020-06 SAR Drafting Team; original SAR submitted by IRPTF (06/10/2020)		
Telephone:	413-535-4050	Email:	bmarszalkowski@iso-ne.com

SAR Type (Check as many as apply)

☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☐ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☐ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)

☐ Regulatory Initiation	☒ NERC Standing Committee Identified
☐ Emerging Risk (Reliability Issues Steering Committee) Identified	☐ Enhanced Periodic Review Initiated
☐ Reliability Standard Development Plan	☒ Industry Stakeholder Identified

Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

The NERC Inverter-based Resource Performance Task Force (IRPTF) undertook an effort to perform a comprehensive review of all NERC Reliability Standards to determine if there were any potential gaps or improvements based on the work and findings of the IRPTF. The IRPTF identified several issues as part of this effort and documented its findings and recommendations in a white paper. The *IRPTF Review of NERC Reliability Standards White Paper* was approved by the Operating Committee and the Planning Committee in March 2020. Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed.

MOD-026-1 and MOD-027-1 require, among other things, GOs to provide verified dynamic models to their Transmission Planner (TP) for the purposes of power system planning studies. Both standards contain language that is specific to synchronous generators and is not applicable to inverter-based resources

Requested information
(IBRs). For example, sub-requirement 2.1.3 in MOD-026-1 states that each verification shall include "model structure and data including, but not limited to reactance, time constants, saturation factors, total rotational inertia…" The standards should be revised to clarify the applicable requirements for synchronous generators and IBRs. For example, total rotational inertia should not be required for IBRs, while voltage ride-through control settings should only be required of IBRs and not synchronous generators. Additionally, to some degree, all dynamic model parameters affect the response of a represented resource in dynamic simulations performed by power engineers. Accurate model response is required for the engineers to adequately study system conditions. Hence, it is crucial that all parameters in a model be verified in some way. However, a significant number of parameters in the models are not verified in the typical verification tests used to comply with MOD-026-1 and MOD-027-1. ~~For example, the test currently used to comply with MOD-026-1 does not verify the model parameters associated with voltage control behavior during large disturbance conditions.~~
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
This SAR proposes to revise MOD-026-1 and MOD-027-1 and/or create a new standard to clarify requirements related to IBRs and to require sufficient model verification to ensure accurate generator representation in dynamic simulations.
Project Scope (Define the parameters of the proposed project):
~~The proposed scope of this project is as follows:~~ ~~a. Update requirement language to better reflect all types of generation resources and not just synchronous resources.~~ ~~b. Consider ways to require sufficient model verification to ensure accurate generator representation in dynamic simulations of typical phenomena that would be studied by power system engineers, including large disturbances.~~ a. Revise or develop requirements that provide Generator Owners (GO) needed direction to provide verified generating unit and/or generating plant resource models that can be used that reflect resource performance regardless of the resource type. b. Revise or develop requirements that provide Transmission Planners (TP) latitude and flexibility to specify the usability criteria of models submitted by the GO.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The SDT will address the following deliverables: 1) Review, and if necessary, update MOD-026/027 to be inclusive of IBRs with focus on the following: a) Applicability section(s)

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information

b) Similar to R2.1, identify what the Responsible Entity (GO) should provide for verifications plant-level and inverter-level model parameters, to include but not limited to documentation, equipment information, model structure and data, and compensation settings
c) Other sections of MOD-026/027 pertinent to verification of models including periodicity

2) Review, and if necessary, update MOD-026/027 to clarify language for model verification of all resources types, including synchronous, IBRs, or any combination thereof.
3) Review, and if necessary, update requirement language to improve accuracy and usability of models.
4) In the alternative, develop a new MOD reliability standard that addresses the above.

NERC MOD-026-1 focuses on verification of data for generator excitation control system or plant volt/var control functions, and MOD-027-1 focuses on verification of data for turbine-governor and load control or active power-frequency control functions. Specifically, MOD-026-1 states in footnote 1 that the excitation control system for aggregate generating plants (i.e., wind and solar PV) includes the volt/var control system including the voltage regulator and reactive power control system controlling and coordinating plant voltage and associated reactive capable resources. This language is slightly ambiguous on whether the verification activities include the inverter-level parameter values of the dynamic models. Various testing engineers and entities have stated that they are uncertain as to whether the standard applies to the plant-level parameters or the aggregate representation of the inverter-level settings.

Most commonly, verification test reports for inverter-based resources involve a small set of small disturbance tests including, but not limited to, the following:

- Capacitor switching test
- Plant-level voltage or reactive power reference step test
- Plant-level frequency reference step test
- Plant-level frequency play-in or step test

These tests do not perturb the generating resource such that the parameter values that dictate the large disturbance behavior of the resource are verified in any way. While some incorrect model parameters may be identified during these tests, the tests do not verify that the parameters selected for the model accurately capture the full dynamic behavior of the resource. This gives a false impression to TPs and PCs that the full set of parameters are verified for use in planning studies.

This issue is one of the predominant reasons why ride-through operation modes such as momentary cessation were able to persist and promulgate in IBRs without the knowledge of planners and system operators until the Blue Cut Fire and Canyon 2 Fire events exposed them. The dynamic models did not accurately represent this large disturbance behavior due to the model deficiency and because certain key parameters that govern large disturbance response were incorrectly parameterized. However, many of the same plants that entered momentary cessation mode during these events were able to provide verification reports that demonstrated that the small disturbance behavior driven mainly by plant-level control settings reasonably matched modeled performance in compliance with these standards.

Requested information
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The SAR proposes to clarify and address gaps in the requirements in MOD-026-1 and MOD-027-1. The cost impact is unknown.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
The abovementioned reliability gap exists for both synchronous generators and IBRs. However, it is potentially more severe for IBRs since their behavior is based more on programmable control functions than for synchronous generators which have behavior that is based more on the physical characteristics of the machine. Additionally, the IRPTF noted that it is not feasible to stage large disturbances for verification purposes, so other methods for verification of model performance under large disturbance conditions may need to be developed.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
Transmission Planner, Generator Owner, Planning Coordinator
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
This issue was captured in the *IRPTF Review of NERC Reliability Standards White Paper* which was approved by the Operating Committee and the Planning Committee. Additionally, the issue was discussed in the IRPTF-produced "Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources" reliability guideline.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
Yes, Project 2020-02 Transmission-connected Dynamic Reactive Resources may have overlapping scope.
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.
The IRPTF did not identify any alternatives since there are gaps in the existing language for MOD-026-1 and MOD-027-1 that need to be resolved.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Reliability Principles	
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
None	N/A

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff	☐ Final SAR endorsed by the SC
☒ Draft SAR presented to SC for acceptance	☐ SAR assigned a Standards Project by NERC
☒ DRAFT SAR approved for posting by the SC	☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and please email this form, with attachment(s) to: sarcomm@nerc.net

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Applicability revisions for transmission connected dynamic reactive resources		
Date Submitted:	May 21, 2021		
SAR Requester			
Name:	Brad Marszalkowski (chair)		
Organization:	Project 2020-06 SAR Drafting Team; original submitted by Hari Singh (SAMS)		
Telephone:	413-535-4050	Email:	bmarszalkowski@iso-ne.com

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☒ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☐ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☐ Regulatory Initiation	☒ NERC Standing Committee Identified
☐ Emerging Risk (Reliability Issues Steering Committee) Identified	☐ Enhanced Periodic Review Initiated
☐ Reliability Standard Development Plan	☐ Industry Stakeholder Identified

Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):
Dynamic reactive resources used to provide Essential Reliability Services (ERS) in the BES include generation resources (rotating machine and inverter-based) as well as transmission connected dynamic reactive resources (power-electronics based). Existing reliability standards for verifying the capability, modeling and performance of dynamic reactive resources are only applicable to Facilities comprising generation resources. Augmenting the applicability of these standards to include (non-generation) transmission-connected reactive resources – both rotating machine (i.e. synchronous condenser) and power-electronics based – will enhance the BES reliability by ensuring that the capability, models and performance is verified and validated for all varieties of dynamic reactive resources utilized in providing ERS in the BES.
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
Augment the "Applicability – Facilities" and "Applicability-Functional Entities" sections in MOD-026 and MOD-027 reliability standards to address (non-generation) transmission-connected dynamic reactive

Requested information
resources – both rotating machine (i.e. synchronous condenser) and power-electronics based. Also modify Requirements (including applicable attachments) as needed to ensure they continue to address the additional Facilities. As needed, also define new Glossary Terms for all or some of the transmission-connected dynamic reactive devices noted in the SAMS white-paper "*Transmission Connected Dynamic Reactive Resources – Assessment of Applicability in Reliability Standards*".
Project Scope (Define the parameters of the proposed project):
Revise the "Applicability – Facilities" section, "Applicability – Functional Entities" section, and Requirements (including applicable attachments) as needed in MOD-026 and MOD-027 reliability standards to comprehensively address all varieties of transmission-connected dynamic reactive resources that are utilized in providing ERS in the BES.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1]which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.* research paper) to guide development of the Standard or definition):
The "Applicability – Facilities" and "Applicability-Functional Entities" sections in MOD-026 and MOD-027 reliability standards will be revised to address (non-generation) transmission-connected dynamic reactive resources (TCDRR) based on the recommendations summarized in Table 1 of the SAMS white-paper "*Transmission Connected Dynamic Reactive Resources – Assessment of Applicability in Reliability Standards*". The white-paper also provides the technical justifications for the recommended revisions and the associated reliability benefits. The SDT will address the following deliverables: 1. Review, and if necessary, update MOD-026/027 to be inclusive of TCDRR with focus on the following: a. Applicability section(s) b. Similar to R2.1, identify what the Responsible Entity (TO) should provide for verifications to include but not limited to documentation, equipment information, model structure and data, and compensation settings c. Other sections of MOD-026/027 pertinent to verification of models including periodicity 2. Review, and if necessary, update MOD-026/027 to clarify language for model verification of TCDRR 3. As needed, also define new Glossary Terms for TCDRR or related terms 4. In the alternative, develop a new MOD reliability standard that addresses the above.
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g*. Dispersed Generation Resources):

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information
Power-electronics based transmission-connected reactive resources – also known as FACTS (Flexible AC Transmission System) devices – such as: Static Var Compensator (SVC), Static Synchronous Compensator (STATCOM), HVDC Links (LCC or VSC).
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g*. Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
Transmission Owners in addition to the existing Functional Entities
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
"*Transmission Connected Dynamic Reactive Resources – Assessment of Applicability in Reliability Standards*" white-paper approved by SAMS members.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so which standard(s) or project number(s)?
PRC-019 SAR requested by SPCS and PRC-024 SAR requested by IRPTF
Are there alternatives (e.g. guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.
No viable alternatives were found by SAMS.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☒	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g. NPCC	

For Use by NERC Only

SAR Status Tracking (Check off as appropriate)	
☐ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and please email this form, with attachment(s) to: sarcomm@nerc.net

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Applicability revisions for transmission connected dynamic reactive resources		
Date Submitted:	May 21, 2021		
SAR Requester			
Name:	Brad Marszalkowski (chair)		
Organization:	Project 2020-06 SAR Drafting Team; original submitted by Hari Singh (SAMS)		
Telephone:	413-535-4050	Email:	bmarszalkowski@iso-ne.com

SAR Type (Check as many as apply)	
☒ New Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10)
☒ Revision to Existing Standard	☐ Variance development or revision
☒ Add, Modify or Retire a Glossary Term	☐ Other (Please specify)
☐ Withdraw/retire an Existing Standard	

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☐ Regulatory Initiation	☒ NERC Standing Committee Identified
☐ Emerging Risk (Reliability Issues Steering Committee) Identified	☐ Enhanced Periodic Review Initiated
☐ Reliability Standard Development Plan	☐ Industry Stakeholder Identified

Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):
Dynamic reactive resources used to provide Essential Reliability Services (ERS) in the BES include generation resources (rotating machine and inverter-based) as well as transmission connected dynamic reactive resources (power-electronics based). Existing reliability standards for verifying the capability, modeling and performance of dynamic reactive resources are only applicable to Facilities comprising generation resources. Augmenting the applicability of these standards to include (non-generation) transmission-connected reactive resources – both rotating machine (i.e. synchronous condenser) and power-electronics based – will enhance the BES reliability by ensuring that the capability, models and performance is verified and validated for all varieties of dynamic reactive resources utilized in providing ERS in the BES.
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
Augment the "Applicability – Facilities" and "Applicability-Functional Entities" sections in ~~MOD-025,~~ MOD-026, MOD-027~~, PRC-019 and PRC-024~~ reliability standards to address (non-generation)

Requested information
transmission-connected dynamic reactive resources – both rotating machine (i.e. synchronous condenser) and power-electronics based. Also modify Requirements (including applicable attachments) as needed to ensure they continue to address the additional Facilities. As needed, also define new Glossary Terms for all or some of the transmission-connected dynamic reactive devices noted in the SAMS white-paper "*Transmission Connected Dynamic Reactive Resources – Assessment of Applicability in Reliability Standards*".
Project Scope (Define the parameters of the proposed project):
Revise the "Applicability – Facilities" section, "Applicability – Functional Entities" section, and Requirements (including applicable attachments) as needed in ~~MOD-025,~~ MOD-026, MOD-027, ~~PRC-019 and PRC-024~~ reliability standards to comprehensively address all varieties of transmission-connected dynamic reactive resources that are utilized in providing ERS in the BES.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.* research paper) to guide development of the Standard or definition):
The "Applicability – Facilities" and "Applicability-Functional Entities" sections in ~~MOD-025,~~ MOD-026, MOD-027, ~~PRC-019 and PRC-024~~ reliability standards will be revised to address (non-generation) transmission-connected dynamic reactive resources (TCDRR) based on the recommendations summarized in Table 1 of the SAMS white-paper "*Transmission Connected Dynamic Reactive Resources – Assessment of Applicability in Reliability Standards*". The white-paper also provides the technical justifications for the recommended revisions and the associated reliability benefits. The SDT will address the following deliverables: 1. Review, and if necessary, update MOD-026/027 to be inclusive of TCDRR with focus on the following: a. Applicability section(s) b. Similar to R2.1, identify what the Responsible Entity (TO) should provide for verifications to include but not limited to documentation, equipment information, model structure and data, and compensation settings c. Other sections of MOD-026/027 pertinent to verification of models including periodicity 2. Review, and if necessary, update MOD-026/027 to clarify language for model verification of TCDRR 3. As needed, also define new Glossary Terms for ~~all or some of the~~ TCDRR or related terms. ~~noted as items 1.a – 1.j in the Additional Considerations section of the SAMS white-paper~~. 4. In the alternative, develop a new MOD reliability standard that addresses the above.
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g*. Dispersed Generation Resources):
Power-electronics based transmission-connected reactive resources – also known as FACTS (Flexible AC Transmission System) devices – such as: Static Var Compensator (SVC), Static Synchronous Compensator (STATCOM), HVDC Links (LCC or VSC).
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g*. Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
Transmission Owners in addition to the existing Functional Entities
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
"*Transmission Connected Dynamic Reactive Resources – Assessment of Applicability in Reliability Standards*" white-paper approved by SAMS members.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so which standard(s) or project number(s)?
PRC-019 SAR requested by SPCS and PRC-024 SAR requested by IRPTF
Are there alternatives (e.g. guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.
No viable alternatives were found by SAMS.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☒	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Reliability Principles	
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g. NPCC	

For Use by NERC Only

SAR Status Tracking (Check off as appropriate)	
☐ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template

New or Modified Term(s) Used in NERC Reliability Standards

Background:

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The terms proposed below are intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Power Electronic Device (PED): Any device connected to the ac power system through a power electronic interface that generates or transmits active power or reactive power, or absorbs active power for the purposes of re-injecting it at a later time. This term excludes any load.

Inverter-Based Resource (IBR): Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, supplies primarily active power, and connects to the Bulk Power System. An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a common point of connection (e.g. step-up transformers, collector system(s), main power transformer(s), and power plant controller(s)).

Technical Rationale and Considerations:

- A Power Electronic Device is inclusive of multiple technologies that use a power electronic interface, and is not limited to generators. Power Electronic Device examples include type 3 wind generators, type 4 wind generators, solar photovoltaic inverters, battery energy storage inverters, variable-speed pumped hydro inverter, high-voltage direct current (HVDC) converters, static synchronous compensators (STATCOM), static VAR compensators (SVC), and other inverter/converter connected FACTS devices, as these technologies are also connected to the grid via a power electronic interface.
- Inverter-Based Resource examples include type 3 wind, type 4 wind, solar photovoltaic, battery energy storage, and variable-speed pumped hydro. There is a desire by the SDT to maintain a precedent that IBRs are considered “generating resources”, so the IBR term includes the phrase “primarily supplies active power”. Therefore, an HVDC system or a transmission-connected FACTS device (STATCOM, SVC, etc.) would not be considered an IBR.
- NERC Glossary terms apply to use in NERC Reliability Standards. NERC has a different focus than IEEE. "Power Electronic Device" was chosen as an alternative to the IEEE term "IBR unit" to differentiate the two terms.
- There is a need to distinguish between the individual “device” and the “resource/facility” as a whole, in order to allow the requirement language to be applied at device level or facility level. Hence, the two definitions for PED and IBR. The phrase “IBR plant/facility" refers to a facility in the common meaning.
- Battery energy storage system (BESS) will be considered as a PED/IBR independent of whether or not the device is operating in the charging or discharging mode.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Project 2020-06 Verification of Models and Data for Generators

Do not use this form for submitting comments. Use the Standards Balloting and Commenting System (SBS) to submit comments on **MOD-026-2 – inverter-based resource related Glossary Terms** by **8 p.m. Eastern, Tuesday, October 24, 2023.**

Additional information is available on the project page. If you have questions, contact Senior Standards Developer, Chris Larson (via email), or at 404-446-9708.

Background

The NERC Inverter-based Resource (IBR) Performance Task Force (IRPTF) performed a comprehensive review of all NERC Reliability Standards to identify any potential gaps and/or improvements. The IRPTF discovered several issues as part of this effort and documented its findings and recommendations in the IRPTF Review of NERC Reliability Standards White Paper, which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed. The RSTC endorsed the standard authorization request (SAR) June 10, 2020.

The Standards Committee accepted two revised SARs at its July 21, 2021 meeting. The scope of the Project 2020-06 SARs includes the potential to add, modify, or retire a Glossary Terms for NERC Reliability Standards. The Project 2020-06 standard drafting team proposes two new terms as part of this informal comment period.

Please provide your responses to the questions listed below, along with any detailed comments.

Questions

1. Do you support the definition for Power Electronic Device (PED) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

2. Do you support the definition for Inverter-Based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

3. Provide any additional comments for the SDT to consider, if desired.

   Comments:

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Additional Information

Informal Comment Period Open through October 24, 2023

Now Available

Project 2020-06 Verifications of Models and Data for Generators is developing new definitions for IBR that will be leveraged by other IBR-related drafting teams. An informal comment period for these **inverter-based resource Glossary Terms** is open through **8 p.m. Eastern, Tuesday, October 24, 2023.**

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

The Project 2020-06 drafting team will review all responses received during the comment period. Other IBR-related drafting teams will be provided additional information and modifications to the definitions, if any.

For more information on the Reliability Standards development process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Comment Report

Project Name:	2020-06 Verifications of Models and Data for Generators | Inverter-based, resource-related Glossary Terms
Comment Period Start Date:	9/18/2023
Comment Period End Date:	10/24/2023
Associated Ballots:	

There were 39 sets of responses, including comments from approximately 101 different people from approximately 67 companies representing 8 of the Industry Segments as shown in the table on the following pages.

Questions

1. Do you support the definition for Power Electronic Device (PED) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Do you support the definition for Inverter-Based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

3. Provide any additional comments for the SDT to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
BC Hydro and Power Authority	Adrian Andreoiu	1,3,5	WECC	BC Hydro	Hootan Jarollahi	BC Hydro and Power Authority	3	WECC
					Helen Hamilton Harding	BC Hydro and Power Authority	5	WECC
					Adrian Andreoiu	BC Hydro and Power Authority	1	WECC
DTE Energy - Detroit Edison Company	Adrian Raducea	3,5		DTE Energy - DTE Electric	Karie Barczak	DTE Energy - Detroit Edison Company	3	RF
					Adrian Raducea	DTE Energy - Detroit Edison	5	RF
					patricia ireland	DTE Energy	4	RF
WEC Energy Group, Inc.	Christine Kane	3,4,5,6		WEC Energy Group	Christine Kane	WEC Energy Group	3	RF
					Matthew Beilfuss	WEC Energy Group, Inc.	4	RF
					Clarice Zellmer	WEC Energy Group, Inc.	5	RF
					David Boeshaar	WEC Energy Group, Inc.	6	RF
Tacoma Public Utilities (Tacoma, WA)	Jennie Wike	1,3,4,5,6	WECC	Tacoma Power	Jennie Wike	Tacoma Public Utilities	1,3,4,5,6	WECC
					John Merrell	Tacoma Public Utilities (Tacoma, WA)	1	WECC
					John Nierenberg	Tacoma Public Utilities (Tacoma, WA)	3	WECC
					Hien Ho	Tacoma Public Utilities (Tacoma, WA)	4	WECC
					Terry Gifford	Tacoma Public Utilities (Tacoma, WA)	6	WECC
					Ozan Ferrin	Tacoma Public Utilities (Tacoma, WA)	5	WECC

ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	1	WECC
					Jason Procuniar	Buckeye Power, Inc.	1,4	RF
					Jolly Hayden	East Texas Electric Cooperative, Inc.	NA - Not Applicable	Texas RE
					Amber Skillern	East Kentucky Power Cooperative	1	SERC
					Scott Brame	North Carolina Electric Membership Corporation	3,4,5	SERC
MRO	Kendra Buesgens	1,2,3,4,5,6	MRO	MRO NSRF	Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Christopher Bills	City of Independence Power & Light	3,5	MRO
					Fred Meyer	Algonquin Power Co.	3	MRO
					Jamie Monette	Allete - Minnesota Power, Inc.	1	MRO
					Larry Heckert	Alliant Energy Corporation Services, Inc.	4	MRO
					Marc Gomez	Southwestern Power Administration	1	MRO
					Bryan Sherrow	Kansas City Board Of Public Utilities	1	MRO
					Terry Harbour	MidAmerican Energy	1,3	MRO
					Jamison Cawley	Nebraska Public Power	1,3,5	MRO
					Seth Shoemaker	Muscatine Power &	1,3,5,6	MRO

						Water		
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Shonda McCain	Omaha Public Power District	6	MRO
					George Brown	Acciona Energy North America	5	MRO
					Jaimin Patel	Saskatchewan Power Corporation	1	MRO
					Kimberly Bentley	Western Area Power Administration	1,6	MRO
					Jay Sethi	Manitoba Hydro	1,3,5,6	MRO
					Michael Ayotte	ITC Holdings	1	MRO
FirstEnergy - FirstEnergy Corporation	Mark Garza	1,3,4,5,6		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy- FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
Southern Company - Southern Company Services, Inc.	Pamela Frazier	1,3,5,6	MRO,RF,SERC,Texas RE,WECC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Jim Howell, Jr.	Southern Company - Southern Company Generation	5	SERC

					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC
Southwest Power Pool, Inc. (RTO)	Shannon Mickens	2	MRO,SPP RE,WECC	SPP RTO	Shannon Mickens	Southwest Power Pool Inc.	2	MRO
					Eddie Watson	Southwest Power Pool Inc.	2	MRO
					Jim Williams	Southwest Power Pool Inc	2	MRO
					Jeff McDiarmid	Southwest Power Pool Inc.	2	MRO
					Dee Edmondson	Southwest Power Pool Inc.	2	MRO
					Eric Sullivan	Southwest Power Pool Inc.	2	MRO
					Brandon Hentschel	Southwest Power Pool Inc.	2	MRO
					Mia Wilson	Southwest Power Pool Inc.	2	MRO
					Doug Bowman	Southwest Power Pool Inc.	2	MRO
					Mason Favazza	Southwest Power Pool Inc.	2	MRO
					Zach Sabey	Southwest Power Pool Inc.	2	MRO
Western Electricity Coordinating Council	Steven Rueckert	10		WECC	Steve Rueckert	WECC	10	WECC
					Phil O'Donnell	WECC	10	WECC

1. Do you support the definition for Power Electronic Device (PED) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

Anderson Hoke - National Renewable Energy Laboratory - NA - Not Applicable - NA - Not Applicable

Answer	No
Document Name	

Comment

It is confusing to define a term PED that excludes loads because increasingly many loads are power electronic devices. Instead, I'd suggest leveraging the definition of "IBR unit" from IEEE 2800, which has nearly the same meaning as PED. The IBR unit definition could be amended by NERC to include STATCOMs etc. if desired.

Likes 0	
Dislikes 0	

Response

Randall Buswell - VELCO -Vermont Electric Power Company, Inc. - 1

Answer	No
Document Name	

Comment

The most confusing item is the use of "power electronic interface" in the PED definition because inverters are describes as a PED in the technical rationale. If an inverter is a PED, what is the power electronic interface? The PED definition could be clarified by inserting ", such as an inverter", after "power electronic interface". In addition, we would suggest removing inverters from the technical rationale. If we misunderstood the intent, please explain what is meant by electronic interface.

Likes 0	
Dislikes 0	

Response

Ben Hammer - Western Area Power Administration - 1,6

Answer	No
Document Name	

Comment

NERC Glossary of term utilizes "Real Power" but not "active power", "Reactive Power" not "reactive power" and "Load" not "load".

Suggest modification of PED definition to:

Power Electronic Device (PED): Any device connected to the ac power system through a power electronic interface that generates or transmits **Real Powe**r or **Reactive Power**, or absorbs **Real Power** for the purposes of re-injecting it at a later time. This term excludes any **Load**.

Likes 1	Associated Electric Cooperative, Inc., 3, Bennett Todd
Dislikes 0	

Response

Kendra Buesgens - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF

Answer	No
Document Name	

Comment

The MRO NSRF does not support creating the term Power Electronic Device. The term adds minimal value or clarity on its own. In principle, it's a term created for use in defining another term. In practice it almost completely overlaps with the proposed definition of IBR. The MRO NSRF suggests combining power electronic device definition with the definition of inverter-based resource.

Likes 0	
Dislikes 0	

Response

Srikanth Chennupati - Entergy - 1,3,5,7 - SERC

Answer	No
Document Name	

Comment

Entergy agrees with NAGF comments. The NAGF has identified the following comments for consideration regarding the proposed Power Electronic Device (PED) definition:

1. The term "power electronic interface" needs to be clarified as there are multiple definitions of this term.
2. The last sentence "This term excludes any load" needs to be clarified or deleted. A battery energy storage or pumped hydro device are modeled as a load when in the charging/pumping operational modes. Such devices should not be excluded from the PED definition.

Likes 0	
Dislikes 0	

Response

Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro

Answer	No
Document Name	
Comment	

BC Hydro appreciates the drafting team's efforts and the opportunity to comment, and offers the following.

The term “power electronic device” is widely used in the power and energy industry to refer to semiconductor devices (e.g., IGBT, Thyristor, MOSFET, BJT, etc.) that are used in power electronic circuits and systems. This term has also been occasionally used to refer to power electronic converters (e.g., inverters, rectifiers, choppers, etc.) that are composed of multiple semiconductor devices. The proposed definition now appears to extend this term to also include other components of a single unit of an Inverter-Based Resource (IBR) along with a range of other devices, including HVDC converters and FACTS devices. As such, it can lead to significant confusion.

The proposed definition states that a “Power Electronic Device” is “[any] device connected to the ac power system through a power electronic interface…”. The confusion lies in the fact that the “power electronic interface”, which has been referred to in this definition, is itself recognized by the industry as a power electronic device(s) or composed of power electronic devices.

The Standard Drafting Team may consider alternative terms such as IBR Unit (IBRU), Inverter-Based Device (IBD), or Power-Electronic-Interfaced Device (PEID).

IBRU has been historically used to refer to the devices that are intended to fall into the scope of the definition. Therefore, its consistent use is not expected to create confusion. IBD, on the other hand, does not appear to have been used extensively in the past. Therefore, it can be defined as a new NERC Glossary Term, which will also minimize confusion.

It is recognized that certain FACTS devices are not inverter-based (such as SVC and TCSC). However, BC Hydro is of the opinion that such FACTS devices are better addressed separately, rather than being lumped with the inverter-based devices in a single definition.

Alternatively, PEID can be used to cover all devices that have been intended to fall under the scope of the proposed definition. Although longer, this term has the advantage of clarity, because the key term in the definition, i.e., “power electronic interface”, has been retained in the name, thereby avoiding confusion and misinterpretation.

Likes 0	
Dislikes 0	
Response	

Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	No
Document Name	
Comment	

Please reference the IEEE definition of IBR and IBR units in the technical rationale.

Likes 0	
Dislikes 0	
Response	

George E Brown - Pattern Operators LP - 5	
Answer	No
Document Name	
Comment	
Pattern Energy does not believe a standalone glossary term for “power electronic device is required. Please see response to question three. Thank you.	
Likes 0	
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3,4,5,6, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	
WEC Energy Group supports the comments of the NAGF.	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Salt River Project - 1,3,5,6 - WECC	
Answer	No
Document Name	
Comment	
SRP does not support the addition of this term to the standard. This new term defines IBR’s being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.	
Likes 0	
Dislikes 0	
Response	

Nikki Carson-Marquis - Minnkota Power Cooperative Inc. - 1 - MRO	
Answer	No
Document Name	
Comment	
Minnkota Power Cooperative recognizes the need to distinguish individual IBR “devices” and the “resource/facility” with a term similar to IEEE’s “IBR unit”. However, Minnkota opposes the proposed definition of PED, as well as the title of this term “Power Electronic Device”. The proposed definition for PED is much too broad, as there are many different types of devices that use power electronics, not all of which are relevant to generation resources. The proposed definition should also include more detail for determining which devices that have power electronics are PEDs and which devices do not have PEDs. While the SDT’s technical rationale provides some clarification as to which types of devices are considered PED, this level of detail is missing from the proposed definition. Additionally, Minnkota opposes the proposed title of “Power Electronic Device”. This term is already in broad use within industry, and industry usage of this term is not limited to IBR. The title of the proposed term should be more specific to IBR, perhaps “IBR Device”, “Inverter Based Device (IBD)”, or even IEEE’s “IBR Unit”. While Minnkota acknowledges the SDT’s reasoning that IEEE is a different entity with a different focus, Minnkota believes IEEE’s “IBR Unit” term more clearly indicates that this term is limited to devices used within an IBR context than the proposed PED term, and the SDT should reconsider using the “IBR Unit” term. If, in the SDT’s view, IEEE’s definition of “IBR Unit” conflicts with the purpose of “PED”, it should be explained in more detail.	
Likes 0	
Dislikes 0	
Response	

Adrian Raducea - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy - DTE Electric	
Answer	No
Document Name	
Comment	
No, definition is too much overlap to IBR definition.	
Likes 0	
Dislikes 0	
Response	

Chantal Mazza - Hydro-Quebec (HQ) - 1 - NPCC	
Answer	No

Document Name	

Comment

The definition of PED mentions that it “generates or transmits both active and reactive power” while the definition for IBR mentions that it “supplies primarily active power”. As mentioned, an HVDC or FACTS device is excluded from the term IBR, but is considered a PED. Therefore, the definition of IBR should mention that it is a type of PED and not a collection of PED. This modification doesn’t exclude the possibility to have multiple PED together to form a single bigger resource.

Power Electronic Device (PED): Any device incorporating a power electronic interface for connection to the ac power system that generates or transmits active power or reactive power or absorbs active power for the purposes of re-injecting it later. This term excludes any load.

The most confusing item is the use of “power electronic interface” in the PED definition because inverters are describing as a PED in the technical rationale. If an inverter is a PED, what is the power electronic interface? The PED definition could be clarified by inserting “, such as an inverter”, after “power electronic interface”. In addition, we would suggest removing inverters from the technical rationale. If we misunderstood the intent, please explain what is meant by electronic interface.

Likes 0	
Dislikes 0	

Response

Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company

Answer	No
Document Name	

Comment

There is no clear definition of power electronic interface in provided technical rationale. Loads can also be defined as PEDs i.e., BESS during charging mode. The last sentence of the proposed definition should be removed.

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	No
Document Name	

Comment

The NAGF has identified the following comments for consideration regarding the proposed Power Electronic Device (PED) definition:

a) The term "power electronic interface" needs to be clarified as there are multiple definitions of this term.

b) The last sentence "This term excludes any load" needs to be clarified or deleted. A battery energy storage or pumped hydro device are modeled as a load when in the charging/pumping operational modes. Such devices should not be excluded from the PED definition.

Likes 0	
Dislikes 0	

Response

Junji Yamaguchi - Hydro-Quebec (HQ) - 1,5

Answer	No
Document Name	

Comment

The definition of PED mentions that it "generates or transmits both active and reactive power" while the definition for IBR mentions that it "supplies primarily active power". As mentioned, an HVDC or FACTS device is excluded from the term IBR, but is considered a PED. Therefore, the definition of IBR should mention that it is a type of PED and not a collection of PED. This modification doesn't exclude the possibility to have multiple PED together to form a single bigger resource.

Power Electronic Device (PED): Any device incorporating a power electronic interface for connection to the ac power system that generates or transmits active power or reactive power or absorbs active power for the purposes of re-injecting it later. This term excludes any load.s

The most confusing item is the use of "power electronic interface" in the PED definition because inverters are describing as a PED in the technical rationale. If an inverter is a PED, what is the power electronic interface? The PED definition could be clarified by inserting ", such as an inverter", after "power electronic interface". In addition, we would suggest removing inverters from the technical rationale. If we misunderstood the intent, please explain what is meant by electronic interface.

Likes 0	
Dislikes 0	

Response

Kimberly Turco - Constellation - 5,6

Answer	No
Document Name	

Comment

Constellation supports NAGF comments.

Kimberly Turco on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	
Response	
Hillary Creurer - Allete - Minnesota Power, Inc. - 1	
Answer	No
Document Name	
Comment	
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) comments.	
Likes 0	
Dislikes 0	
Response	
Alison MacKellar - Constellation - 5,6	
Answer	No
Document Name	
Comment	
Constellation supports NAGF comments. Alison Mackellar on behalf of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC	
Answer	No
Document Name	
Comment	
There is no explanation of what purpose the term PED is intended to serve within MOD-026-2 and possibly other standards. Without understanding the concern the term is intended to address, it is unclear whether there is a need for this to be a defined term. Rather than use this defined term in the IBR definition, using "power electronic interface" is sufficient to complete the IBR definition.	

If the PED term is retained, the ISO RTO Council Standards Review Committee (SRC) recommends that the definition be clarified to address the identified ambiguities to ensure that there are no gaps in what the defined terms cover. In addition we do not agree with the phrase “This term excludes any load” in the definition. Though we agree that “PED” does not include traditional load, stating this in the definition can be confusing because BESS in a charging state needs to be modeled as load. We recommend leaving that phrase out of the definition and instead discussing this topic in the Technical Rationale & Considerations. The proposed definition of PED already states that the device generates or transmits electric energy and therefore cannot be a traditional load. Further, it is not good practice to use exclusionary language in a definition. It would be preferred that more descriptive words be added to more clearly eliminate load as PED.

It is also unclear why the SDT used the undefined terms “active power” and “reactive power” in the proposed definition instead of using the existing NERC glossary terms Real Power and Reactive Power. Using undefined terms when suitable defined terms already exist may result in ambiguity and make the definition less effective; the SRC therefore recommends the use of existing defined terms. If the SDT intends “active power” and “reactive power” to mean something different from Real Power and Reactive Power, the SRC recommends that the SDT use different terms and clarify the intended meaning. The proposed definition also lacks clarity regarding whether a combination of multiple pieces of modular equipment of the same type would be considered a single PED or an aggregation of PEDs.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2

Answer	No
Document Name	

Comment

ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and adopts them as its own.

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SPP RTO

Answer	No
Document Name	

Comment

SPP has a concern that the term **Power Electronic Device (PED)** does not have a true definition implemented in the IEEE 2800 Standard. For the record, the term was only found once in the document (on page 134) to where there was no definition associated, but only a description. At this point, it is not clear on what the drafting team is suggesting in reference to the relationship of the PED and the IBR. We recommend that the drafting team

provide clarity around their expectations for the PED term and how it aligns with the IBR from a NERC Reliability Standard perspective.

Furthermore, we recommend that the IRPTF coordinates with the IEEE 2800 drafting team and ensure that this proposed term is included in the IEEE Standard to promote consistency with the proposed Glossary of Terms definition.

Moreover, we recommend that the IRTPF coordinates with NERC legal to ensure that the proposed definition is included in the NERC Rules of Procedures (RoP) Appendix 2A to ensure proper alignment with the other two documents.

Additionally, we recommend that the proposed term **not be capitalized** at the point. This current action will create confusion for the industry on the current status of the term. For clarity, a defined term is only capitalized when it has officially been added to the NERC Glossary of Terms.

Finally, we recommend that the IRPTF create educational opportunities for industry to understand the relationship and purpose of the IEEE Standards and how they align with the NERC Standards to help support the reliability needs of the grid. From our perspective, there's no situational awareness around the alignment of the documents.

Likes 0	
Dislikes 0	

Response

C. A. Campbell - LS Power Development, LLC - 5

Answer	No
Document Name	

Comment

LS Power Development agress with the comments submitted by the North American Generator Forum (NAGF).

Likes 0	
Dislikes 0	

Response

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF

Answer	Yes
Document Name	

Comment

None.

Likes 0	
Dislikes 0	

Response

Shengen Chen - RLC Engineering - NA - Not Applicable - NPCC	
Answer	Yes
Document Name	
Comment	
This definition will cover broader devices that using power eletronic.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
FirstEnergy supports EEI's comments which state: EEI does not oppose the proposed new term "Power Electronic Device" (PED). While we do not oppose the proposed new term, we offer the following edits in boldface for consideration: Power Electronic Device (PED): Any device **incorporating** a power electronic **interface for connection to the Bulk Power System** that generates or transmits active power or reactive power or absorbs active power for the purposes of re-injecting it at a later time.	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI does not oppose the proposed new term "Power Electronic Device" (PED). While we do not oppose the proposed new term, we offer the following edits in boldface for consideration: Power Electronic Device (PED): Any device **incorporating** a power electronic interface **for connection to the Bulk Power System** that generates or	

transmits active power or reactive power or absorbs active power for the purposes of re-injecting it at a later time.

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6

Answer	Yes
Document Name	

Comment

AZPS does not oppose the proposed new term “Power Electronic Device” (PED). While we do not oppose the proposed new term, we support the following edits submitted by EEI on behalf of their members.

Power Electronic Device (PED): Any device **connected to the ac power system through incorporating** a power electronic interface **for connection to the Bulk Power System** that generates or transmits active power or reactive power or absorbs active power for the purposes of re-injecting it at a later time.

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF

Answer	Yes
Document Name	

Comment

N/A

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 3,5,6

Answer	Yes
Document Name	

Comment

Likes 0	
Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC, Group Name Tacoma Power	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Gail Elliott - International Transmission Company Holdings Corporation - NA - Not Applicable - MRO,RF	
Answer	
Document Name	
Comment	

No response received from Subject Matter Experts	
Likes 0	
Dislikes 0	
Response	

2. Do you support the definition for Inverter-Based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

C. A. Campbell - LS Power Development, LLC - 5

Answer	No
Document Name	

Comment

LS Power Development agress with the comments submitted by the North American Generator Forum (NAGF).

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SPP RTO

Answer	No
Document Name	

Comment

SPP has concerns when it comes to the proposed **IBR definition**. One of our concerns pertain to the IEEE definition and the proposed Glossary definition not having similar language.

Moreover, we have a concern on the how these definitions align with the FERC definition as well as what the Technical Rationale states that the glossary of terms and IEEE definitions “has different focus.” We recommend that the IRPTF provide clarity on how this different focus doesn’t create reliability concerns when it comes to the coordination of the IEEE and NERC Standards.

Again, we recommend that the IRPTF coordinates with the IEEE 2800 drafting team and ensure that this proposed term aligns with the IEEE Standard to promote consistency with the NERC Glossary of Terms.

Furthermore, we recommend that the IRTPF coordinates with NERC legal to ensure that the proposed definition is included in the NERC Rules of Procedures (RoP) Appendix 2A to ensure proper alignment with the other documents.

Also, we recommend that the IRPTF coordinates with the PRC-024 drafting team to ensure that the new performance based standard clearly addresses how an IBR is defined, while, addressing the need of the IBR performance during a system disturbance.

Finally, we recommend that the IRPTF create educational opportunities for industry to understand the relationship and purpose of the IEEE standards and how they align with the NERC Standards to help support the reliability needs of the grid. From our perspective, there’s no situational awareness around the alignment of the documents.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	No
Document Name	
Comment	
ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC	
Answer	No
Document Name	
Comment	

The SRC recommends that the drafting team leverage definitions from IEEE 2800 as much as possible instead of creating new definitions. The IEEE 2800 definitions of IBR Unit and IBR Plant are particularly useful, and the SDT should strongly consider defining these terms using the IEEE 2800 definitions, modified as necessary to align with the structure of NERC Reliability Standards. The SRC recognizes that the IEEE definitions may not be a perfect fit for the NERC Reliability Standards, but the SRC believes that the concepts that the IEEE definitions capture will be useful for delineating which Reliability Standard requirements apply to individual units (such as some of the requirements proposed in PRC-028-1) and which requirements apply to IBR Plants as a whole. Therefore, the SRC believes that using the IEEE 2800 definitions as the NERC definitions as much as possible would result in clearer definitions and minimize potential gaps in coverage.

Due to the emergence of inverter-based distributed energy resources connected to distribution systems, a general understanding of the term IBR has arisen in industry that encompasses resources that do not connect to the Bulk-Power System (BPS). Including a reference to BPS connectivity in the NERC definition for IBR may cause confusion, since the term “IBRs” is commonly used to refer to any DC-based energy devices regardless of whether they connect to the BPS or to the distribution system. To avoid this potential confusion, the SRC recommends that the definition for the term not include any references to the BPS. Reliability Standards can refer to “IBRs connected to the BPS” in order to avoid exceeding NERC’s authority without using a nonstandard, confusing definition of the term IBR.

It is also confusing to state an IBR “operates as a single resource.” We support the need to distinguish this capability however, the term as written can be misinterpreted to mean that the definition is not applicable when an IBR is designed to operate in aggregate (instead of as a single resource) through a collector configuration such as what is identified in the I4 BES Inclusion. Instead, better wording to define the combination of PED(s) (or power electronic interfaces”) to form a single IBR would be “taken together constitutes a single resource.” It is also unclear why the IBR definition is limited to devices primarily supplying active power when the PED definition includes resources providing active or reactive power.

Likes 0	

Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	No
Document Name	

Comment
We applaud the efforts of the SDT to develop a definition for IBRs. We believe this is a welcome improvement that will add clarity to multiple Reliability Standards. We believe the initial draft of the proposed IBR definition is a valiant attempt to define a broad range of various technologies; however, we have concerns with the last bullet point of the Technical Rationale section which states: “Battery energy storage system (BESS) will be considered as a PED/IBR independent of whether or not the device is operating in the charging or discharging mode.” This statement seems to contradict the caveat added in the IBR definition “supplies primarily active power”. A BESS system by its very nature will likely be supplying active power <=50% of the time that it is in operation. To wit, charging rates may be less than discharge rates, thereby causing the BESS to be absorbing active power over a longer time frame than it is supplying active power. Considering this, how would a BESS be considered to be primarily supplying active power? We feel that additional clarification is needed to specifically address BESSs.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5,6	
Answer	No
Document Name	

Comment
The definition expands the definition of qualified units required under NERC standards. Alison Mackellar on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Hillary Creurer - Allete - Minnesota Power, Inc. - 1

Answer	No
Document Name	
Comment	
Minnesota Power supports MRO's NERC Standards Review Forum's (NSRF) comments.	
Likes 0	
Dislikes 0	
Response	
Kimberly Turco - Constellation - 5,6	
Answer	No
Document Name	
Comment	
The definition expands the definition of qualified units required under NERC standards. Kimberly Turco on behalf of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
Junji Yamaguchi - Hydro-Quebec (HQ) - 1,5	
Answer	No
Document Name	
Comment	
The definition on its own does not exclude HVDC systems. It may be a good idea to add a specific exclusion like the PED definition. For example, add: "This term excludes HVDC systems". Alternatively, starting the definition with "Any electric power resource" could make it clearer that we are not simply referring to a device that transmits electric power.	
Likes 0	
Dislikes 0	
Response	

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	

Comment

The NAGF has identified the following comments for consideration regarding the proposed Inverter-Based Resource (IBR) definition:

a) Remove the term "Bulk Power System" and replace with "electrical system". The NAGF is concerned that using the BPS term in the proposed definition will not apply to Distributed Energy Resources (DER). The NAGF notes that an IBR is an IBR regardless of the level of the interconnection. It is important that NERC develop DER and IBR definitions that work together and do not cause conflict/confusion.

b) Additional information is needed to understand how the IBR definition will impact the devices/facilities under the new GO/GOP-IBR registration categories.

c) Consider adding the following language to the proposed IBR definition: "An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a common point of connection (e.g. step-up transformers, collector system(s), main power transformer(s), and power plant controller(s)). "

Likes 0	
Dislikes 0	

Response

Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	No
Document Name	

Comment

IBR definition, as proposed, excludes other than BPS systems that IBR are currently connected to i.e., DER. We suggest using "electrical system" in place of "Bulk Power System".

The reactive power production capability of inverter based resources is just as important as the real power production, so the phrase "supplies primarily active power" is inaccurate.

Likes 0	
Dislikes 0	

Response

Chantal Mazza - Hydro-Quebec (HQ) - 1 - NPCC	
Answer	No
Document Name	

Comment
The definition on its own does not exclude HVDC systems. It may be a good idea to add a specific exclusion like the PED definition. For example, add: “This term excludes HVDC systems”. Alternatively, starting the definition with “Any electric power resource” could make it clearer that we are not simply referring to a device that transmits electric power.

Likes 0	
Dislikes 0	

Response

Adrian Raducea - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy - DTE Electric

Answer	No
Document Name	

Comment
No, there is too much overlap to PED definition.

Likes 0	
Dislikes 0	

Response

Nikki Carson-Marquis - Minnkota Power Cooperative Inc. - 1 - MRO

Answer	No
Document Name	

Comment
Minnkota Power supports the MRO New Standard Review Forum (NSRF) and ACES comments. Minnkota believes formally defining “Inverter-Based Resource (IBR)” is the correct path forward and thanks the SDT for their efforts on the initial proposed definition.

Likes 0	
Dislikes 0	

Response

Israel Perez - Salt River Project - 1,3,5,6 - WECC

Answer	No

Document Name	
Comment	
SRP does not support the addition of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.	
Likes 0	
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3,4,5,6, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	
WEC Energy Group supports the comments of the NAGF.	
Likes 0	
Dislikes 0	
Response	
George E Brown - Pattern Operators LP - 5	
Answer	No
Document Name	
Comment	
Please see response to question three. Thank you.	
Likes 0	
Dislikes 0	
Response	
Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	No
Document Name	
Comment	

1. IBR should be independent of whether it is connected to the Bulk Power System or not. 2. In IEEE defined IBR, the IBR with the dedicated VSC-HVDC all belongs to IBR. I am not sure whether it is the same for the NERC-defined IBR. Please clarify.

Likes 0	
Dislikes 0	

Response

Kendra Buesgens - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF

Answer	No
Document Name	

Comment

The MRO NSRF does not agree with the Inverter-Based Resource (IBR) definition. Resource is not well defined or constrained, which isn't typically an issue when the term is used in other locations, but here, it could lead to overlap between IBR and IBR facility/plant. "Connects to the BPS" shouldn't be included in the definition, as a device being connected (or not) to the BPS doesn't actually change what it is, and things not connected to the BPS aren't subject to standards anyways. The phrase "supplies primarily active power" is also not well defined and probably not even needed. The last sentence shouldn't even be considered for inclusion as part of the definition for IBR, as it doesn't define IBR in any way, it just stipulates what may be considered an IBR plant/facility, something like this would be best placed in technical rationale or its own definition.

Likes 0	
Dislikes 0	

Response

Ben Hammer - Western Area Power Administration - 1,6

Answer	No
Document Name	

Comment

NERC Glossary of term utilizes "Real Power" but not "active power".

Suggest modification of PED definition to:

Inverter-Based Resource (IBR): Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, supplies primarily **Real Power**, and connects to the Bulk Power System. An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a common point of connection (e.g. step-up transformers, collector system(s), main power transformer(s), and power plant controller(s)).

Likes 0	
Dislikes 0	

Response

Anderson Hoke - National Renewable Energy Laboratory - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	

Comment
Generally the definition is good. But why define IBR to include only BPS-connected plants? A distribution- or subtransmission-connected IBR is still an IBR. Instead, just leave BPS out of the definition of IBR, but clarify in the main document which IBRs the requirements you are writing apply to. (For example you could say in the main document that the requirements apply to BPS-connected IBRs, if that is the intent.)

Likes 0	
Dislikes 0	

Response

Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	

Comment
We recognize that some older IBR units may not have the capability to provide reactive power. Nevertheless, CEHE would like to include the revision below to the IBR definition for completeness. CEHE proposes the following revision to the IBR definition for consideration: Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, supplies primarily active power, **provides reactive power to support system voltage if capable** and connects to the Bulk Power System. An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a common point of connection (e.g., step-up transformers, collector system(s), main power transformer(s), and power plant controller(s)).

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	Yes
Document Name	

Comment

N/A	
Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6

Answer	Yes
Document Name	

Comment

While AZPS does not oppose the proposed definition of IBR, we do support the proposed changes submitted by EEI on behalf of their members. The last sentence of the proposed definition seems to add a definition within a definition. If there is a belief that IBR plant/Facility needs to be defined, an additional definition should be developed. We also suggest adding reactive power to the definition. All of our suggested changes are in boldface below:

Inverter-Based Resource (IBR): Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, supplies primarily active power, and connects to the Bulk Power System. (Strikethrough/remove- **An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a common point of connection (e.g. step-up transformers, collector system(s), main power transformer(s), and power plant controller(s)).)**

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	Yes
Document Name	

Comment

While EEI does not oppose the proposed definition of IBR, we do suggest some changes. The last sentence of the proposed definition seems to add a definition within a definition. If there is a belief that IBR plant/Facility needs to be defined, an additional definition should be developed. Suggest deleting the last sentence, see below:

Inverter-Based Resource (IBR): Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, supplies primarily active power, and connects to the Bulk Power System.

Likes 0	
Dislikes 0	

Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
While EEI does not oppose the proposed definition of IBR, we do suggest some changes. The last sentence of the proposed definition seems to add a definition within a definition. If there is a belief that IBR plant/Facility needs to be defined, an additional definition should be developed. We also suggest adding reactive power to the definition. Inverter-Based Resource (IBR): Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, supplies primarily active power, and connects to the Bulk Power System.	
Likes 0	
Dislikes 0	

Response	
Srikanth Chennupati - Entergy - 1,3,5,7 - SERC	
Answer	Yes
Document Name	
Comment	
Entergy agrees with NAGF. NAGF has identified the following comments for consideration regarding the proposed Inverter- Based Resource (IBR) definition: a) Remove the term “Bulk Power System” and replace with “electrical system”. The NAGF is concerned that using the BPS term in the proposed definition will not apply to Distributed Energy Resources (DER). The NAGF notes that an IBR is an IBR regardless of the level of the interconnection. It is important that NERC develop DER and IBR definitions that work together and do not cause conflict/confusion. b) Additional information is needed to understand how the IBR definition will impact the devices/facilities under the new GO/GOP-IBR registration categories.	
Likes 0	
Dislikes 0	

Response	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	Yes

Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Randall Buswell - VELCO -Vermont Electric Power Company, Inc. - 1	
Answer	Yes
Document Name	
Comment	
The definition on its own does not exclude HVDC systems. It may be a good idea to add a specific exclusion similar to the PED definition. For example, add: “This term excludes HVDC systems”. Alternatively, starting the definition with “Any electric power resource” could make it clearer that we are not simply referring to a device that transmits electric power.	
Likes 0	
Dislikes 0	
Response	
Jennie Wike - Tacoma Public Utilities (Tacoma, WA) - 1,3,4,5,6 - WECC, Group Name Tacoma Power	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Shengen Chen - RLC Engineering - NA - Not Applicable - NPCC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Adrian Andreoiu - BC Hydro and Power Authority - 1,3,5, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Thomas Foltz - AEP - 3,5,6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Gail Elliott - International Transmission Company Holdings Corporation - NA - Not Applicable - MRO,RF	
Answer	
Document Name	
Comment	
No response received from Subject Matter Experts	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE agrees with having a definition of Inverter-Based Resource (IBR) appreciates the drafting team's efforts to write a definition. Texas RE is concerned, however, with the phrases "primarily active power" and "collector system(s)" and recommends they be clarified. In using the phrase "primary active power" in the definition, it may imply that supplying reactive power from these IBRs are less important or nonessential. Additionally, using the phrase "collector system(s)" should be clarified to read "portions of the collector system(s) per the BES definition". In the BES Reference Document, there is a discussion about the common point of interconnection and the document indicates not all the collector system(s) are part of the BES. Texas RE recommends the IBR definition be revised to the following:	

Inverter-Based Resource (IBR): Any source of electric power consisting of one or more Power Electronic Devices (PEDs), that operates as a single resource, *supplies active and reactive power simultaneously*, and connects to the Bulk Power System. An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a common point of connection (e.g. step-up transformers, *portions of collector system(s) per the BES definition*, main power transformer(s), and power plant controller(s)). Lastly, Texas RE cautions drafting teams on being consistent with the IBR term. There have been drafts that use the term “IBR unit” rather than IBR, which is not defined. Texas RE recommends being consistent in the use of the term IBR across all applicable standards.	
Likes 0	
Dislikes 0	
Response	

3. Provide any additional comments for the SDT to consider, if desired.

Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC

Answer	
Document Name	

Comment

None.

Likes 0	
Dislikes 0	

Response

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF

Answer	
Document Name	

Comment

Please consider expanding the term “primarily” for the IBR term listed under the Technical Rationale and Considerations section that reads: …supplies “primarily” active power, and c
the statement that it can also provide reactive power.

Reference: MOD-026-2 – Verification of Dynamic Models and Data for BES Connected Facilities, Draft 4 of MOD-026-2, September 2023, Page 1 of 1, New or Modified Term(s) Used
Standards

Likes 0	
Dislikes 0	

Response

Kendra Buesgens - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO NSRF

Answer	
Document Name	

Comment

The MRO NSRF thanks the SDT for their efforts in defining inverter-based resource and is the proper way to proceed. SDT needs to consider other defined terms for inclusion in this
Power, Reactive Power, Bulk Electrical System, et cetera. Using undefined versions of the aforementioned defined terms will lead to misinterpretation.

Likes 0	

Dislikes 0	

Response

Kacie Fischer - Oncor Electric Delivery - 1 - Texas RE

Answer	
Document Name	

Comment

Oncor believes it may be helpful if the following examples were moved out of the “Rationale and Technical Consideration” section and into the “Terms” section:

- The device examples from bullet points 1 and 2.
- The BESS clarification from bullet point 5. BESS acts like a load when it is charging, and the PED definition states “[t]his term excludes any load.” The BESS statement helps of whether it is a PED in the charging state. It would also make more sense that BESS be in one category regardless of its operation modes.

Likes 0	
Dislikes 0	

Response

Srikanth Chennupati - Entergy - 1,3,5,7 - SERC

Answer	
Document Name	

Comment

Technical Rational and Considerations Section:
a) Recommend to include co-located hybrid IBR devices/facilities in the discussion to clarify whether the proposed PED and IBR definitions apply to such technologies.

Likes 0	
Dislikes 0	

Response

George E Brown - Pattern Operators LP - 5

Answer	
Document Name	

Comment

Pattern Energy would like to thank the Standards Drafting Team for their efforts to define inverter-based resource.

Inverter based resource (IBR) needs to be defined on its own and in a general manner, exclusive of either generation or transmission. This will allow the IBR term to capture all types

equipment. Then when it is necessary to have specific regulations/requirements for IBRs, the regulations/requirements could further narrow the scope to which particular types of IBF regulations/requirements are applicable to using the Bulk Electrical System definition.

- Proposed definition:

Inverter Based Resource (IBR): Refer generally to Bulk Power System (BPS) connected facilities that have a power electronic device that converts direct current (dc) electricity to alte electricity between the ac grid and the source of electricity and vice versa. IBRs include but are not limited to type 3 and 4 wind turbine generators, solar photovoltaic inverters, and b resources, as well as high voltage direct current circuits and flexible alternating current transmission system devices like static synchronous compensators and static volt-ampere reac

- Application of the IBR term in regulations/requirements examples, not all inclusive:
  - Aggregate Plant Level:

"IBRs identified through Inclusion I2 or I4 of the Bulk Electrical System definition at an aggregate plant/facility level, shall…"

- Individual Unit Level:

"Individual IBR generating units of dispersed power producing resources identified through Inclusion I4 of the Bulk Electrical System definition, shall…"

Referenced Documents:

2023_NERC_Guide_Inverter-Based-Resources.pdf

NERC_IBR_QuickReferenceGuideMarch2023.pdf

Likes 0	
Dislikes 0	

Response

Christine Kane - WEC Energy Group, Inc. - 3,4,5,6, Group Name WEC Energy Group

Answer	
Document Name	

Comment

WEC Energy Group supports the comments of the NAGF.

Likes 0	
Dislikes 0	

Response

Xiaoyu Wang - Enel Green Power - NA - Not Applicable - NA - Not Applicable

Answer	
Document Name	

Comment

Please the SDT consider providing further clarifications on the PED definition.

Generally speaking, the team is to use this term to include a broader range of power electronics technology than IBRs, mainly to cover the FACTS such as StatCom, SVC, etc. This in conveyed by the PED definition and its Technical Rationales.

However, in the IBR term definition, it reads that 'An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for delivering the power to a comm (e.g. step-up transformers, collector system(s), main power transformer(s), and power plant controller(s)).' Sounds like here it refers PED to the inverter unit/device/equipment vs. othe equipment/components within the IBR plant, such as transformers and collector systems.

It will be beneficial to clarify the actual scope of PED for future use.

Likes 0	
Dislikes 0	

Response

Shengen Chen - RLC Engineering - NA - Not Applicable - NPCC

Answer	
Document Name	

Comment

Maybe also consider some langueges that describing the software come with PED and IBR could also control/impact the performance of PED and IBR.

Likes 0	
Dislikes 0	

Response

Israel Perez - Salt River Project - 1,3,5,6 - WECC

Answer	
Document Name	

Comment

SRP does not support the addition of these new terms to the standard. These new terms are specific to IBR's. SRP strongly feels Inverter Based Resources should have separate sta

Likes 0	
Dislikes 0	

Response

Nikki Carson-Marquis - Minnkota Power Cooperative Inc. - 1 - MRO

Answer	
Document Name	

Comment

Minnkota Power Cooperative appreciates the opportunity to comment.

Likes 0	
Dislikes 0	

Response

Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,3,4,5,6, Group Name FE Voter

Answer	
Document Name	

Comment

N/A

Likes 0	
Dislikes 0	

Response

Adrian Raducea - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy - DTE Electric

Answer	
Document Name	

Comment

None

Likes 0	
Dislikes 0	

Response	
Chantal Mazza - Hydro-Quebec (HQ) - 1 - NPCC	
Answer	
Document Name	
Comment	

An IBR doesn't have to be connected to the Bulk Power System to be an IBR. This is the case for IBR on the distribution grid or on isolated grid.

Within MOD-026 please keep distinction between LCC HVDC vs. VSC HVDC.

We have concerns with the proposed IBR definition and the existing BES definition, in particular the I4 inclusion with refers to “Dispersed power producing resources” (DPPR) and is v
proposed IBR definition. Our understanding is that an IBR is automatically considered a DDPR, but the opposite is possibly not the case? Are there 2 distinct types of facilities, IBR (r
(BES)? We encourage the SDT to ensure consistent use of these terms when referring to an installation

Likes 0	
Dislikes 0	
Response	
Pamela Frazier - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	
Document Name	
Comment	

Consider adding the following language to the proposed IBR definition: “An IBR plant/facility includes the Power Electronic Devices, and the equipment designed primarily for deliverin
common point of connection (e.g. step-up transformers, collector system(s), main power transformer(s), and power plant controller(s))."

HVDC systems and transmission-connected FACTS devices (STATCOMs and SVCs, etc) are power electronic devices. Simply saying they are not in the IBR definition is not a valid
disassociation from the definition. If those device types are not intended or planned to be part of the development of future reliability standards, then the exclusion from applicability s
the standard, not in the development of a definition that doesn’t satisfy common sense.

Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6	
Answer	

Document Name	

Comment

None

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	
Document Name	

Comment

Technical Rational and Considerations Section:

a) Recommend to include co-located hybrid IBR devices/facilities in the discussion to clarify whether the proposed PED and IBR definitions apply to such technologies. Please see Guide for reference that NERC published back in 2021:

https://www.nerc.com/pa/comp/RegistrationReferenceDocsDL/CMEP%20Practice%20Guide%20%20Application%20of%20the%20BES%20Definition%20to%20BESS%20and%20H

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF

Answer	
Document Name	

Comment

N/A

Likes 0	
Dislikes 0	

Response

Junji Yamaguchi - Hydro-Quebec (HQ) - 1,5

Answer	
Document Name	

Comment

An IBR doesn't have to be connected to the Bulk Power System to be an IBR. This is the case for IBR on the distribution grid or on isolated grid.

Within MOD-026 please keep distinction between LCC HVDC vs. VSC HVDC.

We have concerns with the proposed IBR definition and the existing BES definition, in particular the I4 inclusion with refers to “Dispersed power producing resources” (DPPR) and is v
proposed IBR definition. Our understanding is that an IBR is automatically considered a DDPR, but the opposite is possibly not the case? Are there 2 distinct types of facilities, IBR (r
(BES)? We encourage the SDT to ensure consistent use of these terms when referring to an installation.

Likes 0	
Dislikes 0	

Response

Kimberly Turco - Constellation - 5,6

Answer	
Document Name	

Comment

Constellation has no additional comments.

Kimberly Turco on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Hillary Creurer - Allete - Minnesota Power, Inc. - 1

Answer	
Document Name	

Comment

Minnesota Power supports MRO’s NERC Standards Review Forum’s (NSRF) comments.

Likes 0	

Dislikes 0	

Response

Alison MacKellar - Constellation - 5,6

Answer	
Document Name	

Comment

Constellation has no additional comments.

Alison Mackellar on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	
Document Name	

Comment

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC

Answer	
Document Name	

Comment

The headers for R4, R5, and R6 in the posted draft 3 of MOD-026-2 infer they are applicable to IBRs by stating “Inverter Based Resources.” However, these three requirements also
does not meet the “IBR” definition, e.g. - FACTS, VSC HVDC, and LCC HVDC. The headers should be changed to remove “Inverter Based Resources” or removed in their entirety to

In addition the second bullet of the section “Technical Rationale and Considerations” states that the presence of the phrase “primarily supplies active power” in the IBR definition is the
systems would not be considered IBRs. The SRC agrees that HVDC systems should not be considered IBRs, but believes the stated reason is not correct. The SDT’s desire for the I

limited to generating resources or sources of electric power would be a more accurate basis for excluding HVDC systems from the universe of IBRs.

It is necessary for the standard to distinguish between unit level and plant level requirements for commissioning purposes, since most facilities perform commissioning tests as interm as building blocks leading up to the final end-to-end testing. This would help make available IBR test information prior to the commercial operation date. Finally, in the fourth bullet of t is unclear what requirements are being proposed at the device level. In particular, with respect to model verification and validation, it is unclear what need exists for device-level NER of plant-level requirements.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2

Answer	
Document Name	

Comment

ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.

Additionally, the definitions and associated technical guidance should account for HVDC systems and their associated inverters, all of which may be considered PEDs. An HVDC syst multiple smaller HVDC ties that include multiple inverters. Offshore wind farms may also employ a VSC HVDC transmission system to transfer power from the wind turbine PEDs to t interconnection, potentially with different owners. Finally, ERCOT recommends that the SDT coordinate with the Project No. 2023-01 SDT, which has also been considering the appr defining the term IBR.

Likes 0	
Dislikes 0	

Response

Gail Elliott - International Transmission Company Holdings Corporation - NA - Not Applicable - MRO,RF

Answer	
Document Name	

Comment

No response received from Subject Matter Experts

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SPP RTO

Answer	
Document Name	

Comment
N/A

Likes 0	
Dislikes 0	

Response

C. A. Campbell - LS Power Development, LLC - 5

Answer	
Document Name	

Comment
LS Power Development agress with the comments submitted by the North American Generator Forum (NAGF).

Likes 0	
Dislikes 0	

Response

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project 2020-06 Verification of Models and Data for Generators
IBR Definitions | Posted September 18 – October 24, 2023

Comments Received Summary

There were 39 sets of responses, including comments from approximately 101 different people from approximately 67 companies representing 8 of the Industry Segments.

All comments submitted can be reviewed in their original format on the project page. If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, contact Director, Standards Development Latrice Harkness (via email) or at (404) 858-8088.

Consideration of Comments

The Project 2020-06 drafting team (DT) thanks all of industry for your time and comments. The DT identified themes from the informal comment period for the two terms (Inverter-Based Resource and Power Electronic Device) to guide the overall revisions to the definitions and revised the inverter-based resource (IBR)-related definitions based on the comments received. Due to the similar nature of multiple comments received during the initial ballot and comment period, the DT chose to respond to comments in summary format as described in Section 4.12 of the Standard Processes Manual.

Industry Comment Themes

- The definitions should be more similar or aligned with the IEEE definitions for “IBR and IBR unit,” since these definitions are well established.
- The Power Electronic Device (PED) term is too broad. A PED can mean almost anything power electronic based device/technology, such as an IGBT, computers, or other power electronic based devices. Commenters also recommended using a different term to replace PED, such as IBR Unit or Inverter-Based Device.
- There needs to be a distinction between the definitions for PED and IBR. There is too much overlap between the two terms.
- The description of power electronic interface would be clearer if followed by the phrase “such as an inverter/converter.”
- The definition for IBR should not include “connected to the Bulk Power System.” An IBR is an IBR regardless of where it is connected to the electrical power system, (e.g., transmission, distribution, BES, BPS, etc.). Other commenters felt that the IBR definition should include specific mention of connection to the Bulk Power System or transmission system.
- The definitions should make it clearer which types of technologies are considered IBR.

- The definitions should use other defined terms when possible, such as Real Power instead of active power.

New Definitions

The DT proposes the two definitions below based on industry comment themes and team discussions. Additional information can be found in the initial ballot documentation posted on the project page.

Inverter-Based Resource (IBR): A source (or sink in the case of a charging battery energy storage system (BESS)) of electric power that is connected to the electric power system (transmission, sub-transmission, or distribution system), and that consists of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.

IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.

Description of Current Draft

This is the first draft of the proposed Glossary Terms posted for a formal comment period and initial ballot.

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021

Anticipated Actions	Date
45-day formal comment period with initial ballot	November 16, 2023 – January 4, 2024
10-day final ballot	January 2024
NERC Board adoption	February 2024

New or Modified Term(s) Used in NERC Reliability Standards

Background:

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The terms proposed below are intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A source (or sink in the case of a charging battery energy storage system (BESS)) of electric power that is connected to the electric power system (transmission, sub-transmission, or distribution system), and that consists of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.

IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.

Background

- The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the IBR terms for the NERC Glossary of Terms and adjusted, as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions.
- The IBR and IBR Unit definitions are intended to describe the technology and which types of technologies are considered IBR. An IBR is not defined by where it is connected or the size of the IBR. Therefore, the definitions do not define the applicability for Reliability Standards, voltage connection level, or facility capability level (MW/MVA). The applicability of IBR will be defined in the Applicability section of the respective Reliability Standards. Additionally, this is the DT's reasoning to include the phrase "connected to the electric power system (transmission, sub-transmission, or distribution system)," while excluding specific voltage connection and MW values within the IBR definition.
- There is a need to distinguish between the individual "IBR unit or device" and the "IBR plant/facility" as a whole, so that standards or requirements can be written for each, as necessary. Hence, the two definitions for IBR Unit and IBR.
- The term IBR is synonymous with the term "IBR plant/facility." An IBR includes the IBR Units, and the equipment designed primarily for delivering the power to a common point of interconnection (e.g., step-up transformers, collector system(s), main power transformer(s), power plant controller(s), reactive resources within the IBR plant, and a voltage source converter high-voltage direct current (VSC HVDC) system with a dedicated connection to the IBR).
- An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.
- IBRs have traditionally been considered "generating resources." An IBR is not a HVDC system (except for a VSC HVDC with a dedicated connection to an IBR), flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. The DT's intent with the phrase "IBRs include" is to articulate a specific list of IBRs. Therefore, other technologies not listed would not be considered an IBR.
- A hybrid IBR (e.g., BESS and solar PV) or collocated portions of a facility that are IBR (e.g., a BESS at synchronous generation facility) are considered an IBR.
- IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power.
- Battery energy storage systems (BESS) are considered an IBR unit or IBR independent of whether the device is operating in a charging, idle, or discharging mode.
- The Project 2020-06 DT intends to use the Glossary Terms of IBR Unit and IBR for MOD-026-2. Additional standards development projects and related standards that may use these defined terms include:
    - Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)
    - Project 2021-01 Modifications to PRC-019 and MOD-025
    - Project 2021-04 Modifications to PRC-002 (new PRC-028)

  - Project 2022-04 EMT Modeling
  - Project 2023-01 EOP-004 IBR Event Reporting
  - Project 2023-02 Performance of IBRs (new PRC-030)
- Distributed Energy Resources (DER) related projects that may or may not need to use IBR/IBR Unit if they end up with their own definition)
  - Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
  - Project 2023-05 FAC-001/FAC-002 DER
  - Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource Definitions

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definitions must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)
- IBR Unit

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the Drafting Team (DT) that would coalesce development efforts for these definitions and coordinate proposed definitions with the other NERC developers. The Drafting Team proposes the two definitions of IBR and IBR Unit to be used in Reliability Standard MOD-026-2, as well as other IBR-related standards development projects.

General Considerations

Multiple standards in development will use the definition(s), and the proposed implementation timeframe is intended to reflect that any one of those standards may be the first to use one or more of the definitions. Additionally, this implementation plan only affects the date that these new definitions will become effective terms in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use these proposed definitions.

Effective Date

The effective date(s) for the proposed definitions for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed definitions shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the definitions, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed definitions shall become effective on the first day of the first calendar quarter after the date the definitions are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Project 2020-06 Verification of Models and Data for Generators Inverter-based Resource Definitions

Do not use this form for submitting comments. Use the Standards Balloting and Commenting System (SBS) to submit comments on **Inverter-based Resource (IBR) Glossary Terms** by **8 p.m. Eastern, Tuesday, January 9, 2024.**

Additional information is available on the project page. If you have questions, contact Senior Standards Developer, Chris Larson (via email), or at 404-446-9708.

Background

The NERC IBR Performance Task Force (IRPTF) performed a comprehensive review of all NERC Reliability Standards to identify any potential gaps and/or improvements. The IRPTF discovered several issues as part of this effort and documented its findings and recommendations in the IRPTF Review of NERC Reliability Standards White Paper, which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed. The RSTC endorsed the standard authorization request (SAR) June 10, 2020.

The Standards Committee accepted two revised SARs at its July 21, 2021 meeting. The scope of the SARs include the potential to add, modify, or retire a Glossary Terms for NERC Reliability Standards. The Project 2020-06 drafting team proposes two new terms as part of this formal comment and initial ballot period.

Please provide your responses to the questions listed below, along with any detailed comments.

Questions

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

3. Provide any additional comments for the DT to consider, if desired.

   Comments:

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

UPDATED
Standards Announcement
Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Terms

Formal Comment Period Open through January 9, 2024
Ballot Pools Forming through December 15, 2023

Now Available

A formal comment period for **Inverter-based Resource Glossary Terms** is open through **8 p.m. Eastern, Tuesday, January 9, 2024.**

Commenting
Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

Reminder Regarding Corporate RBB Memberships
Under the NERC Rules of Procedure, each entity and its affiliates are collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Ballot Pools
Ballot pools are being formed through **8 p.m. Eastern, Friday, December 15, 2023.** Registered Ballot Body members can join the ballot pools here.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps
Initial ballots will be conducted **December 29, 2023 – January 9, 2024**.

For more information on the Reliability Standards development process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Comment Report

Project Name:	2020-06 Verifications of Models and Data for Generators | Draft 1 of IBR Definitions
Comment Period Start Date:	11/16/2023
Comment Period End Date:	1/9/2024
Associated Ballots:	2020-06 Verifications of Models and Data for Generators IBR Unit IN 1 DEF 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan IN 1 OT 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) IN 1 DEF

There were 73 sets of responses, including comments from approximately 179 different people from approximately 113 companies representing 10 of the Industry Segments as shown in the table on the following pages.

Questions

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

3. Provide any additional comments for the DT to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
BC Hydro and Power Authority	Adrian Andreoiu	1	WECC	BC Hydro	Hootan Jarollahi	BC Hydro and Power Authority	3	WECC
					Helen Hamilton Harding	BC Hydro and Power Authority	5	WECC
					Adrian Andreoiu	BC Hydro and Power Authority	1	WECC
MRO	Anna Martinson	1,2,3,4,5,6	MRO	MRO Group	Shonda McCain	Omaha Public Power District (OPPD)	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jamison Cawley	Nebraska Public Power District	1,3,5	MRO
					Jay Sethi	Manitoba Hydro (MH)	1,3,5,6	MRO
					Husam Al-Hadidi	Manitoba Hydro (System Preformance)	1,3,5,6	MRO
					Kimberly Bentley	Western Area Power Adminstration	1,6	MRO
					Jaimin Patal	Saskatchewan Power Coporation (SPC)	1	MRO
					Angela Wheat	Southwestern Power Administration	1	MRO
					George Brown	Pattern Operators LP	5	MRO
					Larry Heckert	Alliant Energy (ALTE)	4	MRO
					Terry Harbour	MidAmerican Energy Company (MEC)	1,3	MRO

					Dane Rogers	Oklahoma Gas and Electric (OG&E)	1,3,5,6	MRO
					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Michael Ayotte	ITC Holdings	1	MRO
					Andrew Coffelt	Board of Public Utilities-Kansas (BPU)	1,3,5,6	MRO
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,SPP RE,WECC	SRC 2023	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Helen Lainis	IESO	1	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Elizabeth Davis	PJM	2	RF
					Kennedy Meier	Electric Reliability Council of Texas, Inc.	2	Texas RE
WEC Energy Group, Inc.	Christine Kane	3		WEC Energy Group	Christine Kane	WEC Energy Group	3	RF
					Matthew Beilfuss	WEC Energy Group, Inc.	4	RF
					Clarice Zellmer	WEC Energy Group, Inc.	5	RF
					David Boeshaar	WEC Energy Group, Inc.	6	RF
Southern Company - Southern Company Services, Inc.	Colby Galloway	1,3,5,6	MRO,RF,SERC,Texas RE,WECC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern	6	SERC

						Company - Southern Company Generation		
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC
Public Utility District No. 1 of Chelan County	Diane E Landry	1		CHPD	Joyce Gundry	Public Utility District No. 1 of Chelan County	3	WECC
					Anne Kronshage	Public Utility District No. 1 of Chelan County	6	WECC
					Rebecca Zahler	Public Utility District No. 1 of Chelan County	5	WECC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	1	WECC
					Scott Brame	North Carolina Electric Membership Corporation	3,4,5	SERC
					Jason Procuniar	Buckeye Power, Inc.	4	RF
					Kevin Lyons	Central Iowa Power Cooperative	1	MRO
					Amber Skillern	East Kentucky Power Cooperative	1	SERC
					Nick Fogleman	Prairie Power, Inc.	1,3	SERC
					Kylee Kropp	Sunflower Electric Power Corporation	1	MRO
					Austin Towne	Western	1,5	Texas RE

						Farmers Electric Cooperative		
Eversource Energy	Joshua London	1		Eversource	Joshua London	Eversource Energy	1	NPCC
					Vicki O'Leary	Eversource Energy	3	NPCC
FirstEnergy - FirstEnergy Corporation	Mark Garza	4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy-FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
Michael Johnson	Michael Johnson		WECC	PG&E All Segments	Marco Rios	Pacific Gas and Electric Company	1	WECC
					Sandra Ellis	Pacific Gas and Electric Company	3	WECC
					Frank Lee	Pacific Gas and Electric Company	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC
					Alain Mukama	Hydro One Networks, Inc.	1	NPCC
					Deidre Altobell	Con Edison	1	NPCC
					Jeffrey Streifling	NB Power Corporation	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael	Central	1	NPCC

Ridolfino	Hudson Gas & Electric Corp.		
Randy Buswell	Vermont Electric Power Company	1	NPCC
James Grant	NYISO	2	NPCC
John Pearson	ISO New England, Inc.	2	NPCC
Harishkumar Subramani Vijay Kumar	Independent Electricity System Operator	2	NPCC
Randy MacDonald	New Brunswick Power Corporation	2	NPCC
Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
David Burke	Orange and Rockland	3	NPCC
Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
Salvatore Spagnolo	New York Power Authority	1	NPCC
Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
David Kwan	Ontario Power Generation	4	NPCC
Silvia Mitchell	NextEra Energy - Florida Power and Light Co.	1	NPCC
Glen Smith	Entergy Services	4	NPCC
Sean Cavote	PSEG	4	NPCC
Jason Chandler	Con Edison	5	NPCC
Tracy MacNicoll	Utility Services	5	NPCC

					Shivaz Chopra	New York Power Authority	6	NPCC
					Vijay Puran	New York State Department of Public Service	6	NPCC
					ALAN ADAMSON	New York State Reliability Council	10	NPCC
					David Kiguel	Independent	7	NPCC
					Joel Charlebois	AESI	7	NPCC
					Joshua London	Eversource Energy	1	NPCC
Elevate Energy Consulting	Ryan Quint	NA - Not Applicable	NA - Not Applicable	Elevate Energy Consulting	Ryan Quint	Elevate Energy Consulting		NA - Not Applicable
					N/A	N/A		NA - Not Applicable
Dominion - Dominion Resources, Inc.	Sean Bodkin	6		Dominion	Connie Lowe	Dominion - Dominion Resources, Inc.	3	NA - Not Applicable
					Lou Oberski	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
					Larry Nash	Dominion - Dominion Virginia Power	1	NA - Not Applicable
					Rachel Snead	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
Shannon Mickens	Shannon Mickens		MRO,SPP RE,WECC	SPP RTO	Shannon Mickens	Southwest Power Pool Inc.	2	MRO
					Mia Wilson	Southwest Power Pool Inc.	2	MRO
					Josh Phillips	Southwest Power Pool Inc.	2	MRO
					Darian Richards	Southwest Power Pool	2	MRO

						Inc		
					Jim William	Southwest Power Pool Inc.	2	MRO
					Mason Favazza	Southwest Power Pool Inc.	2	MRO
					Scott Jordan	Southwest Power Pool Inc.	2	MRO
					Will Tootle	Southwest Power Pool Inc.	2	MRO
					Zach Sabey	Southwest Power Pool Inc.	2	MRO
Stephen Whaite	Stephen Whaite		RF	ReliabilityFirst Ballot Body Member and Proxies	Lindsey Mannion	ReliabilityFirst	10	RF
					Stephen Whaite	ReliabilityFirst	10	RF
Western Electricity Coordinating Council	Steven Rueckert	10		WECC	Steve Rueckert	WECC	10	WECC
					Phil O'Donnell	WECC	10	WECC
Tim Kelley	Tim Kelley		WECC	SMUD and BANC	Nicole Looney	Sacramento Municipal Utility District	3	WECC
					Charles Norton	Sacramento Municipal Utility District	6	WECC
					Wei Shao	Sacramento Municipal Utility District	1	WECC
					Foung Mua	Sacramento Municipal Utility District	4	WECC
					Nicole Goi	Sacramento Municipal Utility District	5	WECC
					Kevin Smith	Balancing Authority of Northern California	1	WECC

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	No
Document Name	
Comment	

The Inverter Based Resource proposed definition includes distribution. GADS and other regional (ISO/RTO) definitions support BPS (transmission and sub-transmission) and purposely leave out distribution systems (distributed energy resources (DERs)). We recommend also having this delineation to help industry terms align. Thus, DER should have its own definition and a MW delineation or facility descriptions as part of its definition. We believe having MW delineation may help approval odds of both definitions. This may also help with the inclusions and exclusions of IBRs and DERs for upcoming standards.

Further we recommend that BESS Resource should be excluded from this definition, and should be its own definition. Separating these items out may help the inclusion and exclusion of certain units/facilities. We also recommend that converter unit resources should be its own definition. Reasoning for breaking these resources out as their own definition, makes it easier to include, exclude, delineate and detail requirements for each kind of resource within upcoming standards. Example: EMT modeling requirements, event reporting, and performances should differ between IBRs, BESS Resources and Converter Based Resources.

Also, many companies (GOs) are seperating out their PV Plant as one legal entity and their BESS as another legal entity. With this in mind, making seperate definitions also helps these companies.

Likes 0	
Dislikes 0	
Response	

Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	No
Document Name	
Comment	

· Item 4 in the background of the IBR definition documents indicates that the IBR is synonymous with the term “IBR plant/facility”, where a step-up transformer, collector systems, main power transformers, power plant controllers, etc., all belong to the IBR. However, these details are not mentioned in the IBR definition. Therefore, it is recommended to include these details in the IBR definition to clarify the definition.

· The isolated IBR, regardless of their energy resource, interconnecting via a dedicated VSC-HVDC transmission facility should be included in the IBR definition.

Likes 0	
Dislikes 0	

Response

Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	No
Document Name	

Comment
The proposed defintion conflicts with the BES definition and also appears to be an attempt to expand NERC jurisidction into the distribution system. The definition is expansive and goes beyond a defintoin of what an Inverter Based Resource is technically. Dominion Energy recommends that NERC use the FERC definition of IBR: IBRs include solar photovoltaic, wind, fuel cell, and battery storage resources powering electronic devices that change direct current power produced by these resources to alternating current power to be transmitted on the BPS. The FERC definition clearly communicates that only resources that are intending to move power across the BPS are a jurisdictional IBR and does not conflict with the existing and approved BES definition. Dominion Energy also supports EEI comments.

Likes 0	
Dislikes 0	

Response

Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	No
Document Name	

Comment
The drafting team has presented a good draft definition of IBR but the proposed definition includes some technical issues that could create challenges, inconsistencies, and applicability challenges when used in the NERC Reliability Standards. These issues should be further vetted and considered by the drafting team for the next iteration. Potential issues include: 1. The parenthetical “(transmission, sub-transmission, or distribution system)” encapsulates all IBRs connected to the power grid which is a good approach to create a generic definition that can then be further specified for applicability to requirements. However, the phrase could also be removed and the meaning would remain the same. So therefore, it may not be necessary to add that level of specificity to the Glossary Term knowing that further clarification would be needed for applicability in the Standards. o IBRs connected to the distribution system are classified as distributed energy resources (DERs) and would need a separate definition to classify them as such for any DER-related standards modifications. 2. The list of IBR technologies at the end of the definition is confusing in that it is unclear whether this list is inclusive or exclusive. As written, one cannot clearly determine whether the list defines the types of resources that are considered IBRs or if they are simply examples. There are other types of IBRs such as FACTS devices (STATCOMs, SVCs, etc.) and HVDC circuits that are not included in this list. Therefore, as written, the definition will cause a significant amount of confusion and require significant clarifying language in every standard where used. 3. The *ERO Enterprise CMEP Practice Guide: Application of the Bulk Electric System Definition to Battery Energy Storage Systems and Hybrid Resources Version 1* clarifies that BESS applicability is irrespective of charging and discharging. This is relevant to these definitions in that the proposed IBR definition states “A source (or sink in the case of a charging BESS)” but it is unclear what value the parenthetical addition brings to the definition. A BESS is a source of electric power when discharging and therefore could be classified accordingly without the additional language. The drafting team should consider this when developing the definition given the past precedence set with the Practice Guide.

Similarly, if the team decides to keep it, it could be integrated into the definition so there are less parentheticals throughout.

The following are supported in the definition:

1. The use of “electric power system” is likely a suitable term in that it is generic enough for a definition such as this. Again, without the additional text that appears to be unnecessary, as described above.

A more fundamental definition such as the following may be just as useful for reference in NERC Standards: “A source of electric power connected to the electric power system that consists of one or more IBR Unit(s) operated as a single resource at a common point of connection.

Likes 0	
Dislikes 0	

Response

Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter

Answer	No
Document Name	

Comment

FirstEnergy supports EEI’s comments which state:

EEI appreciates the efforts to develop the proposed IBR definition, however, we do not support the definition as currently written

Our concerns include the specificity in the technology types covered in the proposed definition, noting that NERC definitions should be technology agnostic. Also, as written the definition seems to cast an overly broad net relative to the size and voltage class for the IBR resources yielding insufficient regulatory clarity necessary for entities to apply the definition in any meaningful way. While the definition is not intended to identify specific resource applicability, it still should be clear enough to provide a regulatory floor as it relates to NERC Reliability Standards.

To address these concerns, either the IEEE definition of IBRs, as defined in IEEE 2800-2022 (IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems, See Section 3, page 31) or the informal definition of IBRs as proposed by the FERC Commission on Nov. 17, 2023 should be leveraged.

Finally, consideration should be given to defining DERs separately noting these resources, while also inverter based, represent a specific class of IBRs that are directly connected to the distribution system and in many cases serve a very different purpose outside of supporting the reliability of the Bulk Power System.

Likes 0	
Dislikes 0	

Response

Michael Johnson - Michael Johnson On Behalf of: Frank Lee, Pacific Gas and Electric Company, 3, 1, 5; Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	No
Document Name	

Comment
PG&E does not support the definition of an IBR as written because it is too narrow to only define the listed 5 items as IBR technologies. There are other generation types that use IBR technologies that produce MWs such as Flywheels, Tidal flows, etc… that if left out, will result in future ambiguity. PG&E's recommendation is to either list other generation methods by name or the Drafting Team (DT) should include in the requirement text "and other" to ensure emerging generation or technologies are not excluded to avoid future modifications to the definition.

Likes 0	
Dislikes 0	

Response

Ruchi Shah - AES - AES Corporation - 5	
Answer	No
Document Name	

Comment
AES Clean Energy supports NAGF's comments and NAGF's proposed definition for IBR.

Likes 0	
Dislikes 0	

Response

Andy Thomas - DTE Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	

Comment
Duke Energy provides the following guidance: Delete proposed NERC IBR definition and substitute the IEEE 2800 "IBR Plant" definition. The IEEE2800 definition is well vetted within the industry and serves the NERC intended purpose for this application. Note: The proposed NERC IBR definition fits the IBR Plant definition from IEEE 2800.

Likes 0	
Dislikes 0	

Response

Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No

Document Name	
Comment	

MRO NSRF does not support the definition as written due to the following concerns:

The phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" needs to be removed. Language is unnecessary.

The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted. When possible, language used in standards and definitions should be technology neutral.

The broadness of the definition generates ambiguity and will create difficultly in the application for NERC compliance. While identifying specific resource applicability isn't the aim, the definition should provide a clear regulatory framework as a baseline for adherence to NERC Reliability Standards.

Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	
Response	

Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	No
Document Name	
Comment	

PNM and TNMP supports EEI comments but also provide recommended modification of the IBR definition.

Inverter Based Resource: A source of electric power that is connected to the and consists of one or more IBR Unit(s) operated as a single resource at common point of interconnection. IBRs include but are not limited to solar photovoltaic (PV), Type 3 and Type 4 wind BESS, and fuel cell.

Likes 0	
Dislikes 0	
Response	

Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,7 - SERC	
Answer	No
Document Name	
Comment	

The definition of IBR is very vague.

Entergy recommends The Inverter Based Resource(IBR) definition should clearly state that this definition should apply to only transmission connected

facilities. Distribution connected facilities should be called DER in alignment with other NERC Posted guidelines.	
Likes 0	
Dislikes 0	
Response	
Sheila Suurmeier - Black Hills Corporation - 5	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI Comments.	
Likes 0	
Dislikes 0	
Response	
Micah Runner - Black Hills Corporation - 1	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	
Carly Miller - Carly Miller On Behalf of: Josh Combs, Black Hills Corporation, 5, 1, 3, 6; - Carly Miller	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	

Dislikes 0	

Response

Rachel Schuldt - Rachel Schuldt On Behalf of: Rachel Schuldt, Black Hills Corporation, 5, 1, 3, 6; - Black Hills Corporation - 6	
Answer	No
Document Name	

Comment
Black Hills Corporation supports NAGF and EEI comments.

Likes 0	
Dislikes 0	

Response

Jennifer Neville - Western Area Power Administration - 6	
Answer	No
Document Name	

Comment
• Remove the phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" as it is unnecessary language. • Delete the sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** because the language is not technology neutral. • The definition should provide a clarity for regulatory pruposes, currently the broadness of the definition generates ambiguity and will create difficultly in the application for NERC compliance.

Likes 0	
Dislikes 0	

Response

Tracy MacNicoll - Utility Services, Inc. - 4	
Answer	No
Document Name	

Comment
"(transmission, sub-transmission, or distribution system)" is unnecessary for the definition. This clarification would be made in the Applicability or Facilities section of a standard.

The last sentence should have "may include". If it is only those 4 generating types, the rest of the definition wouldn't be necessary.

Likes 0	
Dislikes 0	

Response

James Keele - Entergy - 3

Answer	No
Document Name	

Comment

Entergy recommends The Inverter Based Resource(IBR) definition should clearly state that this definition should apply to only transmission connected facilities. Distribution connected facilities should be called DER in alignment with other NERC Posted guidelines.

Likes 0	
Dislikes 0	

Response

Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC

Answer	No
Document Name	

Comment

The first sentence of the proposed definition includes the phrase “(or sink in the case of a charging battery energy storage system (BESS)” which limits the applicability of an IBR to just BESS. Energy storage systems that could use IBRs are not limited to BESS - they could be used in other energy storage technologies such as compressed gas, gravity based, etc. Also, using the word “or” limits the IBR to one or the other, when it could be both. Suggest changing “or” to “and/or” and removing the word “battery” and “(BESS)” such that it reads “ “(and/or sink when used in conjunction with an energy storage system)”. Also, change “BESS” to “energy storage system” in the last sentence.

The last sentence of the proposed definition includes the phrase “IBRs include solar photovoltaic (PV)… This seems to indicate that IBRs are PVs, etc., when they actually only support them. Suggest changing the sentence to read “IBRs are typically used with solar photovoltaic (PV), Type 3 and Type 4 wind, energy storage, and fuel cells.”

Likes 0	
Dislikes 0	

Response

Zahid Qayyum - New York Power Authority - 5	
Answer	No
Document Name	
Comment	

NYPA reviewed the proposed IBR definition and suggests a revision. Given the dynamic nature of IBR technology, it's advisable not to specify certain types as the sole IBRs; instead, they could be cited as examples.

The term "IBR Unit" causes confusion as it says every inverter is a unit in the current definition, and NYPA recommends adopting an alternative term in alignment with other NERC standards.

Additionally, it's essential to explicitly include hybrid plants in the IBR definition, as the current background section lacks clarity on the designated IBR portion. Besides, NYPA also recommends using ***Inverter Based Unit(s)*** *instead of* ***IBR Units (s)*** *in the following sentence as it intends to explain IBR itself:*

"…and that consists of one or more ***IBR Unit(s)*** *operated as a single resource at a common point of interconnection…"*

Likes 0	
Dislikes 0	
Response	

Ben Hammer - Western Area Power Administration - 1	
Answer	No
Document Name	
Comment	

The phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" needs to be removed. Language is unnecessary.

The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted. When possible, language used in standards and definitions should be technology neutral.

The broadness of the definition generates ambiguity and will create difficultly in the application for NERC compliance. While identifying specific resource applicability isn't the aim, the definition should provide a clear regulatory framework as a baseline for adherence to NERC Reliability Standards.

Likes 0	
Dislikes 0	
Response	

Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	No
Document Name	
Comment	
Either delete the sentence “IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.” all together or add "may include". .	
Likes 0	
Dislikes 0	
Response	

Marty Hostler - Northern California Power Agency - 4	
Answer	No
Document Name	
Comment	
BES needs to be included in the Definition. We already have experience with regulators making up their own interpretation when "BES" is not included. For example, in CIP-002-5.1a IRC 2.11 Auditors claim since BES is not before the word generation, GOP's must include non-BES generation in their Control Center assessments. Even though a GOP can not possibly perform a GOP functional obligation for a non-BES generator, as it has no NERC functional obligations.	
Likes 0	
Dislikes 0	
Response	

Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
BES needs to be included in the Definition. We already have experience with regulators making up their own interpretation when "BES" in not included. For example, in CIP-002-5.1A IRC 2.11 Auditors claim since BES is not before the word generation, GOP's must include non-BES generation in their Control Center assessments. Even though a GOP cannot possibly perform a GOP functional obligation for a non-BES generator as it has no NERC functional obligations	
Likes 0	
Dislikes 0	

Response	
Michael Whitney - Northern California Power Agency - 3,4,5,6	
Answer	No
Document Name	
Comment	
BES needs to be included in the Definition. We already have experience with regulators making up their own interpretation when "BES" in not included. For example, in CIP-002-5.1A IRC 2.11 Auditors claim since BES is not before the word generation, GOP's must include non-BES generation in their Control Center assessments. Even though a GOP cannot possibly perform a GOP functional obligation for a non-BES generator as it has no NERC functional obligations. Marty Hostler, Northern California Power Agency, 4, 1/8/2024	
Likes 0	
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	
WEC Energy Group supports the comments of the NAGF, the MRO NSRF and EEI.	
Likes 0	
Dislikes 0	
Response	
Stephen Stafford - Stephen Stafford On Behalf of: Greg Davis, Georgia Transmission Corporation, 1; - Stephen Stafford	
Answer	No
Document Name	
Comment	
Remove the reference for sink in the IBR definition. A sink (load) is not a resource. Consider referring to a discharging battery energy storage system (BESS).	
Likes 0	

Dislikes 0	

Response

Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1

Answer	No
Document Name	

Comment

AEPC signed on to ACES comments:

It is ACES' viewpoint that the proposed definitions are a welcome step towards better defining what is inherently a somewhat nebulous concept. While we can appreciate the approach taken by the Drafting Team, we believe further refinement is necessary. We would like to specifically emphasize our agreement with the 3rd bullet point of the "Background" section. We believe that it is imperative that the industry adopt specific definitions to distinguish between an individual "IBR unit" and the "IBR plant/facility as a whole" thereby allowing each SDT the flexibility to draft each individual standard or requirement with the correct scope for each. While we agree that creating distinct definitions is the correct method to clearly define these resource types, it is our interpretation that the currently proposed IBR definition does not align with this stated approach. It is our opinion that the first sentence of the IBR definition is redundant to the IBR unit definition and should be struck.

Furthermore, we do not believe that the IBR definition should be limited by a specific listing of technologies as is done in the last sentence of the definition. The last sentence of the 6th bullet point in the background section states:

- "The DT's intent with the phrase "IBRs include" is to articulate a specific list of IBRs. Therefore, other technologies not listed would not be considered an IBR."

It is our perspective that if a specific list of applicable technologies is required to clearly define this term, then the rest of the definition is moot and can be eliminated. In other words, rather than providing a definition and an all-inclusive list of applicable technologies, why not simply provide an all-inclusive list? We believe this approach needlessly limits the IBR definition to current technologies in common use and does not allow enough flexibility for future technological growth nor changes in industry trends.
It is our recommendation that the IBR definition be modified as follows:

- "One or more IBR Unit(s), operated as a single resource at a common point of interconnection, connected to the electric power system (transmission, sub-transmission, or distribution system).
- IBRs may include, but are not limited to, any combination of one or more of the following installation types: solar photovoltaic (PV), wind turbine, battery energy storage system, and fuel cell."

Likes 0	
Dislikes 0	

Response

Tammy Porter - Tammy Porter On Behalf of: Byron Booker, Oncor Electric Delivery, 1; - Tammy Porter

Answer	No

Document Name	
Comment	
We are in agreement with other comments that, although the applicability section of MOD-026-2 limits resources set by the NERC I4 BES definition, the proposed IBR definition needs to clearly state that it aligns with the NERC I4 BES definition. The current definition may imply that each IBR, ranging from roof top solar to large dispatchable units, would fall under future NERC standards whose applicability does not explicitly include the NERC I4 BES definition. It would be a costly undertaking for a larger utility to include all connected IBR units outside the I4 BES definition. In short, the applicability scope of MOD-026-2 is directed toward NERC's I4 BES definition, and the IBR definition need to reflect this boundary as well. Also, to better incorporate the industry recommendation to use other defined terms when possible, such as Real Power, we recommend replacing "electric power" to "Real Power."	
Likes 0	
Dislikes 0	
Response	
Alan Kloster - Alan Kloster On Behalf of: Jeremy Harris, Evergy, 3, 5, 1, 6; Kevin Frick, Evergy, 3, 5, 1, 6; Marcus Moor, Evergy, 3, 5, 1, 6; Tiffany Lake, Evergy, 3, 5, 1, 6; - Alan Kloster	
Answer	No
Document Name	
Comment	
Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI), MRO NSRF and the NAGF reasons for not supporting the proposed definition for question #1. Evergy also humbly submits the following proposed definition for the drafting teams consideration: Inverter-Based Resource - A generating resource or an energy storage system that relies on power electronic interfaces (inverter**s**, converter**s**, etc.) to deliver electric power to a common point of interconnection.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF does not support the proposed IBR definition draft #1 for the following reasons: *a. It is unclear if the proposed IBR definition draft #1 would make a three (3) unit IBR generating plant a single Inverter-Based Resource or multiple Inverter-Based Resources. A 2x1 synchronous combined cycle gas plant has three generating units that can be controlled separately. Inverter-based resources may also be structured and controlled as distinct units behind a common point of interconnection. When this occurs, these separately*	

controlled groups of inverters are considered generating units within a single plant.

b. Recommend removing the parenthetical narrative "(transmission, sub-transmission, and distribution system).

c. *Recommend deleting the last sentence of the proposed IBR definition draft #1. It appears that any type of inverter not listed is excluded. While at this time the list may be complete, there will be different types of inverter resources in the future that are applicable under the IBR definition.*

The NAGF recommends the following alternative definition for IBR:

Inverter-Based Resource (IBR): *A source (or sink in the case of a charging battery energy storage system (BESS)) of electric power that consists of one or more IBR Unit(s) at a common point of interconnection.*

Likes 0	
Dislikes 0	

Response

Selene Willis - Edison International - Southern California Edison Company - 5

Answer	No
Document Name	

Comment

"See comments submitted by the Edison Electric Institute"

Likes 0	
Dislikes 0	

Response

Kenya Streeter - Edison International - Southern California Edison Company - 1,3,5,6

Answer	No
Document Name	

Comment

See comments submitted by the Edison Electric Institute

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1

Answer	No
Document Name	

Comment

AZPS supports the following comments that were submitted by EEI on behalf of its members:

EEI appreciates the efforts to develop the proposed IBR definition, however, we do not support the definition as currently written. Our concerns include the specificity in the technology types covered in the proposed definition, noting that NERC definitions should be technology agnostic. Also, as written the definition seems to cast an overly broad net relative to the size and voltage class for the IBR resources yielding insufficient regulatory clarity necessary for entities to apply the definition in any meaningful way. While the definition is not intended to identify specific resource applicability, it still should be clear enough to provide a regulatory floor as it relates to NERC Reliability Standards.

To address these concerns, either the IEEE definition of IBRs, as defined in IEEE 2800-2022 (IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems, See Section 3, page 31) or the informal definition of IBRs as proposed by the FERC Commission on Nov. 17, 2023 should be leveraged.

EEI further notes that the Project 2022-02 SDT has already attempted to define DERs separately within that project and while these resources are also inverter based, they represent a specific class of IBRs that are directly connected to the distribution system and in many cases serve a very different purpose outside of supporting the reliability of the Bulk Power System and therefore should be defined separately.

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	No
Document Name	

Comment

EEI appreciates the efforts to develop the proposed IBR definition, however, we do not support the definition as currently written. Our concerns include the specificity in the technology types covered in the proposed definition, noting that NERC definitions should be technology agnostic. Also, as written the definition seems to cast an overly broad net relative to the size and voltage class for the IBR resources yielding insufficient regulatory clarity necessary for entities to apply the definition in any meaningful way. While the definition is not intended to identify specific resource applicability, it still should be clear enough to provide a regulatory floor as it relates to NERC Reliability Standards.

To address these concerns, either the IEEE definition of IBRs, as defined in IEEE 2800-2022 (IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems, See Section 3, page 31) or the informal definition of IBRs as proposed by the FERC Commission on Nov. 17, 2023 should be leveraged.

EEI further notes that the Project 2022-02 SDT attempted to define DERs separately within that project. While these resources are also inverter based, they represent a specific class of IBRs that are directly connected to the distribution system and in many cases serve a different purpose outside of supporting the reliability of the Bulk Power System and therefore should be defined separately.

Likes 0	
Dislikes 0	

Response	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	

The phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" needs to be removed. Language is unnecessary.

The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** Should be deleted. When possible, language used in standards and definitions should be technology neutral. If a resource would otherwise meet the criteria for being classified as an IBR, the specific device type should not be taken into consideration as a means of exclusion. Any resource that meets the inclusion criteria of Bulk Electric System should be subject to the appropriate reliability standards, regardless of specific device type. This is important for ensuring that standards and associated language have the necessary flexibility to adapt to future technology and changing resource mixes. Additionally, while the Standard Drafting Team's intent in this being a closed list is stated in the Technical Rationale, the writing of this sentence does not clearly convey that intent, as "includes" has been interpreted to be both limiting and non-limiting in various jurisdictions.

Likes 0	
Dislikes 0	
Response	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	No
Document Name	
Comment	

ITC supports the comments provided by MRO NSRF

Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	No
Document Name	
Comment	

Texas RE is concerned that the proposed definition of IBR Unit does not account for Reactive Power capabilities required to maintain BPS reliability. Since, all Inverter-based Resources (IBR) shall be capable of providing dynamic reactive power support to the grid to maintain voltage stability, Texas RE recommends the definition of IBR Unit be revised to include Reactive Power capabilities required to maintain BPS reliability.

According to the background section, the IBR definition should not designate the location of the resource connection. The verbiage of the definition, however, indicates that it is connected to the electric power system (transmission, sub-transmission, or distribution). Texas RE recommends removing the reference to transmission, sub-transmission, and distribution.

Likes 0	
Dislikes 0	

Response

Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC

Answer	No
Document Name	

Comment

WECC suggests that the drafting team attempt to not include one-off technology-based language within the definition (i.e., “sink” phrase). Essentially, batteries, in order to charge and discharge, have bi-directional converters (AC to DC when charging and DC to AC when discharging.) Using “IBR” as part of the definition of IBR even as a descriptor of the unit type is somewhat circular. The phrase “operated as a single resource at a common point of interconnection” may be troublesome as there are configurations where devices connect to separate systems and then those systems make multiple connections (both to sub-transmission and in some cases transmission level voltages.) There should not be a loophole for compliance built into a definition (if a company puts two connections to separate parts of a station there will be the discussion about applicability of the definition.) Additionally, if there are multiple owners with multiple strings of IBRS but collect to a single GSU and a single point of interconnection, there could be confusion regarding joint-owned and responsibilities OR there could be the argument that it is not a single resource and does not meet the definition. WECC suggests the following definition:” Inverter-Based Resource (IBR)- A dispersed power producing resource that uses equipment explicitly for the transformation of current flow from DC to AC, AC to DC, or some combination thereof including, but not limited to, solar photovoltaic (PV), Type 3 wind, Type 4 wind, battery energy storage system (BESS) and fuel cell technologies or combinations of said technologies.”

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Shannon Mickens On Behalf of: Joshua Phillips, Southwest Power Pool, Inc. (RTO), 2; - Shannon Mickens, Group Name SPP RTO

Answer	No
Document Name	

Comment

SPP has a concern that the proposed definition for Inverter-Based Resource (IBR) creates confusion on how to identify the resource as well as define the responsibility. The initial draft for IBRs focused around the inclusion of the Power Electronic Device (PED) while the recent version includes language pertaining to a source/sink. From our perspective, the latest version (including source/sink) doesn't create a clear and concise picture defining the definition. Moreover, those terms are more associated with Transmission Service Request (TSR) that allows a utility to allocate physical capacity in the form of transmission service rights (TSRs) for the transmission of electric power.

SPP recommends that the drafting team considers removing the terms "source and sink" from the proposed definition and replaced them with language that aligns with their purpose (proposed language shown below).

From our perspective, the proposed IBR definition doesn't include language showing what a facility/plant is and the difference in reference to an IBR unit (device) as noted in the rationale language.

Inverter-Based Resource (IBR): A generation (plant) (or load (storage facility) in the case of a charging battery energy storage system (BESS)) of electric power that is connected to the electric power system (transmission, sub-transmission, or distribution system), and that consists of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	No
Document Name	

Comment

Comments: It is ACES' viewpoint that the proposed definitions are a welcome step towards better defining what is inherently a somewhat nebulous concept. While we can appreciate the approach taken by the Drafting Team, we believe further refinement is necessary.

We would like to specifically emphasize our agreement with the 3rd bullet point of the "Background" section. We believe that it is imperative that the industry adopt specific definitions to distinguish between an individual "IBR unit" and the "IBR plant/facility as a whole" thereby allowing each SDT the flexibility to draft each individual standard or requirement with the correct scope for each.

While we agree that creating distinct definitions is the correct method to clearly define these resource types, it is our interpretation that the currently proposed IBR definition does not align with this stated approach. It is our opinion that the first sentence of the IBR definition is redundant to the IBR unit definition and should be struck.

Furthermore, we do not believe that the IBR definition should be limited by a specific listing of technologies as is done in the last sentence of the definition. The last sentence of the 6th bullet point in the background section states:

"The DT's intent with the phrase "IBRs include" is to ariculate a specific list of IBRs. Therefore, other technologies not listed would not be considered an IBR."

It is our perspective that if a specific list of applicable technologies is required to clearly define thisterm, then the rest of the definition is moot and can be eliminated. In other words, rather than providing a definition and an all-inclusive list of applicable technologies, why not simply provide an all-inclusive list? We believe this approach needlessly limits the IBR definition to current technologies in common use and does not allow enough flexibility

for future technological growthnor changes in industry trends.

It is our recommendation that the IBR definition be modified as follows:

“One or more IBR Unit(s), operated as a single resource at a common point of interconnection, connected to the electric power system (transmission, sub-transmission, or distribution system).

IBRs may include, but are not limited to, any combination of one or more of the following installation types: solar photovoltaic (PV), wind turbine, battery energy storage system, and fuel cell.”

Likes 0	
Dislikes 0	

Response

LaTroy Brumfield - American Transmission Company, LLC - 1

Answer	No
Document Name	

Comment

ATC mostly agrees with the MRO NSRF‘s comment on this matter.

ATC agrees with the MRO NSRF that the phrase “**that is connected to the electric power system (transmission, sub-transmission, or distribution)**” should be removed as the highlighted language is unnecessary.

ATC also agrees with the MRO NSRF that the sentence “**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.”**

should be deleted. When possible, language used in standards and definitions should be technology neutral.

However, ATC believes that the IBR definition should not explicitly include applicability considerations within the definition itself, but that should be left within the Applicability section of each standard. ATC does not believe the IBR definition should reference the BES definition as even the BES definition may shift and change to accommodate the new IBR-GO and IBR-GOP thresholds being considered. This may have unintended consequences for the IBR definition down the line.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023

Answer	No
Document Name	

Comment

The ISO RTO Council (IRC) Standards Review Committee (SRC) believes the definition does not fully align with the intent described in the background material provided with the definition. Specifically, the proposed definition does not appear to fully include “the equipment designed primarily for delivering the power to a common point of interconnection . . . .” Additionally, it seems to be unnecessary for the definition to include a BESS-specific parenthetical since the proposed definition of IBR Unit already addresses energy storage systems. Additionally, new technologies may emerge that include devices that are not capable of storing energy in batteries, but are capable of functioning as both a source and a sink of electric power, and it would be inappropriate for the definition to exclude these devices if they otherwise meet the definition of an IBR. We also believe it is unnecessary for the proposed IBR definition to reference specific fuel sources such as solar photovoltaic and wind. The type of fuel used is not the defining characteristic of IBRs, and the definition should not be limited to currently known fuel types and configurations.

Finally, it is unnecessary to specify that the IBR interconnection point is transmission, sub-transmission and distribution. The applicability of the IBR requirements is defined by the BES definition and distribution level applicability through the NERC Rules of Procedure. Any changes to applicability would require a change in the term if these are included. Consequently, the BESS-specific parenthetical should be removed from the definition of IBR and the definition be further revised to read as follows:

Inverter-Based Resource (IBR): A source of electric power that is connected to the electric power system, and that consists of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. **An IBR consists of the IBR Unit(s), and the equipment designed primarily for delivering the power to a common point of interconnection (e.g., step-up transformers, collector system(s), main power transformer(s), power plant controller(s), reactive resources within the IBR plant, and a voltage source converter high-voltage direct current (VSC HVDC) system with a dedicated connection to the IBR). A Battery Energy Storage System (BESS) operating in charging mode, acting as a sink of electrical energy, is considered an IBR.**

Likes 0	
Dislikes 0	

Response

Elizabeth Davis - Elizabeth Davis On Behalf of: Thomas Foster, PJM Interconnection, L.L.C., 2; - Elizabeth Davis

Answer	No

Document Name	
Comment	
Please reference IRC SRC comments. Thank you.	
Likes 0	
Dislikes 0	
Response	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	No
Document Name	
Comment	
ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Robert Blackney - Edison International - Southern California Edison Company - 1	
Answer	No
Document Name	
Comment	
See comments submitted by the Edison Electric Institute (EEI).	
Likes 0	
Dislikes 0	
Response	
Patricia Lynch - NRG - NRG Energy, Inc. - 5	
Answer	No
Document Name	
Comment	

NRG is in support of the NAGF comments concerning the proposed definiton of IBR as:

a. It is unclear if the proposed IBR definition draft #1 would make a three (3) unit IBR generating plant a single Inverter-Based Resource or multiple Inverter-Based Resources. A 2x1 synchronous combined cycle gas plant has three generating units that can be controlled separately. Inverter-based resources may also be structured and controlled as distinct units behind a common point of interconnection. When this occurs, these separately controlled groups of inverters are considered generating units within a single plant.

b. Recommend deleting the last sentence of the proposed IBR definition draft #1. It appears that any type of inverter not listed is excluded. While at this time the list may be complete, there will be different types of inverter resources in the future that are applicable under the IBR definition.

As proposed by NAGF, an alternate definition for IBR can include the following:

Inverter-Based Resource (IBR): *A source (or sink in the case of a charging battery energy storage system (BESS)) of electric power that consists of one or more IBR Unit(s) at a common point of interconnection.*

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 5

Answer	Yes
Document Name	

Comment

While AEP does not object to the definition as proposed, we would like to suggest the drafting team to consider revising it as follows: IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that *functionally integrate* at a *delivery* point on the collector system.

Likes 0	
Dislikes 0	

Response

Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro

Answer	Yes
Document Name	

Comment

BC Hydro requests that SDT clarify whether the last sentence, which only appears to serve as examples, is intended to convey any additional material criteria to the application of the proposed definition.

Using the “connected to electric power system” in the definition appears to further qualify IBRs; however, as “electric power system” is not a defined

term, this wording may only result in unnecessary applicability interpretations.

BC Hydro suggests that the applicability to specific reliability standards be kept outside the IBR definition (such as within the Facility section of Standards), or further define the criteria that would make an inverter-based resource an IBR for the purpose of the NERC standards applicability.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5

Answer	Yes
Document Name	

Comment

Constellation has no additional comments.

Alison Mackellar on behalf of Constellation Segments 5 and 6.

Likes 0	
Dislikes 0	

Response

Kimberly Turco - Constellation - 6

Answer	Yes
Document Name	

Comment

Constellation has no additional comments

Kimberly Turco on behald of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF

Answer	Yes

Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1	
Answer	Yes
Document Name	
Comment	
While Exelon supports the proposed definition, we support the questions presented in the EEI comments.	
Likes 0	
Dislikes 0	
Response	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Southern Company suggests that additional clarification could be provided to further indicate that this definition is intended to apply to an entire facility or electric power producing plant.	
Likes 0	
Dislikes 0	
Response	
Joshua London - Eversource Energy - 1, Group Name Eversource	
Answer	Yes
Document Name	

Comment
The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted or edited to say "Examples of IBRs include". Definitions should not require the statement of specific technologies for an individual to understand that those technologies fall under the definition as doing so may lead a reader to believe only those specific technologies are in-scope. If you want to provide examples, then it should be stated that way.

Likes 0	
Dislikes 0	

Response

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC

Answer	Yes
Document Name	

Comment
NPCC RSC supports the definition for IBR as proposed.

Likes 0	
Dislikes 0	

Response

Russell Jones - Invenergy LLC - 5

Answer	Yes
Document Name	

Comment
Invenergy supports the spirit of the definition proposed and does not offer any substantive changes. We do, however, have concerns about the application of this definition to various reliability standards going forward. More specifically, Invenergy believes the drafting team should consider how this broad definition will be applied in specific Reliability Standard requirements to different roles (transmission, sub-transmission, distribution) and different technologies (PV, Type 3 and Type 4 wind, BESS, and fuel cell) where nuance may be required to account for technological limitations or differences.

Likes 0	
Dislikes 0	

Response

Colin Chilcoat - Invenergy LLC - 6

Answer	Yes
Document Name	
Comment	
Invenergy supports the spirit of the definition proposed and does not offer any substantive changes. We do, however, have concerns about the application of this definition to various reliability standards going forward. More specifically, Invenergy believes the drafting team should consider how this broad definition will be applied in specific Reliability Standard requirements to different roles (transmission, sub-transmission, distribution) and different technologies (PV, Type 3 and Type 4 wind, BESS, and fuel cell) where nuance may be required to account for technological limitations or differences.	
Likes 0	
Dislikes 0	
Response	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
While Exelon supports the proposed definition, we support the question presented in the EEI comments.	
Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
OPG supports NPCC Regional Standards Committee’s comments.	
Likes 0	
Dislikes 0	
Response	
Diane E Landry - Public Utility District No. 1 of Chelan County - 1, Group Name CHPD	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Stephen Whaite - Stephen Whaite On Behalf of: Lindsey Mannion, ReliabilityFirst , 10; - Stephen Whaite, Group Name ReliabilityFirst Ballot Body Member and Proxies	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jesus Sammy Alcaraz - Imperial Irrigation District - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Nikki Carson-Marquis - Nikki Carson-Marquis On Behalf of: Theresa Allard, Minnkota Power Cooperative Inc., 1; - Nikki Carson-Marquis	
Answer	
Document Name	
Comment	
No. Minnkota Power Cooperative supports comments by ACES and the MRO New Standard Review Forum (NSRF). MPC believes the IBR definition should be technology-neutral and should avoid listing examples within the final definition.	
Likes 0	
Dislikes 0	
Response	

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

Patricia Lynch - NRG - NRG Energy, Inc. - 5

Answer	No
Document Name	

Comment

NRG is in support of the NAGF comments that has been submitted regarding this proposed definiton:

The NAGF does not support the proposed IBR Unit definition draft #1 for the following reasons:

a. Utilizing the term IBR Unit to refer to a single inverter within the generating plant will cause significant confusion at the plant level. Unless any instruction provided to the plant is written, then it will not be clear if the term IBR Unit is the defined term used by NERC or if it is intended to mean the generating unit (Unit 1, 2 or 3), IBR unit. This level of potential confusion is unacceptable resulting in an unacceptable risk of the BES being misoperated. The word "unit" has long been associated with a distinct operating segment of a plant. For this reason, the NAGF does not support the use of the term unit to mean anything less than the dispatchable grouping of inverters.

The NAGF recommends the following alternative definition for IBR Unit:

***IBR Unit:** All or part of an Inverter-Based Resource that is operated as a single resource. An IBR Unit may consist of one or more IBR Devices.*

In addition, the NAGF recommends the creation of the definition for IBR Device:

***IBR Device:** An individual device, or a grouping of multiple devices, (including equipment connected to the DC terminal of the inverter) that includes power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system.*

These proposed alternative definitions will enable applicable NERC standards to be clear when a protection device or modeling information is needed at the device or unit level without causing confusion. While normally the use of the IEEE definition would be supported, in this case it is likely to cause more problems and uncertainty for the industry.

Likes 0	
Dislikes 0	

Response

Robert Blackney - Edison International - Southern California Edison Company - 1

Answer	No
Document Name	

Comment

See comments submitted by the Edison Electric Institute (EEI).

Likes 0	
Dislikes 0	
Response	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	No
Document Name	
Comment	
ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Elizabeth Davis - Elizabeth Davis On Behalf of: Thomas Foster, PJM Interconnection, L.L.C., 2; - Elizabeth Davis	
Answer	No
Document Name	
Comment	
Please reference IRC SRC comments. Thank you.	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	No
Document Name	
Comment	
The IRC SRC believes that the definition should be revised to clarify that the phrase “and that connect together at a single point on the collector system” is only intended to apply to “a grouping of multiple devices” and not to “an individual device.” The definition should be revised to read as follows: **IBR Unit:** An individual device that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a	

primary energy source or energy storage system **or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system and delivering that power at a common point**.

Likes 0	
Dislikes 0	

Response

LaTroy Brumfield - American Transmission Company, LLC - 1

Answer	No
Document Name	

Comment

ATC supports the comments of the MRO NSRF indicating that two separate definitions are not needed, and the use of the term facility or plant can be used to differentiate between the IBR and the IBR facility.

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	No
Document Name	

Comment

Similar to our interpretation of the IBR definition, as stated above, we believe the currently proposed IBR Unit definition contains superfluous language that overlaps the proposed IBR definition and should be modified. It is our opinion that the IBR unit definition should utilize a standalone technologically agnostic approach. Therefore, we are in favor of removing all references to multiple devices within this single unit definition. We recommend that the IBR Unit definition be modified as follows:

“An individual device that uses a power electronic interface(s), such as an inverter or converter, that is capable of exporting Real Power from a primary energy source or energy storage system.”

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Shannon Mickens On Behalf of: Joshua Phillips, Southwest Power Pool, Inc. (RTO), 2; - Shannon Mickens, Group Name SPP RTO	
Answer	No
Document Name	
Comment	
SPP has a concern in reference to the proposed definition for the IBR Unit. We understand that the drafting team used definitions from the IEEE 1547 and 2800 Standards to structure the proposed definition. However, there is the concern that the drafting team has not created enough rationale language defining the components of an actual IBR device. In our evaluation, we noticed that the IBR definition in the IEEE 2800 Standard mentions that an IBR Device is "a *collector system* or *supplemental".* From our perspective, there will need to be some clarity placed around the definition of an IBR device. With that said, SPP recommends that the drafting team considers creating a definition for the term "IBR Device" as well as provide a list of those types of elements to help ensure there is a clear and concise distinction of an IBR Unit and IBR Device.	
Likes 0	
Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	No
Document Name	
Comment	
The definitions does not address Reactive Power. The phrase "that connect together at a single point on the collector system" may be troublesome as there are configurations where devices connect to separate systems and then those systems make multiple connections (both to sub-transmission and in some cases transmission level voltages.) As indicated in our response to question 1, there should not be a loophole for compliance built into a definition. In the December 5 presentation, if there are two owners of the two sets of IBR Units, are there two IBRs or one IBR that is co-owned/jointly-owned? "IBR" in the presentation provided December 5, slide 10 appears to indicate the inverter banks and the power source are part of the BES but slide 7 only calls out the inverters as an IBR Unit. The SDT needs to clarify if the primary energy source is part of the IBR Unit (thus part of the BES) to help ensure consistency by industry when used in a Standard. For instance- are freeze protection measures only for the inverter or the inverter and the primary energy source? Slide 8 clearly reveals more details than the definition of IBR states and does not support the BES definition clearly.	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	No

Document Name	
Comment	
Texas RE is concerned the current verbiage of IBR Unit does not include the capabilities for absorbing or delivering reactive power which is essential for electric system operations. Texas RE recommends the following verbiage: IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power **and capable of providing dynamic Reactive Power support** from a primary energy source or energy storage system, and that connect together at a single point on a collector system.	
Likes 0	
Dislikes 0	
Response	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	No
Document Name	
Comment	
ITC supports the comments provided by MRO NSRF	
Likes 0	
Dislikes 0	
Response	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
There should not be two separate definitions. IBR should be defined to address the resource itself. The term facility{C}[1] can be included when necessary to refer to a group of IBRs and the equipment associated with the group. This is the how Standards and associated language address synchronous resources and is easily understood and applied.	
Likes 0	

Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
We do not support the proposed definition for IBR unit. Given the linkage between IBR and IBR Unit, we cannot support this definition until the core IBR definition is resolved.	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	No
Document Name	
Comment	
AZPS supports the following comments that were submitted by EEI on behalf of its members: We do not support the proposed definition for IBR unit. Given the linkage between IBR and IBR Unit, we cannot support this definition until the core IBR definition is resolved.	
Likes 0	
Dislikes 0	
Response	
Kenya Streeter - Edison International - Southern California Edison Company - 1,3,5,6	
Answer	No
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	

Dislikes 0	
Response	
Selene Willis - Edison International - Southern California Edison Company - 5	
Answer	No
Document Name	
Comment	
“See comments submitted by the Edison Electric Institute”	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	

The NAGF does not support the proposed IBR Unit definition draft #1 for the following reasons:

a. Utilizing the term IBR Unit to refer to a single inverter within the generating plant will cause significant confusion at the plant level. Unless any instruction provided to the plant is written, then it will not be clear if the term IBR Unit is the defined term used by NERC or if it is intended to mean the generating unit (Unit 1, 2 or 3), IBR unit. This level of potential confusion is unacceptable resulting in an unacceptable risk of the BES being misoperated. The word “unit” has long been associated with a distinct operating segment of a plant. For this reason, the NAGF does not support the use of the term unit to mean anything less than the dispatchable grouping of inverters.

The NAGF recommends the following alternative definition for IBR Unit:

IBR Unit: *All or part of an Inverter-Based Resource that is operated as a single resource. An IBR Unit may consist of one or more IBR Devices.*

In addition, the NAGF recommends the creation of the definition for IBR Device:

IBR Device: *An individual device, or a grouping of multiple devices, (including equipment connected to the DC terminal of the inverter) that includes power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system.*

These proposed alternative definitions will enable applicable NERC standards to be clear when a protection device or modeling information is needed at the device or unit level without causing confusion. While normally the use of the IEEE definition would be supported, in this case it is likely to cause more problems and uncertainty for the industry.

Likes 0	

Dislikes 0	

Response

Alan Kloster - Alan Kloster On Behalf of: Jeremy Harris, Evergy, 3, 5, 1, 6; Kevin Frick, Evergy, 3, 5, 1, 6; Marcus Moor, Evergy, 3, 5, 1, 6; Tiffany Lake, Evergy, 3, 5, 1, 6; - Alan Kloster	
Answer	No
Document Name	
Comment	
Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI), MRO NSRF and the NAGF for question #2.	
Likes 0	
Dislikes 0	
Response	

Tammy Porter - Tammy Porter On Behalf of: Byron Booker, Oncor Electric Delivery, 1; - Tammy Porter	
Answer	No
Document Name	
Comment	
Again we echo our previous comment in the IBR definition, chiefly that the NERC I4 BES definition needs to be explicitly stated or reflected in this definition. The labor and cost of the compliance effort would not serve the customer well if we needed to incorporate all connected IBR units outside of the I4 definition.	
Likes 0	
Dislikes 0	
Response	

Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	No
Document Name	
Comment	
AEPC signed on to ACES comments: Similar to our interpretation of the IBR definition, as stated above, we believe the currently proposed IBR Unit definition contains superfluous language that overlaps the proposed IBR definition and should be modified. It is our opinion that the IBR unit definition should utilize a standalone technologically agnostic approach. Therefore, we are in favor of removing all references to multiple devices within this single unit	

definition. We recommend that the IBR Unit definition be modified as follows:

- “An individual device that uses a power electronic interface(s), such as an inverter or converter, that is capable of exporting Real Power from a primary energy source or energy storage system.”

Likes 0	
Dislikes 0	

Response

Stephen Stafford - Stephen Stafford On Behalf of: Greg Davis, Georgia Transmission Corporation, 1; - Stephen Stafford

Answer	No
Document Name	

Comment

The IBR Unit definition lacks clarity in the last part of the definition. GTC recommends rewording this part of the definition as follows: “An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are electrically connected on a collector system.”

Likes 0	
Dislikes 0	

Response

Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group

Answer	No
Document Name	

Comment

WEC Energy Group supports the comments of the NAGF, the MRO NSRF and EEI.

Likes 0	
Dislikes 0	

Response

Michael Whitney - Northern California Power Agency - 3,4,5,6

Answer	No
Document Name	

Comment
See response to question 1. BES needs to be included here too. Connected to a BES collector.

Likes 0	
Dislikes 0	

Response

Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	

Comment
See response to question 1. BES needs to be included here too. Connected to a BES collector.

Likes 0	
Dislikes 0	

Response

Marty Hostler - Northern California Power Agency - 4	
Answer	No
Document Name	

Comment
See response to question 1. BES needs to be included here too. Connect to a BES collector.

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	No
Document Name	

Comment

SIGE recommends adding Reactive Power language to the proposed definition.

Likes 0	
Dislikes 0	

Response

Ben Hammer - Western Area Power Administration - 1

Answer	No
Document Name	

Comment

There should not be two separate definitions. IBR should be defined to address the resource itself. The term F(f)acility(1) can be included when necessary to refer to a group of IBRs and the equipment associated with the group. This is the how Standards and associated language address synchronous resources and is easily understood and applied. Additionally, the use of the term unit adds potential additional confusion based on the understanding and usage of the term for synchronous generation.

1: Facility as defined in the NERC Glossary of Terms, “A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)”

Likes 0	
Dislikes 0	

Response

Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC

Answer	No
Document Name	

Comment

The proposed definition includes the phrase “capable of exporting Real Power”. They can also “import” power when used as a sink for energy storage systems. They are also not limited to “Real Power” as they can also produce “Reactive Power” such as synthetic inertia.

Likes 0	
Dislikes 0	

Response

James Keele - Entergy - 3

Answer	No

Document Name	
Comment	
Entergy recommend changing IBR Unit definition to the following. **IBR Unit:** An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at the collector substation.	
Likes 0	
Dislikes 0	
Response	
Jennifer Neville - Western Area Power Administration - 6	
Answer	No
Document Name	
Comment	
There should not be two separate definitions. IBR should be defined to address the resource itself. The NERC defined term "Facility" can be included when necessary to refer to a group of IBRs and the equipment associated with the group. Additionally, the use of the term unit adds potential additional confusion based on the understanding and usage of the term for synchronous generation.	
Likes 0	
Dislikes 0	
Response	
Rachel Schuldt - Rachel Schuldt On Behalf of: Rachel Schuldt, Black Hills Corporation, 5, 1, 3, 6; - Black Hills Corporation - 6	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	

Carly Miller - Carly Miller On Behalf of: Josh Combs, Black Hills Corporation, 5, 1, 3, 6; - Carly Miller	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	
Micah Runner - Black Hills Corporation - 1	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	
Sheila Suurmeier - Black Hills Corporation - 5	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,7 - SERC	
Answer	No

Document Name	
Comment	

Entergy recommend changing IBR Unit definition to the following.

IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at the collector substation.

Likes 0	
Dislikes 0	
Response	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	No
Document Name	
Comment	

PNM and TNMP supports EEI comments but also provide specific recommended changes to the IBR definition.

IBR Unit: Device(s) that uses a power electronic interface(s), such as an inverter or converter, capable or exporting Real Power from a primary energy source or energy storage system, and that connect at a single point on the collector system.

Likes 0	
Dislikes 0	
Response	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No
Document Name	
Comment	

There should not be two separate definitions. IBR should be defined to address the resource itself. The term F(f)acility(1) can be included when necessary to refer to a group of IBRs and the equipment associated with the group. This is the how Standards and associated language address synchronous resources and is easily understood and applied. Additionally, the use of the term unit adds potential additional confusion based on the understanding and usage of the term for synchronous generation.

1: Facility as defined in the NERC Glossary of Terms, “A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)”

Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	

Response

Andy Thomas - DTE Energy - 1,3,5,6 - SERC,RF

Answer	No
Document Name	

Comment

Duke Energy provides the following guidance: Delete the proposed NERC IBR Unit definition and substitute the IEEE 2800 “IBR Unit” definition. The IEEE2800 definition is well vetted within the industry and serves the NERC intended purpose for this application.

Likes 0	
Dislikes 0	

Response

Ruchi Shah - AES - AES Corporation - 5

Answer	No
Document Name	

Comment

AES Clean Energy supports NAGF’s comments, and NAGF’s proposed definition for IBR Unit as well as creation of a new term called IBR Device.

Likes 0	
Dislikes 0	

Response

Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter

Answer	No
Document Name	

Comment

We do not support the proposed definition for IBR unit. Given the linkage between IBR and IBR Unit, we cannot support this definition until the core IBR definition is resolved.

Likes 0	
Dislikes 0	

Response

Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting

Answer	No
Document Name	

Comment

The drafting team has presented a good draft definition of IBR Unit but the proposed definition includes some technical issues that could create challenges, inconsistencies, and applicability challenges when used in the NERC Reliability Standards. These issues should be further vetted and considered by the drafting team for the next iteration. Potential issues include:

1. The proposed term uses “Real Power”, which significantly restricts the use of the IBR definition above. In the proposed term, IBR Unit must export Real Power whereas the proposed IBR definition as a whole is defined as “electric power” (no specification of Real Power or Reactive Power). Therefore, this definition as proposed precludes STATCOMs, SVCs, and HVDC circuits from being considered IBRs in NERC standards. This will require significant clarifying language to address within every standard where these types of inverter-based devices and technologies should be considered. As NERC has initiated projects to more directly pull in these resources to applicable standards, it would be a significant misstep to not include them in the IBR definition.
    - Note that this broader term for IBR has been used for over 7 years by NERC and is described clearly in the NERC IBR Risk Mitigation Strategy (https://www.nerc.com/comm/Documents/NERC_IBR_Strategy.pdf). Risks posed to the BPS related to IBRs are across all resource types, not just generating resources. Stability studies conducted by NERC and stakeholders following the Blue Cut Fire and Canyon 2 Fire disturbances highlighted that momentary cessation of solar PV IBRs would then cause unexpected and unwanted blocking on a major HVDC circuit in the Western Interconnection, which would subsequently cause instability, uncontrolled separation, and cascading. Ensuring reliable performance, accurate modeling, and sufficiently detailed studies of all these devices and resources is critical to reliable operation of the BPS.
    - Similarly, the phrase “from a primary energy source or energy storage system” can add some confusion as well, as it has nothing to do with the IBR Unit itself. For example, STATCOMs, SVCs, and HVDC then do not meet this definition (or only implicitly, at best), which relates to the added confusion above.
2. The proposed definition states “that connect together at a single point on the collector system,” implying that the common connection must be on the collector system for all IBR Units. This is often not the case, such as with wind collector systems aggregating at the substation. Minor issue, but one that should possibly be clarified in future revision. The SDT could consider something like “that connect to single point(s) of connection through a collector system.”

A definition such as the following may be more appropriate: “An individual device or a grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter.”

Likes 0	
Dislikes 0	

Response

Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion

Answer	No

Document Name	
Comment	
Please see previous comment.	
Likes 0	
Dislikes 0	
Response	
Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	No
Document Name	
Comment	
The DT specifically mentions the differences between inverter and converter within the Background of the proposed definition. We recommend that these "definitions" be included as part of the overall unit definition. Furthermore, converter should be its own definition. This may help the inclusion and exclusion of such units for specific standards. "An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion. " Since a battery energy storage system may have both, we recommend a detailed definition of BESS unit. We do understand the initial mindset of the DT, separating these out may make it easier for future standards (Modeling, Protection studies, Performance, CIP, Maintenance, etc).	
Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
OPG supports NPCC Regional Standards Committee’s comments.	
Likes 0	
Dislikes 0	
Response	

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
NPCC RSC supports the definition for IBR Unit as proposed.	
Likes 0	
Dislikes 0	
Response	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Southern Company understands that the IBR Unit definition is essentially addressing the power conversion device at most typical DC-to-AC type and AC-DC-AC type electric generating stations. Southern Company respectfully requests that additional examples be provided to further clarify the various configurations that typically exist at IBR facilities, including AC-DC-DC converters, solar plant string inverters, individual inverter modules, groups of modules, etc., and to, in each case, identify which parts are to be considered the IBR Unit or IBR Units. Further, Southern Company believes that this is essential based on the probable use of these definitions as seen in the use of IBR Unit in MOD-026-2 Draft 3 (Jun 2022).	
Likes 0	
Dislikes 0	
Response	
Kimberly Turco - Constellation - 6	
Answer	Yes
Document Name	
Comment	
Constellation has no additional comments Kimberly Turco on behald of Constellation Segments 5 and 6	

Likes 0	
Dislikes 0	
Response	
Alison MacKellar - Constellation - 5	
Answer	Yes
Document Name	
Comment	
Constellation has no additional comments. Alison Mackellar on behalf of Constellation Segments 5 and 6.	
Likes 0	
Dislikes 0	
Response	
Michael Johnson - Michael Johnson On Behalf of: Frank Lee, Pacific Gas and Electric Company, 3, 1, 5; Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
PG&E supports the IBR Unit definition.	
Likes 0	
Dislikes 0	
Response	
Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
The IEEE definition says may include unit transformer in the IBR *unit* definition. There may be some confusion when the other equipment (ex.transformer) is to be included; at the IBR unit level or IBR plant/facility level?	

Likes 0	
Dislikes 0	
Response	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Colin Chilcoat - Invenergy LLC - 6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Russell Jones - Invenergy LLC - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Matt Lewis - Lower Colorado River Authority - 1,5	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Joshua London - Eversource Energy - 1, Group Name Eversource	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Tracy MacNicoll - Utility Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jesus Sammy Alcaraz - Imperial Irrigation District - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Stephen Whaite - Stephen Whaite On Behalf of: Lindsey Mannion, ReliabilityFirst , 10; - Stephen Whaite, Group Name ReliabilityFirst Ballot Body Member and Proxies	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diane E Landry - Public Utility District No. 1 of Chelan County - 1, Group Name CHPD	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Nikki Carson-Marquis - Nikki Carson-Marquis On Behalf of: Theresa Allard, Minnkota Power Cooperative Inc., 1; - Nikki Carson-Marquis	
Answer	
Document Name	
Comment	

No. Minnkota Power Cooperative supports the reasoning provided in the ACES comments.	
Likes 0	
Dislikes 0	
Response	

3. Provide any additional comments for the DT to consider, if desired.

Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO

Answer	
Document Name	

Comment

· The IBR definition states that an IBR can be connected to the transmission, sub-transmission, and distribution systems. However, the last bullet of the background in the IBR definition documents says that DER-related projects may or may not need to use the same definition of IBR/IBR units. It is suggested that NERC collaborate with different departments to use the same definition and to reduce confusion.

· What about the IBR unit and IBR plant auxiliary equipment? Does it belong to the IBR and IBR units? More clarity is required to the IBR/IBR unit definition regarding auxiliary equipment.

· It is not clear how the terms IBR & IBR Unit fit in with the term dispersed power producing resource. If an IBR is also a dispersed power producing resource, what term is MOD 26-2 going to use? IBRs or the BES inclusion term using dispersed power producing (generating) resource.

Likes 0	
Dislikes 0	

Response

Diane E Landry - Public Utility District No. 1 of Chelan County - 1, Group Name CHPD

Answer	
Document Name	

Comment

Further clarification requested regarding whether the definition is for IBRs applied to the BES, or for all categories of IBRs. MOD-026 currently limits scope to BES under 'Applicability' of the MOD-026 standard. However, since the new term is defined apart from the MOD-026 standard, it is recommended that BES applicability be included in the definition, so the application of the term is consistent with MOD-026 units, should the term be used elsewhere. The concern is that the term could be used beyond the scope of units defined under MOD-026 if this BES is not clarified; for example, a 1 MW PV unit connected to a distribution system would fall under the scope of the proposed definition, although it is neither BES nor in-scope under MOD-026.

Likes 0	
Dislikes 0	

Response

Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting

Answer	

Document Name	
Comment	
1. The definitions are leveraging IEEE 2800-2022 as a reference; however, there are notable differences between definitions. Most importantly, IEEE 2800-2022 is careful in its consideration of supplemental IBR, defined as “any equipment within an IBR plant, which may or may not be inverter-based…” These could include capacitor banks, STATCOMs, harmonic filters, protection systems, plant-level controllers, etc., which should all be considered as part of the overall IBR facility. If the resource (or part of the resource) is deemed “IBR”, then all applicable components that support that resource (such as those listed above) should be considered part of the IBR. 2. The drafting team should consider how these definitions will apply to hybrid/co-located resources. Some consideration and clarifications, if needed, could be useful as the terms get used in NERC Reliability Standards. Growth of hybrid resources across the BPS will make this a notable issue moving forward, so careful consideration of this topic now will be most effective.	
Likes 0	
Dislikes 0	
Response	

Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter

Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	

Michael Johnson - Michael Johnson On Behalf of: Frank Lee, Pacific Gas and Electric Company, 3, 1, 5; Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	
Document Name	
Comment	
PG&E thanks the Drafting Team's effort in creating an IBR definition that can be used throughout the industry for other current and future standards development work.	
Likes 0	
Dislikes 0	
Response	

Ruchi Shah - AES - AES Corporation - 5	
Answer	
Document Name	
Comment	
AES Clean Energy recommends most of the Background section (except the last two main bullets) of the IBR Definition document be included in a separate document (such as a technical rationale or implementation guidance).	
Likes 0	
Dislikes 0	
Response	
Andy Thomas - DTE Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	
Document Name	
Comment	
IBR: A single generating unit of generating Facility as identified through Inclusion I2 or I4 of the BES Definition that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System. 1: This includes DC electricity that is discharged from devices such as batteries and fuel cells.	
Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	
Response	

Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	
Document Name	
Comment	
Request SDT to provide a full list of specific IBR devices that will be covered under this definition.	
Likes 0	
Dislikes 0	
Response	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,7 - SERC	
Answer	
Document Name	
Comment	
Clarify how these IBR and IBR Unit definitions will interact with other projects proposed definitions for DERs.	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	
Document Name	
Comment	
SRP does not support the addition or modification of this term and simply adding it to Reliability Standards that previously did not have IBR applicability. SRP strongly feels IBRs should have separate standards.	
Likes 0	
Dislikes 0	
Response	
Sheila Suurmeier - Black Hills Corporation - 5	

Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	
Response	
Micah Runner - Black Hills Corporation - 1	
Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	
Response	
Carly Miller - Carly Miller On Behalf of: Josh Combs, Black Hills Corporation, 5, 1, 3, 6; - Carly Miller	
Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	
Response	
Rachel Schuldt - Rachel Schuldt On Behalf of: Rachel Schuldt, Black Hills Corporation, 5, 1, 3, 6; - Black Hills Corporation - 6	
Answer	
Document Name	

Comment
Black Hills Corporation supports NAGF comments.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5	
Answer	
Document Name	

Comment
Constellation has no additional comments. Alison Mackellar on behalf of Constellation Segments 5 and 6.

Likes 0	
Dislikes 0	

Response

Jennifer Neville - Western Area Power Administration - 6	
Answer	
Document Name	

Comment
Suggested IBR definition: A single generating unit of generating facility as identified through Inclusion I2 or I4 of the BES Definition that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System. (1): This includes DC electricity that is discharged from devices such as batteries and fuel cells.

Likes 0	
Dislikes 0	

Response

Kimberly Turco - Constellation - 6	
Answer	

Document Name	
Comment	
Constellation has no additional comments Kimberly Turco on behald of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
James Keele - Entergy - 3	
Answer	
Document Name	
Comment	
Clarify how these IBR and IBR Unit definitions will interact with other projects proposed definitions for DERs.	
Likes 0	
Dislikes 0	
Response	
Ben Hammer - Western Area Power Administration - 1	
Answer	
Document Name	
Comment	
IBR: A single generating unit of generating Facility as identified through Inclusion I2 or I4 of the BES Definition that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System. 1: This includes DC electricity that is discharged from devices such as batteries and fuel cells.	
Likes 0	
Dislikes 0	
Response	

Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	
Document Name	
Comment	
NA	
Likes 0	
Dislikes 0	
Response	
Nikki Carson-Marquis - Nikki Carson-Marquis On Behalf of: Theresa Allard, Minnkota Power Cooperative Inc., 1; - Nikki Carson-Marquis	
Answer	
Document Name	
Comment	
Minnkota Power Cooperative appreciates the SDT's efforts to define impactful terms. MPC recommends distinguishing "IBR" and "IBR Unit" terms from those of the same name in IEEE 2800-2022 to avoid conflating the two entities' similar terminology.	
Likes 0	
Dislikes 0	
Response	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Marty Hostler - Northern California Power Agency - 4	
Answer	

Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Michael Whitney - Northern California Power Agency - 3,4,5,6	
Answer	
Document Name	
Comment	
No	
Likes 0	
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	
Document Name	
Comment	
No additional comments	
Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	
Document Name	
Comment	

AEPC signed on to ACES comments:

We at ACES appreciate the effort put forth by the Drafting Team in developing these proposed definitions. We especially appreciate the fact that the Drafting Team used an industry standard source (IEEE 2800-2022) as a starting point for their efforts. While we do not completely agree with the exact language as currently proposed, we do agree with the overall premise utilized by the Drafting team.

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	
Document Name	

Comment

The NAGF provides the following additional comments for consideration:

a. The proposed Inverter-Based Resources (IBR) Definitions – Background section

i. General – this section provides supporting information that is critical to understanding the IBR Definitions and therefore should be memorialized in a technical rational or similar document.

ii. Bullet # 7 – the entire collocated synchronous generation and BESS facility should not be considered an IBR; only the IBR portion of the facility (i.e. the BESS) should be considered IBR. Recommend revising the language to clarify.

Likes 0	
Dislikes 0	

Response

Selene Willis - Edison International - Southern California Edison Company - 5

Answer	
Document Name	

Comment

“See comments submitted by the Edison Electric Institute”

Likes 0	

Dislikes 0	
Response	
Romel Aquino - Edison International - Southern California Edison Company - 3	
Answer	
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	
Dislikes 0	
Response	
Kenya Streeter - Edison International - Southern California Edison Company - 1,3,5,6	
Answer	
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	

Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	
Document Name	
Comment	
ITC supports the comments provided by MRO NSRF	
Likes 0	
Dislikes 0	
Response	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Joshua London - Eversource Energy - 1, Group Name Eversource	
Answer	
Document Name	
Comment	
There appears to be confusing circular logic with calling the second definition IBR Unit. By shortening to “IBR” you are stating it is previously defined, but the definition of Inverter-Based Resource relies upon the **definition** of “IBR Unit”. Change “IBR Unit” to “Inverter-Based Resource Unit.	
Likes 0	
Dislikes 0	
Response	

Teresa Krabe - Lower Colorado River Authority - 5	
Answer	
Document Name	
Comment	
IBRs do not have an electromagnetic link to grid power which can extract stored inertial energy.	
Likes 0	
Dislikes 0	
Response	

Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	
Document Name	
Comment	
IBRs do not have an electromagnetic link to grid power which can extract stored inertial energy.	
Likes 0	
Dislikes 0	
Response	

Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	
Document Name	
Comment	
WECC appreciates the efforts and understands the difficulties in proposing definitions. WECC can support the defintionsif Implementation Guidance or Definition Guidance (like the BES Reference Guide) with drawings that clearly depict the difference between an IBR and an IBR Unit as well as BES relationship to eachare developed. This will get industry on the same page and the ERO Enterprise on the same page. Do not allow other uses such as IBR plant or IBR Facility or hybrid IBR within the Implementation Guidance or any Standard. If there needs to be additional descriptors add it to the definition—consistency in terminology will make applicability easier for everyone. In slide 14 of the Dec 5 presentation, the example 6.3 verbiage appears to reflect IBR aspects and IBR Unit aspects but uses “Facility” for IBR. Are the “enabled protective and limiting functions” directly tripping the IRB Unit(s) or IBR (versus Facility)? Or an IBR Facility?	
Likes 0	
Dislikes 0	

Response

Shannon Mickens - Shannon Mickens On Behalf of: Joshua Phillips, Southwest Power Pool, Inc. (RTO), 2; - Shannon Mickens, Group Name SPP RTO

Answer	
Document Name	

Comment

SPP recommends that the drafting team reference the IEEE 1547-2018 Standard in the background details since there are terms from that standard has been included in the proposed definitions (for example electric power system (eps) and Energy storage system (ess).

Additionally, SPP recommends that the drafting team consider to coordinate with NERC staff to implement the definitions into the Rules of Procedures (RoP) to ensure proper alignment with the proposed efforts associated with the Glossary of Terms.

Likes 0	
Dislikes 0	

Response

Russell Jones - Invenergy LLC - 5

Answer	
Document Name	

Comment

Invenergy supports the spirit of the definition proposed and does not offer any substantive changes. We do, however, have concerns about the application of this definition to various reliability standards going forward. More specifically, Invenergy believes the drafting team should consider how this broad definition will be applied in specific Reliability Standard requirements to different roles (transmission, sub-transmission, distribution) and different technologies (PV, Type 3 and Type 4 wind, BESS, and fuel cell) where nuance may be required to account for technological limitations or differences.

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	
Document Name	

Comment

We at ACES appreciate the effort put forth by the Drafting Team in developing these proposed definitions. We especially appreciate the fact that the Drafting Team used an industry standard source (IEEE 2800-2022) as a starting point for their efforts. While we do not completely agree with the exact language as currently proposed, we do agree with the overall premise utilized by the Drafting team.

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

LaTroy Brumfield - American Transmission Company, LLC - 1

Answer	
Document Name	

Comment

Below is a consideration for an updated definition of IBR.

IBR: A single generating unit or generating Facility that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System.

1: This includes DC electricity that is discharged from devices such as batteries and fuel cells. Self-generated also implies that FACTs devices that simply convert power do not apply to this definition.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023

Answer	
Document Name	

Comment

The SRC notes the inconsistent use of “electric power system” and “electric system” throughout various definitions in the NERC Glossary and recommends NERC give some thought to standardizing this language in the future.

Likes 0	

Dislikes 0	

Response

Elizabeth Davis - Elizabeth Davis On Behalf of: Thomas Foster, PJM Interconnection, L.L.C., 2; - Elizabeth Davis	
Answer	
Document Name	

Comment
PJM recommends the following concise axioms in managing future updates: 1) All IBRs are comprised of one or more IBR Units. 2) An IBR unit is a generator that employs inverter(s) to create power. 3) To be an IBR unit, the DC side must be able to generate power onto the AC side past the POI. 4) An IBR unit may also consume power, but to be an IBR unit, axiom 3 must be met. 5) IBRs are the combination of IBR units, conversion (inverter), and AC equipment up to a POI.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	

Comment
ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.

Likes 0	
Dislikes 0	

Response

Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	

Document Name	
Comment	
OPG supports NPCC Regional Standards Committee’s comments.	
Likes 0	
Dislikes 0	
Response	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project Name:	2020-06 Verifications of Models and Data for Generators | Draft 1 of IBR Definitions
Comment Period Start Date:	11/16/2023
Comment Period End Date:	1/9/2024
Associated Ballot(s):	2020-06 Verifications of Models and Data for Generators IBR Unit IN 1 DEF 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan IN 1 OT 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) IN 1 DEF

There were 73 sets of responses, including comments from approximately 179 different people from approximately 113 companies representing 10 of the Industry Segments as shown in the table on the following pages.

All comments submitted can be reviewed in their original format on the project page.

If you feel that your comment has been overlooked, let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, contact Director, Standards Development Latrice Harkness (via email) or at (404) 858-8088.

Questions

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

3. Provide any additional comments for the DT to consider, if desired.

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
BC Hydro and Power Authority	Adrian Andreoiu	1	WECC	BC Hydro	Hootan Jarollahi	BC Hydro and Power Authority	3	WECC
					Helen Hamilton Harding	BC Hydro and Power Authority	5	WECC
					Adrian Andreoiu	BC Hydro and Power Authority	1	WECC
MRO	Anna Martinson	1,2,3,4,5,6	MRO	MRO Group	Shonda McCain	Omaha Public Power District (OPPD)	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jamison Cawley	Nebraska Public Power District	1,3,5	MRO
					Jay Sethi	Manitoba Hydro (MH)	1,3,5,6	MRO
					Husam Al-Hadidi	Manitoba Hydro (System Preformance)	1,3,5,6	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Kimberly Bentley	Western Area Power Adminstration	1,6	MRO
					Jaimin Patal	Saskatchewan Power Coporation (SPC)	1	MRO
					Angela Wheat	Southwestern Power Administration	1	MRO
					George Brown	Pattern Operators LP	5	MRO
					Larry Heckert	Alliant Energy (ALTE)	4	MRO
					Terry Harbour	MidAmerican Energy Company (MEC)	1,3	MRO
					Dane Rogers	Oklahoma Gas and Electric (OG&E)	1,3,5,6	MRO
					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Michael Ayotte	ITC Holdings	1	MRO
					Andrew Coffelt	Board of Public Utilities-Kansas (BPU)	1,3,5,6	MRO
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,SPP RE,WECC	SRC 2023	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Helen Lainis	IESO	1	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Elizabeth Davis	PJM	2	RF
					Kennedy Meier	Electric Reliability Council of Texas, Inc.	2	Texas RE
WEC Energy Group, Inc.	Christine Kane	3		WEC Energy Group	Christine Kane	WEC Energy Group	3	RF
					Matthew Beilfuss	WEC Energy Group, Inc.	4	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Clarice Zellmer	WEC Energy Group, Inc.	5	RF
					David Boeshaar	WEC Energy Group, Inc.	6	RF
Southern Company - Southern Company Services, Inc.	Colby Galloway	1,3,5,6	MRO,RF,SERC,Texas RE,WECC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Public Utility District No. 1 of Chelan County	Diane E Landry	1		CHPD	Joyce Gundry	Public Utility District No. 1 of Chelan County	3	WECC
					Anne Kronshage	Public Utility District No. 1 of Chelan County	6	WECC
					Rebecca Zahler	Public Utility District No. 1 of Chelan County	5	WECC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	1	WECC
					Scott Brame	North Carolina Electric Membership Corporation	3,4,5	SERC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Jason Procuniar	Buckeye Power, Inc.	4	RF
					Kevin Lyons	Central Iowa Power Cooperative	1	MRO
					Amber Skillern	East Kentucky Power Cooperative	1	SERC
					Nick Fogleman	Prairie Power, Inc.	1,3	SERC
					Kylee Kropp	Sunflower Electric Power Corporation	1	MRO
					Austin Towne	Western Farmers Electric Cooperative	1,5	Texas RE
Eversource Energy	Joshua London	1		Eversource	Joshua London	Eversource Energy	1	NPCC
					Vicki O'Leary	Eversource Energy	3	NPCC
FirstEnergy - FirstEnergy Corporation	Mark Garza	4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy- FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
Michael Johnson	Michael Johnson		WECC	PG&E All Segments	Marco Rios	Pacific Gas and Electric Company	1	WECC
					Sandra Ellis	Pacific Gas and Electric Company	3	WECC
					Frank Lee	Pacific Gas and Electric Company	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Alain Mukama	Hydro One Networks, Inc.	1	NPCC
					Deidre Altobell	Con Edison	1	NPCC
					Jeffrey Streifling	NB Power Corporation	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael Ridolfino	Central Hudson Gas & Electric Corp.	1	NPCC
					Randy Buswell	Vermont Electric Power Company	1	NPCC
					James Grant	NYISO	2	NPCC
					John Pearson	ISO New England, Inc.	2	NPCC
					Harishkumar Subramani Vijay Kumar	Independent Electricity System Operator	2	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Randy MacDonald	New Brunswick Power Corporation	2	NPCC
					Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
					David Burke	Orange and Rockland	3	NPCC
					Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
					Salvatore Spagnolo	New York Power Authority	1	NPCC
					Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
					David Kwan	Ontario Power Generation	4	NPCC
					Silvia Mitchell	NextEra Energy -	1	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
						Florida Power and Light Co.		
					Glen Smith	Entergy Services	4	NPCC
					Sean Cavote	PSEG	4	NPCC
					Jason Chandler	Con Edison	5	NPCC
					Tracy MacNicoll	Utility Services	5	NPCC
					Shivaz Chopra	New York Power Authority	6	NPCC
					Vijay Puran	New York State Department of Public Service	6	NPCC
					ALAN ADAMSON	New York State Reliability Council	10	NPCC
					David Kiguel	Independent	7	NPCC
					Joel Charlebois	AESI	7	NPCC
					Joshua London	Eversource Energy	1	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Elevate Energy Consulting	Ryan Quint	NA - Not Applicable	NA - Not Applicable	Elevate Energy Consulting	Ryan Quint	Elevate Energy Consulting		NA - Not Applicable
					N/A	N/A		NA - Not Applicable
Dominion - Dominion Resources, Inc.	Sean Bodkin	6		Dominion	Connie Lowe	Dominion - Dominion Resources, Inc.	3	NA - Not Applicable
					Lou Oberski	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
					Larry Nash	Dominion - Dominion Virginia Power	1	NA - Not Applicable
					Rachel Snead	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
Shannon Mickens	Shannon Mickens		MRO,SPP RE,WECC	SPP RTO	Shannon Mickens	Southwest Power Pool Inc.	2	MRO
					Mia Wilson	Southwest Power Pool Inc.	2	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Josh Phillips	Southwest Power Pool Inc.	2	MRO
					Darian Richards	Southwest Power Pool Inc	2	MRO
					Jim William	Southwest Power Pool Inc.	2	MRO
					Mason Favazza	Southwest Power Pool Inc.	2	MRO
					Scott Jordan	Southwest Power Pool Inc.	2	MRO
					Will Tootle	Southwest Power Pool Inc.	2	MRO
					Zach Sabey	Southwest Power Pool Inc.	2	MRO
Stephen Whaite	Stephen Whaite		RF	ReliabilityFirst Ballot Body Member and Proxies	Lindsey Mannion	ReliabilityFirst	10	RF
					Stephen Whaite	ReliabilityFirst	10	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Western Electricity Coordinating Council	Steven Rueckert	10		WECC	Steve Rueckert	WECC	10	WECC
					Phil O'Donnell	WECC	10	WECC
Tim Kelley	Tim Kelley		WECC	SMUD and BANC	Nicole Looney	Sacramento Municipal Utility District	3	WECC
					Charles Norton	Sacramento Municipal Utility District	6	WECC
					Wei Shao	Sacramento Municipal Utility District	1	WECC
					Foung Mua	Sacramento Municipal Utility District	4	WECC
					Nicole Goi	Sacramento Municipal Utility District	5	WECC
					Kevin Smith	Balancing Authority of Northern California	1	WECC

1. *Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support*.	
Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	No
Document Name	
Comment	
The Inverter Based Resource proposed definition includes distribution. GADS and other regional (ISO/RTO) definitions support BPS (transmission and sub-transmission) and purposely leave out distribution systems (distributed energy resources (DERs)). We recommend also having this delineation to help industry terms align. Thus, DER should have its own definition and a MW delineation or facility descriptions as part of its definition. We believe having MW delineation may help approval odds of both definitions. This may also help with the inclusions and exclusions of IBRs and DERs for upcoming standards. Further we recommend that BESS Resource should be excluded from this definition, and should be its own definition. Separating these items out may help the inclusion and exclusion of certain units/facilities. We also recommend that converter unit resources should be its own definition. Reasoning for breaking these resources out as their own definition, makes it easier to include, exclude, delineate and detail requirements for each kind of resource within upcoming standards. Example: EMT modeling requirements, event reporting, and performances should differ between IBRs, BESS Resources and Converter Based Resources. Also, many companies (GOs) are separating out their PV Plant as one legal entity and their BESS as another legal entity. With this in mind, making separate definitions also helps these companies.	
Likes 0	
Dislikes 0	
Response	
1. This parenthetical has been removed, and further discussion about this topic is included in the technical rationale.	

2. A table has been added to the technical rationale, and the list of technologies has been removed from the definition. 3. The language has been updated, but in general the SDT believes a BESS is an IBR whether it is charging or discharging. Reliability Standards drafting teams will have the responsibility of deciding whether requirements apply in both modes or not. Additionally, the DT wanted to define as few terms as possible. The commenter is welcome to submit a SAR in the future to address their concern. 4. Thank you for the comment. The DT has chosen to keep the BESS as part of the IBR definition. 5.	
Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	No
Document Name	
Comment	
· Item 4 in the background of the IBR definition documents indicates that the IBR is synonymous with the term “IBR plant/facility”, where a step-up transformer, collector systems, main power transformers, power plant controllers, etc., all belong to the IBR. However, these details are not mentioned in the IBR definition. Therefore, it is recommended to include these details in the IBR definition to clarify the definition. · The isolated IBR, regardless of their energy resource, interconnecting via a dedicated VSC-HVDC transmission facility should be included in the IBR definition.	
Likes 0	
Dislikes 0	
Response	
Please see the Technical Rationale. This is included under the definition and the technical rationale explains this more thoroughly.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	

Answer	No
Document Name	
Comment	
The proposed defintion conflicts with the BES definition and also appears to be an attempt to expand NERC jurisidction into the distribution system. The definition is expansive and goes beyond a defintoin of what an Inverter Based Resource is technically. Dominion Energy recommends that NERC use the FERC definition of IBR: IBRs include solar photovoltaic, wind, fuel cell, and battery storage resources powering electronic devices that change direct current power produced by these resources to alternating current power to be transmitted on the BPS. The FERC definition clearly communicates that only resources that are intending to move power across the BPS are a jurisdictional IBR and does not conflict with the existing and approved BES definition. Dominion Energy also supports EEI comments.	
Likes 0	
Dislikes 0	
Response	
The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	No
Document Name	
Comment	

The drafting team has presented a good draft definition of IBR but the proposed definition includes some technical issues that could create challenges, inconsistencies, and applicability challenges when used in the NERC Reliability Standards. These issues should be further vetted and considered by the drafting team for the next iteration. Potential issues include:

1. The parenthetical "(transmission, sub-transmission, or distribution system)" encapsulates all IBRs connected to the power grid which is a good approach to create a generic definition that can then be further specified for applicability to requirements. However, the phrase could also be removed and the meaning would remain the same. So therefore, it may not be necessary to add that level of specificity to the Glossary Term knowing that further clarification would be needed for applicability in the Standards.
    - IBRs connected to the distribution system are classified as distributed energy resources (DERs) and would need a separate definition to classify them as such for any DER-related standards modifications.
2. The list of IBR technologies at the end of the definition is confusing in that it is unclear whether this list is inclusive or exclusive. As written, one cannot clearly determine whether the list defines the types of resources that are considered IBRs or if they are simply examples. There are other types of IBRs such as FACTS devices (STATCOMs, SVCs, etc.) and HVDC circuits that are not included in this list. Therefore, as written, the definition will cause a significant amount of confusion and require significant clarifying language in every standard where used.
3. The *ERO Enterprise CMEP Practice Guide: Application of the Bulk Electric System Definition to Battery Energy Storage Systems and Hybrid Resources Version 1* clarifies that BESS applicability is irrespective of charging and discharging. This is relevant to these definitions in that the proposed IBR definition states "A source (or sink in the case of a charging BESS)" but it is unclear what value the parenthetical addition brings to the definition. A BESS is a source of electric power when discharging and therefore could be classified accordingly without the additional language. The drafting team should consider this when developing the definition given the past precedence set with the Practice Guide. Similarly, if the team decides to keep it, it could be integrated into the definition so there are less parentheticals throughout.

The following are supported in the definition:

1. The use of "electric power system" is likely a suitable term in that it is generic enough for a definition such as this. Again, without the additional text that appears to be unnecessary, as described above.

A more fundamental definition such as the following may be just as useful for reference in NERC Standards: “A source of electric power connected to the electric power system that consists of one or more IBR Unit(s) operated as a single resource at a common point of connection.

Likes 0	
Dislikes 0	

Response

1. This parenthetical has been removed, and further discussion about this topic is included in the technical rationale.
2. A table has been added to the technical rationale, and the list of technologies has been removed from the definition.
3. The language has been updated, but in general the SDT believes a BESS is an IBR whether it is charging or discharging. Reliability Standards drafting teams will have the responsibility of deciding whether requirements apply in both modes or not.
4. Language has been removed.

Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter

Answer	No
Document Name	

Comment

FirstEnergy supports EEI’s comments which state:

EEI appreciates the efforts to develop the proposed IBR definition, however, we do not support the definition as currently written

Our concerns include the specificity in the technology types covered in the proposed definition, noting that NERC definitions should be technology agnostic. Also, as written the definition seems to cast an overly broad net relative to the size and voltage class for the IBR resources yielding insufficient regulatory clarity necessary for entities to apply the definition in any meaningful way. While the definition is not intended to identify specific resource applicability, it still should be clear enough to provide a regulatory floor as it relates to NERC Reliability Standards.

To address these concerns, either the IEEE definition of IBRs, as defined in IEEE 2800-2022 (IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems, See Section 3, page 31) or the informal definition of IBRs as proposed by the FERC Commission on Nov. 17, 2023 should be leveraged. Finally, consideration should be given to defining DERs separately noting these resources, while also inverter based, represent a specific class of IBRs that are directly connected to the distribution system and in many cases serve a very different purpose outside of supporting the reliability of the Bulk Power System.	
Likes 0	
Dislikes 0	
Response	
The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Michael Johnson - Michael Johnson On Behalf of: Frank Lee, Pacific Gas and Electric Company, 3, 1, 5; Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	No
Document Name	
Comment	
PG&E does not support the definition of an IBR as written because it is too narrow to only define the listed 5 items as IBR technologies. There are other generation types that use IBR technologies that produce MWs such as Flywheels, Tidal flows, etc… that if left out, will result in future ambiguity. PG&E's recommendation is to either list other generation methods by name or the Drafting Team (DT) should include in the requirement text "and other" to ensure emerging generation or technologies are not excluded to avoid future modifications to the definition.	
Likes 0	
Dislikes 0	

Response	
A table has been added to the technical rationale to help further clarify	
Ruchi Shah - AES - AES Corporation - 5	
Answer	No
Document Name	
Comment	
AES Clean Energy supports NAGF's comments and NAGF's proposed definition for IBR.	
Likes 0	
Dislikes 0	
Response	
Please see NAGF response.	
Andy Thomas - DTE Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	
Duke Energy provides the following guidance: Delete proposed NERC IBR definition and substitute the IEEE 2800 "IBR Plant" definition. The IEEE2800 definition is well vetted within the industry and serves the NERC intended purpose for this application. Note: The proposed NERC IBR definition fits the IBR Plant definition from IEEE 2800.	
Likes 0	
Dislikes 0	

Response
The IEEE 2800 definition was used in this NERC definition, there is effectively no difference between them.

Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No
Document Name	
Comment	
MRO NSRF does not support the definition as written due to the following concerns: The phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" needs to be removed. Language is unnecessary. The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted. When possible, language used in standards and definitions should be technology neutral. The broadness of the definition generates ambiguity and will create difficultly in the application for NERC compliance. While identifying specific resource applicability isn't the aim, the definition should provide a clear regulatory framework as a baseline for adherence to NERC Reliability Standards.	
Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	

Response
The last sentence of the IBR definition was updated, and additional information provided in the Technical Rationale.

Casey Perry - PNM Resources - 1,3 - WECC,Texas RE

Answer	No
Document Name	
Comment	
PNM and TNMP supports EEI comments but also provide recommended modification of the IBR definition. Inverter Based Resource: A source of electric power that is connected to the and consists of one or more IBR Unit(s) operated as a single resource at common point of interconnection. IBRs include but are not limited to solar photovoltaic (PV), Type 3 and Type 4 wind BESS, and fuel cell.	
Likes 0	
Dislikes 0	
Response	
See EEI response.	

Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,7 - SERC	
Answer	No
Document Name	
Comment	
The definition of IBR is very vague. Entergy recommends The Inverter Based Resource(IBR) definition should clearly state that this definition should apply to only transmission connected facilities. Distribution connected facilities should be called DER in alignment with other NERC Posted guidelines.	
Likes 0	
Dislikes 0	
Response	

The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.

Sheila Suurmeier - Black Hills Corporation - 5	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI Comments.	
Likes 0	
Dislikes 0	
Response	
See NAGF and EEI responses.	

Micah Runner - Black Hills Corporation - 1	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	

See NAGF and EEI responses.	
Carly Miller - Carly Miller On Behalf of: Josh Combs, Black Hills Corporation, 5, 1, 3, 6; - Carly Miller	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	
See NAGF and EEI responses.	
Rachel Schuldt - Rachel Schuldt On Behalf of: Rachel Schuldt, Black Hills Corporation, 5, 1, 3, 6; - Black Hills Corporation - 6	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response	
See NAGF and EEI responses.	

Jennifer Neville - Western Area Power Administration - 6	
Answer	No
Document Name	
Comment	
• Remove the phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" as it is unnecessary language. • Delete the sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** because the language is not technology neutral. • The definition should provide a clarity for regulatory pruposes, currently the broadness of the definition generates ambiguity and will create difficultly in the application for NERC compliance.	
Likes 0	
Dislikes 0	
Response	
• Has been removed from the definition and clarified in the technical rationale. • Has been removed from the definition and clarified in the technical rationale. • The base definition can be further clarified in each NERC reliability standard by that SDT. IBR is ambiguous as it covers many differing fuel sources.	

Tracy MacNicoll - Utility Services, Inc. - 4	
Answer	No
Document Name	
Comment	
"(transmission, sub-transmission, or distribution system)" is unnecessary for the definition. This clarification would be made in the Applicability or Facilities section of a standard.	

The last sentence should have "may include". If it is only those 4 generating types, the rest of the definition wouldn't be necessary.	
Likes 0	
Dislikes 0	
Response	
• Has been removed from the definition and further clarified in the technical rationale • Has been added to say may include but not limited to, and was moved to the technical rationale	
James Keele - Entergy - 3	
Answer	No
Document Name	
Comment	
Entergy recommends The Inverter Based Resource(IBR) definition should clearly state that this definition should apply to only transmission connected facilities. Distribution connected facilities should be called DER in alignment with other NERC Posted guidelines.	
Likes 0	
Dislikes 0	
Response	
The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	

The first sentence of the proposed definition includes the phrase "(or sink in the case of a charging battery energy storage system (BESS)" which limits the applicability of an IBR to just BESS. Energy storage systems that could use IBRs are not limited to BESS - they could be used in other energy storage technologies such as compressed gas, gravity based, etc. Also, using the word "or" limits the IBR to one or the other, when it could be both. Suggest changing "or" to "and/or" and removing the word "battery" and "(BESS)" such that it reads " "(and/or sink when used in conjunction with an energy storage system)". Also, change "BESS" to "energy storage system" in the last sentence.

The last sentence of the proposed definition includes the phrase "IBRs include solar photovoltaic (PV)… This seems to indicate that IBRs are PVs, etc., when they actually only support them. Suggest changing the sentence to read "IBRs are typically used with solar photovoltaic (PV), Type 3 and Type 4 wind, energy storage, and fuel cells."

Likes 0	
Dislikes 0	

Response

Removed this language and moved it to the technical rationale to further clarify. The new language says may include but is not limited to.

Has been removed from the definition and moved to the technical rationale.

Zahid Qayyum - New York Power Authority - 5

Answer	No
Document Name	

Comment

NYPA reviewed the proposed IBR definition and suggests a revision. Given the dynamic nature of IBR technology, it's advisable not to specify certain types as the sole IBRs; instead, they could be cited as examples.

The term "IBR Unit" causes confusion as it says every inverter is a unit in the current definition, and NYPA recommends adopting an alternative term in alignment with other NERC standards.

*Additionally, it's essential to explicitly include hybrid plants in the IBR definition, as the current background section lacks clarity on the designated IBR portion. Besides, NYPA also recommends using **Inverter Based Unit(s)** instead of **IBR Units (s)** in the following sentence as it intends to explain IBR itself:* *"…and that consists of one or more **IBR Unit(s)** operated as a single resource at a common point of interconnection…"*

Likes 0	
Dislikes 0	

Response

1. SDT agrees and has moved this to the technical rationale with examples
2. This is the intent, every inverter is an IBR unit, the resource or IBR as a whole is comprised of those units. This aligns with the IEEE 2800 definition.
3. The definition does not exclude Hybrid IBRs, no change is needed here.

Ben Hammer - Western Area Power Administration - 1

Answer	No
Document Name	

Comment

The phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" needs to be removed. Language is unnecessary.

The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted. When possible, language used in standards and definitions should be technology neutral.

The broadness of the definition generates ambiguity and will create difficultly in the application for NERC compliance. While identifying specific resource applicability isn't the aim, the definition should provide a clear regulatory framework as a baseline for adherence to NERC Reliability Standards.

Likes 0	
Dislikes 0	
Response	
• Has been removed from the definition and clarified in the technical rationale • Has been removed from the definition and clarified in the technical rationale • The base definition can be further clarified in each NERC reliability standard by that SDT. IBR is ambiguous as it covers many differing fuel sources.	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	No
Document Name	
Comment	
Either delete the sentence “IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.” all together or add "may include". .	
Likes 0	
Dislikes 0	
Response	
Has been removed, and added “may include but not limited to” language in the technical rationale.	
Marty Hostler - Northern California Power Agency - 4	
Answer	No
Document Name	
Comment	

BES needs to be included in the Definition. We already have experience with regulators making up their own interpretation when "BES" is not included. For example, in CIP-002-5.1a IRC 2.11 Auditors claim since BES is not before the word generation, GOP's must include non-BES generation in their Control Center assessments. Even though a GOP can not possibly perform a GOP functional obligation for a non-BES generator, as it has no NERC functional obligations.	
Likes 0	
Dislikes 0	
Response	
The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
BES needs to be included in the Definition. We already have experience with regulators making up their own interpretation when "BES" in not included. For example, in CIP-002-5.1A IRC 2.11 Auditors claim since BES is not before the word generation, GOP's must include non-BES generation in their Control Center assessments. Even though a GOP cannot possibly perform a GOP functional obligation for a non-BES generator as it has no NERC functional obligations	
Likes 0	
Dislikes 0	
Response	

The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Michael Whitney - Northern California Power Agency - 3,4,5,6	
Answer	No
Document Name	
Comment	
BES needs to be included in the Definition. We already have experience with regulators making up their own interpretation when "BES" in not included. For example, in CIP-002-5.1A IRC 2.11 Auditors claim since BES is not before the word generation, GOP's must include non-BES generation in their Control Center assessments. Even though a GOP cannot possibly perform a GOP functional obligation for a non-BES generator as it has no NERC functional obligations. Marty Hostler, Northern California Power Agency, 4, 1/8/2024	
Likes 0	
Dislikes 0	
Response	
The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	
WEC Energy Group supports the comments of the NAGF, the MRO NSRF and EEI.	

Likes 0	
Dislikes 0	
Response	
See EEI, NAGF, and MRO NSRF Comments.	
Stephen Stafford - Stephen Stafford On Behalf of: Greg Davis, Georgia Transmission Corporation, 1; - Stephen Stafford	
Answer	No
Document Name	
Comment	
Remove the reference for sink in the IBR definition. A sink (load) is not a resource. Consider referring to a discharging battery energy storage system (BESS).	
Likes 0	
Dislikes 0	
Response	
Language removed and clarified within the technical rationale.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	No
Document Name	
Comment	
AEPC signed on to ACES comments:	

It is ACES' viewpoint that the proposed definitions are a welcome step towards better defining what is inherently a somewhat nebulous concept. While we can appreciate the approach taken by the Drafting Team, we believe further refinement is necessary. We would like to specifically emphasize our agreement with the 3rd bullet point of the "Background" section. We believe that it is imperative that the industry adopt specific definitions to distinguish between an individual "IBR unit" and the "IBR plant/facility as a whole" thereby allowing each SDT the flexibility to draft each individual standard or requirement with the correct scope for each. While we agree that creating distinct definitions is the correct method to clearly define these resource types, it is our interpretation that the currently proposed IBR definition does not align with this stated approach. It is our opinion that the first sentence of the IBR definition is redundant to the IBR unit definition and should be struck.

Furthermore, we do not believe that the IBR definition should be limited by a specific listing of technologies as is done in the last sentence of the definition. The last sentence of the 6th bullet point in the background section states:

- "The DT's intent with the phrase "IBRs include" is to articulate a specific list of IBRs. Therefore, other technologies not listed would not be considered an IBR."

It is our perspective that if a specific list of applicable technologies is required to clearly define this term, then the rest of the definition is moot and can be eliminated. In other words, rather than providing a definition and an all-inclusive list of applicable technologies, why not simply provide an all-inclusive list? We believe this approach needlessly limits the IBR definition to current technologies in common use and does not allow enough flexibility for future technological growth nor changes in industry trends.
It is our recommendation that the IBR definition be modified as follows:

- "One or more IBR Unit(s), operated as a single resource at a common point of interconnection, connected to the electric power system (transmission, sub-transmission, or distribution system).
- IBRs may include, but are not limited to, any combination of one or more of the following installation types: solar photovoltaic (PV), wind turbine, battery energy storage system, and fuel cell."

Likes 0	
Dislikes 0	

Response

SDT Agrees and language has been modified with clarification added to the technical rationale.

List has been removed from the language and added to the technical rationale with “may include but not limited to” language.	
Tammy Porter - Tammy Porter On Behalf of: Byron Booker, Oncor Electric Delivery, 1; - Tammy Porter	
Answer	No
Document Name	
Comment	
We are in agreement with other comments that, although the applicability section of MOD-026-2 limits resources set by the NERC I4 BES definition, the proposed IBR definition needs to clearly state that it aligns with the NERC I4 BES definition. The current definition may imply that each IBR, ranging from roof top solar to large dispatchable units, would fall under future NERC standards whose applicability does not explicitly include the NERC I4 BES definition. It would be a costly undertaking for a larger utility to include all connected IBR units outside the I4 BES definition. In short, the applicability scope of MOD-026-2 is directed toward NERC’s I4 BES definition, and the IBR definition need to reflect this boundary as well. Also, to better incorporate the industry recommendation to use other defined terms when possible, such as Real Power, we recommend replacing “electric power” to “Real Power.”	
Likes 0	
Dislikes 0	
Response	
The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.	
Alan Kloster - Alan Kloster On Behalf of: Jeremy Harris, Evergy, 3, 5, 1, 6; Kevin Frick, Evergy, 3, 5, 1, 6; Marcus Moor, Evergy, 3, 5, 1, 6; Tiffany Lake, Evergy, 3, 5, 1, 6; - Alan Kloster	
Answer	No
Document Name	
Comment	

Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI), MRO NSRF and the NAGF reasons for not supporting the proposed definition for question #1. Evergy also humbly submits the following proposed definition for the drafting teams consideration:

Inverter-Based Resource - A generating resource or an energy storage system that relies on power electronic interfaces (inverter**s**, converter**s**, etc.) to deliver electric power to a common point of interconnection.

Likes 0	
Dislikes 0	

Response

Please see EEI, NAGF, and MRO-NSRF comments.

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	No
Document Name	

Comment

The NAGF does not support the proposed IBR definition draft #1 for the following reasons:

a. It is unclear if the proposed IBR definition draft #1 would make a three (3) unit IBR generating plant a single Inverter-Based Resource or multiple Inverter-Based Resources. A 2x1 synchronous combined cycle gas plant has three generating units that can be controlled separately. Inverter-based resources may also be structured and controlled as distinct units behind a common point of interconnection. When this occurs, these separately controlled groups of inverters are considered generating units within a single plant.

b. Recommend removing the parenthetical narrative “(transmission, sub-transmission, and distribution system).

c. Recommend deleting the last sentence of the proposed IBR definition draft #1. It appears that any type of inverter not listed is excluded. While at this time the list may be complete, there will be different types of inverter resources in the future that are applicable under the IBR definition. The NAGF recommends the following alternative definition for IBR: **Inverter-Based Resource (IBR):** A source (or sink in the case of a charging battery energy storage system (BESS)) of electric power that consists of one or more IBR Unit(s) at a common point of interconnection.	
Likes 0	
Dislikes 0	
Response	
a. IBR Definition would include these projects dependent on how they were operated. Either they would be separate IBR's or one whole IBR. It would depend on the circumstance, but the definition would cover it in either case. b. Language removed from the definition, and further clarified in the technical rationale. c. SDT Agrees and has moved this list to the technical rationale with "May include but not limited to" language.	
Selene Willis - Edison International - Southern California Edison Company - 5	
Answer	No
Document Name	
Comment	
"See comments submitted by the Edison Electric Institute"	
Likes 0	
Dislikes 0	
Response	
Please see response to EEI.	

Kenya Streeter - Edison International - Southern California Edison Company - 1,3,5,6	
Answer	No
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	
Dislikes 0	
Response	
Please see response to EEI comments.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	No
Document Name	
Comment	
AZPS supports the following comments that were submitted by EEI on behalf of its members: EEI appreciates the efforts to develop the proposed IBR definition, however, we do not support the definition as currently written. Our concerns include the specificity in the technology types covered in the proposed definition, noting that NERC definitions should be technology agnostic. Also, as written the definition seems to cast an overly broad net relative to the size and voltage class for the IBR resources yielding insufficient regulatory clarity necessary for entities to apply the definition in any meaningful way. While the definition is not intended to identify specific resource applicability, it still should be clear enough to provide a regulatory floor as it relates to NERC Reliability Standards.	

To address these concerns, either the IEEE definition of IBRs, as defined in IEEE 2800-2022 (IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems, See Section 3, page 31) or the informal definition of IBRs as proposed by the FERC Commission on Nov. 17, 2023 should be leveraged.

EEI further notes that the Project 2022-02 SDT has already attempted to define DERs separately within that project and while these resources are also inverter based, they represent a specific class of IBRs that are directly connected to the distribution system and in many cases serve a very different purpose outside of supporting the reliability of the Bulk Power System and therefore should be defined separately.

Likes 0	
Dislikes 0	

Response

Please see response to EEI comments.

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	No
Document Name	

Comment

EEI appreciates the efforts to develop the proposed IBR definition, however, we do not support the definition as currently written. Our concerns include the specificity in the technology types covered in the proposed definition, noting that NERC definitions should be technology agnostic. Also, as written the definition seems to cast an overly broad net relative to the size and voltage class for the IBR resources yielding insufficient regulatory clarity necessary for entities to apply the definition in any meaningful way. While the definition is not intended to identify specific resource applicability, it still should be clear enough to provide a regulatory floor as it relates to NERC Reliability Standards.

To address these concerns, either the IEEE definition of IBRs, as defined in IEEE 2800-2022 (IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems, See Section 3, page 31) or the informal definition of IBRs as proposed by the FERC Commission on Nov. 17, 2023 should be leveraged.

EEI further notes that the Project 2022-02 SDT attempted to define DERs separately within that project. While these resources are also inverter based, they represent a specific class of IBRs that are directly connected to the distribution system and in many cases serve a different purpose outside of supporting the reliability of the Bulk Power System and therefore should be defined separately.	
Likes 0	
Dislikes 0	
Response	
Please see the first part of the Technical Rationale. This is the approach used by the DT in the IBR and IBR Unit definitions. The IBR definition is written in such a way that an IBR is defined based on its technology and not its voltage connection level or size (MVA). This is stated in the Technical Rationale. Additionally, a DER can include IBR technologies plus other generators that are not inverter-based.	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
The phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" needs to be removed. Language is unnecessary. The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** Should be deleted. When possible, language used in standards and definitions should be technology neutral. If a resource would otherwise meet the criteria for being classified as an IBR, the specific device type should not be taken into consideration as a means of exclusion. Any resource that meets the inclusion criteria of Bulk Electric System should be subject to the appropriate reliability standards, regardless of specific device type. This is important for ensuring that standards and associated language have the necessary flexibility to adapt to future technology and changing resource mixes. Additionally, while the Standard Drafting Team's intent in this being a closed list is stated in the Technical	

Rationale, the writing of this sentence does not clearly convey that intent, as “includes” has been interpreted to be both limiting and non-limiting in various jurisdictions.	
Likes 0	
Dislikes 0	
Response	
• Has been removed, and language added to the technical rationale to clarify. • Has been removed, and language added to the technical rationale to clarify.	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	No
Document Name	
Comment	
ITC supports the comments provided by MRO NSRF	
Likes 0	
Dislikes 0	
Response	
Please see MRO NSRF comments.	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	No
Document Name	
Comment	

Texas RE is concerned that the proposed definition of IBR Unit does not account for Reactive Power capabilities required to maintain BPS reliability. Since, all Inverter-based Resources (IBR) shall be capable of providing dynamic reactive power support to the grid to maintain voltage stability, Texas RE recommends the definition of IBR Unit be revised to include Reactive Power capabilities required to maintain BPS reliability.

According to the background section, the IBR definition should not designate the location of the resource connection. The verbiage of the definition, however, indicates that it is connected to the electric power system (transmission, sub-transmission, or distribution). Texas RE recommends removing the reference to transmission, sub-transmission, and distribution.

Likes 0	
Dislikes 0	

Response

SDT does not specifically include reactive power in order to remove any confusion about whether or not FACTS devices would be included. The IBR definition is meant to only apply to generation type resources.

Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC

Answer	No
Document Name	

Comment

WECC suggests that the drafting team attempt to not include one-off technology-based language within the definition (i.e., “sink” phrase). Essentially, batteries, in order to charge and discharge, have bi-directional converters (AC to DC when charging and DC to AC when discharging.) Using “IBR” as part of the definition of IBR even as a descriptor of the unit type is somewhat circular. The phrase “operated as a single resource at a common point of interconnection” may be troublesome as there are configurations where devices connect to separate systems and then those systems make multiple connections (both to sub-transmission and in some cases transmission level voltages.) There should not be a loophole for compliance built into a definition (if a company puts two connections to separate parts of a station there will be the discussion about applicability of the definition.) Additionally, if there are multiple owners with multiple strings of IBRS but collect to a single GSU and a single point of interconnection, there could be confusion regarding joint-

owned and responsibilities OR there could be the argument that it is not a single resource and does not meet the definition. WECC suggests the following definition:"

Inverter-Based Resource (IBR)- A dispersed power producing resource that uses equipment explicitly for the transformation of current flow from DC to AC, AC to DC, or some combination thereof including, but not limited to, solar photovoltaic (PV), Type 3 wind, Type 4 wind, battery energy storage system (BESS) and fuel cell technologies or combinations of said technologies."

Likes 0	
Dislikes 0	

Response

Language has been removed and clarification has been added to the technical rational about BESS, voltage class, and other applicability concerns.

Shannon Mickens - Shannon Mickens On Behalf of: Joshua Phillips, Southwest Power Pool, Inc. (RTO), 2; - Shannon Mickens, Group Name SPP RTO

Answer	No
Document Name	

Comment

SPP has a concern that the proposed definition for Inverter-Based Resource (IBR) creates confusion on how to identify the resource as well as define the responsibility. The initial draft for IBRs focused around the inclusion of the Power Electronic Device (PED) while the recent version includes language pertaining to a source/sink. From our perspective, the latest version (including source/sink) doesn't create a clear and concise picture defining the definition. Moreover, those terms are more associated with Transmission Service Request (TSR) that allows a utility to allocate physical capacity in the form of transmission service rights (TSRs) for the transmission of electric power.

SPP recommends that the drafting team considers removing the terms "source and sink" from the proposed definition and replaced them with language that aligns with their purpose (proposed language shown below).

From our perspective, the proposed IBR definition doesn't include language showing what a facility/plant is and the difference in reference to an IBR unit (device) as noted in the rationale language.

Inverter-Based Resource (IBR): A generation (plant) (or load (storage facility) in the case of a charging battery energy storage system (BESS)) of electric power that is connected to the electric power system (transmission, sub-transmission, or distribution system), and that consists of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell.

Likes 0	
Dislikes 0	

Response

The SDT agrees and this language has been removed from the definition and added to the technical rationale with further clarification

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	No
Document Name	

Comment

Comments: It is ACES' viewpoint that the proposed definitions are a welcome step towards better defining what is inherently a somewhat nebulous concept. While we can appreciate the approach taken by the Drafting Team, we believe further refinement is necessary.

We would like to specifically emphasize our agreement with the 3rd bullet point of the "Background" section. We believe that it is imperative that the industry adopt specific definitions to distinguish between an individual "IBR unit" and the "IBR plant/facility as a whole" thereby allowing each SDT the flexibility to draft each individual standard or requirement with the correct scope for each.

While we agree that creating distinct definitions is the correct method to clearly define these resource types, it is our interpretation that the currently proposed IBR definition does not align with this stated approach. It is our opinion that the first sentence of the IBR definition is redundant to the IBR unit definition and should be struck.

Furthermore, we do not believe that the IBR definition should be limited by a specific listing of technologies as is done in the last sentence of the definition. The last sentence of the 6th bullet point in the background section states: “The DT’s intent with the phrase "IBRs include" is to ariculate a specific list of IBRs. Therefore, other technologies not listed would not be considered an IBR.” It is our perspective that if a specific list of applicable technologies is required to clearly define this term, then the rest of the definition is moot and can be eliminated. In other words, rather than providing a definition and an all-inclusive list of applicable technologies, why not simply provide an all-inclusive list? We believe this approach needlessly limits the IBR definition to current technologies in common use and does not allow enough flexibility for future technological growthnor changes in industry trends. It is our recommendation that the IBR definition be modified as follows: “One or more IBR Unit(s), operated as a single resource at a common point of interconnection, connected to the electric power system (transmission, sub-transmission, or distribution system). IBRs may include, but are not limited to, any combination of one or more of the following installation types: solar photovoltaic (PV), wind turbine, battery energy storage system, and fuel cell.”	
Likes 0	
Dislikes 0	
Response	
IBRs include, but are not limited to, any combination of one or more of the following: solar photovoltaic (PV), wind turbine (Type 3&4), battery energy storage system, and fuel cell.”	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	No
Document Name	
Comment	

ATC mostly agrees with the MRO NSRF's comment on this matter.

ATC agrees with the MRO NSRF that the phrase "**that is connected to the electric power system (transmission, sub-transmission, or distribution)**" should be removed as the highlighted language is unnecessary.

ATC also agrees with the MRO NSRF that the sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted. When possible, language used in standards and definitions should be technology neutral.

However, ATC believes that the IBR definition should not explicitly include applicability considerations within the definition itself, but that should be left within the Applicability section of each standard. ATC does not believe the IBR definition should reference the BES definition as even the BES definition may shift and change to accommodate the new IBR-GO and IBR-GOP thresholds being considered. This may have unintended consequences for the IBR definition down the line.

Likes 0	
Dislikes 0	

Response

Please see MRO-NSRF Comments.

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023

Answer	No
Document Name	

Comment

The ISO RTO Council (IRC) Standards Review Committee (SRC) believes the definition does not fully align with the intent described in the background material provided with the definition. Specifically, the proposed definition does not appear to fully include "the equipment designed primarily for delivering the power to a common point of interconnection . . . ." Additionally, it seems to be unnecessary for the definition to include a BESS-specific parenthetical since the proposed definition of IBR Unit already addresses energy storage systems. Additionally, new technologies may emerge that include devices that are not capable of storing energy in batteries, but are capable of functioning as both a source and a sink of electric power, and it would be inappropriate for the definition to exclude these devices if they

otherwise meet the definition of an IBR. We also believe it is unnecessary for the proposed IBR definition to reference specific fuel sources such as solar photovoltaic and wind. The type of fuel used is not the defining characteristic of IBRs, and the definition should not be limited to currently known fuel types and configurations.

Finally, it is unnecessary to specify that the IBR interconnection point is transmission, sub-transmission and distribution. The applicability of the IBR requirements is defined by the BES definition and distribution level applicability through the NERC Rules of Procedure. Any changes to applicability would require a change in the term if these are included. Consequently, the BESS-specific parenthetical should be removed from the definition of IBR and the definition be further revised to read as follows:

Inverter-Based Resource (IBR): A source of electric power that is connected to the electric power system, and that consists of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. An IBR consists of the IBR Unit(s), and the equipment designed primarily for delivering the power to a common point of interconnection (e.g., step-up transformers, collector system(s), main power transformer(s), power plant controller(s), reactive resources within the IBR plant, and a voltage source converter high-voltage direct current (VSC HVDC) system with a dedicated connection to the IBR). A Battery Energy Storage System (BESS) operating in charging mode, acting as a sink of electrical energy, is considered an IBR.

Likes 0	
Dislikes 0	

Response

- Language has been added to the technical rationale to further clarify that this equipment is part of the IBR.
- Language was removed and clarification in the technical rational has been added.
- The updated definition stays silent on the applicability. In general, the SDT believes an IBR is an IBR regardless of the voltage class it is connected to or the size. This is further described in the technical rationale.

Elizabeth Davis - Elizabeth Davis On Behalf of: Thomas Foster, PJM Interconnection, L.L.C., 2; - Elizabeth Davis

Answer	No
Document Name	

Comment

Please reference IRC SRC comments. Thank you.	
Likes 0	
Dislikes 0	
Response	
Please see IRC-SRC response.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	No
Document Name	
Comment	
ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Please see IRC-SRC response.	
Robert Blackney - Edison International - Southern California Edison Company - 1	
Answer	No
Document Name	
Comment	
See comments submitted by the Edison Electric Institute (EEI).	

Likes 0	
Dislikes 0	
Response	
Please see EEI response.	
Patricia Lynch - NRG - NRG Energy, Inc. - 5	
Answer	No
Document Name	
Comment	

NRG is in support of the NAGF comments concerning the proposed definition of IBR as:

a. It is unclear if the proposed IBR definition draft #1 would make a three (3) unit IBR generating plant a single Inverter-Based Resource or multiple Inverter-Based Resources. A 2x1 synchronous combined cycle gas plant has three generating units that can be controlled separately. Inverter-based resources may also be structured and controlled as distinct units behind a common point of interconnection. When this occurs, these separately controlled groups of inverters are considered generating units within a single plant.

b. Recommend deleting the last sentence of the proposed IBR definition draft #1. It appears that any type of inverter not listed is excluded. While at this time the list may be complete, there will be different types of inverter resources in the future that are applicable under the IBR definition.

As proposed by NAGF, an alternate definition for IBR can include the following:

Inverter-Based Resource (IBR): *A source (or sink in the case of a charging battery energy storage system (BESS)) of electric power that consists of one or more IBR Unit(s) at a common point of interconnection.*

Likes 0	
Dislikes 0	
Response	

a. IBR Definition would include these projects dependent on how they were operated. Either they would be separate IBR's or one whole IBR. It would depend on the circumstance, but the definition would cover it in either case.
b. Language removed ,and added to the technical rational with further clarification

Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	
Comment	
While AEP does not object to the definition as proposed, we would like to suggest the drafting team to consider revising it as follows: IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that *functionally integrate* at a *delivery* point on the collector system.	
Likes 0	
Dislikes 0	
Response	

Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
BC Hydro requests that SDT clarify whether the last sentence, which only appears to serve as examples, is intended to convey any additional material criteria to the application of the proposed definition.	

Using the “connected to electric power system” in the definition appears to further qualify IBRs; however, as “electric power system” is not a defined term, this wording may only result in unnecessary applicability interpretations. BC Hydro suggests that the applicability to specific reliability standards be kept outside the IBR definition (such as within the Facility section of Standards), or further define the criteria that would make an inverter-based resource an IBR for the purpose of the NERC standards applicability.	
Likes 0	
Dislikes 0	
Response	
Change made. A clarifying phrase “but not limited to” was added. A list of example IBRs were added to the Technical Rationale.	
Alison MacKellar - Constellation - 5	
Answer	Yes
Document Name	
Comment	
Constellation has no additional comments. Alison Mackellar on behalf of Constellation Segments 5 and 6.	
Likes 0	
Dislikes 0	
Response	
Kimberly Turco - Constellation - 6	

Answer	Yes
Document Name	
Comment	
Constellation has no additional comments Kimberly Turco on behald of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	Yes
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1	
Answer	Yes
Document Name	

Comment	
While Exelon supports the proposed definition, we support the questions presented in the EEI comments.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support and please see response to EEI comments.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Southern Company suggests that additional clarification could be provided to further indicate that this definition is intended to apply to an entire facility or electric power producing plant.	
Likes 0	
Dislikes 0	
Response	
See updated Technical Rationale.	
Joshua London - Eversource Energy - 1, Group Name Eversource	
Answer	Yes
Document Name	
Comment	

The sentence "**IBRs include solar photovoltaic (PV), Type 3 and Type 4 wind, BESS, and fuel cell."** should be deleted or edited to say "Examples of IBRs include". Definitions should not require the statement of specific technologies for an individual to understand that those technologies fall under the definition as doing so may lead a reader to believe only those specific technologies are in-scope. If you want to provide examples, then it should be stated that way.	
Likes 0	
Dislikes 0	
Response	
Definition is updated. See Table in Technical Rationale.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
NPCC RSC supports the definition for IBR as proposed.	
Likes 0	
Dislikes 0	
Response	
Russell Jones - Invenergy LLC - 5	
Answer	Yes
Document Name	
Comment	

Invenergy supports the spirit of the definition proposed and does not offer any substantive changes. We do, however, have concerns about the application of this definition to various reliability standards going forward. More specifically, Invenergy believes the drafting team should consider how this broad definition will be applied in specific Reliability Standard requirements to different roles (transmission, sub-transmission, distribution) and different technologies (PV, Type 3 and Type 4 wind, BESS, and fuel cell) where nuance may be required to account for technological limitations or differences.	
Likes 0	
Dislikes 0	
Response	
Colin Chilcoat - Invenergy LLC - 6	
Answer	Yes
Document Name	
Comment	
Invenergy supports the spirit of the definition proposed and does not offer any substantive changes. We do, however, have concerns about the application of this definition to various reliability standards going forward. More specifically, Invenergy believes the drafting team should consider how this broad definition will be applied in specific Reliability Standard requirements to different roles (transmission, sub-transmission, distribution) and different technologies (PV, Type 3 and Type 4 wind, BESS, and fuel cell) where nuance may be required to account for technological limitations or differences.	
Likes 0	
Dislikes 0	
Response	
If there are nuances that need to be addressed for each standard or technology, then those need to be made in the respective standard. Additionally, more Technical Rationale and Implementation Guidance can be created in the future as industry and the ERO learn more about the application and implementation of the terms.	

Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
While Exelon supports the proposed definition, we support the question presented in the EEI comments.	
Likes 0	
Dislikes 0	
Response	
Please see response to EEI comments.	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
OPG supports NPCC Regional Standards Committee’s comments.	
Likes 0	
Dislikes 0	
Response	
Diane E Landry - Public Utility District No. 1 of Chelan County - 1, Group Name CHPD	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Stephen Whaite - Stephen Whaite On Behalf of: Lindsey Mannion, ReliabilityFirst , 10; - Stephen Whaite, Group Name ReliabilityFirst Ballot Body Member and Proxies	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Jesus Sammy Alcaraz - Imperial Irrigation District - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Nikki Carson-Marquis - Nikki Carson-Marquis On Behalf of: Theresa Allard, Minnkota Power Cooperative Inc., 1; - Nikki Carson-Marquis	
Answer	
Document Name	
Comment	
No. Minnkota Power Cooperative supports comments by ACES and the MRO New Standard Review Forum (NSRF). MPC believes the IBR definition should be technology-neutral and should avoid listing examples within the final definition.	
Likes 0	
Dislikes 0	
Response	
Please see response to ACES and MRO NSRF comments.	

2. *Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support*.

Patricia Lynch - NRG - NRG Energy, Inc. – 5	
Answer	No
Document Name	
Comment	

NRG is in support of the NAGF comments that has been submitted regarding this proposed definition:

The NAGF does not support the proposed IBR Unit definition draft #1 for the following reasons:

a. Utilizing the term IBR Unit to refer to a single inverter within the generating plant will cause significant confusion at the plant level. Unless any instruction provided to the plant is written, then it will not be clear if the term IBR Unit is the defined term used by NERC or if it is intended to mean the generating unit (Unit 1, 2 or 3), IBR unit. This level of potential confusion is unacceptable resulting in an unacceptable risk of the BES being misoperated. The word "unit" has long been associated with a distinct operating segment of a plant. For this reason, the NAGF does not support the use of the term unit to mean anything less than the dispatchable grouping of inverters.

The NAGF recommends the following alternative definition for IBR Unit:

***IBR Unit:** All or part of an Inverter-Based Resource that is operated as a single resource. An IBR Unit may consist of one or more IBR Devices.*

In addition, the NAGF recommends the creation of the definition for IBR Device:

***IBR Device:** An individual device, or a grouping of multiple devices, (including equipment connected to the DC terminal of the inverter) that includes power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system.*

These proposed alternative definitions will enable applicable NERC standards to be clear when a protection device or modeling information is needed at the device or unit level without causing confusion. While normally the use of the IEEE definition would be supported, in this case it is likely to cause more problems and uncertainty for the industry.

Likes 0	
Dislikes 0	

Response:	
While the definition of IBR Unit is aligned with the IEEE 2800 definition, it will only apply to NERC standards. It is further not a term that needs to be used between Transmission Operators and IBR plant personnel. The proposed IBR Unit definition is necessary if standard requirements need to be applied at the individual inverter level instead of the plant/facility as a whole. The definition of IBR Device given above cannot be distinguished from the proposed definition of IBR Unit.	
Robert Blackney - Edison International - Southern California Edison Company – 1	
Answer	No
Document Name	
Comment	
See comments submitted by the Edison Electric Institute (EEI).	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. – 2	
Answer	No
Document Name	
Comment	
ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.	
Likes 0	
Dislikes 0	
Response:	

Please see the SDT's reply to IRC SRC comments.	
Elizabeth Davis - Elizabeth Davis On Behalf of: Thomas Foster, PJM Interconnection, L.L.C., 2; - Elizabeth Davis	
Answer	No
Document Name	
Comment	
Please reference IRC SRC comments. Thank you.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to IRC SRC comments.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	No
Document Name	
Comment	
The IRC SRC believes that the definition should be revised to clarify that the phrase "and that connect together at a single point on the collector system" is only intended to apply to "a grouping of multiple devices" and not to "an individual device." The definition should be revised to read as follows: **IBR Unit:** An individual device that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system **or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system and delivering that power at a common point**.	
Likes 0	

Dislikes 0	
Response:	
The IBR Unit definition has been expanded to better distinguish between individual inverter devices and groupings of inverter devices according to the comment.	
LaTroy Brumfield - American Transmission Company, LLC - 1	
Answer	No
Document Name	
Comment	
ATC supports the comments of the MRO NSRF indicating that two separate definitions are not needed, and the use of the term facility or plant can be used to differentiate between the IBR and the IBR facility.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to MRO NSRF comments.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	No
Document Name	
Comment	
Similar to our interpretation of the IBR definition, as stated above, we believe the currently proposed IBR Unit definition contains superfluous language that overlaps the proposed IBR definition and should be modified. It is our opinion that the IBR unit definition should utilize a standalone technologically agnostic approach. Therefore, we are in favor of removing all references to multiple devices within this single	

unit definition. We recommend that the IBR Unit definition be modified as follows: "An individual device that uses a power electronic interface(s), such as an inverter or converter, that is capable of exporting Real Power from a primary energy source or energy storage system."	
Likes 0	
Dislikes 0	
Response:	
No change. Examples of groupings of inverter devices that should each be understood as an IBR Unit as distinct from an IBR plant/facility have been added to the technical rationale.	
Shannon Mickens - Shannon Mickens On Behalf of: Joshua Phillips, Southwest Power Pool, Inc. (RTO), 2; - Shannon Mickens, Group Name SPP RTO	
Answer	No
Document Name	
Comment	
SPP has a concern in reference to the proposed definition for the IBR Unit. We understand that the drafting team used definitions from the IEEE 1547 and 2800 Standards to structure the proposed definition. However, there is the concern that the drafting team has not created enough rationale language defining the components of an actual IBR device. In our evaluation, we noticed that the IBR definition in the IEEE 2800 Standard mentions that an IBR Device is "a *collector system* or *supplemental".* From our perspective, there will need to be some clarity placed around the definition of an IBR device. With that said, SPP recommends that the drafting team considers creating a definition for the term "IBR Device" as well as provide a list of those types of elements to help ensure there is a clear and concise distinction of an IBR Unit and IBR Device.	
Likes 0	
Dislikes 0	

Response:	
The SDT is not defining an IBR device because it would only end up being synonymous with IBR Unit for any usage in NERC standards. Examples of groupings of inverter devices that should each be understood as an IBR Unit as distinct from an IBR plant/facility have been added to the technical rationale to help clarify.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	No
Document Name	
Comment	
The definitions does not address Reactive Power. The phrase "that connect together at a single point on the collector system" may be troublesome as there are configurations where devices connect to separate systems and then those systems make multiple connections (both to sub-transmission and in some cases transmission level voltages.) As indicated in our response to question 1, there should not be a loophole for compliance built into a definition. In the December 5 presentation, if there are two owners of the two sets of IBR Units, are there two IBRs or one IBR that is co-owned/jointly-owned? "IBR" in the presentation provided December 5, slide 10 appears to indicate the inverter banks and the power source are part of the BES but slide 7 only calls out the inverters as an IBR Unit. The SDT needs to clarify if the primary energy source is part of the IBR Unit (thus part of the BES) to help ensure consistency by industry when used in a Standard. For instance- are freeze protection measures only for the inverter or the inverter and the primary energy source? Slide 8 clearly reveals more details than the definition of IBR states and does not support the BES definition clearly.	
Likes 0	
Dislikes 0	
Response:	
Reactive power is not a defining characteristic of either an IBR or IBR Unit so it does not need to be stipulated in the definitions. An IBR may or may not be capable of producing reactive power. As stated in the technical rationale, IBR and IBR Unit are defined by technology type and not by ownership or what system they may be connected to or whether they may be considered BES or not.	
Rachel Coyne - Texas Reliability Entity, Inc. – 10	
Answer	No

Document Name	
Comment	
Texas RE is concerned the current verbiage of IBR Unit does not include the capabilities for absorbing or delivering reactive power which is essential for electric system operations. Texas RE recommends the following verbiage: IBR Unit: An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power and capable of providing dynamic Reactive Power support from a primary energy source or energy storage system, and that connect together at a single point on a collector system.	
Likes 0	
Dislikes 0	
Response:	
Essential as it may be, reactive power is not a defining characteristic of either IBR or IBR Unit so it does not need to be stipulated in the definitions. There may be IBR Units not capable of providing reactive power that should still be classified as IBR Units if other stipulations are met.	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	No
Document Name	
Comment	
ITC supports the comments provided by MRO NSRF	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to MRO NSRF comments.	

Dwanique Spiller - Berkshire Hathaway - NV Energy – 5	
Answer	No
Document Name	
Comment	
There should not be two separate definitions. IBR should be defined to address the resource itself. The term facility{C}[1] can be included when necessary to refer to a group of IBRs and the equipment associated with the group. This is the how Standards and associated language address synchronous resources and is easily understood and applied.	
Likes 0	
Dislikes 0	
Response:	
The proposed definitions are both necessary because NERC standard requirements may need to be applied at both the individual inverter level and the plant/facility as a whole.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
We do not support the proposed definition for IBR unit. Given the linkage between IBR and IBR Unit, we cannot support this definition until the core IBR definition is resolved.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI's comment under Q1.	

Daniela Atanasovski - APS - Arizona Public Service Co. – 1	
Answer	No
Document Name	
Comment	
AZPS supports the following comments that were submitted by EEI on behalf of its members: We do not support the proposed definition for IBR unit. Given the linkage between IBR and IBR Unit, we cannot support this definition until the core IBR definition is resolved.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Kenya Streeter - Edison International - Southern California Edison Company - 1,3,5,6	
Answer	No
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Selene Willis - Edison International - Southern California Edison Company - 5	

Answer	No
Document Name	
Comment	
"See comments submitted by the Edison Electric Institute"	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	

The NAGF does not support the proposed IBR Unit definition draft #1 for the following reasons:

a. Utilizing the term IBR Unit to refer to a single inverter within the generating plant will cause significant confusion at the plant level. Unless any instruction provided to the plant is written, then it will not be clear if the term IBR Unit is the defined term used by NERC or if it is intended to mean the generating unit (Unit 1, 2 or 3), IBR unit. This level of potential confusion is unacceptable resulting in an unacceptable risk of the BES being misoperated. The word "unit" has long been associated with a distinct operating segment of a plant. For this reason, the NAGF does not support the use of the term unit to mean anything less than the dispatchable grouping of inverters.

The NAGF recommends the following alternative definition for IBR Unit:

IBR Unit: All or part of an Inverter-Based Resource that is operated as a single resource. An IBR Unit may consist of one or more IBR Devices.

In addition, the NAGF recommends the creation of the definition for IBR Device: **IBR Device:** An individual device, or a grouping of multiple devices, (including equipment connected to the DC terminal of the inverter) that includes power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system. These proposed alternative definitions will enable applicable NERC standards to be clear when a protection device or modeling information is needed at the device or unit level without causing confusion. While normally the use of the IEEE definition would be supported, in this case it is likely to cause more problems and uncertainty for the industry.	
Likes 0	
Dislikes 0	
Response:	
While the definition of IBR Unit is aligned with the IEEE 2800 definition, it will only apply to NERC standards. It is further not a term that needs to be used between Transmission Operators and IBR plant personnel. The proposed IBR Unit definition is necessary if standard requirements need to be applied at the individual inverter level instead of the plant/facility as a whole. The definition of IBR Device given above cannot be distinguished from the proposed definition of IBR Unit.	
Alan Kloster - Alan Kloster On Behalf of: Jeremy Harris, Evergy, 3, 5, 1, 6; Kevin Frick, Evergy, 3, 5, 1, 6; Marcus Moor, Evergy, 3, 5, 1, 6; Tiffany Lake, Evergy, 3, 5, 1, 6; - Alan Kloster	
Answer	No
Document Name	
Comment	
Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI), MRO NSRF and the NAGF for question #2.	
Likes 0	
Dislikes 0	

Response:	
Please see the SDT's reply to these comments.	
Tammy Porter - Tammy Porter On Behalf of: Byron Booker, Oncor Electric Delivery, 1; - Tammy Porter	
Answer	No
Document Name	
Comment	
Again we echo our previous comment in the IBR definition, chiefly that the NERC I4 BES definition needs to be explicitly stated or reflected in this definition. The labor and cost of the compliance effort would not serve the customer well if we needed to incorporate all connected IBR units outside of the I4 definition.	
Likes 0	
Dislikes 0	
Response:	
The applicability sections of NERC standards identify which IBRs and which IBR Units are subject to the standard. As stated in the technical rationale, IBR and IBR Unit are defined by technology type and not by whether they may be considered BES or not. The Glossary should not limit the applicability which may need to be extended beyond BES in some standards.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. – 1	
Answer	No
Document Name	
Comment	
AEPC signed on to ACES comments: Similar to our interpretation of the IBR definition, as stated above, we believe the currently proposed IBR Unit definition contains superfluous language that overlaps the proposed IBR definition and should be modified. It is our opinion that the IBR unit definition should	

utilize a standalone technologically agnostic approach. Therefore, we are in favor of removing all references to multiple devices within this single unit definition. We recommend that the IBR Unit definition be modified as follows: • "An individual device that uses a power electronic interface(s), such as an inverter or converter, that is capable of exporting Real Power from a primary energy source or energy storage system."	
Likes 0	
Dislikes 0	
Response:	
No change. Examples of groupings of inverter devices that should each be understood as an IBR Unit as distinct from an IBR plant/facility have been added to the technical rationale.	
Stephen Stafford - Stephen Stafford On Behalf of: Greg Davis, Georgia Transmission Corporation, 1; - Stephen Stafford	
Answer	No
Document Name	
Comment	
The IBR Unit definition lacks clarity in the last part of the definition. GTC recommends rewording this part of the definition as follows: "An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are electrically connected on a collector system."	
Likes 0	
Dislikes 0	
Response:	
No change. A single point on the collector system is already stipulated in the proposed definition.	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	No
Document Name	

Comment	
WEC Energy Group supports the comments of the NAGF, the MRO NSRF and EEI.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's replies to these comments.	
Michael Whitney - Northern California Power Agency - 3,4,5,6	
Answer	No
Document Name	
Comment	
See response to question 1. BES needs to be included here too. Connected to a BES collector.	
Likes 0	
Dislikes 0	
Response:	
A glossary definition should not limit applicability of a standard. The applicability section of each standard should establish if the standard is limited to BES elements or not.	
Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	

See response to question 1. BES needs to be included here too. Connected to a BES collector.	
Likes 0	
Dislikes 0	
Response:	
A glossary definition should not limit applicability of a standard. The applicability section of each standard should establish if the standard is limited to BES elements or not.	
Marty Hostler - Northern California Power Agency – 4	
Answer	No
Document Name	
Comment	
See response to question 1. BES needs to be included here too. Connect to a BES collector.	
Likes 0	
Dislikes 0	
Response:	
A glossary definition should not limit applicability of a standard. The applicability section of each standard should establish if the standard is limited to BES elements or not.	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	No
Document Name	
Comment	
SIGE recommends adding Reactive Power language to the proposed definition.	

Likes 0	
Dislikes 0	
Response:	
Reactive power is not a defining characteristic of either IBR or IBR Unit, so it does not need to be stipulated in the definitions. An IBR that does not produce or absorb reactive power can still be an IBR.	
Ben Hammer - Western Area Power Administration – 1	
Answer	No
Document Name	
Comment	
There should not be two separate definitions. IBR should be defined to address the resource itself. The term F(f)acility(1) can be included when necessary to refer to a group of IBRs and the equipment associated with the group. This is the how Standards and associated language address synchronous resources and is easily understood and applied. Additionally, the use of the term unit adds potential additional confusion based on the understanding and usage of the term for synchronous generation. 1: Facility as defined in the NERC Glossary of Terms, “A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)”	
Likes 0	
Dislikes 0	
Response:	
The proposed definitions are both necessary because NERC standard requirements may need to be applied at both the individual inverter level and the plant/facility as a whole. The SDT does not see there would be any confusion with the term “unit” as it is applied to synchronous generation as long as the IBR piece is not missing.	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 – SERC	
Answer	No
Document Name	

Comment	
The proposed definition includes the phrase “capable of exporting Real Power”. They can also “import” power when used as a sink for energy storage systems. They are also not limited to “Real Power” as they can also produce “Reactive Power” such as synthetic inertia.	
Likes 0	
Dislikes 0	
Response:	
Both points are true and explained in the technical rationale accompanying the proposed definitions.	
James Keele - Entergy – 3	
Answer	No
Document Name	
Comment	
Entergy recommend changing IBR Unit definition to the following. **IBR Unit:** An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at the collector substation.	
Likes 0	
Dislikes 0	
Response:	
No change. The proposed IBR Unit definition stipulates connections to the collector system but not to the collector substation. Changing this to “collector substation” would make the proposed IBR Unit definition confused with the collector system itself.	
Jennifer Neville - Western Area Power Administration – 6	
Answer	No

Document Name	
Comment	
There should not be two separate definitions. IBR should be defined to address the resource itself. The NERC defined term "Facility" can be included when necessary to refer to a group of IBRs and the equipment associated with the group. Additionally, the use of the term unit adds potential additional confusion based on the understanding and usage of the term for synchronous generation.	
Likes 0	
Dislikes 0	
Response:	
The proposed definitions are both necessary because NERC standard requirements may need to be applied at both the individual inverter level and the plant/facility as a whole.	
Rachel Schuldt - Rachel Schuldt On Behalf of: Rachel Schuldt, Black Hills Corporation, 5, 1, 3, 6; - Black Hills Corporation – 6	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to these comments.	
Carly Miller - Carly Miller On Behalf of: Josh Combs, Black Hills Corporation, 5, 1, 3, 6; - Carly Miller	
Answer	No

Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to these comments.	
Micah Runner - Black Hills Corporation – 1	
Answer	No
Document Name	
Comment	
Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to these comments.	
Sheila Suurmeier - Black Hills Corporation – 5	
Answer	No
Document Name	
Comment	

Black Hills Corporation supports NAGF and EEI comments.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to these comments.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,7 – SERC	
Answer	No
Document Name	
Comment	
Entergy recommend changing IBR Unit definition to the following. **IBR Unit:** An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at the collector substation.	
Likes 0	
Dislikes 0	
Response:	
No change. The proposed IBR Unit definition stipulates connections to the collector system but not to the collector substation. Changing this to "collector substation" would make the proposed IBR Unit definition confused with the collector system itself.	
Casey Perry - PNM Resources - 1,3 - WECC, Texas RE	
Answer	No
Document Name	
Comment	

PNM and TNMP supports EEI comments but also provide specific recommended changes to the IBR definition. IBR Unit: Device(s) that uses a power electronic interface(s), such as an inverter or converter, capable or exporting Real Power from a primary energy source or energy storage system, and that connect at a single point on the collector system.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No
Document Name	
Comment	
There should not be two separate definitions. IBR should be defined to address the resource itself. The term F(f)acility(1) can be included when necessary to refer to a group of IBRs and the equipment associated with the group. This is the how Standards and associated language address synchronous resources and is easily understood and applied. Additionally, the use of the term unit adds potential additional confusion based on the understanding and usage of the term for synchronous generation. 1: Facility as defined in the NERC Glossary of Terms, "A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)"	
Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	
Response:	

The proposed definitions are both necessary because NERC standard requirements may need to be applied at both the individual inverter level and the plant/facility as a whole. The SDT does not see there would be any confusion with the term “unit” as it is applied to synchronous generation as long as the IBR piece is not missing.	
Andy Thomas - DTE Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	
Duke Energy provides the following guidance: Delete the proposed NERC IBR Unit definition and substitute the IEEE 2800 “IBR Unit” definition. The IEEE2800 definition is well vetted within the industry and serves the NERC intended purpose for this application.	
Likes 0	
Dislikes 0	
Response:	
No change. The proposed IBR Unit definition is essentially the same as the 2800 definition but with added clarification to stipulate exporting of Real power, association with an energy storage system, and attachment to the collector system of an IBR plant/facility.	
Ruchi Shah - AES - AES Corporation – 5	
Answer	No
Document Name	
Comment	
AES Clean Energy supports NAGF’s comments, and NAGF’s proposed definition for IBR Unit as well as creation of a new term called IBR Device.	
Likes 0	
Dislikes 0	

Response:	
Please see the SDT's reply to NAGF comments.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	No
Document Name	
Comment	
We do not support the proposed definition for IBR unit. Given the linkage between IBR and IBR Unit, we cannot support this definition until the core IBR definition is resolved.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	No
Document Name	
Comment	

The drafting team has presented a good draft definition of IBR Unit but the proposed definition includes some technical issues that could create challenges, inconsistencies, and applicability challenges when used in the NERC Reliability Standards. These issues should be further vetted and considered by the drafting team for the next iteration. Potential issues include:

1. The proposed term uses "Real Power", which significantly restricts the use of the IBR definition above. In the proposed term, IBR Unit must export Real Power whereas the proposed IBR definition as a whole is defined as "electric power" (no specification of Real Power or Reactive Power). Therefore, this definition as proposed precludes STATCOMs, SVCs, and HVDC circuits from being considered IBRs in NERC standards. This will require significant clarifying language to address within every standard where these

types of inverter-based devices and technologies should be considered. As NERC has initiated projects to more directly pull in these resources to applicable standards, it would be a significant misstep to not include them in the IBR definition.
    - Note that this broader term for IBR has been used for over 7 years by NERC and is described clearly in the NERC IBR Risk Mitigation Strategy (https://www.nerc.com/comm/Documents/NERC_IBR_Strategy.pdf). Risks posed to the BPS related to IBRs are across all resource types, not just generating resources. Stability studies conducted by NERC and stakeholders following the Blue Cut Fire and Canyon 2 Fire disturbances highlighted that momentary cessation of solar PV IBRs would then cause unexpected and unwanted blocking on a major HVDC circuit in the Western Interconnection, which would subsequently cause instability, uncontrolled separation, and cascading. Ensuring reliable performance, accurate modeling, and sufficiently detailed studies of all these devices and resources is critical to reliable operation of the BPS.
    - Similarly, the phrase "from a primary energy source or energy storage system" can add some confusion as well, as it has nothing to do with the IBR Unit itself. For example, STATCOMs, SVCs, and HVDC then do not meet this definition (or only implicitly, at best), which relates to the added confusion above.
2. The proposed definition states "that connect together at a single point on the collector system," implying that the common connection must be on the collector system for all IBR Units. This is often not the case, such as with wind collector systems aggregating at the substation. Minor issue, but one that should possibly be clarified in future revision. The SDT could consider something like "that connect to single point(s) of connection through a collector system."

A definition such as the following may be more appropriate: "An individual device or a grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter."

Likes 0	
Dislikes 0	

Response:

FACTS devices and HVDC systems are deliberately excluded from both proposed definitions. If they are applicable in any standard, the standard may and should refer to them as FACTS and HVDC. The SDT believes that the general usage of the term IBR is directed to Real Power producing (or absorbing in the case of batteries) devices and did not want to depart from this understood use. As for the single point on the collector system, standards may need to apply requirements at inverter terminals instead of the POI or POM. The intent of the proposed IBR Unit definition is to facilitate such requirements. The technical rationale explains in more detail with examples how the definition is intended to be applied.

Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion

Answer	No
Document Name	
Comment	
Please see previous comment.	
Likes 0	
Dislikes 0	
Response	
N/A	

Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE

Answer	No
Document Name	
Comment	
The DT specifically mentions the differences between inverter and converter within the Background of the proposed definition. We recommend that these "definitions" be included as part of the overall unit definition. Furthermore, converter should be its own definition. This may help the inclusion and exclusion of such units for specific standards. "An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion. " Since a battery energy storage system may have both, we recommend a detailed definition of BESS unit. We do understand the initial mindset of the DT, separating these out may make it easier for future standards (Modeling, Protection studies, Performance, CIP, Maintenance, etc).	
Likes 0	
Dislikes 0	

Response:	
The SDT does not believe it is necessary to define the terms inverter, converter, and rectifier in the NERC glossary. There should be no confusion about these terms but just in case there is some uncertainty, the technical rationale has these quoted statements. Regarding the battery comment, if a battery needs to have requirements in a standard distinct from other IBRs, it may be referred to as a battery or BESS. The SDT is attempting to fulfill its charge with as few additions to the glossary as possible.	
Constantin Chitescu - Ontario Power Generation Inc. – 5	
Answer	Yes
Document Name	
Comment	
OPG supports NPCC Regional Standards Committee's comments.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to NPCC comments.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
NPCC RSC supports the definition for IBR Unit as proposed.	
Likes 0	
Dislikes 0	
Response:	

Thank you.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Southern Company understands that the IBR Unit definition is essentially addressing the power conversion device at most typical DC-to-AC type and AC-DC-AC type electric generating stations. Southern Company respectfully requests that additional examples be provided to further clarify the various configurations that typically exist at IBR facilities, including AC-DC-DC converters, solar plant string inverters, individual inverter modules, groups of modules, etc., and to, in each case, identify which parts are to be considered the IBR Unit or IBR Units. Further, Southern Company believes that this is essential based on the probable use of these definitions as seen in the use of IBR Unit in MOD-026-2 Draft 3 (Jun 2022).	
Likes 0	
Dislikes 0	
Response:	
Examples have been added to the technical rationale.	
Kimberly Turco - Constellation – 6	
Answer	Yes
Document Name	
Comment	
Constellation has no additional comments Kimberly Turco on behald of Constellation Segments 5 and 6	

Likes 0	
Dislikes 0	
Response	
Thank you.	
Alison MacKellar - Constellation – 5	
Answer	Yes
Document Name	
Comment	
Constellation has no additional comments. Alison Mackellar on behalf of Constellation Segments 5 and 6.	
Likes 0	
Dislikes 0	
Response	
Thank you.	
Michael Johnson - Michael Johnson On Behalf of: Frank Lee, Pacific Gas and Electric Company, 3, 1, 5; Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
PG&E supports the IBR Unit definition.	
Likes 0	

Dislikes 0	
Response:	
Thank you.	
Duane Franke - Manitoba Hydro - 1,3,5,6 – MRO	
Answer	Yes
Document Name	
Comment	
The IEEE definition says may include unit transformer in the IBR *unit* definition. There may be some confusion when the other equipment (ex. transformer) is to be included; at the IBR unit level or IBR plant/facility level?	
Likes 0	
Dislikes 0	
Response	
Some examples of IBR Units have been added to the technical rationale. It is understood and explained that a GSU transformer stepping up from inverter level voltage to the collector system voltage may be considered a component of an IBR unit.	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Colin Chilcoat - Invenergy LLC - 6	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Russell Jones - Invenergy LLC - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Joshua London - Eversource Energy - 1, Group Name Eversource	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Daniel Gacek - Exelon - 1	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Tracy MacNicoll - Utility Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Jesus Sammy Alcaraz - Imperial Irrigation District - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Stephen Whaite - Stephen Whaite On Behalf of: Lindsey Mannion, ReliabilityFirst , 10; - Stephen Whaite, Group Name ReliabilityFirst Ballot Body Member and Proxies	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diane E Landry - Public Utility District No. 1 of Chelan County - 1, Group Name CHPD	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP – 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Nikki Carson-Marquis - Nikki Carson-Marquis On Behalf of: Theresa Allard, Minnkota Power Cooperative Inc., 1; - Nikki Carson-Marquis	
Answer	
Document Name	
Comment	
No. Minnkota Power Cooperative supports the reasoning provided in the ACES comments.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to ACES comments.	

3. *Provide any additional comments for the DT to consider, if desired*.	
Duane Franke - Manitoba Hydro - 1,3,5,6 – MRO	
Answer	
Document Name	
Comment	
· The IBR definition states that an IBR can be connected to the transmission, sub-transmission, and distribution systems. However, the last bullet of the background in the IBR definition documents says that DER-related projects may or may not need to use the same definition of IBR/IBR units. It is suggested that NERC collaborate with different departments to use the same definition and to reduce confusion. · What about the IBR unit and IBR plant auxiliary equipment? Does it belong to the IBR and IBR units? More clarity is required to the IBR/IBR unit definition regarding auxiliary equipment. · It is not clear how the terms IBR & IBR Unit fit in with the term dispersed power producing resource. If an IBR is also a dispersed power producing resource, what term is MOD 26-2 going to use? IBRs or the BES inclusion term using dispersed power producing (generating) resource.	
Likes 0	
Dislikes 0	
Response	
The SDT maintains that an IBR is defined according to technology and is not defined by where it is connected or its size. The NERC Glossary must not define applicability because different standards may need wider or more restrictive applicability depending on their objectives. The applicability section of each standard is where BES or non-BES IBR applicability should be established and MOD-026 should not be setting the scope for other standards that may need to use the terms.	
Diane E Landry - Public Utility District No. 1 of Chelan County - 1, Group Name CHPD	

Answer	
Document Name	
Comment	
Further clarification requested regarding whether the definition is for IBRs applied to the BES, or for all categories of IBRs. MOD-026 currently limits scope to BES under 'Applicability' of the MOD-026 standard. However, since the new term is defined apart from the MOD-026 standard, it is recommended that BES applicability be included in the definition, so the application of the term is consistent with MOD-026 units, should the term be used elsewhere. The concern is that the term could be used beyond the scope of units defined under MOD-026 if this BES is not clarified; for example, a 1 MW PV unit connected to a distribution system would fall under the scope of the proposed definition, although it is neither BES nor in-scope under MOD-026.	
Likes 0	
Dislikes 0	
Response	
The SDT maintains that an IBR is defined according to technology and is not defined by where it is connected or its size. The NERC Glossary must not define applicability because different standards may need wider or more restrictive applicability depending on their objectives. The applicability section of each standard is where BES or non-BES IBR applicability should be established and MOD-026 should not be setting the scope for other standards that may need to use the terms.	
Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	
Document Name	
Comment	
1. The definitions are leveraging IEEE 2800-2022 as a reference; however, there are notable differences between definitions. Most importantly, IEEE 2800-2022 is careful in its consideration of supplemental IBR, defined as "any equipment within an IBR plant, which may or may not be inverter-based…" These could include capacitor banks, STATCOMs, harmonic filters, protection systems, plant-level controllers, etc., which should all be considered as part of the overall IBR facility. If the resource (or part of the	

resource) is deemed “IBR”, then all applicable components that support that resource (such as those listed above) should be considered part of the IBR. 2. The drafting team should consider how these definitions will apply to hybrid/co-located resources. Some consideration and clarifications, if needed, could be useful as the terms get used in NERC Reliability Standards. Growth of hybrid resources across the BPS will make this a notable issue moving forward, so careful consideration of this topic now will be most effective.	
Likes 0	
Dislikes 0	
Response	
Any auxiliary equipment at the collector station behind the interface to the transmission system, including all the mentioned items, is part of the IBR plant/facility. The SDT has included this clarification in the technical rationale.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Michael Johnson - Michael Johnson On Behalf of: Frank Lee, Pacific Gas and Electric Company, 3, 1, 5; Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	
Document Name	
Comment	

PG&E thanks the Drafting Team's effort in creating an IBR definition that can be used throughout the industry for other current and future standards development work.	
Likes 0	
Dislikes 0	
Response:	
Thank you.	
Ruchi Shah - AES - AES Corporation – 5	
Answer	
Document Name	
Comment	
AES Clean Energy recommends most of the Background section (except the last two main bullets) of the IBR Definition document be included in a separate document (such as a technical rationale or implementation guidance).	
Likes 0	
Dislikes 0	
Response:	
Thak you	
Andy Thomas - DTE Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
None.	

Likes 0	
Dislikes 0	
Response	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	
Document Name	
Comment	
IBR: A single generating unit of generating Facility as identified through Inclusion I2 or I4 of the BES Definition that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System. 1: This includes DC electricity that is discharged from devices such as batteries and fuel cells.	
Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	
Response	
Thank you for this suggestion but the SDT will stick with its proposal as revised based on feedback from other commenters.	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	
Document Name	
Comment	
Request SDT to provide a full list of specific IBR devices that will be covered under this definition.	

Likes 0	
Dislikes 0	
Response	
The common forms of IBRs are listed in a non-exclusive list within the proposed definition. The SDT does not want to exclude any future technologies unknown at present that could qualify as IBRs.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,7 – SERC	
Answer	
Document Name	
Comment	
Clarify how these IBR and IBR Unit definitions will interact with other projects proposed definitions for DERs.	
Likes 0	
Dislikes 0	
Response	
The SDT maintains that an IBR is defined according to technology and is not defined by where it is connected or its size. Therefore, DERs that are also IBRs should be considered a subset of IBRs.	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	
Document Name	
Comment	
SRP does not support the addition or modification of this term and simply adding it to Reliability Standards that previously did not have IBR applicability. SRP strongly feels IBRs should have separate standards.	

Likes 0	
Dislikes 0	
Response	
Whether there should be separate standards for IBRs or whether IBRs applicability may be inserted into standards that presently do no pertain to IBRs is a matter to be determined by each relevant SAR and/or SDT.	
Sheila Suurmeier - Black Hills Corporation – 5	
Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	
Response	
Please see the SDT's reply to NAGF comments.	
Micah Runner - Black Hills Corporation – 1	
Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	

Response	
Please see the SDT's reply to NAGF comments.	
Carly Miller - Carly Miller On Behalf of: Josh Combs, Black Hills Corporation, 5, 1, 3, 6; - Carly Miller	
Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	
Response	
Please see the SDT's reply to NAGF comments.	
Rachel Schuldt - Rachel Schuldt On Behalf of: Rachel Schuldt, Black Hills Corporation, 5, 1, 3, 6; - Black Hills Corporation - 6	
Answer	
Document Name	
Comment	
Black Hills Corporation supports NAGF comments.	
Likes 0	
Dislikes 0	
Response	
Please see the SDT's reply to NAGF comments.	
Alison MacKellar - Constellation – 5	

Answer	
Document Name	
Comment	
Constellation has no additional comments. Alison Mackellar on behalf of Constellation Segments 5 and 6.	
Likes 0	
Dislikes 0	
Response	

Jennifer Neville - Western Area Power Administration – 6	
Answer	
Document Name	
Comment	
Suggested IBR definition: A single generating unit of generating facility as identified through Inclusion I2 or I4 of the BES Definition that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System. (1): This includes DC electricity that is discharged from devices such as batteries and fuel cells.	
Likes 0	
Dislikes 0	
Response	
Thank you for this suggestion but the SDT will stick with its proposal as revised based on feedback from other commenters.	

Kimberly Turco - Constellation – 6	
Answer	
Document Name	
Comment	
Constellation has no additional comments Kimberly Turco on behald of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
James Keele - Entergy – 3	
Answer	
Document Name	
Comment	
Clarify how these IBR and IBR Unit definitions will interact with other projects proposed definitions for DERs.	
Likes 0	
Dislikes 0	
Response:	
The SDT maintains that an IBR is defined according to technology and is not defined by where it is connected or its size. Therefore, DERs that are also IBRs should be considered a subset of IBRs.	
Ben Hammer - Western Area Power Administration – 1	

Answer	
Document Name	
Comment	
IBR: A single generating unit of generating Facility as identified through Inclusion I2 or I4 of the BES Definition that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System. 1: This includes DC electricity that is discharged from devices such as batteries and fuel cells.	
Likes 0	
Dislikes 0	
Response	
Thank you for this suggestion but the SDT will stick with its proposal as revised based on feedback from other commenters.	
Donna Wood - Tri-State G and T Association, Inc. – 1	
Answer	
Document Name	
Comment	
NA	
Likes 0	
Dislikes 0	
Response	
Nikki Carson-Marquis - Nikki Carson-Marquis On Behalf of: Theresa Allard, Minnkota Power Cooperative Inc., 1; - Nikki Carson-Marquis	

Answer	
Document Name	
Comment	
Minnkota Power Cooperative appreciates the SDT's efforts to define impactful terms. MPC recommends distinguishing "IBR" and "IBR Unit" terms from those of the same name in IEEE 2800-2022 to avoid conflating the two entities' similar terminology.	
Likes 0	
Dislikes 0	
Response:	
No change. The proposed NERC glossary IBR definition deviates slightly from the 2800 definition in that the proposed NERC glossary definition is not limited to transmission interconnections but also encompasses DERs. The proposed IBR Unit definition is essentially the same as the 2800 definition but with added clarification to stipulate exporting of Real Power, association with an energy storage system, and attachment to the collector system of an IBR plant/facility.	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 – RF	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Marty Hostler - Northern California Power Agency – 4	

Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Michael Whitney - Northern California Power Agency - 3,4,5,6	
Answer	
Document Name	
Comment	
No	
Likes 0	
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	
Document Name	
Comment	

No additional comments	
Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. – 1	
Answer	
Document Name	
Comment	
AEPC signed on to ACES comments: We at ACES appreciate the effort put forth by the Drafting Team in developing these proposed definitions. We especially appreciate the fact that the Drafting Team used an industry standard source (IEEE 2800-2022) as a starting point for their efforts. While we do not completely agree with the exact language as currently proposed, we do agree with the overall premise utilized by the Drafting team. Thank you for the opportunity to comment.	
Likes 0	
Dislikes 0	
Response:	
Thank you for your comment.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	

Document Name	
Comment	
The NAGF provides the following additional comments for consideration: *a. The proposed Inverter-Based Resources (IBR) Definitions – Background section* *i. General – this section provides supporting information that is critical to understanding the IBR Definitions and therefore should be memorialized in a technical rational or similar document.* *ii. Bullet # 7 – the entire collocated synchronous generation and BESS facility should not be considered an IBR; only the IBR portion of the facility (i.e. the BESS) should be considered IBR. Recommend revising the language to clarify.*	
Likes 0	
Dislikes 0	
Response	
Language updated in the Technical Rationale.	
Selene Willis - Edison International - Southern California Edison Company – 5	
Answer	
Document Name	
Comment	
"See comments submitted by the Edison Electric Institute"	
Likes 0	
Dislikes 0	
Response:	

Please see the SDT's reply to EEI comments.	
Romel Aquino - Edison International - Southern California Edison Company – 3	
Answer	
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Kenya Streeter - Edison International - Southern California Edison Company - 1,3,5,6	
Answer	
Document Name	
Comment	
See comments submitted by the Edison Electric Institute	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to EEI comments.	
Daniela Atanasovski - APS - Arizona Public Service Co. – 1	
Answer	

Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	
Document Name	
Comment	
ITC supports the comments provided by MRO NSRF	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to NAGF comments.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name Southern Company	
Answer	
Document Name	
Comment	

None	
Likes 0	
Dislikes 0	
Response	
Joshua London - Eversource Energy - 1, Group Name Eversource	
Answer	
Document Name	
Comment	
There appears to be confusing circular logic with calling the second definition IBR Unit. By shortening to “IBR” you are stating it is previously defined, but the definition of Inverter-Based Resource relies upon the **definition** of “IBR Unit”. Change “IBR Unit” to “Inverter-Based Resource Unit.	
Likes 0	
Dislikes 0	
Response:	
Thank you for this suggestion. Revised to Inverter-Based Resource Unit (IBR Unit).	
Teresa Krabe - Lower Colorado River Authority – 5	
Answer	
Document Name	
Comment	
IBRs do not have an electromagnetic link to grid power which can extract stored inertial energy.	

Likes 0	
Dislikes 0	
Response:	
This is true.	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	
Document Name	
Comment	
IBRs do not have an electromagnetic link to grid power which can extract stored inertial energy.	
Likes 0	
Dislikes 0	
Response:	
This is true.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	
Document Name	
Comment	
WECC appreciates the efforts and understands the difficulties in proposing definitions. WECC can support the definitions if the Implementation Guidance or Definition Guidance (like the BES Reference Guide) with drawings that clearly depict the difference between an IBR and an IBR Unit as well as BES relationship to each are developed. This will get industry on the same page and the ERO Enterprise on the same page. Do not allow other uses such as IBR plant or IBR Facility or hybrid IBR within the Implementation Guidance or any	

Standard. If there needs to be additional descriptors add it to the definition—consistency in terminology will make applicability easier for everyone. In slide 14 of the Dec 5 presentation, the example 6.3 verbiage appears to reflect IBR aspects and IBR Unit aspects but uses “Facility” for IBR. Are the “enabled protective and limiting functions” directly tripping the IRB Unit(s) or IBR (versus Facility)? Or an IBR Facility?

Likes 0	
Dislikes 0	

Response:
Examples of IBR Units have been added to the technical rationale. In answer to the December 5 presentation slide question; a single or multiple IBR Units can trip or the entire IBR (facility/plant) can trip based on the enabled protective and limiting functions.

Shannon Mickens - Shannon Mickens On Behalf of: Joshua Phillips, Southwest Power Pool, Inc. (RTO), 2; - Shannon Mickens, Group Name SPP RTO	
Answer	
Document Name	
Comment	
SPP recommends that the drafting team reference the IEEE 1547-2018 Standard in the background details since there are terms from that standard has been included in the proposed definitions (for example electric power system (eps) and Energy storage system (ess). Additionally, SPP recommends that the drafting team consider coordinating with NERC staff to implement the definitions into the Rules of Procedures (RoP) to ensure proper alignment with the proposed efforts associated with the Glossary of Terms.	
Likes 0	
Dislikes 0	

Response:	
The SDT does not see a need to reference the above mentioned terms in the IEEE 1547 standard. The SDT has been charged with proposing NERC glossary definitions only. NERC may choose to update the ROP.	
Russell Jones - Invenergy LLC – 5	
Answer	
Document Name	
Comment	
Invenergy supports the spirit of the definition proposed and does not offer any substantive changes. We do, however, have concerns about the application of this definition to various reliability standards going forward. More specifically, Invenergy believes the drafting team should consider how this broad definition will be applied in specific Reliability Standard requirements to different roles (transmission, sub-transmission, distribution) and different technologies (PV, Type 3 and Type 4 wind, BESS, and fuel cell) where nuance may be required to account for technological limitations or differences.	
Likes 0	
Dislikes 0	
Response:	
The applicability section of each standard will establish the scope of its applicability to various IBR connection locations, sizing, and IBR types as necessary for each standard.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	

We at ACES appreciate the effort put forth by the Drafting Team in developing these proposed definitions. We especially appreciate the fact that the Drafting Team used an industry standard source (IEEE 2800-2022) as a starting point for their efforts. While we do not completely agree with the exact language as currently proposed, we do agree with the overall premise utilized by the Drafting team.

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response:

Thank you for your comment.

LaTroy Brumfield - American Transmission Company, LLC - 1

Answer	
Document Name	

Comment

Below is a consideration for an updated definition of IBR.

IBR: A single generating unit or generating Facility that utilizes a power electronic interface to convert its self-generated(1) DC electricity to AC electricity for the primary purpose of supplying power to the Bulk Power System.

1: This includes DC electricity that is discharged from devices such as batteries and fuel cells. Self-generated also implies that FACTs devices that simply convert power do not apply to this definition.

Likes 0	
Dislikes 0	

Response:

Thank you for this suggestion but the SDT will stick with its proposal as revised based on feedback from other commenters.

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	
Document Name	
Comment	
The SRC notes the inconsistent use of “electric power system” and “electric system” throughout various definitions in the NERC Glossary and recommends NERC give some thought to standardizing this language in the future.	
Likes 0	
Dislikes 0	
Response:	
For all practical purposes, the terms are synonymous.	
Elizabeth Davis - Elizabeth Davis On Behalf of: Thomas Foster, PJM Interconnection, L.L.C., 2; - Elizabeth Davis	
Answer	
Document Name	
Comment	
PJM recommends the following concise axioms in managing future updates: 1) All IBRs are comprised of one or more IBR Units. 2) An IBR unit is a generator that employs inverter(s) to create power. 3) To be an IBR unit, the DC side must be able to generate power onto the AC side past the POI. 4) An IBR unit may also consume power, but to be an IBR unit, axiom 3 must be met. 5) IBRs are the combination of IBR units, conversion (inverter), and AC equipment up to a POI.	

Likes 0	
Dislikes 0	
Response:	
Thank you for your comment.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	
ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.	
Likes 0	
Dislikes 0	
Response:	
Please see the SDT's reply to IRC SRC comments.	
Constantin Chitescu - Ontario Power Generation Inc. – 5	
Answer	
Document Name	
Comment	
OPG supports NPCC Regional Standards Committee's comments.	
Likes 0	
Dislikes 0	
Response:	

Please see the SDT's reply to NPCC comments.

End of Report

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Reminder
Standards Announcement
Project 2020-06 Verifications of Models and Data for ~~Generators~~ Inverter-based Resource Glossary Terms

Initial Ballots Open through January 9, 2024

Now Available

The initial ballots for **Inverter-based Resource Glossary Terms** are open through **8 p.m. Eastern, Tuesday, January 9, 2024**.

Reminder Regarding Corporate RBB Memberships

Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Balloting

Members of the ballot pools associated with this project can log in and submit their votes by accessing the Standards Balloting and Commenting System (SBS) here.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

The ballot results will be announced and posted on the project page. The drafting team will review all responses received during the comment period and determine the next steps of the project.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

UPDATED
Standards Announcement
Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Terms

Formal Comment Period Open through January 9, 2024
Ballot Pools Forming through December 15, 2023

Now Available

A formal comment period for **Inverter-based Resource Glossary Terms** is open through **8 p.m. Eastern, Tuesday, January 9, 2024.**

Commenting
Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

Reminder Regarding Corporate RBB Memberships
Under the NERC Rules of Procedure, each entity and its affiliates are collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Ballot Pools
Ballot pools are being formed through **8 p.m. Eastern, Friday, December 15, 2023.** Registered Ballot Body members can join the ballot pools here.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps
Initial ballots will be conducted **December 29, 2023 – January 9, 2024**.

For more information on the Reliability Standards development process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/310)
Ballot Name: 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) IN 1 DEF
Voting Start Date: 12/29/2023 12:01:00 AM
Voting End Date: 1/9/2024 8:00:00 PM
Ballot Type: DEF
Ballot Activity: IN
Ballot Series: 1
Total # Votes: 252
Total Ballot Pool: 282
Quorum: 89.36
Quorum Established Date: 1/9/2024 3:20:53 PM
Weighted Segment Value: 43.82

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	21	0.382	34	0.618	0	11	8
Segment: 2	8	0.7	3	0.3	4	0.4	0	1	0
Segment: 3	57	1	17	0.362	30	0.638	0	2	8
Segment: 4	17	1	5	0.385	8	0.615	0	4	0
Segment: 5	72	1	26	0.456	31	0.544	0	7	8
Segment: 6	47	1	16	0.432	21	0.568	0	5	5
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	7	0.5	4	0.4	1	0.1	0	1	1
Totals:	282	6.2	92	2.717	129	3.483	0	31	30

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		None	N/A
1	Ameren - Ameren Services	Tamara Evey		None	N/A
1	American Transmission Company, LLC	LaTroy Brumfield		Negative	Comments Submitted
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Negative	Comments Submitted
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Negative	Comments Submitted
1	Arkansas Electric Cooperative Corporation	Emily Corley		Abstain	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		Affirmative	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Affirmative	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Negative	Comments Submitted
1	Black Hills Corporation	Micah Runner		Negative	Comments Submitted
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Affirmative	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Negative	Third-Party Comments
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Negative	Third-Party Comments
1	Dairyland Power Cooperative	Karrie Schuldt		Abstain	N/A
1	Dominion - Dominion Virginia Power	Elizabeth Weber		Negative	Comments Submitted
1	Duke Energy	Katherine Street		Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Negative	Comments Submitted
1	Entergy	Brian Lindsey		Negative	Comments Submitted
1	Evergy	Kevin Frick	Alan Kloster	Negative	Comments Submitted
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Negative	Comments Submitted
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Negative	Comments Submitted
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Negative	Comments Submitted
1	Glencoe Light and Power Commission	Terry Volkmann		Negative	Third-Party Comments
1	Hydro One Networks, Inc.	Alain Mukama	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	IDACORP - Idaho Power Company	Sean Steffensen		None	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Negative	Comments Submitted
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		Affirmative	N/A
1	Lincoln Electric System	Josh Johnson		Negative	Comments Submitted
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		None	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Affirmative	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	Negative	Comments Submitted
1	Minnkota Power Cooperative Inc.	Theresa Allard	Nikki Carson-Marquis	Negative	Comments Submitted
1	Muscatine Power and Water	Andrew Kurriger		Negative	Third-Party Comments
1	National Grid USA	Michael Jones		Negative	Third-Party Comments
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Negative	Third-Party Comments
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Abstain	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Negative	Third-Party Comments
1	Omaha Public Power District	Doug Peterchuck		Negative	Third-Party Comments
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Negative	Comments Submitted
1	OTP - Otter Tail Power Company	Charles Wicklund		Negative	Third-Party Comments
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Negative	Comments Submitted
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Abstain	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Negative	Comments Submitted
1	Portland General Electric Co.	Brooke Jockin		None	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		Negative	Third-Party Comments
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Sarah Blankenship	Israel Perez	Affirmative	N/A
1	Santee Cooper	Chris Wagner		None	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Negative	Third-Party Comments
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell	Jennie Wike	Abstain	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Negative	Comments Submitted
1	Tri-State G and T Association, Inc.	Donna Wood		Negative	Comments Submitted
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Negative	Comments Submitted
1	Xcel Energy, Inc.	Eric Barry		None	N/A
2	California ISO	Darcy O'Connell		Abstain	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Negative	Comments Submitted
2	Independent Electricity System Operator	Helen Lainis		Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Negative	Third-Party Comments
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Negative	Third-Party Comments
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips	Shannon Mickens	Negative	Comments Submitted
3	AEP	Kent Feliks		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr		None	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Negative	Comments Submitted
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Abstain	N/A
3	Avista - Avista Corporation	Robert Follini		Affirmative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Affirmative	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Negative	Comments Submitted
3	Black Hills Corporation	Josh Combs	Carly Miller	Negative	Comments Submitted
3	Buckeye Power, Inc.	Carl Spaetzel	Ryan Strom	Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		None	N/A
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Negative	Third-Party Comments
3	Dominion - Dominion Virginia Power	Bill Garvey		Negative	Comments Submitted
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Negative	Comments Submitted
3	Entergy	James Keele		Negative	Comments Submitted
3	Evergy	Marcus Moor	Alan Kloster	Negative	Comments Submitted
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Negative	Comments Submitted
3	Georgia System Operations Corporation	Scott McGough		Negative	Third-Party Comments
3	Great River Energy	Michael Brytowski		Negative	Third-Party Comments
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		Affirmative	N/A
3	Lincoln Electric System	Sam Christensen		Negative	Comments Submitted
3	Los Angeles Department of Water and Power	Fausto Serratos		None	N/A
3	Manitoba Hydro	Mike Smith		Negative	Comments Submitted
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Negative	Third-Party Comments
3	Muscatine Power and Water	Seth Shoemaker		Negative	Third-Party Comments
3	National Grid USA	Brian Shanahan		Negative	Third-Party Comments
3	Nebraska Public Power District	Tony Eddleman		Negative	Third-Party Comments
3	New York Power Authority	David Rivera		Negative	Comments Submitted
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Abstain	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Negative	Third-Party Comments
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Negative	Third-Party Comments
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Negative	Third-Party Comments
3	OTP - Otter Tail Power Company	Wendi Olson		Negative	Third-Party Comments
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Negative	Comments Submitted
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Negative	Comments Submitted
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Negative	Third-Party Comments
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Affirmative	N/A
3	Santee Cooper	Vicky Budreau		None	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Negative	Comments Submitted
3	Tri-State G and T Association, Inc.	Ryan Walter		Negative	Comments Submitted
3	WEC Energy Group, Inc.	Christine Kane		Negative	Comments Submitted
3	Xcel Energy, Inc.	Nicholas Friebel		None	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Negative	Third-Party Comments
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Negative	Third-Party Comments
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		Abstain	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Negative	Comments Submitted
4	Georgia System Operations Corporation	Katrina Lyons		Negative	Third-Party Comments
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	Northern California Power Agency	Marty Hostler		Negative	Comments Submitted
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho	Jennie Wike	Abstain	N/A
4	Utility Services, Inc.	Tracy MacNicoll		Negative	Comments Submitted
4	WEC Energy Group, Inc.	Matthew Beilfuss		Negative	Comments Submitted
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Negative	Comments Submitted
5	Ameren - Ameren Missouri	Sam Dwyer		None	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Negative	Comments Submitted
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		Affirmative	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Helen Hamilton Harding		Affirmative	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Negative	Comments Submitted
5	Black Hills Corporation	Sheila Suurmeier		Negative	Comments Submitted
5	Bonneville Power Administration	Christopher Siewert		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Negative	Third-Party Comments
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Helen Wang		Negative	Third-Party Comments
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Negative	Third-Party Comments
5	Decatur Energy Center LLC	Megan Melham		Negative	Third-Party Comments
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Negative	Comments Submitted
5	Enel Green Power	Natalie Johnson		Abstain	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Evergy	Jeremy Harris	Alan Kloster	Negative	Comments Submitted
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Negative	Comments Submitted
5	Great River Energy	Jacalynn Bentz		Negative	Third-Party Comments
5	Greybeard Compliance Services, LLC	Mike Gabriel		Negative	Third-Party Comments
5	Hydro-Quebec (HQ)	Junji Yamaguchi		Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Negative	Third-Party Comments
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Affirmative	N/A
5	National Grid USA	Robin Berry		Negative	Third-Party Comments
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Negative	Third-Party Comments
5	New York Power Authority	Zahid Qayyum		Negative	Comments Submitted
5	NextEra Energy	Richard Vendetti		Abstain	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Negative	Third-Party Comments
5	Northern California Power Agency	Jeremy Lawson		Negative	Comments Submitted
5	NRG - NRG Energy, Inc.	Patricia Lynch		Negative	Comments Submitted
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Negative	Third-Party Comments
5	Omaha Public Power District	Kayleigh Wilkerson		Negative	Third-Party Comments
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Negative	Third-Party Comments
5	Pacific Gas and Electric Company	Frank Lee	Michael Johnson	Negative	Comments Submitted
5	Pattern Operators LP	George E Brown		Negative	Third-Party Comments
5	Platte River Power Authority	Jon Osell		None	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	PSEG Nuclear LLC	Tim Kucey		Negative	Third-Party Comments
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Affirmative	N/A
5	Santee Cooper	Carey Salisbury		None	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Affirmative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	Abstain	N/A
5	Talen Generation, LLC	Donald Lock		Affirmative	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	Comments Submitted
5	TransAlta Corporation	Ashley Scheelar		Abstain	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Negative	Comments Submitted
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Clarice Zellmer		Negative	Comments Submitted
5	Xcel Energy, Inc.	Gerry Huitt		None	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		None	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Negative	Comments Submitted
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Abstain	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Negative	Comments Submitted
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Cleco Corporation	Robert Hirchak		Negative	Third-Party Comments
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Negative	Third-Party Comments
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Negative	Comments Submitted
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Negative	Comments Submitted
6	Evergy	Tiffany Lake	Alan Kloster	Negative	Comments Submitted
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Negative	Comments Submitted
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Negative	Comments Submitted
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Kelly Bertholet		Negative	Comments Submitted
6	Muscatine Power and Water	Nicholas Burns		Negative	Third-Party Comments
6	New York Power Authority	Shelly Dineen		Negative	Comments Submitted
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Abstain	N/A
6	NiSource - Northern Indiana Public Service Co.	Joseph OBrien		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Negative	Comments Submitted
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Negative	Third-Party Comments
6	Omaha Public Power District	Shonda McCain		Negative	Third-Party Comments
6	Platte River Power Authority	Sabrina Martz		Abstain	N/A
6	Portland General Electric Co.	Stefanie Burke		None	N/A
6	Powerex Corporation	Raj Hundal		Affirmative	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		Negative	Third-Party Comments
6	Public Utility District No. 1 of Chelan County	Anne Kronshage		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Affirmative	N/A
6	Santee Cooper	Marty Watson		None	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Southern Indiana Gas and Electric Co.	Kati Barr		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	Abstain	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	Comments Submitted
6	WEC Energy Group, Inc.	David Boeshaar		Negative	Comments Submitted
6	Western Area Power Administration	Jennifer Neville		Negative	Comments Submitted
6	Xcel Energy, Inc.	Steve Szablya		None	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	New York State Reliability Council	Wesley Yeomans		None	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Lindsey Mannion		Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Negative	Comments Submitted
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 282 of 282 entries

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/310)
Ballot Name: 2020-06 Verifications of Models and Data for Generators IBR Unit IN 1 DEF
Voting Start Date: 12/29/2023 12:01:00 AM
Voting End Date: 1/9/2024 8:00:00 PM
Ballot Type: DEF
Ballot Activity: IN
Ballot Series: 1
Total # Votes: 252
Total Ballot Pool: 281
Quorum: 89.68
Quorum Established Date: 1/9/2024 3:20:45 PM
Weighted Segment Value: 45.04

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	22	0.407	32	0.593	0	12	8
Segment: 2	8	0.7	3	0.3	4	0.4	0	1	0
Segment: 3	57	1	17	0.362	30	0.638	0	2	8
Segment: 4	17	1	6	0.462	7	0.538	0	4	0
Segment: 5	72	1	26	0.456	31	0.544	0	7	8
Segment: 6	47	1	15	0.405	22	0.595	0	5	5
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	6	0.5	4	0.4	1	0.1	0	1	0
Totals:	281	6.2	93	2.792	127	3.408	0	32	29

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		None	N/A
1	Ameren - Ameren Services	Tamara Evey		None	N/A
1	American Transmission Company, LLC	LaTroy Brumfield		Negative	Comments Submitted
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Negative	Comments Submitted
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Negative	Comments Submitted
1	Arkansas Electric Cooperative Corporation	Emily Corley		Abstain	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		Affirmative	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Affirmative	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Negative	Comments Submitted
1	Black Hills Corporation	Micah Runner		Negative	Comments Submitted
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Abstain	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Negative	Third-Party Comments
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Negative	Third-Party Comments
1	Dairyland Power Cooperative	Karrie Schuldt		Abstain	N/A
1	Dominion - Dominion Virginia Power	Elizabeth Weber		Negative	Comments Submitted
1	Duke Energy	Katherine Street		Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Negative	Comments Submitted
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Alan Kloster	Negative	Comments Submitted
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Negative	Comments Submitted
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Negative	Comments Submitted
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Negative	Comments Submitted
1	Glencoe Light and Power Commission	Terry Volkmann		Negative	Third-Party Comments
1	Hydro One Networks, Inc.	Alain Mukama	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte		Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Negative	Comments Submitted
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		Affirmative	N/A
1	Lincoln Electric System	Josh Johnson		Negative	Comments Submitted
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		None	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Affirmative	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	Negative	Comments Submitted
1	Minnkota Power Cooperative Inc.	Theresa Allard	Nikki Carson-Marquis	Negative	Comments Submitted
1	Muscatine Power and Water	Andrew Kurriger		Negative	Third-Party Comments
1	National Grid USA	Michael Jones		Negative	Third-Party Comments
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Negative	Third-Party Comments
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Abstain	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Negative	Third-Party Comments
1	Omaha Public Power District	Doug Peterchuck		Negative	Third-Party Comments
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Negative	Comments Submitted
1	OTP - Otter Tail Power Company	Charles Wicklund		Negative	Third-Party Comments
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Negative	Comments Submitted
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Abstain	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Negative	Comments Submitted
1	Portland General Electric Co.	Brooke Jockin		None	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		Negative	Third-Party Comments
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Salt River Project	Sarah Blankenship	Israel Perez	Affirmative	N/A
1	Santee Cooper	Chris Wagner		None	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Negative	Third-Party Comments
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell	Jennie Wike	Abstain	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Negative	Comments Submitted
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Negative	Comments Submitted
1	Xcel Energy, Inc.	Eric Barry		None	N/A
2	California ISO	Darcy O'Connell		Abstain	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Negative	Comments Submitted
2	Independent Electricity System Operator	Helen Lainis		Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Negative	Third-Party Comments
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Negative	Third-Party Comments
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips	Shannon Mickens	Negative	Comments Submitted
3	AEP	Kent Feliks		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr		None	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Negative	Comments Submitted
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Abstain	N/A
3	Avista - Avista Corporation	Robert Follini		Affirmative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Affirmative	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Negative	Comments Submitted
3	Black Hills Corporation	Josh Combs	Carly Miller	Negative	Comments Submitted
3	Buckeye Power, Inc.	Carl Spaetzel	Ryan Strom	Negative	Third-Party Comments
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Negative	Third-Party Comments
3	Dominion - Dominion Virginia Power	Bill Garvey		Negative	Comments Submitted
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Negative	Comments Submitted
3	Entergy	James Keele		Negative	Comments Submitted
3	Evergy	Marcus Moor	Alan Kloster	Negative	Comments Submitted
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Negative	Comments Submitted
3	Georgia System Operations Corporation	Scott McGough		Negative	Third-Party Comments
3	Great River Energy	Michael Brytowski		Negative	Third-Party Comments
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		Affirmative	N/A
3	Lincoln Electric System	Sam Christensen		Negative	Comments Submitted
3	Los Angeles Department of Water and Power	Fausto Serratos		None	N/A
3	Manitoba Hydro	Mike Smith		Negative	Comments Submitted
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Negative	Third-Party Comments
3	Muscatine Power and Water	Seth Shoemaker		Negative	Third-Party Comments
3	National Grid USA	Brian Shanahan		Negative	Third-Party Comments
3	Nebraska Public Power District	Tony Eddleman		Negative	Third-Party Comments
3	New York Power Authority	David Rivera		Negative	Comments Submitted
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Abstain	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Negative	Third-Party Comments
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Negative	Third-Party Comments
3	OTP - Otter Tail Power Company	Wendi Olson		Negative	Third-Party Comments
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Negative	Comments Submitted
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Negative	Comments Submitted
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Negative	Third-Party Comments
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Affirmative	N/A
3	Santee Cooper	Vicky Budreau		None	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Negative	Comments Submitted
3	Tennessee Valley Authority	Ian Grant		Negative	Comments Submitted
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Negative	Comments Submitted
3	Xcel Energy, Inc.	Nicholas Friebel		None	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Negative	Third-Party Comments
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Negative	Third-Party Comments
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		Abstain	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Negative	Comments Submitted
4	Georgia System Operations Corporation	Katrina Lyons		Negative	Third-Party Comments
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Negative	Third-Party Comments
4	Northern California Power Agency	Marty Hostler		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho	Jennie Wike	Abstain	N/A
4	Utility Services, Inc.	Tracy MacNicoll		Affirmative	N/A
4	WEC Energy Group, Inc.	Matthew Beilfuss		Negative	Comments Submitted
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Negative	Comments Submitted
5	Ameren - Ameren Missouri	Sam Dwyer		None	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Negative	Comments Submitted
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		Affirmative	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Helen Hamilton Harding		Affirmative	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Negative	Comments Submitted
5	Black Hills Corporation	Sheila Suurmeier		Negative	Comments Submitted
5	Bonneville Power Administration	Christopher Siewert		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Negative	Third-Party Comments
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Helen Wang		Negative	Third-Party Comments
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Negative	Third-Party Comments
5	Decatur Energy Center LLC	Megan Melham		Negative	Third-Party Comments
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Negative	Comments Submitted
5	Enel Green Power	Natalie Johnson		Abstain	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Negative	Comments Submitted
5	Evergy	Jeremy Harris	Alan Kloster	Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Negative	Comments Submitted
5	Great River Energy	Jacalynn Bentz		Negative	Third-Party Comments
5	Greybeard Compliance Services, LLC	Mike Gabriel		Negative	Third-Party Comments
5	Hydro-Quebec (HQ)	Junji Yamaguchi		Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Negative	Third-Party Comments
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Affirmative	N/A
5	National Grid USA	Robin Berry		Negative	Third-Party Comments
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Negative	Third-Party Comments
5	New York Power Authority	Zahid Qayyum		Negative	Comments Submitted
5	NextEra Energy	Richard Vendetti		Abstain	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Negative	Third-Party Comments
5	Northern California Power Agency	Jeremy Lawson		Negative	Comments Submitted
5	NRG - NRG Energy, Inc.	Patricia Lynch		Negative	Comments Submitted
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Negative	Third-Party Comments
5	Omaha Public Power District	Kayleigh Wilkerson		Negative	Third-Party Comments
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Negative	Third-Party Comments
5	Pacific Gas and Electric Company	Frank Lee	Michael Johnson	Negative	Comments Submitted
5	Pattern Operators LP	George E Brown		Negative	Third-Party Comments
5	Platte River Power Authority	Jon Osell		None	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Affirmative	N/A
5	Santee Cooper	Carey Salisbury		None	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Negative	Comments Submitted
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	Abstain	N/A
5	Talen Generation, LLC	Donald Lock		Affirmative	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	Comments Submitted
5	TransAlta Corporation	Ashley Scheelar		Abstain	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Clarice Zellmer		Negative	Comments Submitted
5	Xcel Energy, Inc.	Gerry Huitt		None	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		None	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Negative	Comments Submitted
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Abstain	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Negative	Comments Submitted
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Cleco Corporation	Robert Hirchak		Negative	Third-Party Comments
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Negative	Third-Party Comments
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		Negative	Third-Party Comments
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Negative	Comments Submitted
6	Evergy	Tiffany Lake	Alan Kloster	Negative	Comments Submitted
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Negative	Comments Submitted
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Negative	Comments Submitted
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Kelly Bertholet		Negative	Comments Submitted
6	Muscatine Power and Water	Nicholas Burns		Negative	Third-Party Comments
6	New York Power Authority	Shelly Dineen		Negative	Comments Submitted
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Abstain	N/A
6	NiSource - Northern Indiana Public Service Co.	Joseph OBrien		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Negative	Comments Submitted
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Negative	Third-Party Comments
6	Omaha Public Power District	Shonda McCain		Negative	Third-Party Comments
6	Platte River Power Authority	Sabrina Martz		Abstain	N/A
6	Portland General Electric Co.	Stefanie Burke		None	N/A
6	Powerex Corporation	Raj Hundal		Affirmative	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		Negative	Third-Party Comments
6	Public Utility District No. 1 of Chelan County	Anne Kronshage		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Affirmative	N/A
6	Santee Cooper	Marty Watson		None	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	Abstain	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	Comments Submitted
6	WEC Energy Group, Inc.	David Boeshaar		Negative	Comments Submitted
6	Western Area Power Administration	Jennifer Neville		Negative	Comments Submitted
6	Xcel Energy, Inc.	Steve Szablya		None	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Lindsey Mannion		Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Negative	Comments Submitted
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 281 of 281 entries

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/310)
Ballot Name: 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan IN 1 OT
Voting Start Date: 12/29/2023 12:01:00 AM
Voting End Date: 1/9/2024 8:00:00 PM
Ballot Type: OT
Ballot Activity: IN
Ballot Series: 1
Total # Votes: 249
Total Ballot Pool: 280
Quorum: 88.93
Quorum Established Date: 1/9/2024 3:21:51 PM
Weighted Segment Value: 58.52

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	25	0.463	29	0.537	0	12	8
Segment: 2	8	0.6	5	0.5	1	0.1	0	2	0
Segment: 3	57	1	21	0.467	24	0.533	0	4	8
Segment: 4	17	1	8	0.615	5	0.385	0	4	0
Segment: 5	72	1	29	0.537	25	0.463	0	9	9
Segment: 6	46	1	18	0.529	16	0.471	0	6	6
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	6	0.4	4	0.4	0	0	0	2	0
Totals:	280	6	110	3.511	100	2.489	0	39	31

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		None	N/A
1	Ameren - Ameren Services	Tamara Evey		None	N/A
1	American Transmission Company, LLC	LaTroy Brumfield		Negative	Comments Submitted
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Negative	Comments Submitted
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Negative	Comments Submitted
1	Arkansas Electric Cooperative Corporation	Emily Corley		Abstain	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		Affirmative	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Abstain	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Negative	Comments Submitted
1	Black Hills Corporation	Micah Runner		Negative	Comments Submitted
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Affirmative	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Negative	Third-Party Comments
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Negative	Third-Party Comments
1	Dairyland Power Cooperative	Karrie Schuldt		Abstain	N/A
1	Dominion - Dominion Virginia Power	Elizabeth Weber		Negative	Comments Submitted
1	Duke Energy	Katherine Street		Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Negative	Comments Submitted
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Alan Kloster	Negative	Comments Submitted
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Negative	Comments Submitted
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Affirmative	N/A
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Negative	Third-Party Comments
1	Hydro One Networks, Inc.	Alain Mukama	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte		Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		None	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Negative	Comments Submitted
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		Affirmative	N/A
1	Lincoln Electric System	Josh Johnson		Negative	Comments Submitted
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		None	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Affirmative	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	Negative	Comments Submitted
1	Minnkota Power Cooperative Inc.	Theresa Allard	Nikki Carson-Marquis	Negative	Comments Submitted
1	Muscatine Power and Water	Andrew Kurriger		Negative	Third-Party Comments
1	National Grid USA	Michael Jones		Negative	Third-Party Comments
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Negative	Third-Party Comments
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Abstain	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Negative	Third-Party Comments
1	Omaha Public Power District	Doug Peterchuck		Negative	Third-Party Comments
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Negative	Comments Submitted
1	OTP - Otter Tail Power Company	Charles Wicklund		Negative	Third-Party Comments
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Negative	Comments Submitted
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Abstain	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Negative	Comments Submitted
1	Portland General Electric Co.	Brooke Jockin		None	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		Negative	Third-Party Comments
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Sarah Blankenship	Israel Perez	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Santee Cooper	Chris Wagner		None	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Negative	Third-Party Comments
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell	Jennie Wike	Abstain	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Affirmative	N/A
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Negative	Comments Submitted
1	Xcel Energy, Inc.	Eric Barry		None	N/A
2	California ISO	Darcy O'Connell		Abstain	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis		Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Abstain	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips	Shannon Mickens	Negative	Comments Submitted
3	AEP	Kent Feliks		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr		None	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Negative	Comments Submitted
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Abstain	N/A
3	Avista - Avista Corporation	Robert Follini		Affirmative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Abstain	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Negative	Comments Submitted
3	Black Hills Corporation	Josh Combs	Carly Miller	Negative	Comments Submitted
3	Buckeye Power, Inc.	Carl Spaetzel	Ryan Strom	Negative	Third-Party Comments
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		None	N/A
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Dominion - Dominion Virginia Power	Bill Garvey		Negative	Comments Submitted
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Negative	Comments Submitted
3	Entergy	James Keele		Affirmative	N/A
3	Evergy	Marcus Moor	Alan Kloster	Negative	Comments Submitted
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Affirmative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Negative	Third-Party Comments
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		Affirmative	N/A
3	Lincoln Electric System	Sam Christensen		Negative	Comments Submitted
3	Los Angeles Department of Water and Power	Fausto Serratos		None	N/A
3	Manitoba Hydro	Mike Smith		Negative	Comments Submitted
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Negative	Third-Party Comments
3	Muscatine Power and Water	Seth Shoemaker		Negative	Third-Party Comments
3	National Grid USA	Brian Shanahan		Negative	Third-Party Comments
3	Nebraska Public Power District	Tony Eddleman		Negative	Third-Party Comments
3	New York Power Authority	David Rivera		Negative	Comments Submitted
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Abstain	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Negative	Third-Party Comments
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Negative	Third-Party Comments
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Negative	Third-Party Comments
3	OTP - Otter Tail Power Company	Wendi Olson		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Negative	Comments Submitted
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Negative	Comments Submitted
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Abstain	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Affirmative	N/A
3	Santee Cooper	Vicky Budreau		None	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Affirmative	N/A
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Negative	Comments Submitted
3	Xcel Energy, Inc.	Nicholas Friebel		None	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Negative	Third-Party Comments
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Negative	Third-Party Comments
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		Abstain	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Affirmative	N/A
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Negative	Third-Party Comments
4	Northern California Power Agency	Marty Hostler		Negative	Comments Submitted
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho	Jennie Wike	Abstain	N/A
4	Utility Services, Inc.	Tracy MacNicoll		Affirmative	N/A
4	WEC Energy Group, Inc.	Matthew Beilfuss		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		None	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Negative	Comments Submitted
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		Affirmative	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Helen Hamilton Harding		Abstain	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Negative	Comments Submitted
5	Black Hills Corporation	Sheila Suurmeier		Negative	Comments Submitted
5	Bonneville Power Administration	Christopher Siewert		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Negative	Third-Party Comments
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Helen Wang		Negative	Third-Party Comments
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Negative	Third-Party Comments
5	Decatur Energy Center LLC	Megan Melham		Negative	Third-Party Comments
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Negative	Comments Submitted
5	Enel Green Power	Natalie Johnson		Abstain	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Affirmative	N/A
5	Evergy	Jeremy Harris	Alan Kloster	Negative	Comments Submitted
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Affirmative	N/A
5	Great River Energy	Jacalynn Bentz		Negative	Third-Party Comments
5	Greybeard Compliance Services, LLC	Mike Gabriel		Negative	Third-Party Comments
5	Hydro-Quebec (HQ)	Junji Yamaguchi		Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Lincoln Electric System	Brittany Millard		Negative	Third-Party Comments
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Affirmative	N/A
5	National Grid USA	Robin Berry		Negative	Third-Party Comments
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Negative	Third-Party Comments
5	New York Power Authority	Zahid Qayyum		Negative	Comments Submitted
5	NextEra Energy	Richard Vendetti		Abstain	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Negative	Third-Party Comments
5	Northern California Power Agency	Jeremy Lawson		Negative	Comments Submitted
5	NRG - NRG Energy, Inc.	Patricia Lynch		Negative	Comments Submitted
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Negative	Third-Party Comments
5	Omaha Public Power District	Kayleigh Wilkerson		Negative	Third-Party Comments
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Negative	Third-Party Comments
5	Pacific Gas and Electric Company	Frank Lee	Michael Johnson	Negative	Comments Submitted
5	Pattern Operators LP	George E Brown		Negative	Third-Party Comments
5	Platte River Power Authority	Jon Osell		None	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		Abstain	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Affirmative	N/A
5	Santee Cooper	Carey Salisbury		None	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Affirmative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	Abstain	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Affirmative	N/A
5	TransAlta Corporation	Ashley Scheelar		Abstain	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Clarice Zellmer		Negative	Comments Submitted
5	Xcel Energy, Inc.	Gerry Huitt		None	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		None	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Negative	Comments Submitted
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Abstain	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Negative	Comments Submitted
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Negative	Third-Party Comments
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		Negative	Third-Party Comments
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Negative	Comments Submitted
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Affirmative	N/A
6	Evergy	Tiffany Lake	Alan Kloster	Negative	Comments Submitted
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Affirmative	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Negative	Comments Submitted
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Kelly Bertholet		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Muscatine Power and Water	Nicholas Burns		Negative	Third-Party Comments
6	New York Power Authority	Shelly Dineen		Negative	Comments Submitted
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Abstain	N/A
6	NiSource - Northern Indiana Public Service Co.	Joseph OBrien		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Negative	Comments Submitted
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Negative	Third-Party Comments
6	Omaha Public Power District	Shonda McCain		Negative	Third-Party Comments
6	Platte River Power Authority	Sabrina Martz		Abstain	N/A
6	Portland General Electric Co.	Stefanie Burke		None	N/A
6	Powerex Corporation	Raj Hundal		Abstain	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		Abstain	N/A
6	Public Utility District No. 1 of Chelan County	Anne Kronshage		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Affirmative	N/A
6	Santee Cooper	Marty Watson		None	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Affirmative	N/A
6	WEC Energy Group, Inc.	David Boeshaar		Negative	Comments Submitted
6	Western Area Power Administration	Jennifer Neville		Negative	Comments Submitted
6	Xcel Energy, Inc.	Steve Szablya		None	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Lindsey Mannion		Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Abstain	N/A

Previous 1 Next

Showing 1 to 280 of 280 entries

Description of Current Draft

This is the second draft of the proposed Glossary Terms posted for a 45-day formal comment period and additional ballot.

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024

Anticipated Actions	Date
45-day formal comment period with additional ballot	February 22 – April 8, 2024
10-day final ballot	April 2024
NERC Board adoption	May 2024

New or Modified Term(s) Used in NERC Reliability Standards

Background:

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The terms proposed below are intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A plant/facility that is connected to the electric system, consisting of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell.

Inverter-Based Resource Unit (IBR Unit): An individual device that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system; or a grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.

Description of Current Draft

This is the second draft of the proposed Glossary Terms posted for a 45-day formal comment period and additional ballot.

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024

Anticipated Actions	Date
45-day formal comment period with additional ballot	February 22 – April 8, 2024
10-day final ballot	April 2024
NERC Board adoption	May 2024

New or Modified Term(s) Used in NERC Reliability Standards

Background:

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The terms proposed below are intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A ~~source (or sink in the case of a charging battery energy storage system (BESS)) of electric power~~plant/facility that is connected to the electric ~~power~~ system ~~(transmission, sub-transmission, or distribution system), and that consists~~, consisting of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell.

~~**IBR Unit**~~**Inverter-Based Resource Unit (IBR Unit):** An individual device~~,~~ that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system; or a grouping of multiple devices~~,~~ that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.

Background

- The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions.
- The IBR and IBR Unit definitions are intended to describe the technology and which types of technologies are considered IBR. An IBR is not defined by where it is connected or the size of the IBR. Therefore, the definitions do not define the applicability for Reliability Standards, voltage connection level, or facility capability level (MW/MVA). The applicability of IBR will be defined in the Applicability section of the respective Reliability Standards. Additionally, this is the DT's reasoning to include the phrase "connected to the electric power system (transmission, sub-transmission, or distribution system)", while excluding specific voltage connection and MW values within the IBR definition.
- There is a need to distinguish between the individual "IBR unit or device" and the "IBR plant/facility" as a whole, so that standards or requirements can be written for each as necessary. Hence, the two definitions for IBR Unit and IBR.
- The term IBR is synonymous with the term "IBR plant/facility." An IBR includes the IBR Units, and the equipment designed primarily for delivering the power to a common point of interconnection (e.g. step-up transformers, collector system(s), main power transformer(s), power plant controller(s), reactive resources within the IBR plant, and a voltage source converter high-voltage direct current (VSC HVDC) system with a dedicated connection to the IBR).
- An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.
- IBRs have traditionally been considered "generating resources." An IBR is not a HVDC system (except for a VSC HVDC with a dedicated connection to an IBR), flexible ac transmission systems (FACTS) (e.g. static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. The DT's intent with the phrase "IBRs include" is to articulate a specific list of IBRs. Therefore, other technologies not listed would not be considered an IBR.
- A hybrid IBR (e.g. BESS and solar PV) or collocated portions of a facility that are IBR (e.g. a BESS at synchronous generation facility) are considered an IBR.
- IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power.
- Battery energy storage systems (BESS) are considered an IBR unit or IBR independent of whether the device is operating in a charging, idle, or discharging mode.
- The Project 2020-06 DT intends to use the Glossary Terms of IBR Unit and IBR for MOD-026-2. Additional standards development projects and related standards that may use these defined terms include:
    - Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)
    - Project 2021-01 Modifications to PRC-019 and MOD-025
    - Project 2021-04 Modifications to PRC-002 (new PRC-028)

- ~~Project 2022-04 EMT Modeling~~
- ~~Project 2023-01 EOP-004 IBR Event Reporting~~
- ~~Project 2023-02 Performance of IBRs (new PRC-030)~~

- ~~Distributed Energy Resources (DER) related projects that may or may not need to use IBR/IBR Unit if they end up with their own definition)~~
  - ~~Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)~~
  - ~~Project 2023-05 FAC-001/FAC-002 DER~~
  - ~~Project 2023-08 MOD-031 Demand and Energy (DER)~~

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource Definitions

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definitions must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)
- IBR Unit

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the drafting team (DT) that would coalesce development efforts for these definitions and coordinate proposed definitions with the other NERC developers. The DT proposes the two definitions of IBR and IBR Unit to be used in Reliability Standard MOD-026-2, as well as other IBR- related standards development projects.

General Considerations

Multiple standards in development will use the definition(s), and the proposed implementation timeframe is intended to reflect that any one of those standards may be the first to use one or more of the definitions. Additionally, this implementation plan only affects the date that these new definitions will become effective terms in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use these proposed definitions.

Effective Date

The effective date(s) for the proposed definitions for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed definitions shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the definitions, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed definitions shall become effective on the first day of the first calendar quarter after the date the definitions are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Project 2020-06 Verification of Models and Data for Generators Inverter-based Resource-related Definitions

Do not use this form for submitting comments. Use the Standards Balloting and Commenting System (SBS) to submit comments on **MOD-026-2 – Inverter-Based Resource (IBR) related Glossary Terms by 8 p.m. Eastern, Monday, April 8, 2024.**

Additional information is available on the project page. If you have questions, contact Senior Standards Developer, Chris Larson (via email), or at 470-599-3851.

Background

The NERC IBR Performance Task Force (IRPTF) performed a comprehensive review of all NERC Reliability Standards to identify any potential gaps and/or improvements. The IRPTF discovered several issues as part of this effort and documented its findings and recommendations in the IRPTF Review of NERC Reliability Standards White Paper, which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed by a project. The RSTC endorsed the standard authorization request (SAR) June 10, 2020.

The Standards Committee accepted two revised SARs at its July 21, 2021 meeting. The scope of the project includes the potential to add, modify, or retire Glossary Terms for NERC Reliability Standards. The Project 2020-06 drafting team (DT) proposes two new terms as part of this formal comment and initial ballot period.

Please provide your responses to the questions listed below, along with any detailed comments.

Questions

1. Do you support the definition for Inverter-Base Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

3. As discussed in the Technical Rationale, the proposed definitions would define the scope of equipment, but would not define the scope of IBR units subject to mandatory compliance with Reliability Standards. Each standard would define the applicable units subject to compliance with that standard. An example to include both BES and non-BES IBRs is as follows:

   Section 4. Applicability:

   4.1 Functional Entities: Generator Owner, Generator Operator

   4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.

   Please provide any suggested revisions you feel would improve the readability of this example.

   Comments:

4. Provide any additional comments for the DT to consider, if desired.

   Comments:

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Technical Rationale

Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Definitions

1. The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions. The DT also used recent FERC and NERC documents, which included inverter-based resource related terms and descriptions, as the basis for the IBR definitions.

2. The IBR and IBR Unit definitions are intended to describe technologies that shall be considered IBR and to distinguish between a unit and resource. An IBR is defined by technology, thus voltage connection level (kV), facility capability level (MW/MVA), or other factors do not impact the inclusion as an IBR. An IBR can be connected to any part the transmission system, sub-transmission system, or distribution system. For a Reliability Standard(s) that use either the IBR or IBR Unit terms, the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable. Each of these Reliability Standards, including the Applicability Section(s) will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section. For example, an Applicability Section may specify that IBR Facilities (BES), IBRs that are owned by a Generator Owner meeting the new registry criteria for sub-BES resources, or IBRs that are operated by a Generator Operator meeting the new registry criteria for sub-BES resources, are considered applicable.

3. IBRs have commonly been referred to as “generating resources.” An IBR is not a HVDC system (except for a VSC HVDC with a dedicated connection to an IBR, as this is part of the IBR facility), stand-alone flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. A list of IBRs is provided in Table 1 below.

4. IBRs may include any hybrid combination of IBR types (e.g., BESS and solar PV), see Table 1.

5. IBRs also include co-located portions of a facility that are IBR technologies (e.g., a BESS, which is co-located at synchronous generation facility), see Table 1.

6. Examples of IBRs include:

IBRs	Not an IBR
• Solar photovoltaic • Type 3 wind • Type 4 wind • Battery energy storage system (BESS) • Fuel cell(s) • Hybrid combination of IBRs • Portions of co-located facility that are IBR • VSC HVDC with dedicated connection to IBR • This is not an all-inclusive list.	• Stand-alone FACTS device (e.g., STATCOM or SVC) • Flywheels • Synchronous generator • Synchronous condenser • VSC HVDC • LCC HVDC • This is not an all-inclusive list.

Table 1: Inverter-Based Resource (IBR) examples

7. When drafting Reliability Standards and Requirements for IBR, an IBR unit and IBR plant/facility must be distinguishable from one another. Examples from current Reliability Standards usage include the following:

   - MOD-026, MOD-027: An IBR model that has been tested makes up a crucial element of the IBR plant/facility model. Thus, the new standard includes IBR Unit conditions for that testing. Many of the IBR Unit level parameters cannot be validated with plant/facility validation, staged testing.
   - PRC-019: Changes made to IBR Unit control system firmware or settings changes may be subject to updating protection coordination, as would an IBR plant/facility power plant controller firmware or settings changes.
   - PRC-028: Disturbance monitoring at IBR Unit levels may be necessary for disturbance recording.
   - PRC-029: Each Generator Owner or Transmission Owner of an applicable IBR shall ensure that each facility remains electrically connected and continues to exchange current in accordance with the no-trip zones and Operation Regions as specified in Attachment 1 unless needed to clear a fault.

8. An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.

9. Figure 2.1 shows an example diagram of an IBR. The IBR (red box) includes the IBR Units (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the IBR plant. If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system is part of the IBR.

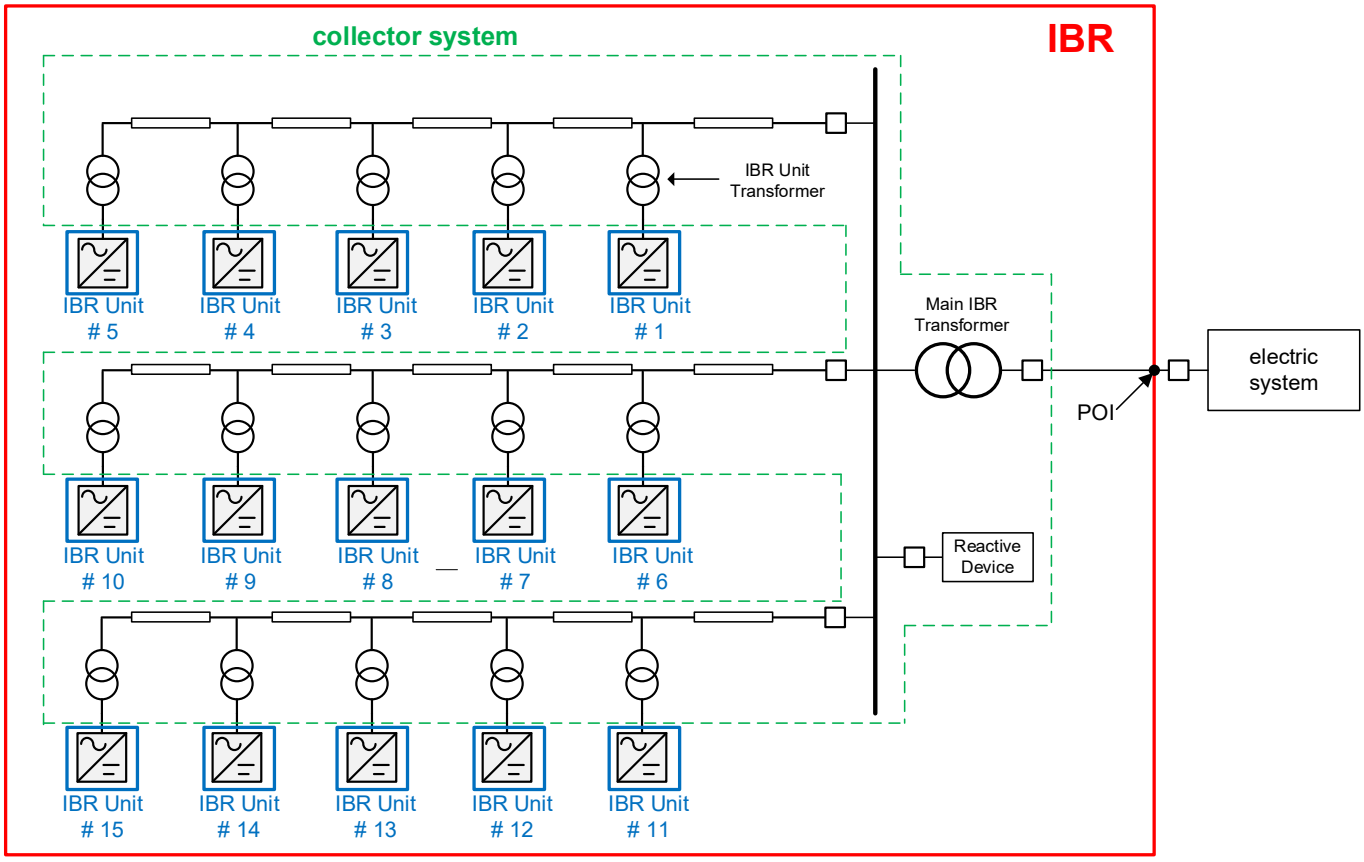

Figure 2.1 Example diagram of an IBR depicting the IBR (red box), collector system (green box), and IBR Units (blue boxes)

10. Examples of common IBR Unit configurations are shown in Figures 2.2 and Figure 2.3.

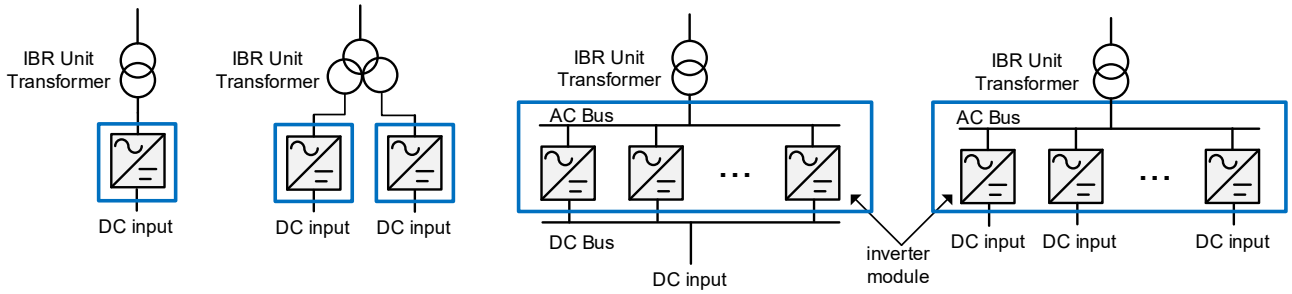

Figure 2.2. Example configurations of full converter-based IBR Units

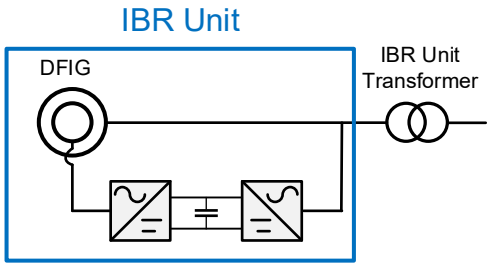

Figure 2.3. Type III wind IBR Unit example

11. The inclusion of 'capable of exporting Real Power' is to clarify that loads connected to the electric system via power electronics are not IBRs. IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power. The DT contemplated adding the phrase "may also be capable of providing Reactive Power" in the definition(s). However, the DT believed this may be misinterpreted that IBRs include technologies such as FACTS devices or HVDC.
12. Battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. Within each Reliability Standard, a DT may draft operating mode-specific Requirements, as needed.
13. The Project 2020-06 DT intends to use the Glossary Terms of IBR Unit and IBR for MOD-026-2. Additional standards development projects and related standards that may use these defined terms include:
    - Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)
    - Project 2021-01 Modifications to PRC-019 and MOD-025
    - Project 2021-04 Modifications to PRC-002 (new PRC-028)
    - Project 2022-04 EMT Modeling
    - Project 2023-01 EOP-004 IBR Event Reporting
    - Project 2023-02 Performance of IBRs (new PRC-030)
14. Distributed Energy Resources (DER) related projects that may or may not need to use IBR/IBR Unit if they end up with their own definition)
    - Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
    - Project 2023-05 FAC-001/FAC-002 DER
    - Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Terms

Formal Comment Period Open through April 8, 2024

Now Available

A formal comment period for **Inverter-based Resource Glossary Terms** is open through **8 p.m. Eastern, Monday, April 8, 2024**.

The standard drafting team's considerations of the responses received from the previous comment period are reflected in this draft of the definitions.

Reminder Regarding Corporate RBB Memberships

Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

Additional ballots will be conducted **March 29 – April 8, 2024**.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Comment Report

Project Name:	2020-06 Verifications of Models and Data for Generators | Draft 2 of IBR Definitions
Comment Period Start Date:	2/22/2024
Comment Period End Date:	4/8/2024
Associated Ballots:	2020-06 Verifications of Models and Data for Generators IBR Unit AB 2 DEF 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan AB 2 OT 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) AB 2 DEF

There were 49 sets of responses, including comments from approximately 144 different people from approximately 102 companies representing 10 of the Industry Segments as shown in the table on the following pages.

Questions

1. Do you support the definition for Inverter-based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

3. As discussed in the Technical Rationale, the proposed definitions would define the scope of equipment, but would not define the scope of IBR units subject to mandatory compliance with Reliability Standards. Each standard would define the applicable units subject to compliance with that standard. An example to include both BES and non-BES IBRs is as follows:

Section 4. Applicability:

4.1 Functional Entities: Generator Owner, Generator Operator

4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.

Provide any suggested revisions you feel would improve the readability of this example.

4. Provide any additional comments for the DT to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
BC Hydro and Power Authority	Adrian Andreoiu	1	WECC	BC Hydro	Hootan Jarollahi	BC Hydro and Power Authority	3	WECC
					Helen Hamilton Harding	BC Hydro and Power Authority	5	WECC
					Adrian Andreoiu	BC Hydro and Power Authority	1	WECC
MRO	Anna Martinson	1,2,3,4,5,6	MRO	MRO Group	Shonda McCain	Omaha Public Power District (OPPD)	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jamison Cawley	Nebraska Public Power District	1,3,5	MRO
					Jay Sethi	Manitoba Hydro (MH)	1,3,5,6	MRO
					Husam Al-Hadidi	Manitoba Hydro (System Preformance)	1,3,5,6	MRO
					Kimberly Bentley	Western Area Power Adminstration	1,6	MRO
					Jaimin Patal	Saskatchewan Power Coporation (SPC)	1	MRO
					George Brown	Pattern Operators LP	5	MRO
					Larry Heckert	Alliant Energy (ALTE)	4	MRO
					Terry Harbour	MidAmerican Energy Company (MEC)	1,3	MRO
					Dane Rogers	Oklahoma Gas and Electric (OG&E)	1,3,5,6	MRO

					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO
					Michael Ayotte	ITC Holdings	1	MRO
					Andrew Coffelt	Board of Public Utilities-Kansas (BPU)	1,3,5,6	MRO
					Peter Brown	Invenergy	5,6	MRO
					Angela Wheat	Southwestern Power Administration	1	MRO
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,SPP RE,WECC	SRC 2023	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Helen Lainis	IESO	1	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Elizabeth Davis	PJM	2	RF
					Kennedy Meier	Electric Reliability Council of Texas, Inc.	2	Texas RE
WEC Energy Group, Inc.	Christine Kane	3		WEC Energy Group	Christine Kane	WEC Energy Group	3	RF
					Matthew Beilfuss	WEC Energy Group, Inc.	4	RF
					Clarice Zellmer	WEC Energy Group, Inc.	5	RF
					David Boeshaar	WEC Energy Group, Inc.	6	RF
Southern Company - Southern Company Services, Inc.	Colby Galloway	1,3,5,6	MRO,RF,SERC,Texas RE,WECC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern	6	SERC

						Company - Southern Company Generation		
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	2	WECC
					Bill Pezalla	Old Dominion Electric Cooperative	3,4	SERC
					Jason Procuniar	Buckeye Power, Inc.	4	RF
					Jolly Hayden	East Texas Electric Cooperative, Inc.	NA - Not Applicable	Texas RE
					Nick Fogleman	Prairie Power, Inc.	1,3	SERC
					Kylee Kropp	Sunflower Electric Power Corporation	1	MRO
FirstEnergy - FirstEnergy Corporation	Mark Garza	4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy-FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
Michael	Michael		WECC	PG&E All	Marco Rios	Pacific Gas	1	WECC

Johnson	Johnson			Segments		and Electric Company		
					Sandra Ellis	Pacific Gas and Electric Company	3	WECC
					Tyler Brun	Pacific Gas and Electric Company	5	WECC
Black Hills Corporation	Rachel Schuldt	6		Black Hills Corporation - All Segments	Micah Runner	Black Hills Corporation	1	WECC
					Josh Combs	Black Hills Corporation	3	WECC
					Rachel Schuldt	Black Hills Corporation	6	WECC
					Carly Miller	Black Hills Corporation	5	WECC
					Sheila Suurmeier	Black Hills Corporation	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC
					Alain Mukama	Hydro One Networks, Inc.	1	NPCC
					Deidre Altobell	Con Edison	1	NPCC
					Jeffrey Streifling	NB Power Corporation	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael Ridolfino	Central Hudson Gas & Electric Corp.	1	NPCC
					Randy Buswell	Vermont Electric Power Company	1	NPCC
					James Grant	NYISO	2	NPCC
					John Pearson	ISO New England, Inc.	2	NPCC
					Harishkumar Subramani Vijay Kumar	Independent Electricity System	2	NPCC

	Operator		
Randy MacDonald	New Brunswick Power Corporation	2	NPCC
Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
David Burke	Orange and Rockland	3	NPCC
Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
Salvatore Spagnolo	New York Power Authority	1	NPCC
Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
David Kwan	Ontario Power Generation	4	NPCC
Silvia Mitchell	NextEra Energy - Florida Power and Light Co.	1	NPCC
Glen Smith	Entergy Services	4	NPCC
Sean Cavote	PSEG	4	NPCC
Jason Chandler	Con Edison	5	NPCC
Tracy MacNicoll	Utility Services	5	NPCC
Shivaz Chopra	New York Power Authority	6	NPCC
Vijay Puran	New York State Department of Public Service	6	NPCC
ALAN ADAMSON	New York State Reliability Council	10	NPCC

					David Kiguel	Independent	7	NPCC
					Joel Charlebois	AESI	7	NPCC
					Joshua London	Eversource Energy	1	NPCC
Elevate Energy Consulting	Ryan Quint	NA - Not Applicable	NA - Not Applicable	Elevate Energy Consulting	Ryan Quint	Elevate Energy Consulting		NA - Not Applicable
					N/A	N/A		NA - Not Applicable
Dominion - Dominion Resources, Inc.	Sean Bodkin	6		Dominion	Connie Lowe	Dominion - Dominion Resources, Inc.	3	NA - Not Applicable
					Lou Oberski	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
					Larry Nash	Dominion - Dominion Virginia Power	1	NA - Not Applicable
					Rachel Snead	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
Western Electricity Coordinating Council	Steven Rueckert	10		WECC Entity Monitoring	Steve Rueckert	WECC	10	WECC
					Phil O'Donnell	WECC	10	WECC
Tim Kelley	Tim Kelley		WECC	SMUD and BANC	Nicole Looney	Sacramento Municipal Utility District	3	WECC
					Charles Norton	Sacramento Municipal Utility District	6	WECC
					Wei Shao	Sacramento Municipal Utility District	1	WECC
					Foung Mua	Sacramento Municipal Utility District	4	WECC
					Nicole Goi	Sacramento Municipal Utility District	5	WECC
					Kevin Smith	Balancing Authority of Northern	1	WECC

						California		

1. Do you support the definition for Inverter-based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO

Answer	No
Document Name	

Comment

- The off-shore IBR connected via VSC-HVDC should be included in the IBR definition list of examples.

- We have concerns about the term 'not limited to' in the definition, which may create some confusion about what could be considered as IBR, such as a STATCOM with limited active power capability to support the system inertia or system reliability, that should not belong to the IBR, even it meets the IBR definition. We proposed adding the exclusion terms in the definition, which may state that an inverter-based plant with limited active power capability is not part of the IBR definition.

- Any FACT device connected to the IBR plant to support the IBR operation should be included in the IBR auxiliary equipment and be part of the IBR definition.

Likes 0	
Dislikes 0	

Response

Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion

Answer	No
Document Name	

Comment

Dominion Energy does not agree with the proposed efintion and offers the folloowing alternative:

Inverter Based Resources (IBR): IBRs include all NERC registered generating facilities directly connected to the Bulk Power System at 60kV and above using power electronic devices that change direct current (DC) power produced by a resource to alternating current (AC).

Likes 0	
Dislikes 0	

Response

Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE

Answer	No

Document Name	
Comment	

MBS supports the direction the SDT has taken. However, we believe that the sentence providing examples should be deleted.

This sentence is not necessary, and may cause ambiguity on what other technologies may or may not qualify. MBS would support the definition if the examples were left out.

Likes 0	
Dislikes 0	
Response	
Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	No
Document Name	
Comment	

Black Hills Corporation believes that only the Inverter-Based Resource (IBR) definition is needed. Consider revision of the definition as follows:

"Generating unit that consists of an individual device or a grouping of multiple devices that:

- *use a power electronic interface, such as an inverter or converter,*
- *can export Real Power from a primary energy source or energy storage system,*
- *and are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission."*

Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	No
Document Name	
Comment	

AEPC has signed on to ACES comments:

We at ACES applaud the SDT for the work that has been put into developing these definitions. We are greatly encouraged by the SDT's willingness to heed industry feedback and implement changes to the IBR definition. It is the opinion of ACES that the currently proposed IBR definition, while overall very good, would benefit from a few minor changes.

It is our opinion that the addition of the phrase "plant/facility" within the definition potentially introduces more confusion than it eliminates. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that the term facility

should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) in order to be more consistent with other uses of this phrase within the NERC Glossary of Terms.

Lastly, we believe that the last sentence of the definition wherein a list of example technologies is provided should be struck. It is our perspective that this list is superfluous and unnecessary. While we appreciate the intent of the SDT in providing said list, we believe this level of granularity is best provided via the Reliability Standards themselves as stated in Section 2 of the Technical Rationale (e.g., "…the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable."). If it is the intention of the SDT to specifically exclude certain resource types, then we suggest either providing an explicit list of excluded resource types or modifying the definition in
such a manner so as to not include these resource types in the first place. Thus, it is our recommendation that the IBR definition be renamed to IBR Facility and modified as follows:

- **Inverter-Based Resource (IBR) Facility**: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of interconnection.

Likes 0	
Dislikes 0	

Response

Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez

Answer	No
Document Name	

Comment

SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.

Likes 0	
Dislikes 0	

Response

Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC

Answer	No
Document Name	

Comment

- Entergy believes that this Inverter-Based Resource (IBR) definition and IBR Unit definition should be combined into to a single definition.
- Proposed definition is "A facility that is connected to the electric system, consisting of one or more devices using a power electronic interface (such as an inverter or converter) and capable of exporting Real Power and acting as a single resource at a common point of interconnection.

IBRs include but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell."

Likes 0	
Dislikes 0	

Response

Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group

Answer	No
Document Name	

Comment

Defining Inverter-Based Resource (IBR) at an aggregate level and at individual level, having two definitions, is unnecessary and inconsistent with existing defined terms. An IBR is a piece of electrical equipment and therefore the definition should stay consistent with defining it as a piece of electrical equipment. Resource is not a defined term and can be used to define either an individual unit or aggregate set of units, please see Blackstart Resource definition. Further, defined terms already exist, such as Facility, that can be utilized to clearly articulate that IBR term is intended to be used at an aggregate level in certain contexts. Additionally, undefined terms such as facility or plant can be used, as currently done in existing standards, when a defined term is not adequate. For example, IBR generating Facility or facility would refer to the aggregate level, whereas IBR individual generating unit would refer to a single wind turbine generator or photovoltaic inverter.

The MRO NSRF proposes the following:

Inverter-Based Resource (IBR):

A generating unit(s) that consists of an individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission.

Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	

Response

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF

Answer	No
Document Name	

Comment

Duke Energy proposes the following three (3) IBR building-block related definitions. Dividing the NERC definitions into 3 definitions, helps align the terms with current NERC usage of the terms for non-IBR generators and with other industry IBR standards. Unit is normally understood as a combination of related equipment which together functions as a single entity for the industry and GADS reported data. This proposed matching of terms

will also reduce confusion within other standards. Additionally, the modeling standard should recognize that modeling may need to be split by inverter model and/or resource type but recombined as a unit based on how the devices are controlled (e.g., PV and BESS inverters need different models, but may be operated together to regulate voltage). The fact that the devices must be modeled differently does not mean that each type of inverter must be defined as a unit.

Definition #1

Inverter-Based Resource Plant/Facility (IBR Plant/Facility): A plant/facility connected to the electric system that consist of one or more IBR Unit(s) at a common point of interconnection. IBRs types include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell.

Justification: With regard to the removal of "Operated as a single resource", this phrase implied that each unit must be combined to operate as a single resource. Generally, multiple units at a plant are controlled individually.

Definition #2

Inverter-Based Resource Unit (IBR Unit): A single or group of devices that are operated and controlled together as a single resource (entity). The unit utilizes a power electronic interface, such as inverters or converters, capable of exporting Power from a primary energy source or energy storage system.

Justification: The phrase "Single point on the collector system" was removed because that the implied condition could result in multiple interpretations. The SDT was possibly assuming that the IEEE Point of Connection term is equivalent to the phrase "single point on the collector system" but are not equivalent in several cases.

Definition: Unit - An electricity generator and related equipment essential to the electricity generator's operation, which together function as a single entity. (Source: Generating Unit Definition: 414 Samples | Law Insider)

Definition #3

Inverter-Based Resource Device (IBR Device): An individual device, such as an inverter or converter, capable of exporting Power from a primary energy source or energy storage system.

Justification: This additional term was added because the NERC use of the term Unit does not align well with IEEE IBR Unit. The IEEE definition of an IBR unit is directed towards a component, or device. It can be a single inverter, a central inverter unit, or a group of inverters tested by a NRTL to function together. The NERC definition of a Unit appears more focused on a collection of individual devices designed and constructed to function together, but not designed as a single package.

Likes 0	
Dislikes 0	

Response

Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group

Answer	No
Document Name	

Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
The Draft 2 "IBR" definition states that it's a plant/facility consisting of one or more IBR Unit(s). The definition of "consisting" is "composed or made up of". As such, the definition is basically stating that an IBR is made up of IBR Unit(s). This is not correct as the updated definition of an IBR Unit is that it's a "device" and not a "plant/facility". As such, suggest changing the words "consisting of" to "using" such that the definition would then read: "A plant/facility that is connected to the electric system **using** one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell."	
Likes 0	
Dislikes 0	
Response	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	No
Document Name	
Comment	
Tri-State Generation and Transmission supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Carver Powers - Utility Services, Inc. - 4	
Answer	No

Document Name	

Comment

The proposed definition first states that an IBR is a plant/facility but the last sentence state that an “IBR includes” and then lists a type of technology (solar photovoltaic) and elements that include inverters to convert power from DC to AC (Type 3 and Type 4) and elements that require separate devices (battery energy storage system, fuel cell). With the proposed definition, it is unclear whether an IBR is an Element or a plant/facility.

Suggest moving the concepts detailed in the second sentence to the IBR Unit definition for clarity of the undefined term “power source” used in that definition.

Both “plant” and “facility” are not defined. The term facility is often confused with the NERC defined term “Facility”. CIP-002 R1 uses the undefined term “asset” and then lists the applicable assets. Suggest replacing the term “facility” with “asset”.

The term “electric system” is undefined. It seems that the intent is to allow the IBR definition to apply to more than the BES or BPS but any two electrical devices connected together could be an “electric system”. Suggest referencing that the IBR is used to convert power that is exported from the plant/facility.

Recommend clarifying “Type 3 and Type 4 wind” by including “turbine” after wind in the proposed IBR definition.

“Solar photovoltaic” is a type of technology or method to generate electricity and not a device. A plant may have ancillary devices such as lights and cameras, that use solar photovoltaic cells to charge their batteries. These ancillary devices should not be IBRs.

The NERC glossary does not define acronyms within definition for a different term. Both PV and BESS acronyms should not be included in the definition of IBR.

Suggest the following:

“Inverter-Based Resource (IBR): A plant/asset that uses one or more IBR Unit(s) for the conversion of power for export from the plant/asset and operated as a single resource at a common point of interconnection.”

Likes 0	
Dislikes 0	

Response

Megan Melham - Decatur Energy Center LLC - 5

Answer	No
Document Name	

Comment

Capital Power supports the NAGF comments for the IBR definition as below:

The NAGF believes that only the Inverter-Based Resource (IBR) definition is needed and should be revised as follows:
“A generating unit(s) that consists of one or more individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission.”

Likes 0	
Dislikes 0	

Response

Dwanique Spiller - Berkshire Hathaway - NV Energy - 5

Answer	No
Document Name	

Comment

Defining Inverter-Based Resource (IBR) at an aggregate level and at individual level, having two definitions, is unnecessary and inconsistent with existing defined terms. An IBR is a piece of electrical equipment and therefore the definition should stay consistent with defining it as a piece of electrical equipment. Resource is not a defined term and can be used to define either an individual unit or aggregate set of units, please see Blackstart Resource definition. Further, defined terms already exist, such as Facility, that can be utilized to clearly articulate that IBR term is intended to be used at an aggregate level in certain contexts. Additionally, undefined terms such as facility or plant can be used, as currently done in existing standards, when a defined term is not adequate. For example, IBR generating Facility or facility would refer to the aggregate level, whereas IBR individual generating unit would refer to a single wind turbine generator or photovoltaic inverter.

NV Energy proposes the following:

Inverter-Based Resource (IBR):

A generating unit(s) that consists of an individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission.

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	No
Document Name	

Comment

The NAGF believes that only the Inverter-Based Resource (IBR) definition is needed and should be revised as follows:

"A generating unit(s) that consists of one or more individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of

exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission."

Likes 0	
Dislikes 0	

Response

Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano

Answer	No
Document Name	

Comment

We believe the SDT needs to explain or clarify what "the electric system" is and how an IBR relates to the Bulk Electric System.

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	No
Document Name	

Comment

We at ACES applaud the SDT for the work that has been put into developing these definitions. We are greatly encouraged by the SDT's willingness to heed industry feedback and implement changes to the IBR definition. It is the opinion of ACES that the currently proposed IBR definition, while overall very good, would benefit from a few minor changes.

It is our opinion that the addition of the phrase "plant/facility" within the definition potentially introduces more confusion than it eliminates. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that the term facility should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) in order to be more consistent with other uses of this phrase within the NERC Glossary of Terms.

Lastly, we believe that the last sentence of the definition wherein a list of example technologies is provided should be struck. It is our perspective that this list is superfluous and unnecessary. While we appreciate the intent of the SDT in providing said list, we believe this level of granularity is best provided via the Reliability Standards themselves as stated in Section 2 of the Technical Rationale (e.g., "…the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable."). If it is the intention of the SDT to specifically exclude certain resource types, then we suggest either providing an explicit list of excluded resource types or modifying the definition in such a manner so as to not include these resource types in the first place.

Thus, it is our recommendation that the IBR definition be renamed to IBR Facility and modified as follows:

Inverter-Based Resource (IBR) Facility: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of interconnection.

Likes 0	
Dislikes 0	

Response

Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2

Answer	No
Document Name	

Comment

SPP requests the drafting team consider that some large loads may also use power electronic interfaces which may also encounter Sub Synchronous Resonance issues. SPP encourages the drafting team to consider if such loads should be considered in the IBR definitions due to these similarities. While they do not inject real power into the grid, they do pull real power from the grid and the impacts of these types of loads tripping off can have impacts to reliability.

Large loads can be considered resources when utilized as demand response, though requirements may need to be considered beyond a resource definition. To the extent these would not be covered by the definition proposed, we request consideration of including such clarifications in the definition.

Likes 0	
Dislikes 0	

Response

Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting

Answer	Yes
Document Name	

Comment

We support the definition; however, the term "plant/facility" is a bit vague and unclear which could add confusion for entitites trying to be in compliance when using this term.

Likes 0	
Dislikes 0	

Response

Teresa Krabe - Lower Colorado River Authority - 5

Answer	Yes

Document Name	
Comment	
LCRA supports the proposed IBR definition with the current Glossary of Terms. However, depending on how “point of interconnection” is defined, or if it is added to the Glossary of Terms, the IBR definition could become invalid since there may be multiple generation facilities behind a common GSU or Transmission Owner equipment which are operated independently and not “as a single resource.”	
Likes 0	
Dislikes 0	
Response	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
LCRA TSC supports the proposed IBR definition with the current Glossary of Terms. However, depending on how “point of interconnection” is defined, or if it is added to the Glossary of Terms, the IBR definition could become invalid since there may be multiple generation facilities behind a common GSU or Transmission Owner equipment which are operated independently and not “as a single resource.”	
Likes 0	
Dislikes 0	
Response	
Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	Yes
Document Name	
Comment	
BC Hydro appreciates the drafting team’s efforts and the opportunity to comment. Given the comprehensive treatment in the Technical Rationale, the second sentence in the proposed IBR definition is not required. BC Hydro suggests that the IBR definition can be simplified as follows: **IBR** – a plant including an individual IBR Unit or multiple IBR Units operated as a single resource connected to the electric system at a common point of connection. As well, BC Hydro sees a potential conflict between IBR as defined here and the recent updates to the NERC Rules of Procedure to the Generator Owner and Operator definitions. In the current draft of the NERC Rules of Procedure – Appendix 2 Definitions used in the Rules of Procedure and Appendix 5B Statement of	

Compliance Registry Criteria (Revision 8), the Category 2 Generator Owner entity is defined as “owns and maintains non-BES inverter based **generating resources** (emphasis added) that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV (Category 2 GO)”.

BC Hydro appreciates the discussion at item #3 in the Technical Rationale. However, depending on the interpretation of “generating resources”, owners of certain IBR types such as battery energy storage systems (BESS) may not be registered as a GO for these facilities. This would create a potential discrepancy between definitions which may create a gap in the intended scope of applicability for MOD-026-2 and potentially other reliability standards, i.e., entities that would be included under the applicability section of the standard wouldn’t be part of the MRS Program as they may not be registered if they don’t meet the GO definition.

Likes 0	
Dislikes 0	

Response

Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	Yes
Document Name	

Comment

PG&E supports the IBR definition.

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1

Answer	Yes
Document Name	

Comment

None

Likes 0	
Dislikes 0	

Response

Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott

Answer	Yes
Document Name	
Comment	
A White Paper authored by either the drafting team or NERC staff identifying those devices considered within the scope of the definition and those outside of the Inverter-Based Resource (IBR) definition would be helpful going forward, if maintained by NERC staff.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	Yes
Document Name	
Comment	
WECC supports the definition and voted affirmative. However, we do have some questions that the SDT can hopefully address. How broad does the SDT consider the “common point of interconnection”? Is it one lead line to one station? Multiple lead lines to multiple transformers within a station? The industry responds to regulatory oversight (e.g., such as building plants at 74 MVA) and could respond to this definition in a similar manner by building a second point of interconnection. The risk would still be there but may remain unregulated. Provided technical rational supports avoiding confusion when applying Requirement language but may need to be enhanced to meet the reliability concerns of two (or more) points of interconnection. WECC agrees with bullet 7 in the Technical Rationale and each SDT using the defined terms needs to ensure clarity. Does the definition fully support all variants of hybrid plants? Care needs to be taken as more hybrid plants are being integrated. If the term “IBR” is used for a MOD Standard and represents a hybrid plant, how does a single model of the “IBR” represent the response? Granted, each part of the hybrid plant would be separate IBR Units which may dictate how Standards utilize the terms.	
Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	

Comment
EEI has no objections to the IBR definition as proposed.

Likes 0	
Dislikes 0	

Response

Amy Wilke - American Transmission Company, LLC - 1	
Answer	Yes
Document Name	

Comment
The language itself may be acceptable, but changes should be made to the technical rationale to explain where an IBR ends. If POI or where the facility is "connected to the electric power system" is the preferred term, this must be reconciled with other standards where IBR is intended to be used. Other standards are contemplating using the POM or high side of the main power transformer as the location where IBR performance is measured. NERC Proposed Definition - Inverter-Based Resource (IBR): A plant/facility that is connected to the electric system consisting of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell.

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	

Comment

Likes 0	
Dislikes 0	

Response	
Pirouz Honarmand - Pirouz Honarmand On Behalf of: Helen Lainis, Independent Electricity System Operator, 2; - Pirouz Honarmand	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Dave Krueger - SERC Reliability Corporation - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
David Jendras Sr - Ameren - Ameren Services - 3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Chantal Mazza - Chantal Mazza On Behalf of: Nicolas Turcotte, Hydro-Quebec (HQ), 1, 5; - Chantal Mazza	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Junji Yamaguchi - Hydro-Quebec (HQ) - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Leslie Hamby - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Marty Hostler - Northern California Power Agency - 4	
Answer	
Document Name	

Comment	
1. NO. We believe the SDT needs to explain or clarify what "the electric system" is and how an IBR relates to the Bulk Electric System.	
Likes 0	
Dislikes 0	
Response	

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC

Answer	No
Document Name	

Comment

SMUD supports the creation of a definition for "IBR Unit" since it is highly likely that drafting teams for other NERC Standards Projects related to inverter-based resources will need the flexibility to draft requirements that apply specifically to the power electronic interface equipment, and not to the entire inverter-based resource facility.

The proposed definition for IBR Unit is excessively complicated. We recommend the drafting team consider the following changes to the proposed definition:

"An individual device**, or grouping of multiple devices,** that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power **and of providing Reactive Power support** from a primary energy source or energy storage system, and that connects at a single point on **a** collector system."

Likes 0	
Dislikes 0	

Response

Amy Wilke - American Transmission Company, LLC - 1

Answer	No
Document Name	

Comment

Additional clarity should be provided to this definition. There is some confusion right now without more context of the technical rationale document included in the standard itself. As stated right now, an IBR unit can be an individual device or multiple devices and while the Technical Rationale examples and pictures make it fairly clear, more clarity in the definition language would be helpful. Perhaps stating that an IBR unit is one that connects together behind the same generator step up transformer (IBR Unit transformer). Edits are also provided below.

NERC Proposed Definition - Inverter-Based Resource unit (IBR Unit): An individual device that uses a power electronic Interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system: or a grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.

ATC Proposed edit - Inverter-Based Resource Unit (IBR Unit): An individual device or grouping of multiple devices that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects

behind the same IBR Unit step up transformer.	
Likes 0	
Dislikes 0	
Response	
Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2	
Answer	No
Document Name	
Comment	
SPP has a concern that the proposed definition potentially places a limit only holding an account for Real Power instead of Reactive Power. We recommend that the drafting team replace the term “Real Power” with power, that aligns with the BES definition for generation (inclusion).	
Likes 0	
Dislikes 0	
Response	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	No
Document Name	
Comment	
We believe the currently proposed IBR Unit definition contains language that overlaps the proposed IBR (a.k.a. IBR Facility) definition and should be modified. It is our opinion that the definition of an IBR Unit should utilize a standalone, technologically agnostic, approach that is consistent with language already utilized elsewhere in the NERC Glossary of Terms. Furthermore, it is the opinion of ACES that the reference to “a grouping of multiple devices” is confusing. We believe that the intent of the SDT was to encompass all possible configurations of IBR Units; however, we do not believe the current language meets said intent succinctly enough. Moreover, there are no other definitions that attempt to define generating units with such a level of specificity. For instance, there are no definitions within the NERC Glossary of Terms that attempt to define the many various configurations of a combined cycle unit (e.g., 1x1, 2x1, 3x2, 4x1, etc.). Hence, in this instance, we believe that less is more. Therefore, it is our recommendation that the IBR Unit definition be modified as follows: **Inverter-Based Resource (IBR) Unit**: An individual generating resource capable of exporting Real Power that uses a power electronic interface, such as an inverter or rectifier, and connects at a single point to a system designed primarily for delivering such Real Power to a common point of interconnection.	
Likes 0	

Dislikes 0	

Response

Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
If the SDT is going to use the proposed definition the language "single point on the collector system" should be revised to "single point on a collector system bus that meets the BES definition."	
Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF recommends that having an IBR unit definition is unnecessary. Please see the response to Question #1. In addition, the NAGF points out that the SDT has said there is no need to define “collector system” as everyone understands what that term means. The SDT is also attempting to use a term that industry understands and uses, “unit”, to mean something much different than how the term is currently used in the operations arena of the industry. This is unacceptable as it will likely lead to significant confusion and misunderstanding in the implementation of the standards.	
Likes 0	
Dislikes 0	

Response

Leslie Hamby - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	No
Document Name	
Comment	
Renewable generation must at some point cover Reactive Power if we are moving towards all renewable generation in the future. Due to this, Southern Indiana Gas & Electric, Company recommends adding “Reactive Power” to the definition.	

Likes 0	
Dislikes 0	
Response	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
See Question 1.	
Likes 0	
Dislikes 0	
Response	
Carver Powers - Utility Services, Inc. - 4	
Answer	No
Document Name	
Comment	

Suggest changing the term name from IBR Unit to Inverter Based Unit (IBU) for clarity in the proposed IBR definition.

The proposed definition is structured in a way that make it difficult to understand. The following is the definition using the NERC style guide… in part.

1) An individual device that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and

2) that connects at a single point on the collector system;

or

1) A grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and

2) that connect together at a single point on the collector system.

Based on this interpretation of the proposed definition, the following definition would mean the same but be simpler to understand. This modified definition also includes the list of primary energy sources and BESS from the IBR definition

“An individual device or grouping of devices that:

1) use a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage

system (e.g. solar photovoltaic devices, Type 3 and Type 4 wind turbines, battery energy storage systems, and fuel cells) and

2) connect at a single point on a collector system;"

It could also be structured this way:

"An individual device or grouping of devices that utilize a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system (e.g., solar photovoltaic devices, Type 3 and Type 4 wind turbines, battery energy storage systems, and fuel cells) and connecting at a single point on a collector system."

Likes 0	
Dislikes 0	

Response

Donna Wood - Tri-State G and T Association, Inc. - 1

Answer	No
Document Name	

Comment

Tri-State Generation and Transmission supports the comments of the MRO NSRF.

Likes 0	
Dislikes 0	

Response

Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC

Answer	No
Document Name	

Comment

The Draft 2 "IBR Unit" definition states that it's a device that uses a power electronic interface. The IBR Unit doesn't use the interface, it is the interface. As such, suggest changing the words "that uses" to "consisting of" such that the definition would now read:

"An individual device **consisting of** a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system; or a grouping of multiple devices **consisting of** power electronic interface(s), such as inverters or converters, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system."

Likes 0	
Dislikes 0	

Response	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	
See Question #1 Response.	
Likes 0	
Dislikes 0	
Response	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No
Document Name	
Comment	
See Question 1.	
Likes 0	
Dislikes 0	

Response	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
Entergy believes that having an IBR Unit definition is unnecessary. Entergy is concerned that the potential level of granularity in the IBR Unit definition makes compliance overly burdensome due to the need to perform compliance activities on a device-by-device basis. An IBR facility can have hundreds of individual IBR Units as it is currently defined. Where standard requirements need to be applied at the inverter level, then the individual standards should state that.	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	No
Document Name	
Comment	
SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.	
Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	No
Document Name	
Comment	
AEPC has signed on to ACES comments: We believe the currently proposed IBR Unit definition contains language that overlap the proposed IBR (a.k.a. IBR Facility) definition and should be modified. It is our opinion that the definition of an IBR Unit should utilize a standalone, technologically agnostic, approach that is	

consistent with language already utilized elsewhere in the NERC Glossary of Terms.

Furthermore, it is the opinion of ACES that the reference to “a grouping of multiple devices” is confusing. We believe that the intent of the SDT was to encompass all possible configurations of IBR Units; however, we do not believe the current language meets said intent succinctly enough.

Moreover, there are no other definitions that attempt to define generating units with such a level of specificity. For instance, there are no definitions within the NERC Glossary of Terms that attempt to define the many various configurations of a combined cycle unit (e.g., 1x1, 2x1, 3x2, 4x1, etc.). Hence, in this instance, we believe that less is more.

Therefore, it is our recommendation that the IBR Unit definition be modified as follows:

- **Inverter-Based Resource (IBR) Unit**: An individual generating resource capable of exporting Real Power that uses a power electronic interface, such as an inverter or rectifier, and connects at a single point to a system designed primarily for delivering such Real Power to a common point of interconnection.

Likes 0	
Dislikes 0	

Response

Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments

Answer	No
Document Name	

Comment

Black Hills Corporation does not believe a definition for “IBR Unit” is necessary if the “IBR” definition from Question 1 is revised as mentioned. The use of the term “unit” may conflict with other industry uses of the term. If necessary to define to an individual level, then consider use of the term “element” or “device” in place of “unit.”

Likes 0	
Dislikes 0	

Response

Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro

Answer	No
Document Name	

Comment

Per the latest revision, the IBR Unit definition references ‘an individual device … that connects at a single point on the collector system’. BC Hydro appreciates the clarification provided during the SDT webinar that this addition was to correct grammar. However, it does not seem to add value as a

single device will not have multiple connection points to a single system.

It is also not clear why the IBR Unit definition needs to be dependent on “the collector system”, which is not a defined term. As the IBR definition already specifies the requirement of “a common point of interconnection”, we posit that would be sufficient to define the IBR.

BC Hydro suggests that the collector system concept is not necessary to define the IBR Unit: the examples provided in the Technical Rationale (Figures 2.1, 2.2, and 2.3 on pages 3-4) seem to indicate that it is the single AC bus that determines the interface between an IBR Unit and the electric power system. However, if the “collector system” is to be deemed a critical component for defining an IBR Unit, BC Hydro suggests that this be defined as a NERC Glossary Term instead of relying on a common understanding in the power industry.

During the SDT webinar’s Q&A session clarifications were provided to the effect that an Electric Vehicle (EV) can be deemed an IBR Unit if bidirectional, i.e., injecting power into the grid, not just charging. Arguably, the collector system concept may be different in such scenarios.

BC Hydro suggests that the simplified definitions proposed below do not miss any critical element to fully define the IBR facilities.

IBR Unit – an individual device or a grouping of multiple devices that can export Real Power from a primary energy source or energy storage system via a power electronics interface.

IBR – a plant including an individual IBR Unit or multiple IBR Units operated as a single resource connected to the electric power system at a common point of connection.

Likes 0	
Dislikes 0	

Response

Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE

Answer	No
Document Name	

Comment

MBS aligns with the previous submission responses made by the NAGF, and feels that the SDT did not address this concern nor provide clarity:

Utilizing the term IBR Unit to refer to a single inverter within the generating plant will cause significant confusion at the plant level. Unless any instruction provided to the plant is written, then it will not be clear if the term IBR Unit is the defined term used by NERC or if it is intended to mean the generating unit (Unit 1, 2 or 3), IBR unit. This level of potential confusion is unacceptable resulting in an unacceptable risk of the BES being mis operated. The word “unit” has long been associated with a distinct operating segment of a plant. For this reason, the NAGF does not support the use of the term unit to mean anything less than the dispatchable grouping of inverters.

MBS further supports TRE previous response:

...the current verbiage of IBR Unit does not include the capabilities for absorbing or delivering reactive power which is essential for electric system operations.

Likes 0	
Dislikes 0	

Response	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	No
Document Name	
Comment	
Dominion Energy is if the opinion that this defintion should be simplifed similiar to the proposed IBR defintion in Q1. **Inverter-Based Resource Unit (IBR Unit):** An individual **inverter** device or a grouping of multiple inverters connected together **operating functionally as a single unit, and directly connected at a single point of interconnection to the Bulk Power System at 60kV and above.**	
Likes 0	
Dislikes 0	
Response	
Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	No
Document Name	
Comment	
The definition appears to be overcomplicated and unnecessarily confusing. It is unclear why the definition could not simply state: "An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system."	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI has no objections to the IBR Unit definition as proposed.	
Likes 0	

Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	Yes
Document Name	
Comment	
WECC has no issue with the definition, but urges that care needs to be taken when using the term in Requirements. WECC appreciated the approach taken by the SDT to distinguish the two terms.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
No comment.	
Likes 0	
Dislikes 0	
Response	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
See the suggestion to change **IBR Unit** to **IBR Device** in Q4 below. It is suggested that the SDT carefully consider the use of the word "unit" to refer to both the power conversion element when unit is capitalized versus using unit to refer to the entire facility when not capitalized.	
Likes 0	
Dislikes 0	

Response	
Junji Yamaguchi - Hydro-Quebec (HQ) - 5	
Answer	Yes
Document Name	
Comment	
Another remark would be that while reading the overall definitions, it doesn't seem clear that E-statcoms are not included in the scope of the term IBR Unit. Perhaps a distinction between STATCOMs and E-STATCOMS should be added to the Technical Rationale depending on the energy that can be stored or the storage technology used (supercaps-short duration vs batteries- long duration). Without this distinction, there exists a risk that a storage system could be identified as a E-STATCOM and thus avoid certain requirements.	
Likes 0	
Dislikes 0	
Response	
Chantal Mazza - Chantal Mazza On Behalf of: Nicolas Turcotte, Hydro-Quebec (HQ), 1, 5; - Chantal Mazza	
Answer	Yes
Document Name	
Comment	
While reading the overall definitions, it doesn't seem clear that E-statcoms are not included in the scope of the term IBR Unit. Perhaps a distinction between STATCOMs and E-STATCOMS should be added to the Technical Rationale depending on the energy that can be stored or the storage technology used (supercaps-short duration vs batteries- long duration). Without this distinction, there exists a risk that a storage system could be identified as a E-STATCOM and thus avoid certain requirements.	
Likes 0	
Dislikes 0	
Response	
Dave Krueger - SERC Reliability Corporation - 10	
Answer	Yes
Document Name	
Comment	
On behalf of the SERC Generator Working Group:	

Suggest changing the word "unit" to "asset" to avoid confusion with the historical meaning of unit	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	Yes
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
PG&E supports the IBR Unit definition.	
Likes 0	
Dislikes 0	
Response	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	
Comment	
Likes 0	

Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
David Jendras Sr - Ameren - Ameren Services - 3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	

Comment	
Likes 0	
Dislikes 0	
Response	
Pirouz Honarmand - Pirouz Honarmand On Behalf of: Helen Lainis, Independent Electricity System Operator, 2; - Pirouz Honarmand	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Marty Hostler - Northern California Power Agency - 4	
Answer	
Document Name	
Comment	
1. No. If the SDT is going to use the proposed definition the language "single point on the collector system" should be revised to "single point on a collector system bus that meets the BES definition."	
Likes 0	
Dislikes 0	
Response	
Megan Melham - Decatur Energy Center LLC - 5	
Answer	
Document Name	
Comment	
Capital Power supports the NAGF comments for the IBR Unit definition as below: The NAGF recommends that having an IBR unit definition is unnecessary. Please see the response to Question #1. In addition, the NAGF points out that the SDT has said there is no need to define “collector system” as everyone understands what that term means. The SDT is also attempting to use a term that industry understands and uses, “unit”, to mean something much different than how the term is currently used in the operations arena of the industry. This is unacceptable as it will likely lead to significant confusion and misunderstanding in the implementation of the standards.	
Likes 0	
Dislikes 0	
Response	

3. As discussed in the Technical Rationale, the proposed definitions would define the scope of equipment, but would not define the scope of IBR units subject to mandatory compliance with Reliability Standards. Each standard would define the applicable units subject to compliance with that standard. An example to include both BES and non-BES IBRs is as follows:

Section 4. Applicability:

4.1 Functional Entities: Generator Owner, Generator Operator

4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.

Provide any suggested revisions you feel would improve the readability of this example.

Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion

Answer	No
Document Name	

Comment

The BES definition should govern applicability and individual standards should not be conflicting with an approved defintoin.

Likes 0	
Dislikes 0	

Response

Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez

Answer	No
Document Name	

Comment

SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards. In addition, 4.1 Facilities definition has redundant "that" in its description.

Likes 0	
Dislikes 0	

Response

Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	
The 60 kV voltage threshold value will limit the application of resources. Please consider reducing the voltage value to 40 kV. Additionally, the NERC Glossary of Terms “Bulk Electric System” definition I2A for synchronous machines uses the phrase: “a) Gross individual nameplate rating ‘greater’ than 20 MVA”; suggest changing 20 MVA language to “4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of ‘greater' than 20 MVA,” to consolidate language and reduce confusion with the implied 20 MVA value.	
Likes 0	
Dislikes 0	
Response	

Carver Powers - Utility Services, Inc. - 4	
Answer	No
Document Name	
Comment	
Recommend that the proposed language for Section 4.1 Facilities, part 2 align with the pending GO/GOP NERC Glossary of Terms revisions and the pending compliance registry definitions.	
Likes 0	
Dislikes 0	
Response	

Megan Melham - Decatur Energy Center LLC - 5	
Answer	No
Document Name	
Comment	
Capital Power supports the NAGF comments as below: The NAGF recommends that the proposed language for Section 4.1 Facilities, part 2 align with the pending GO/GOP NERC Glossary of Terms revisions.	
Likes 0	
Dislikes 0	
Response	
Marty Hostler - Northern California Power Agency - 4	
Answer	No
Document Name	
Comment	
No. Should not say 60 KV. Industry, NERC, and FERC agreed a long time ago on 100 KV.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF recommends that the proposed language for Section 4.1 Facilities, part 2 align with the pending GO/GOP NERC Glossary of Terms revisions.	
Likes 0	
Dislikes 0	
Response	

Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
Should not say 60 KV. Industry, NERC, and FERC agreed a long time ago on 100 KV.	
Likes 0	
Dislikes 0	
Response	
Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2	
Answer	No
Document Name	
Comment	
SPP has concern that the approach of each standard defining the applicable units may create conflicting issues amongst various standards. This one-off concept (not being defined in the glossary of terms or Rules of Procedure RoP) could cause confusion and will not have a solid reference outside of the actual language located in the standard. For example, if a standard is retired that uses this concept, it could create a gap in the IBR process and may require the reopening of various standards. Our concerns include the current BES definition properly aligning among this drafting team and drafting team efforts that are focused on the Inverter-Based Resource (IBR). The current definition does not take into consideration the IBR characteristics and impacts. With that said, SPP recommends that the drafting team ensure the definitions of what is included and excluded within the BES definitions for proper alignment with other NERC standards in reference to the new technology and its impact on the reliability of the grid.	
Likes 0	
Dislikes 0	
Response	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	No
Document Name	
Comment	

The format proposed by the Standard Drafting Team (SDT) is a good way to define applicability within each Standard, however, we feel that the language proposed in NERC Standards Project 2021-04 Modifications to PRC-002 - Phase II, PRC-028-1 draft #2, is even better. This language is formatted as follows:

"4.1. Functional Entities:

4.1.1. Generator Owner *that owns equipment as identified in section 4.2* [emphasis added]

4.1.2. Generator Operator *that operates equipment as identified in section 4.2* [emphasis added]

4.2. Facilities: The Elements associated with (1) BES Inverter-Based Resources; and (2) Non-BES Inverter-Based Resources that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV."

Likes 0	
Dislikes 0	

Response

Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting

Answer	Yes
Document Name	

Comment

Slight editorial changes such as :

1) There are two "4.1" in Section 4, which is in error we believe.

2) The acronym "(IBR)" should be on the first use of the term, not the second.

3) It states "that that" after the current use of (IBR) presently.

Likes 0	
Dislikes 0	

Response

Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	Yes
Document Name	

Comment

PG&E has no suggested revisions that could improve the readability of the Applicability except for making “Facility” 4.2 and not 4.1.

Likes 0	
Dislikes 0	

Response

Donna Wood - Tri-State G and T Association, Inc. - 1

Answer	Yes
Document Name	

Comment

Tri-State Generation and Transmission supports the comments of the MRO NSRF.

Likes 0	
Dislikes 0	

Response

David Jendras Sr - Ameren - Ameren Services - 3

Answer	Yes
Document Name	

Comment

Ameren would like an example of how they use IBR unit in a compliance definition, for example in PRC-029 for a plant where you have mixed types of IBR units.

Likes 0	
Dislikes 0	

Response

Dwanique Spiller - Berkshire Hathaway - NV Energy - 5

Answer	Yes
Document Name	

Comment

NV Energy agrees that the applicability section and/or actual requirements should define the scope of equipment included/excluded whether it be a

Category 1 GO/GOP or Category 2 GO/GOP, as Defined in the proposed NERC ROP.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
No Comments.	
Likes 0	
Dislikes 0	
Response	
Pirouz Honarmand - Pirouz Honarmand On Behalf of: Helen Lainis, Independent Electricity System Operator, 2; - Pirouz Honarmand	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dave Krueger - SERC Reliability Corporation - 10	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	

Response

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC

Answer	Yes
Document Name	

Comment

Likes 0	
Dislikes 0	

Response

Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro

Answer	
Document Name	

Comment

BC Hydro sees a potential conflict between IBR as defined here and the recent updates to the NERC Rules of Procedure to the Generator Owner and Operator definitions.

In the current draft of the NERC Rules of Procedure – Appendix 2 Definitions used in the Rules of Procedure and Appendix 5B Statement of Compliance Registry Criteria (Revision 8), the Category 2 Generator Owner entity is defined as “owns and maintains non-BES inverter based **generating resources** (emphasis added) that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV (Category 2 GO)”.

BC Hydro appreciates the discussion at item #3 in the Technical Rationale. However, depending on the interpretation of “generating resources”, owners of certain IBR types such as battery energy storage systems (BESS) or Electric Vehicles may not be registered as a GO for these facilities. This would create a potential discrepancy between definitions which may create a gap in the intended scope of applicability for MOD-026-2 and potentially other reliability standards, i.e., entities that would be included under the applicability section of the standard wouldn’t be part of the MRS Program as they may not be registered if they don’t meet the GO definition.

Likes 0	
Dislikes 0	

Response

Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	
Document Name	
Comment	
Black Hills Corporation recommends that the proposed language for “Section 4.1. Facilities” be updated to align with the pending GO & GOP definition revisions in the NERC Rules of Procedure.	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	
Document Name	
Comment	
AEPC has signed on to ACES comments: We recommend modifying Section 4.1 Functional Entities to specifically reference the new Category 1 GO/GOP and Category 2 GO/GOP definitions.	
Likes 0	
Dislikes 0	
Response	

Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	
Document Name	
Comment	
MRO NSRF agrees that the applicability section and/or actual requirements should define the scope of equipment included/excluded whether it be a Category 1 GO/GOP or Category 2 GO/GOP, as Defined in the proposed NERC ROP.	
Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	
Document Name	
Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	
The IBR definition states that they have a common point of interconnection. As such, it doesn't need to be stated again so 4.1 could state: **4.1 Facilities:** (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity at a voltage greater than or equal to 60 kV.	
Likes 0	
Dislikes 0	

Response
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company
Answer	
Document Name	
Comment
Likes 0	
Dislikes 0	
Response
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring
Answer	
Document Name	
Comment
It appears that there was not a question above that can be answered Yes or NO, so WECC did not respond. However we do have the folloing thoughts. Note- ALL SDTs needs to be clear in the usage of proposed terms- In the example question, the phrases “IBR unit” and “applicable units” are used. As esoteric as that is, the question clearly demonstrates that the current and future SDTs using the terms should do so carefully and deliberately. Defined terms are critical and using additional descriptors (especially the same term) can lead to various interpretations/thoughts by all entities. Is there any reason why “IBR” is not shown after item 1 phrase? Is there a distinction trying to be made by use or non-use of the hyphen in IBR terms within item 1 and 2? The use of “connection” versus “interconnection”
Likes 0	
Dislikes 0	
Response
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable
Answer	
Document Name	
Comment
EEI has no suggested modifications regarding the readability of the example applicability language.
Likes 0	

Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	
Document Name	
Comment	
Paragraph 2 in the posted technical rationale is clear enough without this example. At this point, adding an example may just cause more confusion becuase the approach for expanding the registration to include these (currently non-BES) facilities has not been finalized. The example may make sense if NERC continues with its current approach of expanding GO/GOP registration criteria, but if NERC were to return to the originally proposed approach of creating new registration categories the specification of facilities in this example would be redundant.	
Likes 0	
Dislikes 0	
Response	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	
We recommend modifying Section 4.1 Functional Entities to specifically reference the new Category 1 GO/GOP and Category 2 GO/GOP definitions.	
Likes 0	
Dislikes 0	
Response	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	
ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) for this response and adopts them as its own.	
Likes 0	

Dislikes 0	
Response	
Amy Wilke - American Transmission Company, LLC - 1	
Answer	
Document Name	
Comment	
No comments.	
Likes 0	
Dislikes 0	
Response	

4. Provide any additional comments for the DT to consider, if desired.

Amy Wilke - American Transmission Company, LLC - 1

Answer	
Document Name	

Comment

The standard should operate as a stand-a-lone document. The standard should address the who, what, when, where and sometimes how (not always). The Tech Rationale is only “why” a requirement is in the standard. References to the Tech Rationale can be misleading in that it is not part of the standard.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2

Answer	
Document Name	

Comment

ERCOT joins the comments submitted by the IRC SRC for this response and adopts them as its own.

Likes 0	
Dislikes 0	

Response

Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2

Answer	
Document Name	

Comment

If determined that load should be included, SPP recommends the Standard Drafting Team consider concurrently undertaking the necessary process to have the SAR(s) revised to allow for more broadly applicable Glossary of Terms definitions while continuing to develop this definition.

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	
Thank you for the opportunity to comment.	
Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	
Document Name	
Comment	
1. Line 89 in the Technical Rationale currently states: “Unit if they end up with their own definition).” The SRC recommends that line 89 be changed to: “Unit definitions:” 2. The SRC does not believe Inclusion of the statement “IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell” in the IBR definition is necessary and therefore recommends that it be deleted. If the SDT determines there is a benefit to keeping this list of examples, the SRC suggests that the list be changed to read: “IBRs include, but are not limited to, solar photovoltaic (PV) Facilities, Type 3 and Type 4 wind Facilities, battery energy storage system (BESS) Facilities, and fuel cell Facilities.” Listing only “solar photovoltaic (PV)” is somewhat ambiguous, as it could be understood refer to just the PV panel or to an IBR Unit (which may or may not be an IBR according to the proposed definition).	
Likes 0	
Dislikes 0	

Response

Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	
Document Name	
Comment	
WECC appreciates the efforts of the SDT to ensure clarity in the definitions and use of the definitions moving forward to help ensure reliable planning	

and operation of the BPS.	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	

The NAGF provides the following additional comments for consideration:

a. The NAGF is concerned with the use of the term "unit" in the proposed IBR Unit definition as it seems to conflict with the way industry currently uses the term. Recommend that Drafting Team consider replacing with the term with "element" or "device" in the event the Drafting Team continues to support the need for two definitions.

b. The NAGF recommends that the proposed IBR Unit definition be revised as follows:

"An individual device or a grouping of multiple devices, that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system."

c. Technical Rationale – the document currently references the terms "IBR", "IBR Unit", and "IBR plant/facility". Recommend that the document references align with the IBR Glossary of Terms definitions to eliminate possible confusion.

d. The NAGF notes that there are two SARs that form the basis for this project:

i. Modifications to MOD-026 and MOD-027

ii. Applicability revisions for transmission connected dynamic reactive resources

The scope of these SARs does not appear to provide the SDT with the latitude to modify the NERC Glossary of Terms for IBRs. The MOD-026/027 SAR does not have the box checked for "Add, Modify or Retire a Glossary Term". While the transmission connected dynamic reactive resources SAR does have such box selected, it limits such changes to "also define new Glossary Terms for TCDRR or related terms". Therefore, the NAGF requests that the Drafting Team revisit the SARs accordingly to ensure that the Drafting Team is not overstepping their intended scope.

Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	
Document Name	

Comment
FirstEnergy requests as the drafting team moves forward with this endeavor that they ensure the applicability is maintained across all standards that relate to this topic.

Likes 0	
Dislikes 0	

Response

Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	
Document Name	

Comment
Upon review of the SARs under which this Standard Drafting Team is operating, NV Energy is of the opinion that the creation of a new glossary of terms definition such as “Inverter Based Resource” is not currently within scope for the Standard Drafting Team. NV Energy would suggest that the Standard Drafting Team concurrently undertake the necessary process to have the SAR(s) revised to allow for the creation of broadly applicable Glossary of Terms definitions, while also continuing to develop this definition to allow for further improvements to the reliability of the Bulk Power System while adhering to the rules for standard development as prescribed by the Standard Processes Manual.

Likes 0	
Dislikes 0	

Response

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	
Document Name	

Comment
NPCC RSC supports the IBR and IBR unit definition.

Likes 0	
Dislikes 0	

Response

Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company

Answer	
Document Name	
Comment	

First, there are concerns with the use of "Unit" in the **IBR Unit** definition due to the current and historical use of the term "Unit" with respect to generating plants. Often, that term has been and is used to represent the entire facility, not specifically the AC power producing component. Consider changing "IBR Unit" to "IBR Device" to resolve this concern and confusion. Note this possible confusion even exists within the Comment item #3 above where the difference between Unit and unit is very significant.

Second, the SDT should consider the compatibility of the proposed IBR definition, as depicted in Figure 2.1 of the Technical Rational with the existing BES definition, I4 inclusion. The definition does not include the collection system (below 75MVA) in the scope of the parts of a facility.

Likes 0	
Dislikes 0	
Response	

Marty Hostler - Northern California Power Agency - 4	
Answer	
Document Name	
Comment	

None.

Likes 0	
Dislikes 0	
Response	

Megan Melham - Decatur Energy Center LLC - 5	
Answer	
Document Name	
Comment	

Capital Power supports the NAGF comments as below:

The NAGF provides the following additional comments for consideration:

a. The NAGF is concerned with the use of the term “unit” in the proposed IBR Unit definition as it seems to conflict with the way industry currently uses the term. Recommend that Drafting Team consider replacing with the term with “element” or “device” in the event the Drafting Team continues to support the need for two definitions.

b. The NAGF recommends that the proposed IBR Unit definition be revised as follows:

“An individual device or a grouping of multiple devices, that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system.”

c. Technical Rationale – the document currently references the terms “IBR”, “IBR Unit”, and “IBR plant/facility”. Recommend that the document references align with the IBR Glossary of Terms definitions to eliminate possible confusion.

d. The NAGF notes that there are two SARs that form the basis for this project:

i. Modifications to MOD-026 and MOD-027

ii. Applicability revisions for transmission connected dynamic reactive resources

The scope of these SARs does not appear to provide the SDT with the latitude to modify the NERC Glossary of Terms for IBRs. The MOD-026/027 SAR does not have the box checked for “Add, Modify or Retire a Glossary Term”. While the transmission connected dynamic reactive resources SAR does have such box selected, it limits such changes to “also define new Glossary Terms for TCDRR or related terms”. Therefore, the NAGF requests that the Drafting Team revisit the SARs accordingly to ensure that the Drafting Team is not overstepping their intended scope.

Likes 0	
Dislikes 0	

Response

Donna Wood - Tri-State G and T Association, Inc. - 1

Answer	
Document Name	

Comment

NA

Likes 0	
Dislikes 0	

Response

Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC

Answer	
Document Name	

Comment

There is a need to ensure the IBR definition is sufficiently clear to determine if pumped storage facilities (particularly new variable speed pumped storage technologies that act similar to IBRs) might be considered as an applicable generator, so that when applying standards and requirements to these facilities, it is clear as to which applies. Does every plant need to be classified as a synchronous generator or an IBR? If so, pumped storage facilities, for example, could be considered to act like bulk energy system synchronous machines due to charging and discharging modes, while at the

same time ride-thru capabilities may not seamlessly apply.	
Likes 0	
Dislikes 0	
Response	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	
Document Name	
Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	
none	
Likes 0	

Dislikes 0	
Response	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	
Document Name	Project 2020-06 MRO NSRF IBR Definition 20240403 Final.docx
Comment	
Upon review of the SARs under which this Standard Drafting Team is operating, MRO NSRF is of the opinion that the creation of a new glossary of terms definition such as “Inverter Based Resource” is not currently within scope for the Standard Drafting Team. MRO NSRF would suggest that the Standard Drafting Team concurrently undertake the necessary process to have the SAR(s) revised to allow for the creation of broadly applicable Glossary of Terms definitions, while also continuing to develop this definition to allow for further improvements to the reliability of the Bulk Power System while adhering to the rules for standard development as prescribed by the Standard Processes Manual. See attachment!	
Likes 0	
Dislikes 0	
Response	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	
Document Name	
Comment	
SRP does not support the addition or modification of this term to the standard. This new term defines IBR’s being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.	
Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	
Document Name	
Comment	

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1

Answer	
Document Name	

Comment

None

Likes 0	
Dislikes 0	

Response

Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments

Answer	
Document Name	

Comment

Black Hills Corporation agrees with comments provided by NAGF, EEI and other industry peer groups.

Likes 0	
Dislikes 0	

Response

Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	
Document Name	

Comment

PG&E has no further comments for the DT, but does wish to thank the DT for listening to the industry in making the current modifications in a difficult

and contentious process.	
Likes 0	
Dislikes 0	
Response	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	
Document Name	
Comment	
Great Job, this is not an easy task!	
Likes 0	
Dislikes 0	
Response	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project Name:	2020-06 Verifications of Models and Data for Generators | Draft 2 of IBR Definitions
Comment Period Start Date:	2/22/2024
Comment Period End Date:	4/8/2024
Associated Ballot(s):	2020-06 Verifications of Models and Data for Generators IBR Unit AB 2 DEF 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan AB 2 OT 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) AB 2 DEF

There were 49 sets of responses, including comments from approximately 144 different people from approximately 102 companies representing 10 of the Industry Segments as shown in the table on the following pages.

All comments submitted can be reviewed in their original format on the project page.

If you feel that your comment has been overlooked, let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, contact Manager of Standards Information, Nasheema Santos (via email) or at (404) 446-2564.

Questions

1. Do you support the definition for Inverter-based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

3. As discussed in the Technical Rationale, the proposed definitions would define the scope of equipment, but would not define the scope of IBR units subject to mandatory compliance with Reliability Standards. Each standard would define the applicable units subject to compliance with that standard. An example to include both BES and non-BES IBRs is as follows:

Section 4. Applicability:

4.1 Functional Entities: Generator Owner, Generator Operator

4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.

Provide any suggested revisions you feel would improve the readability of this example.

4. Provide any additional comments for the DT to consider, if desired.

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
BC Hydro and Power Authority	Adrian Andreoiu	1	WECC	BC Hydro	Hootan Jarollahi	BC Hydro and Power Authority	3	WECC
					Helen Hamilton Harding	BC Hydro and Power Authority	5	WECC
					Adrian Andreoiu	BC Hydro and Power Authority	1	WECC
MRO	Anna Martinson	1,2,3,4,5,6	MRO	MRO Group	Shonda McCain	Omaha Public Power District (OPPD)	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jamison Cawley	Nebraska Public Power District	1,3,5	MRO
					Jay Sethi	Manitoba Hydro (MH)	1,3,5,6	MRO
					Husam Al-Hadidi	Manitoba Hydro (System Preformance)	1,3,5,6	MRO
					Kimberly Bentley	Western Area Power Adminstration	1,6	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Jaimin Patal	Saskatchewan Power Coporation (SPC)	1	MRO
					George Brown	Pattern Operators LP	5	MRO
					Larry Heckert	Alliant Energy (ALTE)	4	MRO
					Terry Harbour	MidAmerican Energy Company (MEC)	1,3	MRO
					Dane Rogers	Oklahoma Gas and Electric (OG&E)	1,3,5,6	MRO
					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO
					Michael Ayotte	ITC Holdings	1	MRO
					Andrew Coffelt	Board of Public Utilities-Kansas (BPU)	1,3,5,6	MRO
					Peter Brown	Invenergy	5,6	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Angela Wheat	Southwestern Power Administration	1	MRO
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,SPP RE,WECC	SRC 2023	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Helen Lainis	IESO	1	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Elizabeth Davis	PJM	2	RF
					Kennedy Meier	Electric Reliability Council of Texas, Inc.	2	Texas RE
WEC Energy Group, Inc.	Christine Kane	3		WEC Energy Group	Christine Kane	WEC Energy Group	3	RF
					Matthew Beilfuss	WEC Energy Group, Inc.	4	RF
					Clarice Zellmer	WEC Energy Group, Inc.	5	RF
					David Boeshaar	WEC Energy Group, Inc.	6	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Southern Company - Southern Company Services, Inc.	Colby Galloway	1,3,5,6	MRO,RF,SERC,Texas RE,WECC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	2	WECC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Bill Pezalla	Old Dominion Electric Cooperative	3,4	SERC
					Jason Procuniar	Buckeye Power, Inc.	4	RF
					Jolly Hayden	East Texas Electric Cooperative, Inc.	NA - Not Applicable	Texas RE
					Nick Fogleman	Prairie Power, Inc.	1,3	SERC
					Kylee Kropp	Sunflower Electric Power Corporation	1	MRO
FirstEnergy - FirstEnergy Corporation	Mark Garza	4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy-FirstEnergy	1,3,4,5,6	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
Michael Johnson	Michael Johnson		WECC	PG&E All Segments	Marco Rios	Pacific Gas and Electric Company	1	WECC
					Sandra Ellis	Pacific Gas and Electric Company	3	WECC
					Tyler Brun	Pacific Gas and Electric Company	5	WECC
Black Hills Corporation	Rachel Schuldt	6		Black Hills Corporation - All Segments	Micah Runner	Black Hills Corporation	1	WECC
					Josh Combs	Black Hills Corporation	3	WECC
					Rachel Schuldt	Black Hills Corporation	6	WECC
					Carly Miller	Black Hills Corporation	5	WECC
					Sheila Suurmeier	Black Hills Corporation	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Alain Mukama	Hydro One Networks, Inc.	1	NPCC
					Deidre Altobell	Con Edison	1	NPCC
					Jeffrey Streifling	NB Power Corporation	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael Ridolfino	Central Hudson Gas & Electric Corp.	1	NPCC
					Randy Buswell	Vermont Electric Power Company	1	NPCC
					James Grant	NYISO	2	NPCC
					John Pearson	ISO New England, Inc.	2	NPCC
					Harishkumar Subramani Vijay Kumar	Independent Electricity System Operator	2	NPCC
					Randy MacDonald	New Brunswick	2	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
						Power Corporation		
					Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
					David Burke	Orange and Rockland	3	NPCC
					Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
					Salvatore Spagnolo	New York Power Authority	1	NPCC
					Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
					David Kwan	Ontario Power Generation	4	NPCC
					Silvia Mitchell	NextEra Energy - Florida Power and Light Co.	1	NPCC
					Glen Smith	Entergy Services	4	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Sean Cavote	PSEG	4	NPCC
					Jason Chandler	Con Edison	5	NPCC
					Tracy MacNicoll	Utility Services	5	NPCC
					Shivaz Chopra	New York Power Authority	6	NPCC
					Vijay Puran	New York State Department of Public Service	6	NPCC
					ALAN ADAMSON	New York State Reliability Council	10	NPCC
					David Kiguel	Independent	7	NPCC
					Joel Charlebois	AESI	7	NPCC
					Joshua London	Eversource Energy	1	NPCC
Elevate Energy Consulting	Ryan Quint	NA - Not Applicable	NA - Not Applicable	Elevate Energy Consulting	Ryan Quint	Elevate Energy Consulting		NA - Not Applicable
					N/A	N/A		NA - Not Applicable

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Dominion - Dominion Resources, Inc.	Sean Bodkin	6		Dominion	Connie Lowe	Dominion - Dominion Resources, Inc.	3	NA - Not Applicable
					Lou Oberski	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
					Larry Nash	Dominion - Dominion Virginia Power	1	NA - Not Applicable
					Rachel Snead	Dominion - Dominion Resources, Inc.	5	NA - Not Applicable
Western Electricity Coordinating Council	Steven Rueckert	10		WECC Entity Monitoring	Steve Rueckert	WECC	10	WECC
					Phil O'Donnell	WECC	10	WECC
Tim Kelley	Tim Kelley		WECC	SMUD and BANC	Nicole Looney	Sacramento Municipal Utility District	3	WECC
					Charles Norton	Sacramento Municipal Utility District	6	WECC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Wei Shao	Sacramento Municipal Utility District	1	WECC
					Foung Mua	Sacramento Municipal Utility District	4	WECC
					Nicole Goi	Sacramento Municipal Utility District	5	WECC
					Kevin Smith	Balancing Authority of Northern California	1	WECC

1. *Do you support the definition for Inverter-based Resource (IBR) as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support*.

Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	No
Document Name	
Comment	
- The off-shore IBR connected via VSC-HVDC should be included in the IBR definition list of examples. *- We have concerns about the term 'not limited to' in the definition, which may create some confusion about what could be considered as IBR, such as a STATCOM with limited active power capability to support the system inertia or system reliability, that should not belong to the IBR, even it meets the IBR definition. We proposed adding the exclusion terms in the definition, which may state that an inverter-based plant with limited active power capability is not part of the IBR definition.* *- Any FACT device connected to the IBR plant to support the IBR operation should be included in the IBR auxiliary equipment and be part of the IBR definition.*	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this comment will be passed along to the drafting team (DT) for consideration when drafting the next draft of the IBR definition. The DT will consider not carrying the IBR Unit term for the next ballot.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	No
Document Name	
Comment	

Dominion Energy does not agree with the proposed definition and offers the following alternative: **Inverter Based Resources (IBR):** IBRs include all NERC registered generating facilities directly connected to the Bulk Power System at 60kV and above using power electronic devices that change direct current (DC) power produced by a resource to alternating current (AC).	
Likes 0	
Dislikes 0	
Response	
It is the DT's intent that IBR can apply to any voltage class and are not inherently linked to NERC registration. Newly proposed NERC registration types specifically call those out as non-registered IBRs.	
Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	No
Document Name	
Comment	
MBS supports the direction the SDT has taken. However, we believe that the sentence providing examples should be deleted. This sentence is not necessary, and may cause ambiguity on what other technologies may or may not qualify. MBS would support the definition if the examples were left out.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has addressed the listed examples from FERC Order No.901, in which examples have proven to pose risks to the transmission system reliability as documented by ERO disturbance reports. It was not the DT intent to exclude any types of inverter-based resources.	
Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	No

Document Name	
Comment	
Black Hills Corporation believes that only the Inverter-Based Resource (IBR) definition is needed. Consider revision of the definition as follows: *"Generating unit that consists of an individual device or a grouping of multiple devices that:* • *use a power electronic interface, such as an inverter or converter,* • *can export Real Power from a primary energy source or energy storage system,* • *and are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission."*	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has re-considered the use of IBR Unit and is no longer proposing it as a definition in the new ballot.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	No
Document Name	
Comment	
AEPC has signed on to ACES comments: We at ACES applaud the SDT for the work that has been put into developing these definitions. We are greatly encouraged by the SDT's willingness to heed industry feedback and implement changes to the IBR definition. It is the opinion of ACES that the currently proposed IBR definition, while overall very good, would benefit from a few minor changes. It is our opinion that the addition of the phrase "plant/facility" within the definition potentially introduces more confusion than it eliminates. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that	

the term facility
should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) in order to be more consistent with other uses of this phrase within the NERC Glossary of Terms.

Lastly, we believe that the last sentence of the definition wherein a list of example technologies is provided should be struck. It is our perspective that this list is superfluous and unnecessary. While we appreciate the intent of the SDT in providing said list, we believe this level of granularity is best provided via the Reliability Standards themselves as stated in Section 2 of the Technical Rationale (e.g., "…the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable."). If it is the intention of the SDT to specifically exclude certain resource types, then we suggest either providing an explicit list of excluded resource types or modifying the definition in such a manner so as to not include these resource types in the first place. Thus, it is our recommendation that the IBR definition be renamed to IBR Facility and modified as follows:

- **Inverter-Based Resource (IBR) Facility**: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of interconnection.

Likes 0	
Dislikes 0	

Response

Thank you for the comment, the DT has considered the use plant/facility but maintains that an IBR is meant to be synonymous with the topology of a plant and facility. The DT has addressed the listed examples from FERC Order no.901 and which examples have proven to pose risks to the transmission system reliability as documented by ERO disturbance reports. It was not the DT intent to exclude any types of inverter-based resources.

Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez

Answer	No
Document Name	

Comment

SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.

Likes 0	
Dislikes 0	
Response	
The original SAR of the Project 2020-06 requires the explicit consideration of IBR in MOD-026 and MOD-027. In addition, as of the current effective version of MOD-026 and MOD-027 these currently apply to IBR.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
• Entergy believes that this Inverter-Based Resource (IBR) definition and IBR Unit definition should be combined into to a single definition. • Proposed definition is "A facility that is connected to the electric system, consisting of one or more devices using a power electronic interface (such as an inverter or converter) and capable of exporting Real Power and acting as a single resource at a common point of interconnection. IBRs include but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell."	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has re-considered the use of IBR Unit and is no longer proposing it as a definition in the new ballot.	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No
Document Name	
Comment	
Defining Inverter-Based Resource (IBR) at an aggregate level and at individual level, having two definitions, is unnecessary and inconsistent with existing defined terms. An IBR is a piece of electrical equipment and therefore the definition should stay consistent with defining it as a piece of electrical equipment. Resource is not a defined term and can be used to define either an individual unit or	

aggregate set of units, please see Blackstart Resource definition. Further, defined terms already exist, such as Facility, that can be utilized to clearly articulate that IBR term is intended to be used at an aggregate level in certain contexts. Additionally, undefined terms such as facility or plant can be used, as currently done in existing standards, when a defined term is not adequate. For example, IBR generating Facility or facility would refer to the aggregate level, whereas IBR individual generating unit would refer to a single wind turbine generator or photovoltaic inverter.

The MRO NSRF proposes the following:

Inverter-Based Resource (IBR):

A generating unit(s) that consists of an individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission.

Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	

Response

Thank you for the comment, this comment will be passed along to the DT for consideration for the next draft of the IBR definition. The team will consider no IBR Unit term for the next ballot.

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF

Answer	No
Document Name	

Comment

Duke Energy proposes the following three (3) IBR building-block related definitions. Dividing the NERC definitions into 3 definitions, helps align the terms with current NERC usage of the terms for non-IBR generators and with other industry IBR standards. Unit is normally understood as a combination of related equipment which together functions as a single entity for the industry and GADS reported data. This proposed matching of terms will also reduce confusion within other standards. Additionally, the modeling standard should recognize that modeling may need to be split by inverter model and/or resource type but recombined as a unit based on how the devices are

controlled (e.g., PV and BESS inverters need different models, but may be operated together to regulate voltage). The fact that the devices must be modeled differently does not mean that each type of inverter must be defined as a unit.

Definition #1

Inverter-Based Resource Plant/Facility (IBR Plant/Facility): A plant/facility connected to the electric system that consist of one or more IBR Unit(s) at a common point of interconnection. IBRs types include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell.

Justification: With regard to the removal of "Operated as a single resource", this phrase implied that each unit must be combined to operate as a single resource. Generally, multiple units at a plant are controlled individually.

Definition #2

Inverter-Based Resource Unit (IBR Unit): A single or group of devices that are operated and controlled together as a single resource (entity). The unit utilizes a power electronic interface, such as inverters or converters, capable of exporting Power from a primary energy source or energy storage system.

Justification: The phrase "Single point on the collector system" was removed because that the implied condition could result in multiple interpretations. The SDT was possibly assuming that the IEEE Point of Connection term is equivalent to the phrase "single point on the collector system" but are not equivalent in several cases.

Definition: Unit - An electricity generator and related equipment essential to the electricity generator's operation, which together function as a single entity. (Source: Generating Unit Definition: 414 Samples | Law Insider)

Definition #3

Inverter-Based Resource Device (IBR Device): An individual device, such as an inverter or converter, capable of exporting Power from a primary energy source or energy storage system.

Justification: This additional term was added because the NERC use of the term Unit does not align well with IEEE IBR Unit. The IEEE definition of an IBR unit is directed towards a component, or device. It can be a single inverter, a central inverter unit, or a group of inverters tested by a NRTL to function together. The NERC definition of a Unit appears more focused on a collection of individual devices designed and constructed to function together, but not designed as a single package.

Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this comment will be passed along to the DT for consideration for the next draft of a singular IBR definition. The team decided to re ballot IBR as a single definition instead multiple.	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please see the response MRO NSRF.	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
The Draft 2 "IBR" definition states that it's a plant/facility consisting of one or more IBR Unit(s). The definition of "consisting" is "composed or made up of". As such, the definition is basically stating that an IBR is made up of IBR Unit(s). This is not correct as the updated definition of an IBR Unit is that it's a "device" and not a "plant/facility". As such, suggest changing the words "consisting of" to "using" such that the definition would then read:	

"A plant/facility that is connected to the electric system **using** one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell."	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has decided to remove IBR Unit and only ballot the term IBR. The team has updated IBR to not include IBR Unit within the new definition.	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	No
Document Name	
Comment	
Tri-State Generation and Transmission supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please see the response to MRO NSRF's comment.	
Carver Powers - Utility Services, Inc. - 4	
Answer	No
Document Name	
Comment	
The proposed definition first states that an IBR is a plant/facility but the last sentence state that an "IBR includes" and then lists a type of technology (solar photovoltaic) and elements that include inverters to convert power from DC to AC (Type 3 and Type 4) and elements	

that require separate devices (battery energy storage system, fuel cell). With the proposed definition, it is unclear whether an IBR is an Element or a plant/facility.

Suggest moving the concepts detailed in the second sentence to the IBR Unit definition for clarity of the undefined term “power source” used in that definition.

Both “plant” and “facility” are not defined. The term facility is often confused with the NERC defined term “Facility”. CIP-002 R1 uses the undefined term “asset” and then lists the applicable assets. Suggest replacing the term “facility” with “asset”.

The term “electric system” is undefined. It seems that the intent is to allow the IBR definition to apply to more than the BES or BPS but any two electrical devices connected together could be an “electric system”. Suggest referencing that the IBR is used to convert power that is exported from the plant/facility.

Recommend clarifying “Type 3 and Type 4 wind” by including “turbine” after wind in the proposed IBR definition.

“Solar photovoltaic” is a type of technology or method to generate electricity and not a device. A plant may have ancillary devices such as lights and cameras, that use solar photovoltaic cells to charge their batteries. These ancillary devices should not be IBRs.

The NERC glossary does not define acronyms within definition for a different term. Both PV and BESS acronyms should not be included in the definition of IBR.

Suggest the following:

“Inverter-Based Resource (IBR): A plant/asset that uses one or more IBR Unit(s) for the conversion of power for export from the plant/asset and operated as a single resource at a common point of interconnection.”

Likes 0	
Dislikes 0	

Response

The IBR definition states that the IBR is a plant/facility comprised of those individual technology types. This is as opposed to a synchronous resource that is comprised of synchronous generators.

IBR Unit Definition has been removed and will not be balloted this next balloting period.

It was the DT's intent to use lowercase plant/facility in order to keep it separate from the NERC defined term Facility. It was the DT's intent that IBR can refer to any voltage class system, as long as it is a plant/facility that is made up of one or more individual devices that export power to an AC electric system using power electronic devices. The DT agrees with this final point.	
Megan Melham - Decatur Energy Center LLC - 5	
Answer	No
Document Name	
Comment	
Capital Power supports the NAGF comments for the IBR definition as below: The NAGF believes that only the Inverter-Based Resource (IBR) definition is needed and should be revised as follows: "A generating unit(s) that consists of one or more individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission."	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has re-considered the use of IBR Unit and is no longer proposing it as a definition in the new ballot.	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	
Comment	
Defining Inverter-Based Resource (IBR) at an aggregate level and at individual level, having two definitions, is unnecessary and inconsistent with existing defined terms. An IBR is a piece of electrical equipment and therefore the definition should stay consistent with	

defining it as a piece of electrical equipment. Resource is not a defined term and can be used to define either an individual unit or aggregate set of units, please see Blackstart Resource definition. Further, defined terms already exist, such as Facility, that can be utilized to clearly articulate that IBR term is intended to be used at an aggregate level in certain contexts. Additionally, undefined terms such as facility or plant can be used, as currently done in existing standards, when a defined term is not adequate. For example, IBR generating Facility or facility would refer to the aggregate level, whereas IBR individual generating unit would refer to a single wind turbine generator or photovoltaic inverter.

NV Energy proposes the following:

Inverter-Based Resource (IBR):

A generating unit(s) that consists of an individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission.

Likes 0	
Dislikes 0	

Response

Thank you for the comment, this will be passed along to the DT for consideration in the next draft of the terms. The DT also will not be moving forward with the IBR Unit term in the next ballot.

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	No
Document Name	

Comment

The NAGF believes that only the Inverter-Based Resource (IBR) definition is needed and should be revised as follows:

"A generating unit(s) that consists of one or more individual device(s) that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that are connected through a system designed primarily for delivering Real Power to a common point of interconnection to Transmission."

Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has re-considered the use of IBR Unit and is no longer proposing it as a definition in the new ballot.	
Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
We believe the SDT needs to explain or clarify what "the electric system" is and how an IBR relates to the Bulk Electric System.	
Likes 0	
Dislikes 0	
Response	
IBR does not specifically relate to the BPS or BES as defined by NERC. IBRs can be located on any voltage class system.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	No
Document Name	
Comment	
We at ACES applaud the SDT for the work that has been put into developing these definitions. We are greatly encouraged by the SDT's willingness to heed industry feedback and implement changes to the IBR definition. It is the opinion of ACES that the currently proposed IBR definition, while overall very good, would benefit from a few minor changes. It is our opinion that the addition of the phrase "plant/facility" within the definition potentially introduces more confusion than it eliminates. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that	

the term facility should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) in order to be more consistent with other uses of this phrase within the NERC Glossary of Terms.

Lastly, we believe that the last sentence of the definition wherein a list of example technologies is provided should be struck. It is our perspective that this list is superfluous and unnecessary. While we appreciate the intent of the SDT in providing said list, we believe this level of granularity is best provided via the Reliability Standards themselves as stated in Section 2 of the Technical Rationale (e.g., "…the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable."). If it is the intention of the SDT to specifically exclude certain resource types, then we suggest either providing an explicit list of excluded resource types or modifying the definition in such a manner so as to not include these resource types in the first place.

Thus, it is our recommendation that the IBR definition be renamed to IBR Facility and modified as follows:

Inverter-Based Resource (IBR) Facility: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of interconnection.

Likes 0	
Dislikes 0	

Response

Thank you for the comment, the DT has considered the use plant/facility but maintains that an IBR is meant to be synonymous with the topology of a plant and facility.
The DT has addressed the listed examples from FERC Order no.901 and which examples have proven to pose risks to the transmission system reliability as documented by ERO disturbance reports.
It was not the DT intent to exclude any types of inverter-based resources.

Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2

Answer	No
Document Name	

Comment

SPP requests the drafting team consider that some large loads may also use power electronic interfaces which may also encounter Sub Synchronous Resonance issues. SPP encourages the drafting team to consider if such loads should be considered in the IBR definitions

due to these similarities. While they do not inject real power into the grid, they do pull real power from the grid and the impacts of these types of loads tripping off can have impacts to reliability. Large loads can be considered resources when utilized as demand response, though requirements may need to be considered beyond a resource definition. To the extent these would not be covered by the definition proposed, we request consideration of including such clarifications in the definition.	
Likes 0	
Dislikes 0	
Response	
The DT did consider large power electronic loads, however decided to remain in line with industry consensus in that IBR are limited to those resources able to inject power into the EPS, as evidenced by NERC IRPS and IEEE 2800. If SPP has this concern the DT would recommend the commenter to look into submitting a SAR on this concern.	
Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	Yes
Document Name	
Comment	
We support the definition; however, the term "plant/facility" is a bit vague and unclear which could add confusion for entitites trying to be in compliance when using this term.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please refer to ACES comment response.	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	

Comment	
LCRA supports the proposed IBR definition with the current Glossary of Terms. However, depending on how “point of interconnection” is defined, or if it is added to the Glossary of Terms, the IBR definition could become invalid since there may be multiple generation facilities behind a common GSU or Transmission Owner equipment which are operated independently and not “as a single resource.”	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
LCRA TSC supports the proposed IBR definition with the current Glossary of Terms. However, depending on how “point of interconnection” is defined, or if it is added to the Glossary of Terms, the IBR definition could become invalid since there may be multiple generation facilities behind a common GSU or Transmission Owner equipment which are operated independently and not “as a single resource.”	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	Yes
Document Name	

Comment
BC Hydro appreciates the drafting team's efforts and the opportunity to comment. Given the comprehensive treatment in the Technical Rationale, the second sentence in the proposed IBR definition is not required. BC Hydro suggests that the IBR definition can be simplified as follows: **IBR** – a plant including an individual IBR Unit or multiple IBR Units operated as a single resource connected to the electric system at a common point of connection. As well, BC Hydro sees a potential conflict between IBR as defined here and the recent updates to the NERC Rules of Procedure to the Generator Owner and Operator definitions. In the current draft of the NERC Rules of Procedure – Appendix 2 Definitions used in the Rules of Procedure and Appendix 5B Statement of Compliance Registry Criteria (Revision 8), the Category 2 Generator Owner entity is defined as "owns and maintains non-BES inverter based **generating resources** (emphasis added) that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV (Category 2 GO)". BC Hydro appreciates the discussion at item #3 in the Technical Rationale. However, depending on the interpretation of "generating resources", owners of certain IBR types such as battery energy storage systems (BESS) may not be registered as a GO for these facilities. This would create a potential discrepancy between definitions which may create a gap in the intended scope of applicability for MOD-026-2 and potentially other reliability standards, i.e., entities that would be included under the applicability section of the standard wouldn't be part of the MRS Program as they may not be registered if they don't meet the GO definition.

Likes 0	
Dislikes 0	

Response
Thank you for the comment, these comments will be passed along to the DT for consideration.
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	Yes

Document Name	
Comment	
PG&E supports the IBR definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	Yes
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	Yes
Document Name	
Comment	

A White Paper authored by either the drafting team or NERC staff identifying those devices considered within the scope of the definition and those outside of the Inverter-Based Resource (IBR) definition would be helpful going forward, if maintained by NERC staff.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this idea will be passed along to DT for further consideration.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	Yes
Document Name	
Comment	
WECC supports the definition and voted affirmative. However, we do have some questions that the SDT can hopefully address. How broad does the SDT consider the “common point of interconnection”? Is it one lead line to one station? Multiple lead lines to multiple transformers within a station? The industry responds to regulatory oversight (e.g., such as building plants at 74 MVA) and could respond to this definition in a similar manner by building a second point of interconnection. The risk would still be there but may remain	

unregulated. Provided technical rational supports avoiding confusion when applying Requirement language but may need to be enhanced to meet the reliability concerns of two (or more) points of interconnection. WECC agrees with bullet 7 in the Technical Rationale and each SDT using the defined terms needs to ensure clarity. Does the definition fully support all variants of hybrid plants? Care needs to be taken as more hybrid plants are being integrated. If the term "IBR" is used for a MOD Standard and represents a hybrid plant, how does a single model of the "IBR" represent the response? Granted, each part of the hybrid plant would be separate IBR Units which may dictate how Standards utilize the terms.	
Likes 0	
Dislikes 0	
Response	
1. It can be either one lead or multiple leads that all connect to the same POI. There can also be multiple POI's. The main idea is that they are all being controlled together to run as a single resource. 2. Yes, the definition does consider hybrid resources and is discussed in the TR. 3. In that case there would need to be multiple models that work together to model the response of the plant.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI has no objections to the IBR definition as proposed.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Amy Wilke - American Transmission Company, LLC - 1	

Answer	Yes
Document Name	
Comment	
The language itself may be acceptable, but changes should be made to the technical rationale to explain where an IBR ends. If POI or where the facility is "connected to the electric power system" is the preferred term, this must be reconciled with other standards where IBR is intended to be used. Other standards are contemplating using the POM or high side of the main power transformer as the location where IBR performance is measured. NERC Proposed Definition - Inverter-Based Resource (IBR): A plant/facility that is connected to the electric system consisting of one or more IBR Unit(s) operated as a single resource at a common point of interconnection. IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this comment will be passed along to the DT for consideration for the next draft of the IBR definition	
Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Pirouz Honarmand - Pirouz Honarmand On Behalf of: Helen Lainis, Independent Electricity System Operator, 2; - Pirouz Honarmand	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the support.	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Dave Krueger - SERC Reliability Corporation - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
David Jendras Sr - Ameren - Ameren Services - 3	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Chantal Mazza - Chantal Mazza On Behalf of: Nicolas Turcotte, Hydro-Quebec (HQ), 1, 5; - Chantal Mazza	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Junji Yamaguchi - Hydro-Quebec (HQ) - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The Drafting Team thanks you for your support.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
The Drafting Team thanks you for your support.	
Leslie Hamby - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal	

Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
The DT thanks you for your support.	
Marty Hostler - Northern California Power Agency - 4	
Answer	
Document Name	
Comment	
1. NO. We believe the SDT needs to explain or clarify what "the electric system" is and how an IBR relates to the Bulk Electric System.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, we will be sure that this is passed along to the DT.	

2. *Do you support the definition for IBR Unit as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support*.

Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC

Answer	No
Document Name	

Comment

SMUD supports the creation of a definition for “IBR Unit” since it is highly likely that drafting teams for other NERC Standards Projects related to inverter-based resources will need the flexibility to draft requirements that apply specifically to the power electronic interface equipment, and not to the entire inverter-based resource facility.

The proposed definition for IBR Unit is excessively complicated. We recommend the drafting team consider the following changes to the proposed definition:

“An individual device**, or grouping of multiple devices,** that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power **and of providing Reactive Power support** from a primary energy source or energy storage system, and that connects at a single point on **a** collector system.”

Likes 0	
Dislikes 0	

Response

Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments.

The "IBR" definition is revised to include the description of individual devices. Examples of IBR are listed.

Amy Wilke - American Transmission Company, LLC - 1

Answer	No
Document Name	
Comment	

Additional clarity should be provided to this definition. There is some confusion right now without more context of the technical rationale document included in the standard itself. As stated right now, an IBR unit can be an individual device or multiple devices and while the Technical Rationale examples and pictures make it fairly clear, more clarity in the definition language would be helpful. Perhaps stating that an IBR unit is one that connects together behind the same generator step up transformer (IBR Unit transformer). Edits are also provided below.

NERC Proposed Definition - Inverter-Based Resource unit (IBR Unit): An individual device that uses a power electronic Interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system: or a grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.

ATC Proposed edit - Inverter-Based Resource Unit (IBR Unit): An individual device or grouping of multiple devices that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects behind the same IBR Unit step up transformer.

Likes 0	
Dislikes 0	
Response	

Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments.

The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.

Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2

Answer	No
Document Name	
Comment	

SPP has a concern that the proposed definition potentially places a limit only holding an account for Real Power instead of Reactive Power.

We recommend that the drafting team replace the term “Real Power” with power, that aligns with the BES definition for generation (inclusion).

Likes 0	
Dislikes 0	

Response

Thank you for the comment, this will be passed along to the DT for consideration when drafting the new IBR definition.

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators

Answer	No
Document Name	

Comment

We believe the currently proposed IBR Unit definition contains language that overlaps the proposed IBR (a.k.a. IBR Facility) definition and should be modified. It is our opinion that the definition of an IBR Unit should utilize a standalone, technologically agnostic, approach that is consistent with language already utilized elsewhere in the NERC Glossary of Terms.

Furthermore, it is the opinion of ACES that the reference to “a grouping of multiple devices” is confusing. We believe that the intent of the SDT was to encompass all possible configurations of IBR Units; however, we do not believe the current language meets said intent succinctly enough. Moreover, there are no other definitions that attempt to define generating units with such a level of specificity. For instance, there are no definitions within the NERC Glossary of Terms that attempt to define the many various configurations of a combined cycle unit (e.g., 1x1, 2x1, 3x2, 4x1, etc.). Hence, in this instance, we believe that less is more.

Therefore, it is our recommendation that the IBR Unit definition be modified as follows:

Inverter-Based Resource (IBR) Unit: An individual generating resource capable of exporting Real Power that uses a power electronic interface, such as an inverter or rectifier, and connects at a single point to a system designed primarily for delivering such Real Power to a common point of interconnection.

Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
If the SDT is going to use the proposed definition the language "single point on the collector system" should be revised to "single point on a collector system bus that meets the BES definition."	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	

The NAGF recommends that having an IBR unit definition is unnecessary. Please see the response to Question #1. In addition, the NAGF points out that the SDT has said there is no need to define "collector system" as everyone understands what that term means. The SDT is also attempting to use a term that industry understands and uses, "unit", to mean something much different than how the term is currently used in the operations arena of the industry. This is unacceptable as it will likely lead to significant confusion and misunderstanding in the implementation of the standards.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Leslie Hamby - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	No
Document Name	
Comment	
Renewable generation must at some point cover Reactive Power if we are moving towards all renewable generation in the future. Due to this, Southern Indiana Gas & Electric, Company recommends adding "Reactive Power" to the definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT will take this into consideration when drafting the new version of the definition for IBR.	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	No
Document Name	

Comment	
See Question 1.	
Likes 0	
Dislikes 0	

Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Carver Powers - Utility Services, Inc. - 4	
Answer	No
Document Name	
Comment	
Suggest changing the term name from IBR Unit to Inverter Based Unit (IBU) for clarity in the proposed IBR definition. The proposed definition is structured in a way that make it difficult to understand. The following is the definition using the NERC style guide… in part. 1) An individual device that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and 2) that connects at a single point on the collector system; or 1) A grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and 2) that connect together at a single point on the collector system.	

Based on this interpretation of the proposed definition, the following definition would mean the same but be simpler to understand. This modified definition also includes the list of primary energy sources and BESS from the IBR definition “An individual device or grouping of devices that: 1) use a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system (e.g. solar photovoltaic devices, Type 3 and Type 4 wind turbines, battery energy storage systems, and fuel cells) and 2) connect at a single point on a collector system;” It could also be structured this way: “An individual device or grouping of devices that utilize a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system (e.g., solar photovoltaic devices, Type 3 and Type 4 wind turbines, battery energy storage systems, and fuel cells) and connecting at a single point on a collector system.”	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, The DT decides to remove the separate definition for "IBR Unit" based on the industry comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	No
Document Name	
Comment	
Tri-State Generation and Transmission supports the comments of the MRO NSRF.	
Likes 0	

Dislikes 0	
Response	
Thank you for the comment, please see the response to MRO NSRF's comment.	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
The Draft 2 "IBR Unit" definition states that it's a device that uses a power electronic interface. The IBR Unit doesn't use the interface, it is the interface. As such, suggest changing the words "that uses" to "consisting of" such that the definition would now read: "An individual device **consisting of** a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system; or a grouping of multiple devices **consisting of** power electronic interface(s), such as inverters or converters, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system."	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industrial comments. Thank you for the suggestion and will be noted if the team decides to reconsider IBR Unit.	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	No
Document Name	
Comment	

WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please refer to the response to MRO NSRF's comment.	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	
See Question #1 Response.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	No
Document Name	
Comment	
See Question 1.	
Likes 0	
Dislikes 0	

Response	
Thank you for the comment.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
Entergy believes that having an IBR Unit definition is unnecessary. Entergy is concerned that the potential level of granularity in the IBR Unit definition makes compliance overly burdensome due to the need to perform compliance activities on a device-by-device basis. An IBR facility can have hundreds of individual IBR Units as it is currently defined. Where standard requirements need to be applied at the inverter level, then the individual standards should state that.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industry comments.	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	No
Document Name	
Comment	
SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.	
Likes 0	
Dislikes 0	

Response	
Thank you for the comments and opinions.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	No
Document Name	
Comment	

AEPC has signed on to ACES comments:

We believe the currently proposed IBR Unit definition contains language that overlap the proposed IBR (a.k.a. IBR Facility) definition and should be modified. It is our opinion that the definition of an IBR Unit should utilize a standalone, technologically agnostic, approach that is
consistent with language already utilized elsewhere in the NERC Glossary of Terms.

Furthermore, it is the opinion of ACES that the reference to “a grouping of multiple devices” is confusing. We believe that the intent of the SDT was to encompass all possible configurations of IBR Units; however, we do not believe the current language meets said intent succinctly enough.

Moreover, there are no other definitions that attempt to define generating units with such a level of specificity. For instance, there are no definitions within the NERC Glossary of Terms that attempt to define the many various configurations of a combined cycle unit (e.g., 1x1, 2x1, 3x2, 4x1, etc.). Hence, in this instance, we believe that less is more.

Therefore, it is our recommendation that the IBR Unit definition be modified as follows:

- **Inverter-Based Resource (IBR) Unit**: An individual generating resource capable of exporting Real Power that uses a power electronic interface, such as an inverter or rectifier, and connects at a single point to a system designed primarily for delivering such Real Power to a common point of interconnection.

Likes 0	
Dislikes 0	
Response	

Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industry comments. This is noted for the future if IBR Unit is being reconsidered.	
Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	No
Document Name	
Comment	
Black Hills Corporation does not believe a definition for “IBR Unit” is necessary if the “IBR” definition from Question 1 is revised as mentioned. The use of the term “unit” may conflict with other industry uses of the term. If necessary to define to an individual level, then consider use of the term “element” or “device” in place of “unit.”	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	No
Document Name	
Comment	
Per the latest revision, the IBR Unit definition references ‘an individual device … that connects at a single point on the collector system’. BC Hydro appreciates the clarification provided during the SDT webinar that this addition was to correct grammar. However, it does not seem to add value as a single device will not have multiple connection points to a single system. It is also not clear why the IBR Unit definition needs to be dependent on “the collector system”, which is not a defined term. As the IBR definition already specifies the requirement of “a common point of interconnection”, we posit that would be sufficient to define the IBR.	

BC Hydro suggests that the collector system concept is not necessary to define the IBR Unit: the examples provided in the Technical Rationale (Figures 2.1, 2.2, and 2.3 on pages 3-4) seem to indicate that it is the single AC bus that determines the interface between an IBR Unit and the electric power system. However, if the "collector system" is to be deemed a critical component for defining an IBR Unit, BC Hydro suggests that this be defined as a NERC Glossary Term instead of relying on a common understanding in the power industry.

During the SDT webinar's Q&A session clarifications were provided to the effect that an Electric Vehicle (EV) can be deemed an IBR Unit if bidirectional, i.e., injecting power into the grid, not just charging. Arguably, the collector system concept may be different in such scenarios.

BC Hydro suggests that the simplified definitions proposed below do not miss any critical element to fully define the IBR facilities.

IBR Unit – an individual device or a grouping of multiple devices that can export Real Power from a primary energy source or energy storage system via a power electronics interface.

IBR – a plant including an individual IBR Unit or multiple IBR Units operated as a single resource connected to the electric power system at a common point of connection.

Likes 0	
Dislikes 0	

Response

Thank you for the comment, these will be considered when drafting the new IBR definition. The IBR Unit term will not be balloted this next posting.

Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE

Answer	No
Document Name	

Comment

MBS aligns with the previous submission responses made by the NAGF, and feels that the SDT did not address this concern nor provide clarity:

Utilizing the term IBR Unit to refer to a single inverter within the generating plant will cause significant confusion at the plant level. Unless any instruction provided to the plant is written, then it will not be clear if the term IBR Unit is the defined term used by NERC or if it is intended to mean the generating unit (Unit 1, 2 or 3), IBR unit. This level of potential confusion is unacceptable resulting in an unacceptable risk of the BES being mis operated. The word “unit” has long been associated with a distinct operating segment of a plant. For this reason, the NAGF does not support the use of the term unit to mean anything less than the dispatchable grouping of inverters. MBS further supports TRE previous response: ...the current verbiage of IBR Unit does not include the capabilities for absorbing or delivering reactive power which is essential for electric system operations.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industry comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	No
Document Name	
Comment	
Dominion Energy is if the opinion that this defintion should be simplifed similiar to the proposed IBR defintion in Q1. **Inverter-Based Resource Unit (IBR Unit):** An individual **inverter** device or a grouping of multiple inverters connected together **operating functionally as a single unit, and directly connected at a single point of interconnection to the Bulk Power System at 60kV and above.**	
Likes 0	
Dislikes 0	
Response	
Thank you for the comments and the suggestion.	

Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	No
Document Name	
Comment	
The definition appears to be overcomplicated and unnecessarily confusing. It is unclear why the definition could not simply state: "An individual device, or a grouping of multiple devices, that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system."	
Likes 0	
Dislikes 0	
Response	
Thank you for the feedback and input.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI has no objections to the IBR Unit definition as proposed.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	Yes

Document Name	
Comment	
WECC has no issue with the definition, but urges that care needs to be taken when using the term in Requirements. WECC appreciated the approach taken by the SDT to distinguish the two terms.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
No comment.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	

See the suggestion to change **IBR Unit** to **IBR Device** in Q4 below. It is suggested that the SDT carefully consider the use of the word "unit" to refer to both the power conversion element when unit is capitalized versus using unit to refer to the entire facility when not capitalized.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industry comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Junji Yamaguchi - Hydro-Quebec (HQ) - 5	
Answer	Yes
Document Name	
Comment	
Another remark would be that while reading the overall definitions, it doesn't seem clear that E-statcoms are not included in the scope of the term IBR Unit. Perhaps a distinction between STATCOMs and E-STATCOMS should be added to the Technical Rationale depending on the energy that can be stored or the storage technology used (supercaps-short duration vs batteries- long duration). Without this distinction, there exists a risk that a storage system could be identified as a E-STATCOM and thus avoid certain requirements.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the IBR Unit will not be posted in the new ballot period.	
Chantal Mazza - Chantal Mazza On Behalf of: Nicolas Turcotte, Hydro-Quebec (HQ), 1, 5; - Chantal Mazza	
Answer	Yes
Document Name	

Comment	
While reading the overall definitions, it doesn't seem clear that E-statcoms are not included in the scope of the term IBR Unit. Perhaps a distinction between STATCOMs and E-STATCOMS should be added to the Technical Rationale depending on the energy that can be stored or the storage technology used (supercaps-short duration vs batteries- long duration). Without this distinction, there exists a risk that a storage system could be identified as a E-STATCOM and thus avoid certain requirements.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment. The DT decides to remove the separate definition for "IBR Unit" based on the industry comments. The "IBR" definition is revised to include the description of individual devices. Examples of IBRs are listed.	
Dave Krueger - SERC Reliability Corporation - 10	
Answer	Yes
Document Name	
Comment	
On behalf of the SERC Generator Working Group: Suggest changing the word "unit" to "asset" to avoid confusion with the historical meaning of unit	
Likes 0	
Dislikes 0	
Response	
Thank you for the comments and suggestions.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	Yes
Document Name	

Comment	
None	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
PG&E supports the IBR Unit definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the support.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Kinte Whitehead - Exelon - 1,3	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
David Jendras Sr - Ameren - Ameren Services - 3	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the support.	
Matt Lewis - Lower Colorado River Authority - 1,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Pirouz Honarmand - Pirouz Honarmand On Behalf of: Helen Lainis, Independent Electricity System Operator, 2; - Pirouz Honarmand	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Thomas Foltz - AEP - 5	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Marty Hostler - Northern California Power Agency - 4	
Answer	
Document Name	
Comment	
1. No. If the SDT is going to use the proposed definition the language "single point on the collector system" should be revised to "single point on a collector system bus that meets the BES definition."	
Likes 0	
Dislikes 0	
Response	
Thank you for the comments and suggestions.	
Megan Melham - Decatur Energy Center LLC - 5	
Answer	
Document Name	
Comment	
Capital Power supports the NAGF comments for the IBR Unit definition as below:	

The NAGF recommends that having an IBR unit definition is unnecessary. Please see the response to Question #1. In addition, the NAGF points out that the SDT has said there is no need to define “collector system” as everyone understands what that term means. The SDT is also attempting to use a term that industry understands and uses, “unit”, to mean something much different than how the term is currently used in the operations arena of the industry. This is unacceptable as it will likely lead to significant confusion and misunderstanding in the implementation of the standards.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please refer to the response to NAGF’s comment.	

3. ***As discussed in the Technical Rationale, the proposed definitions would define the scope of equipment, but would not define the scope of IBR units subject to mandatory compliance with Reliability Standards. Each standard would define the applicable units subject to compliance with that standard. An example to include both BES and non-BES IBRs is as follows:***

Section 4. Applicability:

4.1 Functional Entities: Generator Owner, Generator Operator

4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV.

***Provide any suggested revisions you feel would improve the readability of this example*.**

Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	No
Document Name	
Comment	
The BES definition should govern applicability and individual standards should not be conflicting with an approved definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	

Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	No
Document Name	

Comment	
SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards. In addition, 4.1 Facilities definition has redundant "that" in its description.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this comment will be passed along to the DT for consideration when drafting.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	
The 60 kV voltage threshold value will limit the application of resources. Please consider reducing the voltage value to 40 kV.	

Additionally, the NERC Glossary of Terms “Bulk Electric System” definition I2A for synchronous machines uses the phrase: “a) Gross individual nameplate rating ‘greater’ than 20 MVA”; suggest changing 20 MVA language to “4.1 Facilities: (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that that either have or contribute to an aggregate nameplate capacity of ‘greater' than 20 MVA,” to consolidate language and reduce confusion with the implied 20 MVA value.	
Likes 0	
Dislikes 0	
Response	
Thank you for the feedback, the DT and NERC will take these into consideration.	
Carver Powers - Utility Services, Inc. - 4	
Answer	No
Document Name	
Comment	
Recommend that the proposed language for Section 4.1 Facilities, part 2 align with the pending GO/GOP NERC Glossary of Terms revisions and the pending compliance registry definitions.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the comment will be passed along for consideration.	
Megan Melham - Decatur Energy Center LLC - 5	
Answer	No
Document Name	
Comment	
Capital Power supports the NAGF comments as below:	

The NAGF recommends that the proposed language for Section 4.1 Facilities, part 2 align with the pending GO/GOP NERC Glossary of Terms revisions.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this will be passed along to the DT be taken into consideration.	
Marty Hostler - Northern California Power Agency - 4	
Answer	No
Document Name	
Comment	
No. Should not say 60 KV. Industry, NERC, and FERC agreed a long time ago on 100 KV.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this will be passed along for consideration.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	No
Document Name	
Comment	
The NAGF recommends that the proposed language for Section 4.1 Facilities, part 2 align with the pending GO/GOP NERC Glossary of Terms revisions.	
Likes 0	

Dislikes 0	
Response	
Thank you for the comment and for the recommendation. This will be passed along for consideration.	
Lauren Giordano - Lauren Giordano On Behalf of: Dennis Sismaet, Northern California Power Agency, 4, 6, 3, 5; Jeremy Lawson, Northern California Power Agency, 4, 6, 3, 5; Marty Hostler, Northern California Power Agency, 4, 6, 3, 5; - Lauren Giordano	
Answer	No
Document Name	
Comment	
Should not say 60 KV. Industry, NERC, and FERC agreed a long time ago on 100 KV.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this will be passed along for consideration.	
Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2	
Answer	No
Document Name	
Comment	
SPP has concern that the approach of each standard defining the applicable units may create conflicting issues amongst various standards. This one-off concept (not being defined in the glossary of terms or Rules of Procedure RoP) could cause confusion and will not have a solid reference outside of the actual language located in the standard. For example, if a standard is retired that uses this concept, it could create a gap in the IBR process and may require the reopening of various standards. Our concerns include the current BES definition properly aligning among this drafting team and drafting team efforts that are focused on the Inverter-Based Resource (IBR). The current definition does not take into consideration the IBR characteristics and impacts.	

With that said, SPP recommends that the drafting team ensure the definitions of what is included and excluded within the BES definitions for proper alignment with other NERC standards in reference to the new technology and its impact on the reliability of the grid.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this will be passed along for consideration for the next ballot. The DT will consider the removal of the term, "IBR UNIT" for next ballot	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	No
Document Name	
Comment	
The format proposed by the Standard Drafting Team (SDT) is a good way to define applicability within each Standard, however, we feel that the language proposed in NERC Standards Project 2021-04 Modifications to PRC-002 - Phase II, PRC-028-1 draft #2, is even better. This language is formatted as follows: **"4.1. Functional Entities:** 4.1.1. Generator Owner *that owns equipment as identified in section 4.2* [emphasis added] 4.1.2. Generator Operator *that operates equipment as identified in section 4.2* [emphasis added] **4.2. Facilities:** The Elements associated with (1) BES Inverter-Based Resources; and (2) Non-BES Inverter-Based Resources that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV."	
Likes 0	

Dislikes 0	
Response	
Thank you for the comment, this will be passed along to the DT for consideration.	
Ryan Quint - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable, Group Name Elevate Energy Consulting	
Answer	Yes
Document Name	
Comment	
Slight editorial changes such as : 1) There are two "4.1" in Section 4, which is in error we believe. 2) The acronym "(IBR)" should be on the first use of the term, not the second. 3) It states "that that" after the current use of (IBR) presently.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support, and this comment will be passed along and taken into consideration.	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
PG&E has no suggested revisions that could improve the readability of the Applicability except for making “Facility” 4.2 and not 4.1.	
Likes 0	

Dislikes 0	
Response	
Thank you for the comments and support.	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Tri-State Generation and Transmission supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Please see the response to MRO NSRF's comment.	
David Jendras Sr - Ameren - Ameren Services - 3	
Answer	Yes
Document Name	
Comment	
Ameren would like an example of how they use IBR unit in a compliance definition, for example in PRC-029 for a plant where you have mixed types of IBR units.	
Likes 0	
Dislikes 0	
Response	
Thank you for commenting, the use of IBR Unit was used in PRC-028. IBR Unit will not be balloted this additional ballot.	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	

Answer	Yes
Document Name	
Comment	
NV Energy agrees that the applicability section and/or actual requirements should define the scope of equipment included/excluded whether it be a Category 1 GO/GOP or Category 2 GO/GOP, as Defined in the proposed NERC ROP.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has made changes to better clarify applicability. This suggestion will be passed along for consideration.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	Yes
Document Name	
Comment	
No Comments.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Pirouz Honarmand - Pirouz Honarmand On Behalf of: Helen Lainis, Independent Electricity System Operator, 2; - Pirouz Honarmand	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Teresa Krabe - Lower Colorado River Authority - 5	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Casey Perry - PNM Resources - 1,3 - WECC,Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Dave Krueger - SERC Reliability Corporation - 10	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the support.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the support.	
Adrian Andreoiu - BC Hydro and Power Authority - 1, Group Name BC Hydro	
Answer	
Document Name	
Comment	

BC Hydro sees a potential conflict between IBR as defined here and the recent updates to the NERC Rules of Procedure to the Generator Owner and Operator definitions.

In the current draft of the NERC Rules of Procedure – Appendix 2 Definitions used in the Rules of Procedure and Appendix 5B Statement of Compliance Registry Criteria (Revision 8), the Category 2 Generator Owner entity is defined as “owns and maintains non-BES inverter based **generating resources** (emphasis added) that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV (Category 2 GO)”.

BC Hydro appreciates the discussion at item #3 in the Technical Rationale. However, depending on the interpretation of “generating resources”, owners of certain IBR types such as battery energy storage systems (BESS) or Electric Vehicles may not be registered as a GO for these facilities. This would create a potential discrepancy between definitions which may create a gap in the intended scope of

applicability for MOD-026-2 and potentially other reliability standards, i.e., entities that would be included under the applicability section of the standard wouldn't be part of the MRS Program as they may not be registered if they don't meet the GO definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the feedback, the DT and NERC will take these into consideration when updating definition, and TR.	
Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	
Document Name	
Comment	
Black Hills Corporation recommends that the proposed language for "Section 4.1. Facilities" be updated to align with the pending GO & GOP definition revisions in the NERC Rules of Procedure.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support, the DT will take this into consideration.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	
Document Name	
Comment	
None	
Likes 0	

Dislikes 0	
Response	
Thank you for the comment.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	
Document Name	
Comment	
AEPC has signed on to ACES comments: We recommend modifying Section 4.1 Functional Entities to specifically reference the new Category 1 GO/GOP and Category 2 GO/GOP definitions.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support, the DT will take this into consideration.	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	
Document Name	
Comment	
MRO NSRF agrees that the applicability section and/or actual requirements should define the scope of equipment included/excluded whether it be a Category 1 GO/GOP or Category 2 GO/GOP, as Defined in the proposed NERC ROP.	
Likes 1	Lincoln Electric System, 5, Millard Brittany
Dislikes 0	

Response	
Thank you for the comment, the DT will take this into consideration.	
Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	
Document Name	
Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please refer to the response to MRO NSRF's comment.	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	
The IBR definition states that they have a common point of interconnection. As such, it doesn't need to be stated again so 4.1 could state: **4.1 Facilities:** (1) BES Inverter-Based Resources; and (2) Non-BES Inverter Based Resources (IBRs) that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity at a voltage greater than or equal to 60 kV.	
Likes 0	
Dislikes 0	
Response	

Thank you for the suggestion, the DT will take this back for consideration.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	
Document Name	
Comment	
It appears that there was not a question above that can be answered Yes or NO, so WECC did not respond. However we do have the folloing thoughts. Note- ALL SDTs needs to be clear in the usage of proposed terms- In the example question, the phrases “IBR unit” and “applicable units” are used. As esoteric as that is, the question clearly demonstrates that the current and future SDTs using the terms should do so carefully and deliberately. Defined terms are critical and using additional descriptors (especially the same term) can lead to various interpretations/thoughts by all entities. Is there any reason why “IBR” is not shown after item 1 phrase? Is there a distinction trying to be made by use or non-use of the hyphen in IBR terms within item 1 and 2? The use of “connection” versus “interconnection”	
Likes 0	
Dislikes 0	

Response	
Thank you for the comment, the team will review the usage of these terms for the future posting. Thank you for the comment and insight, these comments will be passed along, and necessary changes will be considered and made.	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
EEI has no suggested modifications regarding the readability of the example applicability language.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	
Document Name	
Comment	
Paragraph 2 in the posted technical rationale is clear enough without this example. At this point, adding an example may just cause more confusion becuase the approach for expanding the registration to include these (currently non-BES) facilities has not been finalized. The example may make sense if NERC continues with its current approach of expanding GO/GOP registration criteria, but if NERC were to return to the originally proposed approach of creating new registration categories the specification of facilities in this example would be redundant.	
Likes 0	
Dislikes 0	

Response	
Thank you for the comment and clarifications for the next ballot.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	
We recommend modifying Section 4.1 Functional Entities to specifically reference the new Category 1 GO/GOP and Category 2 GO/GOP definitions.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment and insight, these comments will be passed along, and necessary changes will be considered and made.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	
ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) for this response and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please refer to the response to the IRC SRC's comment.	
Amy Wilke - American Transmission Company, LLC - 1	

Answer	
Document Name	
Comment	
No comments.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	

4. *Provide any additional comments for the DT to consider, if desired*.	
Amy Wilke - American Transmission Company, LLC - 1	
Answer	
Document Name	
Comment	
The standard should operate as a stand-alone document. The standard should address the who, what, when, where and sometimes how (not always). The Tech Rationale is only "why" a requirement is in the standard. References to the Tech Rationale can be misleading in that it is not part of the standard.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment and this interpretation. The technical rationale was attempting to provide an explanation for the choices and decision the DT made to lead to the balloted version.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	
ERCOT joins the comments submitted by the IRC SRC for this response and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	

Thank you for the comment, please see the response to IRC SRC comment.	
Joshua Phillips - Southwest Power Pool, Inc. (RTO) - 2	
Answer	
Document Name	
Comment	
If determined that load should be included, SPP recommends the Standard Drafting Team consider concurrently undertaking the necessary process to have the SAR(s) revised to allow for more broadly applicable Glossary of Terms definitions while continuing to develop this definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	
Thank you for the opportunity to comment.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2023	
Answer	

Document Name	
Comment	
1. Line 89 in the Technical Rationale currently states: “Unit if they end up with their own definition).” The SRC recommends that line 89 be changed to: “Unit definitions:” 2. The SRC does not believe Inclusion of the statement “IBRs include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell” in the IBR definition is necessary and therefore recommends that it be deleted. If the SDT determines there is a benefit to keeping this list of examples, the SRC suggests that the list be changed to read: “IBRs include, but are not limited to, solar photovoltaic (PV) Facilities, Type 3 and Type 4 wind Facilities, battery energy storage system (BESS) Facilities, and fuel cell Facilities.” Listing only “solar photovoltaic (PV)” is somewhat ambiguous, as it could be understood refer to just the PV panel or to an IBR Unit (which may or may not be an IBR according to the proposed definition).	
Likes 0	
Dislikes 0	
Response	
Thank you for the comments, and the first recommendation. To answer the second comment, thank you for the insight the DT has adjusted the wording in the definition to better reflect the inclusive change.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC Entity Monitoring	
Answer	
Document Name	
Comment	
WECC appreciates the efforts of the SDT to ensure clarity in the definitions and use of the definitions moving forward to help ensure reliable planning and operation of the BPS.	
Likes 0	
Dislikes 0	
Response	

Thank you for support and the response.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	

The NAGF provides the following additional comments for consideration:

a. The NAGF is concerned with the use of the term "unit" in the proposed IBR Unit definition as it seems to conflict with the way industry currently uses the term. Recommend that Drafting Team consider replacing with the term with "element" or "device" in the event the Drafting Team continues to support the need for two definitions.

b. The NAGF recommends that the proposed IBR Unit definition be revised as follows:

"An individual device or a grouping of multiple devices, that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system."

c. Technical Rationale – the document currently references the terms "IBR", "IBR Unit", and "IBR plant/facility". Recommend that the document references align with the IBR Glossary of Terms definitions to eliminate possible confusion.

d. The NAGF notes that there are two SARs that form the basis for this project:

i. Modifications to MOD-026 and MOD-027

ii. Applicability revisions for transmission connected dynamic reactive resources

The scope of these SARs does not appear to provide the SDT with the latitude to modify the NERC Glossary of Terms for IBRs. The MOD-026/027 SAR does not have the box checked for "Add, Modify or Retire a Glossary Term". While the transmission connected dynamic reactive resources SAR does have such box selected, it limits such changes to "also define new Glossary Terms for TCDRR or related terms". Therefore, the NAGF requests that the Drafting Team revisit the SARs accordingly to ensure that the Drafting Team is not overstepping their intended scope.

Likes 0	

Dislikes 0	
Response	
Thank you for the comment, the DT has removed the IBR Unit in this posting. The two standards referenced are upcoming projects that will be revised under milestone 3 under the FERC order, and the team is going to consider not overstepping going forward with IBR in these standards.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	
Document Name	
Comment	
FirstEnergy requests as the drafting team moves forward with this endeavor that they ensure the applicability is maintained across all standards that relate to this topic.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	
Document Name	
Comment	
Upon review of the SARs under which this Standard Drafting Team is operating, NV Energy is of the opinion that the creation of a new glossary of terms definition such as “Inverter Based Resource” is not currently within scope for the Standard Drafting Team. NV Energy would suggest that the Standard Drafting Team concurrently undertake the necessary process to have the SAR(s) revised to allow for the creation of broadly applicable Glossary of Terms definitions, while also continuing to develop this definition to allow for further	

improvements to the reliability of the Bulk Power System while adhering to the rules for standard development as prescribed by the Standard Processes Manual.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the ask of the creation of the creation of an IBR definition was reaffirmed in scope for the DT, thank you for the comment.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	
Document Name	
Comment	
NPCC RSC supports the IBR and IBR unit definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Colby Galloway - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	
First, there are concerns with the use of "Unit" in the **IBR Unit** definition due to the current and historical use of the term "Unit" with respect to generating plants. Often, that term has been and is used to represent the entire facility, not specifically the AC power	

producing component. Consider changing "IBR Unit" to "IBR Device" to resolve this concern and confusion. Note this possible confusion even exists within the Comment item #3 above where the difference between Unit and unit is very significant. Second, the SDT should consider the compatibility of the proposed IBR definition, as depicted in Figure 2.1 of the Technical Rational with the existing BES definition, I4 inclusion. The definition does not include the collection system (below 75MVA) in the scope of the parts of a facility.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT has taken this into consideration with the next round of posting of the IBR definition, the DT has excluded IBR Unit language from the definition and did not repost IBR Unit for another ballot. Second comment, thank you for the comment this will be passed along to the DT for consideration.	
Marty Hostler - Northern California Power Agency - 4	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thanks for the comment.	
Megan Melham - Decatur Energy Center LLC - 5	
Answer	
Document Name	
Comment	

Capital Power supports the NAGF comments as below:

The NAGF provides the following additional comments for consideration:

a. The NAGF is concerned with the use of the term “unit” in the proposed IBR Unit definition as it seems to conflict with the way industry currently uses the term. Recommend that Drafting Team consider replacing with the term with “element” or “device” in the event the Drafting Team continues to support the need for two definitions.

b. The NAGF recommends that the proposed IBR Unit definition be revised as follows:

“An individual device or a grouping of multiple devices, that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system.”

c. Technical Rationale – the document currently references the terms “IBR”, “IBR Unit”, and “IBR plant/facility”. Recommend that the document references align with the IBR Glossary of Terms definitions to eliminate possible confusion.

d. The NAGF notes that there are two SARs that form the basis for this project:

i. Modifications to MOD-026 and MOD-027

ii. Applicability revisions for transmission connected dynamic reactive resources

The scope of these SARs does not appear to provide the SDT with the latitude to modify the NERC Glossary of Terms for IBRs. The MOD-026/027 SAR does not have the box checked for “Add, Modify or Retire a Glossary Term”. While the transmission connected dynamic reactive resources SAR does have such box selected, it limits such changes to “also define new Glossary Terms for TCDRR or related terms”. Therefore, the NAGF requests that the Drafting Team revisit the SARs accordingly to ensure that the Drafting Team is not overstepping their intended scope.

Likes 0	
Dislikes 0	

Response

Please refer to the response to NAGF’s comment.

Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	
Document Name	
Comment	
NA	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	
There is a need to ensure the IBR definition is sufficiently clear to determine if pumped storage facilities (particularly new variable speed pumped storage technologies that act similar to IBRs) might be considered as an applicable generator, so that when applying standards and requirements to these facilities, it is clear as to which applies. Does every plant need to be classified as a synchronous generator or an IBR? If so, pumped storage facilities, for example, could be considered to act like bulk energy system synchronous machines due to charging and discharging modes, while at the same time ride-thru capabilities may not seamlessly apply.	
Likes 0	
Dislikes 0	
Response	
Thank you for the suggestion, this will be passed along to the DT. The DT did decide when drafting to not include an exhaustive list of types of IBRs.	

Christine Kane - WEC Energy Group, Inc. - 3, Group Name WEC Energy Group	
Answer	
Document Name	
Comment	
WEC Energy Group supports the comments of the MRO NSRF.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response, please see the response to MRO NSRF's comment.	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	

none	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	
Document Name	Project 2020-06 MRO NSRF IBR Definition 20240403 Final.docx
Comment	
Upon review of the SARs under which this Standard Drafting Team is operating, MRO NSRF is of the opinion that the creation of a new glossary of terms definition such as “Inverter Based Resource” is not currently within scope for the Standard Drafting Team. MRO NSRF would suggest that the Standard Drafting Team concurrently undertake the necessary process to have the SAR(s) revised to allow for the creation of broadly applicable Glossary of Terms definitions, while also continuing to develop this definition to allow for further improvements to the reliability of the Bulk Power System while adhering to the rules for standard development as prescribed by the Standard Processes Manual. See attachment!	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the team is able to draft a definition under the scope of this project along with the newly added Milestone 3 SAR. To answer the second question, this suggestion will be passed along for consideration.	
Israel Perez - Israel Perez On Behalf of: Mathew Weber, Salt River Project, 3, 1, 6, 5; Sarah Blankenship, Salt River Project, 3, 1, 6, 5; Thomas Johnson, Salt River Project, 3, 1, 6, 5; Timothy Singh, Salt River Project, 3, 1, 6, 5; - Israel Perez	
Answer	

Document Name	
Comment	
SRP does not support the addition or modification of this term to the standard. This new term defines IBR's being introduced directly into a standard which previously did not have IBR applicability. SRP strongly feels Inverter Based Resources should have separate standards.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, this will be passed along.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	
Document Name	
Comment	
Thank you for the opportunity to comment.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	
Document Name	
Comment	

None	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	
Document Name	
Comment	
Black Hills Corporation agrees with comments provided by NAGF, EEI and other industry peer groups.	
Likes 0	
Dislikes 0	
Response	
Thank you, please refer to the response to each of the respected group's comments.	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	
Document Name	
Comment	
PG&E has no further comments for the DT, but does wish to thank the DT for listening to the industry in making the current modifications in a difficult and contentious process.	
Likes 0	

Dislikes 0	
Response	
Thank you for the support.	
Teresa Krabe - Lower Colorado River Authority - 5	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Kristina Marriott - Miller Bros. Solar, LLC - 5 - MRO,WECC,Texas RE	
Answer	
Document Name	
Comment	
Great Job, this is not an easy task!	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	

End of Report

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Reminder
Standards Announcement
Project 2020-06 Verifications of Models and Data for ~~Generators~~ Inverter-based Resource Glossary Terms

Additional Ballots Open through April 8, 2024

Now Available

The additional ballots for **Inverter-based Resource Glossary Terms** are open through **8 p.m. Eastern, Monday, April 8, 2024**.

Reminder Regarding Corporate RBB Memberships

Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Balloting

Members of the ballot pools associated with this project can log in and submit their votes by accessing the Standards Balloting and Commenting System (SBS) here.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

The ballot results will be announced and posted on the project page. The drafting team will review all responses received during the comment period and determine the next steps of the project.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Title and Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Terms

Formal Comment Period Open through April 8, 2024

Now Available

A formal comment period for **Inverter-based Resource Glossary Terms** is open through **8 p.m. Eastern, Monday, April 8, 2024**.

The standard drafting team's considerations of the responses received from the previous comment period are reflected in this draft of the definitions.

Reminder Regarding Corporate RBB Memberships

Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

Additional ballots will be conducted **March 29 – April 8, 2024**.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Senior Standards Developer, Chris Larson (via email) or at 404-446-9708. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/316)
Ballot Name: 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) AB 2 DEF
Voting Start Date: 3/29/2024 12:01:00 AM
Voting End Date: 4/8/2024 8:00:00 PM
Ballot Type: DEF
Ballot Activity: AB
Ballot Series: 2
Total # Votes: 235
Total Ballot Pool: 282
Quorum: 83.33
Quorum Established Date: 4/8/2024 3:53:38 PM
Weighted Segment Value: 67.55

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	35	0.66	18	0.34	0	10	11
Segment: 2	8	0.7	6	0.6	1	0.1	0	0	1
Segment: 3	57	1	31	0.633	18	0.367	0	2	6
Segment: 4	17	1	6	0.6	4	0.4	0	1	6
Segment: 5	72	1	32	0.604	21	0.396	0	5	14
Segment: 6	47	1	19	0.559	15	0.441	0	4	9
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	7	0.6	6	0.6	0	0	0	1	0
Totals:	282	6.3	135	4.256	77	2.044	0	23	47

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Abstain	N/A
1	Ameren - Ameren Services	Tamara Evey		None	N/A
1	American Transmission Company, LLC	Amy Wilke		Affirmative	N/A
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Negative	Comments Submitted
1	Arkansas Electric Cooperative Corporation	Emily Corley		Affirmative	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		Affirmative	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Affirmative	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Negative	Comments Submitted
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Affirmative	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Negative	Third-Party Comments
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Negative	Third-Party Comments
1	Dominion - Dominion Virginia Power	Elizabeth Weber		Negative	Comments Submitted
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Negative	Comments Submitted
1	Evergy	Kevin Frick	Alan Kloster	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Affirmative	N/A
1	Georgia Transmission Corporation	Greg Davis		Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Negative	Third-Party Comments
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		None	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Lincoln Electric System	Josh Johnson		Negative	Comments Submitted
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		Abstain	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	None	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard	Nikki Carson-Marquis	Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Negative	Third-Party Comments
1	National Grid USA	Michael Jones		Affirmative	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Negative	Third-Party Comments
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Negative	Third-Party Comments
1	Omaha Public Power District	Doug Peterchuck		Negative	Third-Party Comments
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		Negative	Third-Party Comments
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Abstain	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		None	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		None	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Sarah Blankenship	Israel Perez	Negative	Comments Submitted
1	Santee Cooper	Chris Wagner		Abstain	N/A
1	SaskPower	Wayne Guttormson		None	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Negative	Third-Party Comments
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell	Jennie Wike	None	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Negative	Comments Submitted
1	Tri-State G and T Association, Inc.	Donna Wood		Negative	Comments Submitted
1	U.S. Bureau of Reclamation	Richard Jackson		None	N/A
1	Western Area Power Administration	Ben Hammer		None	N/A
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		None	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Negative	Comments Submitted
3	AEP	Leshel Hutchings		None	N/A
3	Ameren - Ameren Services	David Jendras Sr		Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Affirmative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Affirmative	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Negative	Comments Submitted
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	None	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Bill Garvey		Negative	Comments Submitted
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A
3	Entergy	James Keele		Negative	Comments Submitted
3	Evergy	Marcus Moor	Alan Kloster	Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Affirmative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Negative	Third-Party Comments
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		Affirmative	N/A
3	Lincoln Electric System	Sam Christensen		Negative	Comments Submitted
3	Los Angeles Department of Water and Power	Fausto Serratos		Abstain	N/A
3	Manitoba Hydro	Mike Smith		Negative	Comments Submitted
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		None	N/A
3	Muscatine Power and Water	Seth Shoemaker		Negative	Third-Party Comments
3	National Grid USA	Brian Shanahan		Affirmative	N/A
3	Nebraska Public Power District	Tony Eddleman		Negative	Third-Party Comments
3	New York Power Authority	David Rivera		Negative	Third-Party Comments
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Negative	Third-Party Comments
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Negative	Third-Party Comments
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Negative	Third-Party Comments
3	OTP - Otter Tail Power Company	Wendi Olson		Negative	Third-Party Comments
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		Affirmative	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		None	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Negative	Comments Submitted
3	Santee Cooper	Vicky Budreau		Abstain	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Negative	Comments Submitted
3	Tri-State G and T Association, Inc.	Ryan Walter		Negative	Comments Submitted
3	WEC Energy Group, Inc.	Christine Kane		Negative	Comments Submitted
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Negative	Third-Party Comments
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	None	N/A
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		None	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Affirmative	N/A
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Negative	Third-Party Comments
4	Northern California Power Agency	Marty Hostler		Negative	Comments Submitted
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		None	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho	Jennie Wike	None	N/A
4	Utility Services, Inc.	Carver Powers		Negative	Comments Submitted
4	WEC Energy Group, Inc.	Matthew Beilfuss		None	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		None	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		Affirmative	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Affirmative	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Negative	Comments Submitted
5	Black Hills Corporation	Sheila Suurmeier	Carly Miller	Negative	Comments Submitted
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	None	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Helen Wang		Affirmative	N/A
5	Constellation	Alison MacKellar		Abstain	N/A
5	Dairyland Power Cooperative	Tommy Drea		Negative	Third-Party Comments
5	Decatur Energy Center LLC	Megan Melham		Negative	Comments Submitted
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		None	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Negative	Comments Submitted
5	Evergy	Jeremy Harris	Alan Kloster	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Affirmative	N/A
5	Great River Energy	Jacalynn Bentz		Negative	Third-Party Comments
5	Greybeard Compliance Services, LLC	Mike Gabriel		Negative	Third-Party Comments
5	Hydro-Quebec (HQ)	Junji Yamaguchi		Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		None	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Negative	Third-Party Comments
5	Los Angeles Department of Water and Power	Glenn Barry		Abstain	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		None	N/A
5	National Grid USA	Robin Berry		Affirmative	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Nebraska Public Power District	Ronald Bender		Negative	Third-Party Comments
5	New York Power Authority	Zahid Qayyum		Negative	Third-Party Comments
5	NextEra Energy	Richard Vendetti		Affirmative	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Negative	Third-Party Comments
5	Northern California Power Agency	Jeremy Lawson		Negative	Comments Submitted
5	NRG - NRG Energy, Inc.	Patricia Lynch		Affirmative	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Negative	Third-Party Comments
5	Omaha Public Power District	Kayleigh Wilkerson		Negative	Third-Party Comments
5	Ontario Power Generation Inc.	Constantin Chitescu		None	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Negative	Third-Party Comments
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Negative	Third-Party Comments
5	Platte River Power Authority	Jon Osell		Abstain	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		Abstain	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Negative	Comments Submitted
5	Santee Cooper	Don Cribb		Abstain	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		None	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Affirmative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	Comments Submitted
5	TransAlta Corporation	Ashley Scheelar		None	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	U.S. Bureau of Reclamation	Wendy Kalidass		None	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Clarice Zellmer		Negative	Comments Submitted
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		None	N/A
6	Black Hills Corporation	Rachel Schuldt		Negative	Comments Submitted
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Cleco Corporation	Robert Hirchak		None	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Abstain	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Negative	Comments Submitted
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Negative	Comments Submitted
6	Evergy	Tiffany Lake	Alan Kloster	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Affirmative	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Negative	Comments Submitted
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Kelly Bertholet		Negative	Comments Submitted
6	Muscatine Power and Water	Nicholas Burns		Negative	Third-Party Comments
6	New York Power Authority	Shelly Dineen		Negative	Third-Party Comments
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		None	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Negative	Comments Submitted
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Omaha Public Power District	Shonda McCain		Negative	Third-Party Comments
6	Platte River Power Authority	Sabrina Martz		None	N/A
6	Portland General Electric Co.	Stefanie Burke		None	N/A
6	Powerex Corporation	Raj Hundal		Affirmative	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Tamarra Hardie		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Negative	Comments Submitted
6	Santee Cooper	Marty Watson		Abstain	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		Abstain	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	Comments Submitted
6	WEC Energy Group, Inc.	David Boeshaar		Negative	Comments Submitted
6	Western Area Power Administration	Jennifer Neville		Negative	Third-Party Comments
6	Xcel Energy, Inc.	Steve Szablya		None	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	New York State Reliability Council	Wesley Yeomans		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman		Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 282 of 282 entries

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/316)
Ballot Name: 2020-06 Verifications of Models and Data for Generators IBR Unit AB 2 DEF
Voting Start Date: 3/29/2024 12:01:00 AM
Voting End Date: 4/8/2024 8:00:00 PM
Ballot Type: DEF
Ballot Activity: AB
Ballot Series: 2
Total # Votes: 234
Total Ballot Pool: 281
Quorum: 83.27
Quorum Established Date: 4/8/2024 3:53:55 PM
Weighted Segment Value: 61.07

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	30	0.577	22	0.423	0	11	11
Segment: 2	8	0.7	6	0.6	1	0.1	0	0	1
Segment: 3	57	1	29	0.592	20	0.408	0	2	6
Segment: 4	17	1	5	0.5	5	0.5	0	1	6
Segment: 5	72	1	29	0.547	24	0.453	0	5	14
Segment: 6	47	1	16	0.471	18	0.529	0	4	9
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	6	0.5	5	0.5	0	0	0	1	0
Totals:	281	6.2	120	3.787	90	2.413	0	24	47

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Abstain	N/A
1	Ameren - Ameren Services	Tamara Evey		None	N/A
1	American Transmission Company, LLC	Amy Wilke		Negative	Comments Submitted
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Negative	Comments Submitted
1	Arkansas Electric Cooperative Corporation	Emily Corley		Affirmative	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		Affirmative	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Negative	Comments Submitted
1	BC Hydro and Power Authority	Adrian Andreoiu		Negative	Comments Submitted
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Negative	Comments Submitted
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Abstain	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Negative	Third-Party Comments
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Negative	Third-Party Comments
1	Dominion - Dominion Virginia Power	Elizabeth Weber		Negative	Comments Submitted
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Negative	Comments Submitted
1	Evergy	Kevin Frick	Alan Kloster	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Affirmative	N/A
1	Georgia Transmission Corporation	Greg Davis		Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Negative	Third-Party Comments
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		None	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Lincoln Electric System	Josh Johnson		Negative	Comments Submitted
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		Abstain	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	None	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard	Nikki Carson-Marquis	Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Negative	Third-Party Comments
1	National Grid USA	Michael Jones		Affirmative	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Negative	Third-Party Comments
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Negative	Third-Party Comments
1	Omaha Public Power District	Doug Peterchuck		Negative	Third-Party Comments
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		Negative	Third-Party Comments
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Abstain	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		None	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		None	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Negative	Comments Submitted
1	Salt River Project	Sarah Blankenship	Israel Perez	Negative	Comments Submitted
1	Santee Cooper	Chris Wagner		Abstain	N/A
1	SaskPower	Wayne Guttormson		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Negative	Third-Party Comments
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell	Jennie Wike	None	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Negative	Comments Submitted
1	Tri-State G and T Association, Inc.	Donna Wood		Negative	Comments Submitted
1	U.S. Bureau of Reclamation	Richard Jackson		None	N/A
1	Western Area Power Administration	Ben Hammer		None	N/A
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		None	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Negative	Comments Submitted
3	AEP	Leshel Hutchings		None	N/A
3	Ameren - Ameren Services	David Jendras Sr		Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Affirmative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Negative	Comments Submitted
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Negative	Comments Submitted
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	None	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Bill Garvey		Negative	Comments Submitted
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A
3	Entergy	James Keele		Negative	Comments Submitted
3	Evergy	Marcus Moor	Alan Kloster	Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Affirmative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Negative	Third-Party Comments
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		Affirmative	N/A
3	Lincoln Electric System	Sam Christensen		Negative	Comments Submitted
3	Los Angeles Department of Water and Power	Fausto Serratos		Abstain	N/A
3	Manitoba Hydro	Mike Smith		Negative	Comments Submitted
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		None	N/A
3	Muscatine Power and Water	Seth Shoemaker		Negative	Third-Party Comments
3	National Grid USA	Brian Shanahan		Affirmative	N/A
3	Nebraska Public Power District	Tony Eddleman		Negative	Third-Party Comments
3	New York Power Authority	David Rivera		Affirmative	N/A
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Negative	Third-Party Comments
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Negative	Third-Party Comments
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Negative	Third-Party Comments
3	OTP - Otter Tail Power Company	Wendi Olson		Negative	Third-Party Comments
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		Affirmative	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Negative	Comments Submitted
3	Salt River Project	Mathew Weber	Israel Perez	Negative	Comments Submitted
3	Santee Cooper	Vicky Budreau		Abstain	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Negative	Comments Submitted
3	Tennessee Valley Authority	Ian Grant		Negative	Comments Submitted
3	Tri-State G and T Association, Inc.	Ryan Walter		Negative	Comments Submitted
3	WEC Energy Group, Inc.	Christine Kane		Negative	Comments Submitted
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Negative	Third-Party Comments
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	None	N/A
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		None	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Affirmative	N/A
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Negative	Third-Party Comments
4	Northern California Power Agency	Marty Hostler		Negative	Comments Submitted
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		None	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Negative	Comments Submitted
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho	Jennie Wike	None	N/A
4	Utility Services, Inc.	Carver Powers		Negative	Comments Submitted
4	WEC Energy Group, Inc.	Matthew Beilfuss		None	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Ameren - Ameren Missouri	Sam Dwyer		None	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		Affirmative	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Negative	Comments Submitted
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Negative	Comments Submitted
5	Black Hills Corporation	Sheila Suurmeier	Carly Miller	Negative	Comments Submitted
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	None	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Helen Wang		Affirmative	N/A
5	Constellation	Alison MacKellar		Abstain	N/A
5	Dairyland Power Cooperative	Tommy Drea		Negative	Third-Party Comments
5	Decatur Energy Center LLC	Megan Melham		Negative	Comments Submitted
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		None	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Negative	Comments Submitted
5	Evergy	Jeremy Harris	Alan Kloster	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Affirmative	N/A
5	Great River Energy	Jacalynn Bentz		Negative	Third-Party Comments
5	Greybeard Compliance Services, LLC	Mike Gabriel		Negative	Third-Party Comments
5	Hydro-Quebec (HQ)	Junji Yamaguchi		Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		None	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Negative	Third-Party Comments
5	Los Angeles Department of Water and Power	Glenn Barry		Abstain	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	LS Power Development, LLC	C. A. Campbell		None	N/A
5	National Grid USA	Robin Berry		Affirmative	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Affirmative	N/A
5	Nebraska Public Power District	Ronald Bender		Negative	Third-Party Comments
5	New York Power Authority	Zahid Qayyum		Negative	Third-Party Comments
5	NextEra Energy	Richard Vendetti		Affirmative	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Negative	Third-Party Comments
5	Northern California Power Agency	Jeremy Lawson		Negative	Comments Submitted
5	NRG - NRG Energy, Inc.	Patricia Lynch		Affirmative	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Negative	Third-Party Comments
5	Omaha Public Power District	Kayleigh Wilkerson		Negative	Third-Party Comments
5	Ontario Power Generation Inc.	Constantin Chitescu		None	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Negative	Third-Party Comments
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Negative	Third-Party Comments
5	Platte River Power Authority	Jon Osell		Abstain	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		Abstain	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Negative	Comments Submitted
5	Salt River Project	Thomas Johnson	Israel Perez	Negative	Comments Submitted
5	Santee Cooper	Don Cribb		Abstain	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		None	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Negative	Comments Submitted
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	Comments Submitted
5	TransAlta Corporation	Ashley Scheelar		None	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Negative	Comments Submitted
5	U.S. Bureau of Reclamation	Wendy Kalidass		None	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Clarice Zellmer		Negative	Comments Submitted
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		None	N/A
6	Black Hills Corporation	Rachel Schuldt		Negative	Comments Submitted
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Cleco Corporation	Robert Hirchak		None	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Abstain	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Negative	Comments Submitted
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Negative	Comments Submitted
6	Evergy	Tiffany Lake	Alan Kloster	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Affirmative	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Negative	Comments Submitted
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Kelly Bertholet		Negative	Comments Submitted
6	Muscatine Power and Water	Nicholas Burns		Negative	Third-Party Comments
6	New York Power Authority	Shelly Dineen		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		None	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Negative	Comments Submitted
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Negative	Third-Party Comments
6	Omaha Public Power District	Shonda McCain		Negative	Third-Party Comments
6	Platte River Power Authority	Sabrina Martz		None	N/A
6	Portland General Electric Co.	Stefanie Burke		None	N/A
6	Powerex Corporation	Raj Hundal		Negative	Third-Party Comments
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Tamarra Hardie		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Negative	Comments Submitted
6	Salt River Project	Timothy Singh	Israel Perez	Negative	Comments Submitted
6	Santee Cooper	Marty Watson		Abstain	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		Abstain	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Negative	Comments Submitted
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	Comments Submitted
6	WEC Energy Group, Inc.	David Boeshaar		Negative	Comments Submitted
6	Western Area Power Administration	Jennifer Neville		Negative	Third-Party Comments
6	Xcel Energy, Inc.	Steve Szablya		None	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman		Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 281 of 281 entries

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/316)
Ballot Name: 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan AB 2 OT
Voting Start Date: 3/29/2024 12:01:00 AM
Voting End Date: 4/8/2024 8:00:00 PM
Ballot Type: OT
Ballot Activity: AB
Ballot Series: 2
Total # Votes: 233
Total Ballot Pool: 280
Quorum: 83.21
Quorum Established Date: 4/8/2024 3:54:06 PM
Weighted Segment Value: 70.04

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	36	0.706	15	0.294	0	12	11
Segment: 2	8	0.7	6	0.6	1	0.1	0	0	1
Segment: 3	57	1	33	0.688	15	0.313	0	2	7
Segment: 4	17	1	6	0.6	4	0.4	0	1	6
Segment: 5	72	1	35	0.673	17	0.327	0	6	14
Segment: 6	46	1	20	0.606	13	0.394	0	5	8
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	6	0.4	4	0.4	0	0	0	2	0
Totals:	280	6.1	140	4.273	65	1.827	0	28	47

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Abstain	N/A
1	Ameren - Ameren Services	Tamara Evey		None	N/A
1	American Transmission Company, LLC	Amy Wilke		Abstain	N/A
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Negative	Comments Submitted
1	Arkansas Electric Cooperative Corporation	Emily Corley		Affirmative	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		Affirmative	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Abstain	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Negative	Comments Submitted
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Affirmative	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Negative	Third-Party Comments
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Negative	Third-Party Comments
1	Dominion - Dominion Virginia Power	Elizabeth Weber		Negative	Comments Submitted
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Alan Kloster	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Affirmative	N/A
1	Georgia Transmission Corporation	Greg Davis		Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Negative	Third-Party Comments
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		None	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Lincoln Electric System	Josh Johnson		Negative	Comments Submitted
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		Abstain	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	None	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard	Nikki Carson-Marquis	Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Negative	Third-Party Comments
1	National Grid USA	Michael Jones		Affirmative	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Negative	Third-Party Comments
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Negative	Third-Party Comments
1	Omaha Public Power District	Doug Peterchuck		Negative	Third-Party Comments
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		Negative	Third-Party Comments
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Abstain	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		None	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Affirmative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		None	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Sarah Blankenship	Israel Perez	Negative	Comments Submitted
1	Santee Cooper	Chris Wagner		Abstain	N/A
1	SaskPower	Wayne Guttormson		None	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Negative	Third-Party Comments
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell	Jennie Wike	None	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Affirmative	N/A
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		None	N/A
1	Western Area Power Administration	Ben Hammer		None	N/A
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		None	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Negative	Comments Submitted
3	AEP	Leshel Hutchings		None	N/A
3	Ameren - Ameren Services	David Jendras Sr		Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Affirmative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Abstain	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Negative	Comments Submitted
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	None	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		Affirmative	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Bill Garvey		Negative	Comments Submitted
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Entergy	James Keele		Affirmative	N/A
3	Evergy	Marcus Moor	Alan Kloster	Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Affirmative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Negative	Third-Party Comments
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		Affirmative	N/A
3	Lincoln Electric System	Sam Christensen		Negative	Comments Submitted
3	Los Angeles Department of Water and Power	Fausto Serratos		None	N/A
3	Manitoba Hydro	Mike Smith		Negative	Comments Submitted
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		None	N/A
3	Muscatine Power and Water	Seth Shoemaker		Negative	Third-Party Comments
3	National Grid USA	Brian Shanahan		Affirmative	N/A
3	Nebraska Public Power District	Tony Eddleman		Negative	Third-Party Comments
3	New York Power Authority	David Rivera		Negative	Third-Party Comments
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Negative	Third-Party Comments
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Negative	Third-Party Comments
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Negative	Third-Party Comments
3	OTP - Otter Tail Power Company	Wendi Olson		Negative	Third-Party Comments
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		Affirmative	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		None	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Salt River Project	Mathew Weber	Israel Perez	Negative	Comments Submitted
3	Santee Cooper	Vicky Budreau		Abstain	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Affirmative	N/A
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Negative	Comments Submitted
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Negative	Third-Party Comments
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	None	N/A
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		None	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Affirmative	N/A
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Negative	Third-Party Comments
4	Northern California Power Agency	Marty Hostler		Negative	Comments Submitted
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		None	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho	Jennie Wike	None	N/A
4	Utility Services, Inc.	Carver Powers		Negative	Comments Submitted
4	WEC Energy Group, Inc.	Matthew Beilfuss		None	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		None	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Abstain	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Negative	Comments Submitted
5	Black Hills Corporation	Sheila Suurmeier	Carly Miller	Negative	Comments Submitted
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	None	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Helen Wang		Affirmative	N/A
5	Constellation	Alison MacKellar		Abstain	N/A
5	Dairyland Power Cooperative	Tommy Drea		Negative	Third-Party Comments
5	Decatur Energy Center LLC	Megan Melham		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		None	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Affirmative	N/A
5	Evergy	Jeremy Harris	Alan Kloster	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Affirmative	N/A
5	Great River Energy	Jacalynn Bentz		Negative	Third-Party Comments
5	Greybeard Compliance Services, LLC	Mike Gabriel		Negative	Third-Party Comments
5	Hydro-Quebec (HQ)	Junji Yamaguchi		Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		None	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Negative	Third-Party Comments
5	Los Angeles Department of Water and Power	Glenn Barry		Abstain	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		None	N/A
5	National Grid USA	Robin Berry		Affirmative	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Affirmative	N/A
5	Nebraska Public Power District	Ronald Bender		Negative	Third-Party Comments
5	New York Power Authority	Zahid Qayyum		Negative	Third-Party Comments

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	NextEra Energy	Richard Vendetti		Affirmative	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Negative	Third-Party Comments
5	Northern California Power Agency	Jeremy Lawson		Negative	Comments Submitted
5	NRG - NRG Energy, Inc.	Patricia Lynch		Affirmative	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Negative	Third-Party Comments
5	Omaha Public Power District	Kayleigh Wilkerson		Negative	Third-Party Comments
5	Ontario Power Generation Inc.	Constantin Chitescu		None	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Negative	Third-Party Comments
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Negative	Third-Party Comments
5	Platte River Power Authority	Jon Osell		Abstain	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		Abstain	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Negative	Comments Submitted
5	Santee Cooper	Don Cribb		Abstain	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		None	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Affirmative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Affirmative	N/A
5	TransAlta Corporation	Ashley Scheelar		None	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		None	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Clarice Zellmer		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		None	N/A
6	Black Hills Corporation	Rachel Schuldt		Negative	Comments Submitted
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Abstain	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Negative	Comments Submitted
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Affirmative	N/A
6	Evergy	Tiffany Lake	Alan Kloster	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Affirmative	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		Negative	Comments Submitted
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Kelly Bertholet		Negative	Comments Submitted
6	Muscatine Power and Water	Nicholas Burns		Negative	Third-Party Comments
6	New York Power Authority	Shelly Dineen		Negative	Third-Party Comments
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		None	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Negative	Comments Submitted
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Negative	Third-Party Comments
6	Omaha Public Power District	Shonda McCain		Negative	Third-Party Comments
6	Platte River Power Authority	Sabrina Martz		None	N/A
6	Portland General Electric Co.	Stefanie Burke		None	N/A
6	Powerex Corporation	Raj Hundal		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Affirmative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Tamarra Hardie		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Negative	Comments Submitted
6	Santee Cooper	Marty Watson		Abstain	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		Abstain	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Affirmative	N/A
6	WEC Energy Group, Inc.	David Boeshaar		Negative	Comments Submitted
6	Western Area Power Administration	Jennifer Neville		Negative	Third-Party Comments
6	Xcel Energy, Inc.	Steve Szablya		None	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman		Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Abstain	N/A

Previous 1 Next

Showing 1 to 280 of 280 entries

Do not use this form for submitting nominations

Unofficial Nomination Form

Project 2020-06 Verification of Models and Data for Generators Drafting Team

Submitting Nominations

Do not use this form for submitting nominations. Use the electronic form to submit nominations for supplemental drafting team members by **8:00 p.m. Eastern, Wednesday, June 26, 2024.** This unofficial version is provided to assist nominees in compiling the information necessary to submit the electronic form.

General Information

Additional information is available on the project page. If you have questions, contact Manager of Standards Development, Jamie Calderon (via email), or at 404-960-0568.

By submitting a nomination form, you are indicating your willingness and agreement to actively participate in face-to-face meetings and conference calls. Previous drafting or quality review team experience is beneficial, but not required.

Project Information

Project Purpose

FERC Order No. 901 – Milestone 3, Part 2: IBR Model Validation SAR addresses regulatory directives from NERC Standards Development Work Plan to respond to FERC Order No. 901. This SAR is intended to establish new or revised Reliability Standards to address FERC Order No. 901 directives related to modeling validation (and verification) activities by utilizing actual performance data, including performance of IBR performance during a disturbance. This will help ensure the facility's model(s) reflect(s) the in-service equipment throughout the lifecycle of the IBR facility. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

As this SAR includes anticipated revisions to model validation for IBR, NERC recommends it be assigned to Project 2020-06 Verifications of Models and Data for Generators. The drafting team will need to prioritize changes for this SAR over currently assigned SARs to remove IBR from MOD-026 and MOD-027 as this holistic approach includes some form of ongoing quality review and corrections based on new performance-based validation. This is necessary to prevent duplicative model validation requirements that do not align with the performance-based objectives of the regulatory directives. A second phase proposed by this SAR to incorporate the uniform model framework revisions into FAC-002 to assure a consistent holistic approach for model data sharing is established throughout the lifespan of IBR. As regulatory directives included within this SAR must be addressed in revisions to Reliability Standards that must be filed with FERC by November, 2025, NERC also recommends that this project remain prioritized as a High Priority project. No waivers to the Standard Processes Manual are being requested at this time.

At the July 21, 2021 meeting, the Standards Committee accepted the original SAR assigned to Project 2020-06 Verifications of Models and Data for Generators. The drafting team has only proposed revisions to MOD-026 at this time. The initial draft was posted May 20, 2022 through July 6, 2022. An additional draft was posted November 21, 2022 through January 18, 2023. Another additional draft was posted June 7, 2023 through July 21, 2023. The drafting team has also posted new definitions for IBRs to assure alignment between other 901-related projects. The drafting team will post one more draft of revisions before being assigned this SAR and moving forward with revisions.

This project has been identified as higher priority at this time. This project has a FERC deadline under Milestone 3 of FERC Order No. 901 to file new or modified Reliability Standards by November 4, 2025.

Standard(s) Affected

MOD-026-1 Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

MOD-027-1 Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

MOD-033-2 Steady-State and Dynamic System Model Validation

Nominee Expertise Requested

For this project, NERC is seeking individuals who possess experience in one or more of the following areas:

- Transmission planning assessments;
- Steady state and dynamic stability analyses;
- Sensitivity analysis;
- Modeling;
- Model Validation;
- Operational/performance data limitations

Time Commitment Expectations

Time commitments for most projects include up to two face-to-face meetings per quarter (on average two full working days each meeting) with conference calls scheduled as needed. Team members may agree to individual or subgroup assignments, to work in separate meetings and present to the larger team for discussion and review. Another important component of quality reviews and drafting team efforts is outreach. Members of the team will be expected to conduct industry outreach during the development process to support a successful project outcome.

Project Priority

Each project will be developed according to that project's priority status. While each standard project addresses particular industry needs, some projects will be identified as a higher priority project. A higher priority project may initially include a strict timeline, which may be needed to effectively respond to a FERC Directive or as determined by the NERC Board of Trustees. A higher priority project may also need to increase the frequency of meetings at any time throughout the development process to account for project timeline needs. Similarly, other priority projects may adjust to a lower frequency of meetings throughout the development process to reallocate resources to high priority projects.

This project has been identified as higher priority at this time. The project has a FERC deadline of November 4, 2025. To meet this deadline, the team will meet regularly, up to three times a week on conference calls, with face-to-face meetings scheduled as the members' schedule allows, up to once a quarter.

Name:	
Organization:	
Address:	
Telephone:	
E-mail:	
Please briefly describe your experience and qualifications to serve on the requested Standard Drafting Team (Bio):	
If you are currently a member of any NERC drafting team, please list each team here: ☐ Not currently on any active SAR or standard drafting team. ☐ Currently a member of the following SAR or standard drafting team(s):	
If you previously worked on any NERC drafting team, please identify the team(s): ☐ No prior NERC SAR or standard drafting team. ☐ Prior experience on the following team(s):	
Acknowledgement that the nominee has read and understands both the *NERC Participant Conduct Policy* and the *Standard Drafting Team Scope* documents, available on NERC Standards Resources. ☐ Yes, the nominee has read and understands these documents.	

Select each NERC Region in which you have experience relevant to the Project for which you are volunteering:

☐ MRO ☐ NPCC ☐ RF	☐ SERC ☐ Texas RE ☐ WECC	☐ NA – Not Applicable

Select each Industry Segment that you represent:

☐	1 — Transmission Owners
☐	2 — RTOs, ISOs
☐	3 — Load-serving Entities
☐	4 — Transmission-dependent Utilities
☐	5 — Electric Generators
☐	6 — Electricity Brokers, Aggregators, and Marketers
☐	7 — Large Electricity End Users
☐	8 — Small Electricity End Users
☐	9 — Federal, State, and Provincial Regulatory or other Government Entities
☐	10 — Regional Reliability Organizations and Regional Entities
☐	NA – Not Applicable

Select each Function in which you have current or prior expertise:

☐ Balancing Authority	☐ Transmission Operator
☐ Compliance Enforcement Authority	☐ Transmission Owner
☐ Distribution Provider	☐ Transmission Planner
☐ Generator Operator	☐ Transmission Service Provider
☐ Generator Owner	☐ Purchasing-selling Entity
☐ Interchange Authority	☐ Reliability Coordinator
☐ Load-serving Entity	☐ Reliability Assurer
☐ Market Operator	☐ Resource Planner
☐ Planning Coordinator	

Provide the names and contact information for two references who could attest to your technical qualifications and your ability to work well in a group:			
Name:		Telephone:	
Organization:		E-mail:	
Name:		Telephone:	
Organization:		E-mail:	
Provide the name and contact information of your immediate supervisor or a member of your management who can confirm your organization's willingness to support your active participation.			
Name:		Telephone:	
Title:		Email:	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications for Models and Data for Generators

Drafting Team Nomination Period Open through June 26, 2024

Now Available

Nominations are being sought for supplemental drafting team members through **8 p.m. Eastern, Wednesday, June 26, 2024**.

Use the electronic form to submit a nomination. Contact Wendy Muller regarding issues using the electronic form. An unofficial Word version of the nomination form is posted on the Standard Drafting Team Vacancies page and the project page.

Time commitments for most projects include up to two face-to-face meetings per quarter (on average two full working days each meeting) with conference calls scheduled as needed. Team members may agree to individual or subgroup assignments, to work in separate meetings and present to the larger team for discussion and review. Another important component of quality reviews and drafting team efforts is outreach. Members of the team will be expected to conduct industry outreach during the development process to support a successful project outcome.

Project Priority

Each project will be developed according to that project's priority status. While each standard project addresses particular industry needs, some projects will be identified as a higher priority project. A higher priority project may initially include a strict timeline, which may be needed to effectively respond to a FERC Directive or as determined by the NERC Board of Trustees. A higher priority project may also need to increase the frequency of meetings at any time throughout the development process to account for project timeline needs. Similarly, other priority projects may adjust to a lower frequency of meetings throughout the development process to reallocate resources to high priority projects.

This project has been identified as higher priority at this time. The project has a FERC deadline of November 4, 2025. To meet this deadline, the team will meet regularly, up to three times a week on conference calls, with face-to-face meetings scheduled as the members' schedule allows, up to once a quarter.

Next Steps

The Standards Committee is expected to appoint members to the drafting team in August 2024. Nominees will be notified shortly after they have been appointed.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Jamie Calderon (via email) or at 404-960-0568. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators observer list” in the Title and Description Boxes.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 2: IBR Model Validation		
Date Submitted:	4/29/24		
SAR Requester			
Name:	Alex Shattuck, Jamie Calderon, JP Skeath		
Organization:	North American Electric Reliability Corporation (NERC)		
Telephone:	470-259-0109 (Alex Shattuck) 404-960-0568 (Jamie Calderon) 404-823-1365 (JP Skeath)	Email:	Alex.Shattuck@nerc.net Jamie.Calderon@nerc.net John.Skeath@nerc.net

SAR Type (Check as many as apply)	
☒ New Standard ☒ Revision to Existing Standard ☒ Add, Modify or Retire a Glossary Term ☒ Withdraw/retire an Existing Standard	☐ Imminent Action/ Confidential Issue (SPM Section 10) ☐ Variance development or revision ☐ Other (Please specify)

Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)	
☒ Regulatory Initiation ☒ Emerging Risk (Reliability Issues Steering Committee) Identified ☒ Reliability Standard Development Plan	☒ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified

What is the risk to the Bulk Electric System (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):

This Standards Authorization Request (SAR) is initiated by NERC, with consultation of the Reliability Security Technical Committee, to address directives issued by the Federal Energy Regulatory Commission (FERC) in Order No. 901. FERC issued Order No. 901 on October 19, 2023, which includes directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of inverter-based resources (IBRs); including both utility scale and behind-the-meter or distributed energy resources (DERs).

Within the Order, are four milestones that include sets of directives to NERC. In the Order, FERC has directed NERC to propose new or modified standards to mitigate reliability gaps in the current NERC Reliability Standards related to IBRs. Specifically, FERC directed NERC to develop new or modified

Requested information

Reliability Standards to address the following four broad topic areas related to IBRs: (1) data sharing; (2) data and model validation; (3) planning and operational studies; and (4) performance.

In January 2024, NERC filed the initial **Standards Development Work Plan in Response to FERC Order No. 901** (hereafter referred to as the "Work Plan). A current version of the Work Plan will be maintained here. The Work Plan discusses how NERC will develop Reliability Standards within three tranches (Milestones 2-4) to meet FERC's filing deadlines. This Standard Authorization Request addresses Milestone 3 – Part 2 of the Work Plan, related to Reliability Standards for IBR data sharing and model validation.

Milestone 3 of the Work Plan covers the development of data provisioning, parameters, and estimation requirements for IBRs. FERC Order No. 901 directives address three categories of IBR: (1) registered IBR, including sub-Bulk Electric System IBRs to be registered under NERC's revised Compliance Registry criteria; (2) unregistered IBR; and (3) IBR-DER, to distinguish registered bulk connected IBRs from unregistered bulk connected IBRs as well as the transmission connected IBRs from distribution-connected IBRs. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

Purpose or Goal (What are the reliability gap(s) or risk(s) to the Bulk Electric System being addressed, and how does this proposed project provide the reliability-related benefit described above?):

This SAR addresses specific pieces of the NERC filed Work Plan related to Milestone 3 and addresses the various industry comments to meet the regulatory directives of FERC Order No. 901. This project shall coordinate among other projects (i.e., act as a clearing house to tie directive language to standard revisions), develop standard language (i.e., perform the normal duties of a standard development Project), and build upon other Milestones from FERC Order No. 901 Standards Projects to meet regulatory deadlines (i.e., maintain agility based on how FERC Order No. 901 related Projects proceed to meet the directive deadlines).

Specifically, the drafting team will address FERC Order No. 901 directives related to modeling validation (and verification) activities by utilizing actual performance data. This will help ensure the facility's model(s) reflects the in-service equipment throughout the lifecycle of the IBR facility.

Project Scope (Define the parameters of the proposed project):

The FERC Order No. 901 directives assigned to this SAR are outlined in the Detailed Description section below. The project scope shall address all those directives, and should consider the following objectives during the standards development process:

Phase 1 Objectives:

1. Either revise MOD-033 or create a new IBR model validation Reliability Standard to require model validation using actual performance data.
    a. include a complete set of validation expectations using performance data (must include performance data of IBR during disturbances as well as other performance measures);

Requested information

b. leverages the most accurate and highest quality model type available (reference data sharing scope from Milestone 3 Part 1 SAR);
c. ensure post-interconnection validations are not solely based on staged testing, but instead are periodically validated using performance data;
d. be designed to follow and be able to leverage new performance validations expected to be done during the interconnection process (to be established in phase 2 of this SAR);
e. include minimum criteria for performing validation (e.g., time, tolerance, impact);
f. include some planner/operator flexibility in determining specific performance criteria –
g. Require planner and operators to communicate any performance criteria to Generator Owners;
h. the DT should ensure any performance criteria established by the DT or by the planner and operators are risk-based and region-specific;
i. the DT should consider other criteria may be created by planners and operators to demonstrate performance in upcoming revisions to Reliability Standards due to Milestone 4 projects (planning and operator studies using performance data); and
j. the DT must require corrective action plans (CAPs) to be created by planners and operators that require the GO/TO to identify and improve model performance characteristics to align with performance.

2. Revise MOD-026 and MOD-027 to remove IBR from those Standards as this holistic approach includes some form of ongoing quality review and corrections based on new performance-based validation.

3. The drafting team shall ensure that implementation plans for new or modified Reliability Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap during implementation.

Phase 2 Objectives (not required as part of 901 Milestone 3 timeline)

4. Either revise FAC-002 or create a new SAR to incorporate similar changes to IBR validation during the interconnection process or create a new IBR model validation standard to require model validation using actual performance data to validate model quality during the interconnection process.
    a. include a complete set of validation expectations using performance data,
    b. leverages the most accurate and highest quality model type available,
    c. ensure post-interconnection validations are not based on staged testing but instead are periodically validated using performance data,
    d. be designed to follow and be able to leverage new performance validations done during the interconnection process,
    e. include minimum criteria for performing validation (e.g., time, tolerance, impact),
    f. include some planner/operator flexibility in determining specific performance criteria,
    g. These are necessary to ensure that performance criteria are risk-based and region-specific
    h. These should consider parallel criteria developed for TPL-001 and the new PRC-030 to allow corrective action plans to be created by planners and operators that require the

Requested information
GO/TO to identify and improve model performance characteristics to align with performance.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1] of developing a new or revised Reliability Standard or definition, which includes a discussion of the risk and impact to reliability-of the BES, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The project scope above will need to account for the specific FERC Directive text in FERC Order 901 to be successful. The drafting team should consider the specific language in the FERC directives, as well as any comments in the FERC Order No. 901 proceeding that FERC directed NERC to consider as part of the standard development process. **FERC Order 901 Directives Assigned to this SAR:** NERC will maintain a current version of NERC Standards Development's Work Plan to Address FERC Order No. 901 on the NERC website under Reliability Standards Under Development. Included in this Work Plan is a list of the directives in FERC Order No. 901 and their associated mapping to each SAR submitted by NERC. The Work Plan will be updated should any mapping of FERC directives be reassigned due to ongoing work in the various Standards Development Projects. As of April 1, 2024, this SAR will address the following FERC Order No. 901 directives, with the scope for this SAR emphasized in **bold** as appropriate: 1. "**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal to direct NERC to include in the new or modified Reliability Standards** technical criteria to require registered IBR generator owners to install disturbance monitoring equipment at their buses and elements, to require registered IBR generator owners to provide disturbance monitoring data to Bulk-Power System planners and operators for analyzing disturbances on the Bulk-Power System**, and to require Bulk-Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners' disturbance monitoring equipment**." (P85) 2. "With respect to NERC's recommendation for model benchmarking, we direct NERC to determine through its standards development process whether the development of benchmark cases to test model performance and a subsequent report comparing model performance are needed and at what periodicity." (P 126) 3. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the generator owners of registered IBRs, transmission owners that have unregistered IBRs on their system, and distribution providers that have IBR-DERs on their system to provide models that represent the dynamic behavior of these IBRs at a sufficient level of fidelity to provide to Bulk-Power System planners and operators

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.

Requested information

to perform valid interconnection-wide, planning, and operational studies on a basis comparable to synchronous generation resources." (P 140)

4. "We also direct NERC to require the generator owners of registered IBRs and the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior." (P 141)
5. "While we decline to include this level of detail in the directive to NERC, we nonetheless direct NERC to establish a standard uniform model verification process." (P 143)
6. "Therefore, we direct NERC to define the model verification process and to require consistency among the model verification processes for existing Reliability Standards (e.g., FAC-002, MOD-026, and MOD-027) and any new or modified Reliability Standards." (P 143)
7. "Moreover, although the Reliability Standards will apply to a different (albeit overlapping) set of entities than Order No. 2023, we believe consistency is needed between the complimentary proceedings and therefore direct NERC to include in the new or modified Reliability Standards a similar model verification process timeline consistent with FERC Order No. 2023 modeling deadline requirements." (P 149)
8. "Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to submit new or modified Reliability Standards that require Bulk-Power System planners and operators to validate, coordinate, and update in a timely manner the system models by comparing all generator owner, transmission owner, and distribution provider verified IBR models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and resulting system models against actual system operational behavior." (P 156)
9. "**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to** determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate and to **establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models**." (P 157)
10. "**Specifically, we direct NERC to develop new or modified Reliability Standards that require** planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and **the validation of each respective system model**." (P 161)

Requested information
11. "Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners, and distribution providers to regularly update and communicate the verified data and models of registered IBRs, unregistered IBRs, and IBR-DERs by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models." (P 161) 12. "For those areas with IBR-DERs in the aggregate that have a material impact on the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the models of those IBR-DERs and to determine the registered entities responsible for updating, verifying, and coordinating models for IBR-DERs in the aggregate to meet the system models directives." (P 161) 13. "Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date." (P 226)
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The associated cost with implementation of a new standard is currently unknown. There may be potential cost savings if fewer reoccurring staged tests are performed.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
Inverter-Based Resources connected to the Bulk Power System (BPS) Distributed Energy Resources (DER-IBR), in aggregate
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the NERC Rules of Procedure Appendix 5A:
Transmission Planner Reliability Coordinator Distribution Provider Generator Owner and Generator Operator Transmission Owner and Transmission Operator
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.

[2] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Requested information

FERC Order No. 901
NERC Standards Development Work Plan in Response to FERC Order No. 901
Inverter-Based Resource Activities, Quick Reference Guide
Distributed Energy Resource Activities, Quick Reference Guide
IBR Registration Initiative, Quick Reference Guide

Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?

1. SARs:
    a. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirements
    b. SAR titled: Federal Energy Regulatory Commission (FERC) Order No. 901 – Milestone 3, Part 3: IBR Modeling Revision
2. Active Reliability Standards Projects:
    a. 2020-06 Verifications of Models and Data for Generators (NERC Standards Development recommends assigning the SAR to this active project)
    b. 2021-01 Modifications to MOD-025 and PRC-019
    c. 2022-02 Modifications to TPL-001-5.1 and MOD-032-1
    d. 2022-04 EMT Modeling
    e. 2023-05 Modifications to FAC-001 and FAC-002
    f. 2023-08 Modifications of MOD-031 Demand and Energy Data

Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives with the benefits of using them.

Reliability Principles

Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.

☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☐	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☒	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.

Reliability Principles	
☐	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g., NPCC	Unknown at this time.

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☒ Draft SAR reviewed by NERC Staff	☐ Final SAR endorsed by the SC
☐ Draft SAR presented to SC for acceptance	☐ SAR assigned a Standards Project by NERC
☐ DRAFT SAR approved for posting by the SC	☐ SAR denied or proposed as Guidance document
Risk Tracking.	
☐ Grid Transformation	☐ Energy Policy
☐ Resilience/Extreme Events	☐ Critical Infrastructure Interdependencies
☐ Security Risks	

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised

1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised
2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer
5	August 14, 2023	Standards Development Staff	Updated template as part of Standards Process Stakeholder Engagement Group

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Project 2020-06 Verification of Models and Data for Generators Standard Authorization Request (SAR)

Do not use this form for submitting comments. Use the Standards Balloting and Commenting System (SBS) to submit comments on the **Project 2020-06 Verification of Models and Data for Generators SAR** by **8:00 p.m. Eastern, Wednesday, June 26, 2024.**

Additional information is available on the project page. If you have questions, contact Manager of Standard Developer, Jamie Calderon (via email), or at 404-960-0568.

Background Information

FERC Order No. 901 – Milestone 3, Part 2: IBR Model Validation SAR addresses regulatory directives from NERC Standards Development Work Plan to respond to FERC Order No. 901. This SAR is intended to establish new or revised Reliability Standards to address FERC Order No. 901 directives related to modeling validation (and verification) activities by utilizing actual performance data, including performance of IBR performance during a disturbance. This will help ensure the facility's model(s) reflect(s) the in-service equipment throughout the lifecycle of the IBR facility. NERC must file the Reliability Standards or definitions developed under Milestone 3 by November 4, 2025.

As this SAR includes anticipated revisions to model validation for IBR, NERC recommends it be assigned to Project 2020-06 Verifications of Models and Data for Generators. The drafting team will need to prioritize changes for this SAR over currently assigned SARs to remove IBR from MOD-026 and MOD-027 as this holistic approach includes some form of ongoing quality review and corrections based on new performance-based validation. This is necessary to prevent duplicative model validation requirements that do not align with the performance-based objectives of the regulatory directives. A second phase proposed by this SAR to incorporate the uniform model framework revisions into FAC-002 to assure a consistent holistic approach for model data sharing is established throughout the lifespan of IBR. As regulatory directives included within this SAR must be addressed in revisions to Reliability Standards that must be filed with FERC by November, 2025, NERC also recommends that this project remain prioritized as a High Priority project. No waivers to the Standard Processes Manual are being requested at this time.

At the July 21, 2021 meeting, the Standards Committee (SC) accepted the original SAR assigned to Project 2020-06 Verifications of Models and Data for Generators. The drafting team has only proposed revisions to MOD-026 at this time. The initial draft was posted May 20, 2022 through July 6, 2022. An additional draft was posted November 21, 2022 through January 18, 2023. Another additional draft was posted June 7, 2023 through July 21, 2023. The drafting team has also posted new definitions for IBRs to assure alignment between other 901-related projects. The drafting team will post one more draft of revisions before being assigned this SAR and moving forward with revisions.

This project has been identified as higher priority at this time. This project has a FERC deadline under Milestone 3 of November 4, 2025.

Questions

1. Are there any areas of concern that duplicative coverage or competing expectations would occur, if so, what are these areas the team should be aware of when drafting?

   ☐ Yes
   ☐ No

   Comments:

2. Provide any additional comments for the drafting team to consider, if desired.

   ☐ Yes
   ☐ No

   Comments:

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verification of Models and Data for Generators Standard Authorization Request (SAR)

Formal Comment Period Open through June 26 2024

Now Available

A formal comment period for the **Project 2020-06 Verification of Models and Data for Generators SAR**, is open through **8 p.m. Eastern, Wednesday, June 26, 2024**.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

The drafting team will review all responses received during the comment period and determine the next steps of the project.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Jamie Calderon (via email) or at 404-960-0568. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators observer list” in the Title and Description Boxes.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Comment Report

Project Name:	2020-06 Verifications of Models and Data for Generators | Standard Authorization Request
Comment Period Start Date:	5/28/2024
Comment Period End Date:	6/26/2024
Associated Ballots:	

There were 40 sets of responses, including comments from approximately 111 different people from approximately 69 companies representing 10 of the Industry Segments as shown in the table on the following pages.

Questions

1. Are there any areas of concern that duplicative coverage or competing expectations would occur, if so, what are these areas the team should be aware of when drafting?

2. Provide any additional comments for the drafting team to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,SPP RE,WECC	SRC 2024	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Helen Lainis	IESO	1	NPCC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Elizabeth Davis	PJM	2	RF
					Kennedy Meier	Electric Reliability Council of Texas, Inc.	2	Texas RE
					Matt Goldberg	ISO New England	2	NPCC
Entergy	Julie Hall	1,3,6		Entergy	Oliver Burke	Entergy - Entergy Services, Inc.	1	SERC
					Jamie Prater	Entergy	5	SERC
FirstEnergy - FirstEnergy Corporation	Mark Garza	1,4,5,6		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy-FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
DTE Energy - Detroit Edison Company	Mohamad Elhusseini	3,5		DTE Energy	Mohamad Elhusseini	DTE Energy	5	RF
					Patricia Ireland	DTE Energy	4	RF
					Marvin Johnson	DTE Energy - Detroit Edison Company	3	RF
Southern	Pamela Hunter	1,3,5,6	SERC	Southern	Matt Carden	Southern	1	SERC

Company - Southern Company Services, Inc.				Company		Company - Southern Company Services, Inc.		
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC
Black Hills Corporation	Rachel Schuldt	1,3,5,6		Black Hills Corporation - All Segments	Micah Runner	Black Hills Corporation	1	WECC
					Josh Combs	Black Hills Corporation	3	WECC
					Rachel Schuldt	Black Hills Corporation	6	WECC
					Carly Miller	Black Hills Corporation	5	WECC
					Sheila Suurmeier	Black Hills Corporation	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC
					Deidre Altobell	Con Edison	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael Ridolfino	Central Hudson Gas & Electric Corp.	1	NPCC
					Randy Buswell	Vermont Electric Power Company	1	NPCC
					James Grant	NYISO	2	NPCC

Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
David Burke	Orange and Rockland	3	NPCC
Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
Salvatore Spagnolo	New York Power Authority	1	NPCC
Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
David Kwan	Ontario Power Generation	4	NPCC
Silvia Mitchell	NextEra Energy - Florida Power and Light Co.	1	NPCC
Sean Cavote	PSEG	4	NPCC
Jason Chandler	Con Edison	5	NPCC
Tracy MacNicoll	Utility Services	5	NPCC
Shivaz Chopra	New York Power Authority	6	NPCC
Vijay Puran	New York State Department of Public Service	6	NPCC
David Kiguel	Independent	7	NPCC
Joel Charlebois	AESI	7	NPCC
Joshua London	Eversource Energy	1	NPCC
Emma Halilovic	Hydro One Networks, Inc.	1,2	NPCC
Emma Halilovic	Hydro One Networks, Inc.	1,2	NPCC
Chantal Mazza	Hydro Quebec	1,2	NPCC

					Emma Halilovic	Hydro One Networks, Inc.	1,2	NPCC
					Chantal Mazza	Hydro Quebec	1,2	NPCC
					Nicolas Turcotte	Hydro-Quebec (HQ)	1	NPCC
					Jeffrey Streifling	NB Power Corporation	1,4,10	NPCC
					Jeffrey Streifling	NB Power Corporation	1,4,10	NPCC
					Jeffrey Streifling	NB Power Corporation	1,4,10	NPCC
					Joel Charlebois	AESI	7	NPCC
Southwest Power Pool, Inc. (RTO)	Shannon Mickens	2	MRO,SPP RE,WECC	SPP RTO	Shannon Mickens	Southwest Power Pool Inc.	2	MRO
					Mia Wilson	Southwest Power Pool Inc.	2	MRO
					Eddie Watson	Southwest Power Pool Inc.	2	MRO
					Steve Purdy	Southwest Power Pool Inc.	2	MRO
					Jim Williams	Southwest Power Pool Inc.	2	MRO
					Jeff McDiarmid	Southwest Power Pool Inc.	2	MRO
					Mason Favazza	Southwest Power Pool Inc.	2	MRO
					Eric Sullivan	Southwest Power Pool Inc.	2	MRO
					Heather Harris	Southwest Power Pool Inc.	2	MRO
					Scott Jordan	Southwest Power Pool Inc	2	MRO
					Hugh Benfer	Southwest Power Pool Inc.	2	MRO

					Zach Sabey	Southwest Power Pool Inc.	2	MRO
					Bryan Wood	Southwest Power Pool Inc	2	MRO
					Margaret Quispe	Southwest Power Pool Inc	2	MRO
					Will Tootle	Southwest Power Pool Inc.	2	MRO
					ashley Stringer	Southwest Power Pool Inc.	2	MRO
					Brett Springfield	Southwest Power Pool Inc.	2	MRO
Western Electricity Coordinating Council	Steven Rueckert	10		WECC	Steve Rueckert	WECC	10	WECC
					Curtis Crews	WECC	10	WECC

1. Are there any areas of concern that duplicative coverage or competing expectations would occur, if so, what are these areas the team should be aware of when drafting?

Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy

Answer	No
Document Name	

Comment

Possible answers:Yes (could not correct it above).

There may be overlap with theFAC-002 and/or MOD-025/026/027/032 Standards that could occur if not coordinated together.

How will this Standard or Standards be different from the requirements for FR, DDR, and SER data in PRC-028 as noted in item #1 under detailed description to install and provide disturbance monitoring information to BPS planners and operators.

Will the specific attributes being required in the dynamic model be similar to that which is required in MOD-032 currently or will there be a separate set of criteria to be met?

There appears that there could be significant overlap with SARs 2022-04, 2022-02, and 2023-05.

Likes 0	
Dislikes 0	

Response

(Drafting team's response to submitter's comments)

Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,4,5,6, Group Name FE Voter

Answer	No
Document Name	

Comment

Until the Order 901 Milestone 3 SARs are more clearly defined, we cannot effectively assess whether this SAR contains any duplication in coverage or competing expectations.

Likes 0	
Dislikes 0	

Response

Daniel Gacek - Exelon - 1,3

Answer	No
Document Name	

Comment	
Not at this time, however several SARs are posted for comments and subject to modifications.	
Likes 0	
Dislikes 0	
Response	
Patricia Lynch - NRG - NRG Energy, Inc. - 5,6	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Stephen Stafford - Georgia Transmission Corporation - 1 - SERC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jessica Cordero - Unisource - Tucson Electric Power Co. - 1	
Answer	Yes
Document Name	
Comment	
TEPC agrees with EEI's response - EEI believes that until the Order 901 Milestone SARs are better defined, we cannot address whether the SARs provide any duplication in coverage.	
Likes 0	
Dislikes 0	
Response	
Jennifer Weber - Tennessee Valley Authority - 1,3,5,6 - SERC	

Answer	Yes
Document Name	
Comment	
Request that this SAR be revised to combine with the previous SAR accepted by the Standards Committee on 7/21/2021. Three draft revisions of MOD-026-2 have been balloted as well as 2 new definitions. This is not addressed in this new proposed SAR. It is confusing to industry to have multiple SARs open on the same standard and leaves industry unclear on the path forward for this Project.	
Likes 0	
Dislikes 0	
Response	
Duane Franke - Manitoba Hydro - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
It looks like the Phase-2 objectives duplicate the scope of the Project 2022-04 EMT Modeling Standard Drafting Team, where FAC-002-4 is currently under revision to include EMT modeling and study requirements. Coordinating with the Project 2022-04 EMT Modeling Standard Drafting Team is advisable to check whether they can address some of the objectives in this new SAR. **Phase 2 Objectives (not required as part of 901 Milestone 3 timeline)** 4. Either revise FAC-002 or create a new SAR to incorporate similar changes to IBR validation during the interconnection process or create a new IBR model validation standard to require model validation using actual performance data to validate model quality during the interconnection process.	
Likes 0	
Dislikes 0	
Response	
Kimberly Turco - Constellation - 5,6	
Answer	Yes
Document Name	
Comment	
Constellation feels projects have listed PRC-029 or PRC 030 as examples to may necessitate some form of change to the model but also are mentioning impacts in existing standards such as TPL-001-5, MOD-32, MOD-026, MOD-027, MOD-025, PRC-019 and IRO-010, the standard drafting team should ensure there is not duplicative requirements.	

Kimberly Turco on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Julie Hall - Entergy - 1,3,6, Group Name Entergy

Answer	Yes
Document Name	

Comment

Entergy has the following concerns around duplicative coverage or competing expectations:

- Multiple projects appear to be asking for or talking about similar/same questions and issues.
- Mod-033 is not appropriate Standard to do model validation for IBRs.
- If IBRs are removed from MOD-026 and MOD-027, then MOD-033 needs to include requirements for all the testing and validation that are required in MOD-026 and MOD-27.
- Various SDTs do not seem to be communicating.
- This project appears to be negating much of the previous work done to approve and implement MOD-026 and MOD-027.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5,6

Answer	Yes
Document Name	

Comment

Constellation feels projects have listed PRC-029 or PRC 030 as examples to may necessitate some form of change to the model but also are mentioning impacts in existing standards such as TPL-001-5, MOD-32, MOD-026, MOD-027, MOD-025, PRC-019 and IRO-010, the standard drafting team should ensure there is not duplicative requirements.

Alison Mackellar on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Rachel Schuldt - Black Hills Corporation - 1,3,5,6, Group Name Black Hills Corporation - All Segments	
Answer	Yes
Document Name	
Comment	

Black Hills Corporation agrees with the NAGF in their 3 detailed description sections that the narratives added confusion and could lead to duplicative or competing outcomes, as written below:

The NAGF provides the following comments regarding possible duplication/overlap for consideration:

a. Detailed Description Section:

i. FERC Order 901 Directives Assigned to this SAR (page 4) – The paragraph states “As of April 1, 2024, this SAR will address the following FERC Order 901 directives, with the scope for this SAR emphasized in bold as appropriate:”. 13 sections of the FERC Order 901 directives are included in the Detailed Description Section of which only 3 are bolded (1, 9, and 10). It is unclear as to value of including the non-bolded narratives as it adds significant confusion to the SAR. Recommend removing the non-bolded FERC Order 901 directive narratives from this section or clearly identify DT work activities associated with these non-bolded narratives.

ii. The NAGF notes that the inclusion of the following FERC Order 901 directive narratives in both the Project 2022-02 and this draft SARs Detailed Description section could lead to duplicative or competing outcomes:

#4 (unbolded)

#9 (bolded)

#10 (bolded)

#13 (unbolded)

iii. Given the numerous parallel NERC IBR efforts and the speed at which they are progressing, it is unclear as to the potential for duplication/overlap among these efforts. The NAGF and industry expect that NERC will have checks in place to ensure there are no duplication or competing expectations for these important IBR activities.

Likes 0	
Dislikes 0	
Response	

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	

The NAGF provides the following comments regarding possible duplication/overlap for consideration:

a. Detailed Description Section:

i. FERC Order 901 Directives Assigned to this SAR (page 4) – The paragraph states “As of April 1, 2024, this SAR will address the following FERC Order 901 directives, with the scope for this SAR emphasized in bold as appropriate:”. 13 sections of the FERC Order 901 directives are included in the Detailed Description Section of which only 3 are bolded (1, 9, and 10). It is unclear as to value of including the non-bolded narratives as it adds significant confusion to the SAR. Recommend removing the non-bolded FERC Order 901 directive narratives from this section or clearly identify DT work activities associated with these non-bolded narratives.

ii. The NAGF notes that the inclusion of the following FERC Order 901 directive narratives in both the Project 2022-02 and this draft SARs Detailed Description section could lead to duplicative or competing outcomes:

#4 (unbolded)

#9 (bolded)

#10 (bolded)

#13 (unbolded)

iii. Given the numerous parallel NERC IBR efforts and the speed at which they are progressing, it is unclear as to the potential for duplication/overlap among these efforts. The NAGF and industry expect that NERC will have checks in place to ensure there are no duplication or competing expectations for these important IBR activities.

Likes 0	
Dislikes 0	

Response

Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company

Answer	Yes
Document Name	

Comment

The purpose section of the SAR needs to limited to the specific purpose of the SAR (the second paragraph).

The detailed description section should be much more precise and not include items that are to be action items for the drafting team. Consider only including the bolded part of the long list of directive elements which are unique to the purpose of this SAR. Take care to not include duplicative bolded text in two concurrent SARs being written. See the comment below regarding this subject.

The project scope of the SR needs to be more succinct and not include material duplicated in other SARs (e.g. 2022-02) for both phases listed.

Some detailed description section duplicates bolded text in two SARs – creating confusion of which project is supposed to address the directive. FERC Order 901 Directives Assigned to this SAR (page 5) – The paragraph states “As of April 1, 2024, this SAR will address the following FERC Order 901 directives, with the scope for this SAR emphasized in bold as appropriate:”. 26 sections of the FERC Order 901 directives are included in the Detailed Description Section of which only 3 are bolded (17, 24, and 25). It is unclear as to value of including the non-bolded narratives and it adds significant confusion to the SAR. We recommend removing the non-bolded FERC Order 901 directive narratives from this section or clearly identify DT work activities associated with these non-bolded narratives.

With so many standards currently in revision with unknown outcomes, it is impossible to predict conflicts before they occur. NERC supposably has

internal groups tasked with preventing duplication and conflicting competition between standards during development.

Likes 0	
Dislikes 0	

Response

Hayden Maples - Evergy - 1,3,5,6 - MRO

Answer	Yes
Document Name	

Comment

Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI) on question 1

Likes 0	
Dislikes 0	

Response

Christy Thompson - PPL - Louisville Gas and Electric Co. - 3,5,6 - SERC

Answer	Yes
Document Name	

Comment

The recently released PRC-029-1 standard from project 2020-02 include multiple requirements in the form “Each GO or TO of an applicable IBR shall ensure that…” followed by a condition and a performance requirement. Measures include requirements in the form “Each GO and TO shall have evidence of actual recorded data…”. Essentially, PRC-029-1 requires post-event validation against performance criteria. This SAR requires post-event validation against models. These two things may be competing goals if model performance indicates failure to meet performance criteria. Though PRC-029-1 is still under development and the event validation components may be an overstep in its scope, care should be taken to not duplicate event validation work.

The recently released PRC-030-1 standard from project 2023-02 also includes requirements that overlap the stated purpose of this SAR. Specifically, requirement R4 of PRC-030-1 requires GOs to “analyze its IBRs performance” for certain system events. While this standard is also under development, the DT must consider that two different entities will be attempting to complete the same task. Again, this poses risk for duplicative coverage and competing expectations. For example, suppose due to PRC-030-1 the GO initiates a project to change inverter settings in a way that improves the simulated performance match for the event studied under PRC-030-1, but degrades the simulated performance match for an event studied by the TP under the requirements developed by this SAR. It is well known in the industry that model tweaks can simultaneously improve and degrade model performance depending on the event studied.

The DT must consider the scope and frequency of MOD-033. MOD-033 currently requires steady-state and stability validation once every 24 calendar months. Moreover, the stability portion only requires a validation of a single dynamic local event. The DT must keep in mind that MOD-033 is considered sufficient for the validation of the entire BES and has been serving the industry well. It is unreasonable to subject PCs and TPs to IBR validation activities that are inconsistent with the expectations of MOD-033. I.e., if the entire system is validated once every two years, a DER does not need to be

validated for every event.

The DT must consider the scope, timelines, and mitigations associated with MOD-026 and MOD-027. These standards directly relative to the scope of the SAR. Requirement R3 in each standard states “Each GO shall provide a written response to its TP” if the TP indicates that “the simulated … response did not match[approximate] the recorded response” for one to three events. While it is understood not all IBR owners are NERC registered entities, these standards currently set the expectation for the exact types of concerns raised in the SAR. The current mitigation requires coordination between the TP and GO to resolve or technically justify model issues.

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6

Answer	Yes
Document Name	

Comment

Until the Order 901 Milestone 3 SARs are more clearly defined, we cannot effectively assess whether this SAR contains any duplication in coverage or competing expectations.

Likes 0	
Dislikes 0	

Response

Greg Sorenson - ReliabilityFirst - 10 - RF

Answer	Yes
Document Name	

Comment

The SAR states, “Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection wide models (i.e., system models) and the validation of each respective system model.” This may create a competing expectation, or order-of-operation issue with the effort to modify MOD-032. The modeling criteria would need to be established prior to the development of the validation requirements. There also could be some duplication with MOD-033 as it also deals with system model validation.

Likes 0	
Dislikes 0	

Response

Scott Thompson - PNM Resources - 1,3,5 - WECC	
Answer	Yes
Document Name	
Comment	
Potential for duplicate coverage to the following projects: 2022-04, 2022-02, and 2023-05. FAC-002 and/or MOD-025/026/027/032 Standards that could occur if not coordinated together How will this Standard or Standards be different from the requirements for FR, DDR, and SER data in PRC-028 as noted in item #1 under detailed description to install and provide disturbance monitoring information to BPS planners and operators. Will the specific attributes being required in the dynamic model be similar to that which is required in MOD-032 currently or will there be a separate set of criteria to be met?	
Likes 0	
Dislikes 0	
Response	
Joseph Gatten - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	Yes
Document Name	
Comment	
Xcel Energy supports the comments of the EEI.	
Likes 0	
Dislikes 0	
Response	
Bobbi Welch - Midcontinent ISO, Inc. - 2	
Answer	Yes
Document Name	
Comment	
MISO supports comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC).	
Likes 0	
Dislikes 0	

Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2024	
Answer	Yes
Document Name	
Comment	

The ISO/RTO Council (IRC) Standards Review Committee (SRC) submits four comments in response to this question:

1) Need clarity on the expected entity for compliance with IBR model validation. The SRC proposes the IBR facility owner as the appropriate entity to validate the models that represent its equipment and devices.

2) Allow flexibility to revise all standards to ensure the IBR requirements are not applied to non-IBR.

3) Clarify whether this project or 2021-01 has authority over final proposed language.

4) Validation requirements for an interconnection study need to recognize limitations on data.

Phase 1 objectives:

Item 1:

MOD-033 is already a “system model validation” standard that requires comparison of simulation results to an actual event (field measurement). It seems odd to reference this existing standard (applicable to the PC, RC, and TOP) if the intention of this SAR is to require IBR-specific model validation. The SAR should be more clear about the intended entity that would have a compliance obligation to perform model validation. As a practical matter, the SRC proposes the IBR-facility owner should be the entity obligated to validate the models that represent its equipment and devices.

“2. Revise MOD-026 and MOD-027 to remove IBR from those Standards as this holistic approach

includes some form of ongoing quality review and corrections based on new performance-based

validation.”

The SAR should provide better clarity on the expectations of how it will align with the SAR from 2021 Since that SAR is still valid and not being revised to preclude IBRs, this SAR needs to be clear on the “authority” over the 2021 SAR for IBR requirements. Furthermore MOD-026/027 seems to be a logical starting point for an SDT to consider since those currently address model verification for generating plant volt/var and active power/frequency control functions.

However, if the SDT elects to create a separate standard for IBR model validation, the SAR scope should provide the SDT the flexibility to determine how best to establish IBR-specific model validation requirements (and whether they should be a part of MOD-026/027, MOD-033, or a new standard). If the SDT elects to create a separate standard for IBR model validation, the SAR scope should allow the SDT the flexibility needed to make appropriate revisions to MOD-026/027 (e.g. limiting applicability to non-IBR, etc.).

“3. The drafting team shall ensure that implementation plans for new or modified Reliability

Standards related to Milestone 3 of the Work Plan are aligned and do not create a reliability gap

during implementation.”

Both this SAR and the SAR for Project 2021-01 reference the same objective to address gaps for all Milestone 3 standards.

We agree with the need to ensure there are no reliability gaps during implementation. But it is unclear in the SAR how this team’s work is different than the work the Project 2021-01 drafting team will be responsible for.

The comparison exercises currently required by MOD-033 are themselves duplicative – if a system model consists of validated and verified models of individual components (generators, plants, IBR, transmission elements, loads, etc.), that are tuned to reflect actual event conditions, then system simulation results would more closely match with actual performance. Correcting system model performance to match measured values can only be effectively and conclusively completed by correcting/validating individual component models impacted by the disturbance event.

Phase 2 objectives:

“4. Either revise FAC-002 or create a new SAR to incorporate similar changes to IBR validation during the interconnection process or create a new IBR model validation standard to require model validation using actual performance data to validate model quality during the interconnection process.”

The FAC-002 standard’s purpose is to require the study of interconnection requests, not to address model validation, whereas the MOD series of standards is focused on the accuracy and integrity of models. Whether the team decides to revise FAC-002 or create a new standard for model validation, the scope must consider the limitations of model validation at the time of an interconnection study.

If validation is intended to refer to a confirmation that IBR simulation model performance matches field performance, validation is not possible throughout most of the interconnection process since there is no field performance that can be measured until after construction is complete. If the SAR is contemplating validation tests that occur as part of plant commissioning, the SAR should be more precise in identifying that portion of the interconnection process.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2

Answer	Yes
Document Name	

Comment

ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and adopts them as its own.

Likes 0	

Dislikes 0	
Response	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
Duke Energy agrees with and supports EEI comments for Question 1.	
Likes 0	
Dislikes 0	
Response	
David Jendras Sr - Ameren - Ameren Services - 1,3,6	
Answer	
Document Name	
Comment	
Ameren supports EEI's Comments on this project.	
Likes 0	
Dislikes 0	
Response	
Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
Until the Order 901 Milestone 3 SARs are more clearly defined, we cannot effectively assess whether this SAR contains any duplication in coverage or competing expectations.	
Likes 0	
Dislikes 0	
Response	

Dwanique Spiller - Berkshire Hathaway - NV Energy - 5	
Answer	
Document Name	
Comment	
Until the Order 901 Milestone 3 SARs are more clearly defined, we cannot effectively assess whether this SAR contains any duplication in coverage or competing expectations.	
Likes 0	
Dislikes 0	
Response	
Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SPP RTO	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	

2. Provide any additional comments for the drafting team to consider, if desired.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	
ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SRC 2024	
Answer	
Document Name	
Comment	
The SRC submits five comments in response to this question: 1) The SAR should be revised to clarify whether the responsible party for non-associated DERs will be identified by NERC or by the NERC standards process. 2) Require minimum categories or data to be identified to meet FERC directive. 3) Address use of phasor-domain vs EMT specific models. 4) Allow for creation of guidelines to address older facilities that may not have EMT data available. 5) Models for IBRs not subject to NERC standards and registration are not available. It is unclear how the standard language is to be written to meet objective no. 9. The language directs NERC (the organization) to determine and specify the team that will assign responsibility for non-associated DERs, which suggests that NERC staff will execute this directive. It would be preferable if the drafting team had the ability to propose the responsible entity and allow for stakeholder feedback and ballot. 9. “Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered	

entity responsible for the data and parameters of IBR-DERs in the aggregate and to establish a

process that requires identified registered entities to coordinate, validate, and keep up to date

the system models." (P 157)

The scope of the SAR should include item 4 from the FERC Order approving the NERC IBR Workplan. The bolded text is a clear directive from FERC.

4. "Regarding CAISO's concern regarding the potential "compliance trap" where planners and operators rely on third-party data and IRC's request that the final rule specify the data to be submitted by all IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate) and transmission devices using similar technologies, we direct NERC to determine through its standards development process the minimum categories or types of data that must be provided to transmission planners, transmission operators, transmission owners, and distribution providers necessary to predict the behavior of all IBRs and to ensure that compliance obligations are clear."

The SAR must direct the SDT to address the use of Phasor domain models or detailed EMT models. The final standards must be clear in how these models will be used. Our preference is to address both types of models and to require benchmarking of both types against each other.

Similarly, the scope should include the ability for the SDT to develop guidelines on how to address grandfathered facilities with no EMT models. For many of these facilities, the OEM is no longer supporting the inverter vintage or is completely out of business.

The SAR should recognize modeling limitations for non-registered IBRs or those connected to non-registered distribution providers. Regarding the multiple SAR references to unregistered IBRs and IBR-DERs – the SRC agrees that such data exchange, modeling, validation and coordination is best served by the generation owners, transmission owners, and distribution providers. However, such data and parameter requests will presumptively not meet the intended results as unregistered IBRs and IBR-DERs are not required to comply with NERC Reliability Standards. This is even further magnified for unregistered IBRs and IBR-DERs that are connected to non-registered distribution providers. Generally, case studies do not include resources of 20MW or lower, and the requirement to add such resources is anticipated to result in significant costs without any known benefits to modeling at the distribution level.

Likes 0	
Dislikes 0	

Response

Shannon Mickens - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC, Group Name SPP RTO

Answer	
Document Name	

Comment

The relevance of modeling validation references in sub-part H to revisions of FAC-002 for the Inverter-Based Resource (IBR) during the interconnection process is unclear. The drafting team should clarify the relationship to the Correction Action Plan (CAP) criteria and indicate these other projects should be finalized before adopting similar criteria to TPL-001 and PRC-030. The drafting team should also consider if this is a separate issue that needs to be

removed and addressed by a different drafting team for not aligning with the Phase 2 Objective.

As noted in the SRC comments, we recommend that the drafting team provide more clarity in the SAR on responsibilities and how modeling data is validated.

Finally, SPP recommends that the drafting team add the Planning Coordinator (PC) to the applicable entities of the SAR. We anticipate the PC may be impacted via this validation of modeling data.

Likes 0	
Dislikes 0	

Response

Dwanique Spiller - Berkshire Hathaway - NV Energy - 5

Answer	
Document Name	

Comment

The following comments are intended to address NV Energy concerns with the Proposed SAR. Our negative response also reflects our opinion that the SAR needs to be revised prior to final approval.

Detail Description/FERC Order 901 Directives for Milestone 3 Part 2 Comments

While NV Energy generally agrees that many of the FERC Order 901 directives allocated to this project are reflected in this proposed Project Scope (i.e., Items 1, 3, 5, 6, 7, & 10), we do not agree the following directives have been sufficiently addressed in the SAR:

Note: Item numbers below align with those contained in the Detailed Description Section of the SAR.

{C}· **Item 2** contains a directive that requires the assessment and development of benchmark cases to test model performance as well as a report comparing model performance and associated periodicity requirements. In our review of the Scope items, we do not find this task. We further note that if this task is to be done outside of this project, then it should be made clear where this work is being done and this directive should be removed from the Detail Scope section of the SAR.

{C}· **Item 5** directs the establishment of uniform model verification processes. While we have included this item as being addressed in the proposed SAR, we do suggest that clearer language be added to certain SAR scope items to strengthen this directive and ensure it will be thoroughly addressed.

{C}· **Items 4, 8, and 11** all contain directives that address issues with unregistered IBRs yet none of the language in the SAR scope clearly addresses those entities or the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where unregistered IBRs directives are to be addressed.

{C}· **Items 8, and 11** contain directives that address issues with IBR-DERs yet none of the language in the SAR scope clearly address those entities and the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where IBR-DERs directives are to be addressed.

{C}· **Item 8** addresses the verification of aggregated models for unregistered IBRs and IBR-DER that have a material impact on the BPS, but the proposed SAR contains nothing in the proposed Project Scope that addresses this issue. To address this issue, we suggest adding language to the proposed scope to address the associated directives on verifying aggregated unregistered IBRs and IBR DERs and the process differences associated

with validating those models.

NV Energy also suggests that Items 9 and 12 be removed from the Detailed Description section of this SAR because the directives contained in these Items are directives for NERC not the DT.

Next, we offer the following comments on the specifics of the Project Scope items and offer some suggested comments, edits, and deletions that provide clearer alignment to the directives, noting not all the concerns listed above are reflected in the comments below.

Phase 1 Objectives Comments:

Item 1: NV Energy is concerned that some of the suggested changes under the Item 1 work scope, which aligns to MOD-033 seem to confuse the intent of this Reliability Standard. Specifically, MOD-033 is intended to validate resource models against actual system events/data, whereas MOD-026 and MOD-027 are intended to verify individual resource models in dynamic simulations. We additionally ask that the phrase "actual performance data" be clarified, noting this is an undefined term and could be understood to mean many things. To address the clarity issue of Item 1 we suggest the following edits in boldface below:

Either revise MOD-033 or create a new **IBR model** system model validation Reliability Standard **that more accurately validates IBR performance within those interconnected transmission system studies to require model validation** using actual performance data.

Item 1a: NV Energy suggests not using the phrase "validation expectations" because the phrase has no meaning in the context of a NERC Reliability Standard. Noting an expectation is not a requirement. NV ENERGY also suggests that given MOD-033 is the focus of Item 1, it is important to maintain context that MOD-033 is focused specifically on validating resource performance within system models. Verifying the accuracy of IBR models should be conducted under the new Reliability Standard that would be created under Item 2. We additionally suggest adding aggregated IBR models for non-registered IBR and IBR-DERs that have a material impact on the BPS because both need to be validated within MOD-033. Furthermore, additional clarity is needed regarding what performance data is going to be available for the aggregated unregistered IBRs and IBR DERs that have a material impact, while registered IBR owners will have specific data requirements through PRC-028, we are unaware of similar requirements for unregistered resources. To address all but the performance data issues for unregistered resources, we offer the following suggested changes in boldface for Item 1a:

include **a complete set of validation expectations criteria for validating system planning models that requires assessing and validating IBR performance, as well as assessing the impact of both unregistered IBRs (in aggregate) and IBR-DERs (in aggregate) that have been identified as having a material impact on the BPS through the use of using** performance data (must include performance data of IBR during disturbances as well as other performance measures);

Item 1b: NV Energy suggest deleting item 1b because it is unnecessary to include language within a NERC Reliability Standard that simply asks for accurate and high-quality standards.

Item 1c: As stated above, we suggest that the term "performance data" be clarified.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item. Moreover, we understand Phase 2 is necessary to fulfill other Milestones not Milestone 3, Part 2 and therefore should not be included in this SAR.

Item 1e: The SAR should not attempt to prescriptively define how system planning models are to be validated. The DT should only develop requirements that obligate Planning Coordinators to have processes in place that validate IBR models within system planning models and include methods to reconcile any model issues with resource owners (i.e., IBR-GOs).

include **requirements that ensure Planning Coordinators have processes in place that can identify IBR model problems within system planning models and requirements for insuring IBR GOs are held accountable for providing updated models that more accurately validate IBR performance against actual performance data. minimum criteria for performing validation (e.g., time, tolerance, impact)**;

Item 1f: NV Energy does not agree with Item 1f. As stated in paragraph 143 of FERC Order 901, what is required is the development of a new or revised Reliability Standard that establishes "uniform model verification processes" not specific performance criteria. For this reason, we suggest deleting Item 1f because this item goes beyond what was directed by the Commission.

Item 1g: NV Energy supports requirements that include expanded communication processes that obligate IBR owners and planners to cooperatively communicate to resolve issues with IBR model validation. However, we do not support including "performance criteria" because that is not what Order 901 directed. For this reason, we suggest the following changes to Item 1g:

Include Require requirements that obligate planner and operators to **incorporate in their model verification processes documented communications with communicate any performance criteria to Generator Owners IBR owners to address deficiencies in IBR models. Include requirements for IBR owners to provide timely updates to their IBR models in response to issues identified in communications from planners and operators.**

Item 1h: This item should be deleted because none of the directives associated with this project include the establishment of "performance criteria", what is directed is the development of processes to validate IBR models. The development of performance criteria goes beyond the directives of FERC Order 901.

Item 1i: NV Energy believes that trying to add considerations for other future work overly complicates this project. Consider deleting this item.

Item 1j: NV Energy does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance within dynamic simulations (New Standard) and system planning models (MOD-033 or New Reliability Standard). Instead, we suggest that the DT develop requirements in that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of for both individual IBRs and aggregated IBR resources.

Item 2:

NV Energy suggests Items 1 & 2 do not fully capture the directives identified in FERC Order 901 specific to model verification. We also suggest that Item 2 should more clearly capture all the directives noted in FERC Order 901 specific to model verification (see Items 5, 6, & 7). To address these directives, we offer the following:

Develop a new or revised Reliability Standard that address IBR model verification processes that:

{C}· Establishes uniform processes regardless of the IBR type; and

{C}· Provides consistency among verification processes with other NERC Reliability Standards; and

{C}· Contains process timelines consistent with FERC Order No. 2023 modeling deadline requirements; and

{C}· Removes IBRs from MOD-026 and MOD-027.

Item 3: No suggested changes.

Item 4 (Phase 2):

NV Energy does not agree that there is any benefit in adding scope items that fall outside of Milestone 3 at this time. The scope is already very large

and including Phase 2 work that is so prescriptive and speculative when it is not clear exactly what additional work will be necessary does not add to the SAR and may only delay approval of the SAR. NV Energy recognizes that additional work will be needed to address all the directives in FERC Order 901, but it is more important at this time to address those directives identified as Milestone 3. There will be plenty of time to add additional scope later. For these reasons we suggest deleting the Phase 2 work and submitting a revised SAR later to address this work.

Likes 0	
Dislikes 0	

Response

Daniel Gacek - Exelon - 1,3

Answer	
Document Name	

Comment

In Project Scope, Phase 2, Section 4c, clarify the action to be taken if performance data (of IBR during disturbances...) if no such events have taken place. Consider defining performance data as performance during disturbances combined with performance during staged testing.

In Detailed Description, Sections 3 and 9, registered entities may be limited in some case with the quality and level of fidelity that can be provided of the dynamic behavior of existing, unregistred IBR and IBR-DER resources.

Additionally, Exelon support the concerns expressed in the EEI comments.

Likes 0	
Dislikes 0	

Response

Bobbi Welch - Midcontinent ISO, Inc. - 2

Answer	
Document Name	

Comment

MISO supports comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC).

In addition, while the resulting standard may or may not apply directly to the function of Planning Coordinator, MISO requests that Planning Coordinators be added to the list of functions considered to serve on the Standard Drafting Team due to the role they play in performing wide area planning studies. (SAR, page 6)

Likes 0	

Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Joseph Gatten - Xcel Energy, Inc. - 1,3,5,6 - MRO,WECC	
Answer	
Document Name	
Comment	
Xcel Energy supports the comments of the EEI.	
Likes 0	
Dislikes 0	
Response	
Scott Thompson - PNM Resources - 1,3,5 - WECC	
Answer	
Document Name	
Comment	
MOD-033 is about validating the full system model not a specific generator models. A holistic approach has been cited as the reason to remove IBR from MOD-026 and Mod-027. Thus, adding IBRs specifically to MOD-033 seems to counter that approach. As does, adding IBR validation during the interconnection process to FAC-002.. The addition will also put an additional burden on the PC to work with GO for get data for generators that are not yet in service and may not have an obligation under the NERC standards. Modeling gaps that exists in the interconnection process needs to be handled through FERC revisions to the interconnection process not through NERC standards.	

Likes 0	
Dislikes 0	

Response

Mark Garza - FirstEnergy - FirstEnergy Corporation - 1,4,5,6, Group Name FE Voter

Answer	
Document Name	

Comment

FirstEnergy supports EEI's comments which state:

The following comments are intended to address EEI concerns with the Proposed SAR. Our negative response also reflect our opinion that the SAR needs to be revised prior to final approval.

Detail Description/FERC Order 901 Directives for Milestone 3 Part 2 Comments

While EEI generally agrees that many of the FERC Order 901 directives allocated to this project are reflected in this proposed Project Scope (i.e., Items 1, 3, 5, 6, 7, & 10), we do not agree the following directives have been sufficiently addressed in the SAR:

Note: Item numbers below align with those contained in the Detailed Description Section of the SAR.

Item 2 contains a directive that requires the assessment and development of benchmark cases to test model performance as well as a report comparing model performance and associated periodicity requirements. In our review of the Scope items, we do not find this task. We further note that if this task is to be done outside of this project, then it should be made clear where this work is being done and this directive should be removed from the Detail Scope section of the SAR.

Item 5 directs the establishment of uniform model verification processes. While we have included this item as being addressed in the proposed SAR, we do suggest that clearer language be added to certain SAR scope items to strengthen this directive and ensure it will be thoroughly addressed.

Items 4, 8, and 11 all contain directives that address issues with unregistered IBRs yet none of the language in the SAR scope clearly addresses those entities or the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where unregistered IBRs directives are to be addressed.

Items 8, and 11 contain directives that address issues with IBR-DERs yet none of the language in the SAR scope clearly address those entities and the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where IBR-DERs directives are to be addressed.

Item 8 addresses the verification of aggregated models for unregistered IBRs and IBR-DER that have a material impact on the BPS, but the proposed SAR contains nothing in the proposed Project Scope that addresses this issue. To address this issue, we suggest adding language to the proposed scope to address the associated directives on verifying aggregated unregistered IBRs and IBR DERs and the process differences associated with validating those models.

EEI also suggests that Items 9 and 12 be removed from the Detailed Description section of this SAR because the directives contained in these Items are directives for NERC not the DT.

Next, we offer the following comments on the specifics of the Project Scope items and offer some suggested comments, edits, and deletions that provide clearer alignment to the directives, noting not all of the concerns listed above are reflected in the comments below.

Phase 1 Objectives Comments:

Item 1: EEI is concerned that some of the suggested changes under the Item 1 work scope, which aligns to MOD-033 seem to confuse the intent of this Reliability Standard. Specifically, MOD-033 is intended to validate resource models against actual system events/data, whereas MOD-026 and MOD-027 are intended to verify individual resource models in dynamic simulations. We additionally ask that the phrase "actual performance data" be clarified, noting this is an undefined term and could be understood to mean many things. To address the clarity issue of Item 1 we suggest the following edits in boldface below:

Either revise MOD-033 or create a new **IBR model** system model validation Reliability Standard **that more accurately validates IBR performance within those interconnected transmission system studies to require model validation** using actual performance data.

Item 1a: EEI suggests not using the phrase "validation expectations" because the phrase has no meaning in the context of a NERC Reliability Standard. Noting an expectation is not a requirement. EEI also suggests that given MOD-033 is the focus of Item 1, it is important to maintain context that MOD-033 is focused specifically on validating resource performance within system models. Verifying the accuracy of IBR models should be conducted under the new Reliability Standard that would be created under Item 2. We additionally suggest adding aggregated IBR models for non-registered IBR and IBR-DERs that have a material impact on the BPS because both need to be validated within MOD-033. Furthermore, additional clarity is needed regarding what performance data is going to be available for the aggregated unregistered IBRs and IBR DERs that have a material impact, while registered IBR owners will have specific data requirements through PRC-028, we are unaware of similar requirements for unregistered resources. To address all but the performance data issues for unregistered resources, we offer the following suggested changes in boldface for Item 1a:

include **a complete set of validation expectations criteria for validating system planning models that requires assessing and validating IBR performance, as well as assessing the impact of both unregistered IBRs (in aggregate) and IBR-DERs (in aggregate) that have been identified as having a material impact on the BPS through the use of using** performance data (must include performance data of IBR during disturbances as well as other performance measures);

Item 1b: EEI suggest deleting item 1b because it is unnecessary to include language within a NERC Reliability Standard that simply asks for accurate and high quality standards.

Item 1c: As stated above, we suggest that the term "performance data" be clarified.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item. Moreover, we understand Phase 2 is necessary to fulfill other Milestones not Milestone 3, Part 2 and therefore should not be included in this SAR.

Item 1e: The SAR should not attempt to prescriptively define how system planning models are to be validated. The DT should only develop requirements that obligate Planning Coordinators to have processes in place that validate IBR models within system planning models and include methods to reconcile any model issues with resource owners (i.e., IBR-GOs).

include **requirements that ensure Planning Coordinators have processes in place that are capable of identifying IBR model problems within system planning models and requirements for insuring IBR GOs are held accountable for providing updated models that more accurately validate IBR performance against actual performance data. minimum criteria for performing validation (e.g., time, tolerance, impact)**;

Item 1f: EEI does not agree with Item 1f. As stated in paragraph 143 of FERC Order 901, what is required is the development of a new or revised Reliability Standard that establishes "uniform model verification processes" not specific performance criteria. For this reason, we suggest deleting Item 1f because this item goes beyond what was directed by the Commission.

Item 1g: EEI supports requirements that include expanded communication processes that obligate IBR owners and planners to cooperatively communicate to resolve issues with IBR model validation. However, we do not support including "performance criteria" because that is not what Order 901 directed. For this reason, we suggest the following changes to Item 1g:

Include Require requirements that obligate planner and operators to **incorporate in their model verification processes documented communications with communicate any performance criteria to Generator Owners IBR owners to address deficiencies in IBR models. Include requirements for IBR owners to provide timely updates to their IBR models in response to issues identified in communications from**

planners and operators.

Item 1h: This item should be deleted because none of the directives associated with this project include the establishment of “performance criteria”, what is directed is the development of processes to validate IBR models. The development of performance criteria goes beyond the directives of FERC Order 901.

Item 1i: EEI believes that trying to add considerations for other future work overly complicates this project. Consider deleting this item.

Item 1j: EEI does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance within dynamic simulations (New Standard) and system planning models (MOD-033 or New Reliability Standard). Instead, we suggest that the DT develop requirements in that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of for both individual IBRs and aggregated IBR resources.

Item 2:

EEI suggests Items 1 & 2 do not fully capture the directives identified in FERC Order 901 specific to model verification. We also suggest that Item 2 should more clearly capture all of the directives noted in FERC Order 901 specific to model verification (see Items 5, 6, & 7). To address these directives, we offer the following:

Develop a new or revised Reliability Standard that address IBR model verification processes that:

- Establishes uniform processes regardless of the IBR type; and
- Provides consistency among verification processes with other NERC Reliability Standards; and
- Contains process timelines consistent with FERC Order No. 2023 modeling deadline requirements; and
- Removes IBRs from MOD-026 and MOD-027.

Item 3: No suggested changes.

Item 4 (Phase 2):

EEI does not agree that there is any benefit in adding scope items that fall outside of Milestone 3 at this time. The scope is already very large and including Phase 2 work that is so prescriptive and speculative when it is not clear exactly what additional work will be necessary does not add to the SAR and may only delay approval of the SAR. EEI recognizes that additional work will be needed to address all of the directives in FERC Order 901, but it is more important at this time to address those directives identified as Milestone 3. There will be plenty of time to add additional scope later. For these reasons we suggest deleting the Phase 2 work and submitting a revised SAR at a later date to address this work.

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	
Document Name	
Comment	

BPA believes the industry will still need IBR model data if IBR applicability was removed from MOD-025/026/027 and PRC-019. BPA believes MOD-033 is not the correct standard to modify. BPA recommends a new suite of standards be created for IBR model verification.

BPA believes MOD-033 should not be modified for the following observations:

Under “Project Scope”, the “Phase 1 Objectives” 1. Says “Either revise MOD-033 or create a new IBR model validation Reliability Standard to require model validation using actual performance data.” Item ‘b’ says “leverage the most accurate and highest quality model type available”. BPA believes that according to NERC MOD-033-2 A.1, MOD-033-2 is a system model validation standard. According to A.3., the purpose is to analyze the reliability of the interconnected transmission system. For Transmission Operators in WECC, using the highest quality model type available could imply using generator models outside of the WECC base cases (and potentially in a different simulation domain altogether). BPA believes using different models would create difficulties meeting the purpose of MOD-033-2 because the models validated may differ from those most often used to analyze the reliability of the interconnected transmission system.

“Project Scope… Phase 1 Objectives:… d” suggests revising MOD-033 to “be designed to follow and be able to leverage new performance validations expected to be done during the interconnection process…”. The performance validations as part of the interconnection process are also detailed and local to plants. BPA believes it is unrealistic to validate details of all plants in a system model validation like MOD-033. BPA also believes following performance validation procedures performed during commissioning for all plants is a separate set of activities than MOD-033 event analysis. BPA believes leveraging performance validations done during the interconnection process can be helpful, but should not be specifically required for Transmission Operators to demonstrate the models match actual data for the event and timestamp chosen under MOD-033-2.

MOD-033-2 compliance obligations can be met with one dynamic event and one steady state timestamp. BPA believes including “a complete set of validation expectations” as in Phase 1 Objectives,1,a seems to imply that all IBR models are getting validated. BPA recognizes the intent to remove “IBR” from MOD-026/027. If modeling data is still required after being removed from MOD-026/027, BPA recommends data would be best placed in a standard with a targeted electrical scope, not a system model validation.

Likes 0	
Dislikes 0	

Response

Greg Sorenson - ReliabilityFirst - 10 - RF

Answer	
Document Name	

Comment

There is some concern about the development of requirements to both create and validate dynamic models for 1) transmission owners that have unregistered IBRs on their system, and 2) distribution providers that have IBR-DERs on their system. It may be difficult to hold transmission owners and distribution providers accountable for model creation and validation for unregistered IBRs and IBR-DERs.

It may be challanging for transmission owners to consistently obtain quality IBR data from unregistered entities. Item 141 of FERC Order No. 901 (page 105) contains language that adds caveats to this requirement. “Recognizing that there may be instances in which transmission owners are unable to gather accurate unregistered IBR modeling data and parameters to create and maintain accurate unregistered IBR dynamic models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas, dynamic models of unregistered IBRs using estimated data in accordance with this final rule’s section IV.B.3data sharing directives.” The drafted SAR does not contain this language, but should be amended to have it included for clarity on overall expectations. This would follow SPIDERWG recommendations for setting the initial parameterization for the DER-A dynamic model based on the estimated vintage of IEEE 1547 that is dominant in the area. However, setting default parameters based on estimates does not lend itself to successful

validation of the model. RF also does not recommend adjusting model parameters to exactly match real-world measurements during anomalous events, but rather using these events as an opportunity to adjust.

There are several places in the SAR that uses the terms “in the aggregate have a material impact on the Bulk-Power System” What criteria is being proposed to define this?

The SAR includes language that directs “NERC to determine the appropriate registered entity responsible for the data and parameters of IBR-DERs” for those entities that “do not have an associated distribution provider.” Can this be accomplished in a Reliability Standard? Or would this require the review of a new Registered Function (similar to a Load Serving Entity)?

The SAR states, “Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection wide models (i.e., system models) and the validation of each respective system model.” For the Eastern Interconnection, the MOD-032 designee is presently the Eastern Interconnection Reliability Assessment Group (ERAG), which is comprised of NERC, MRO, RF, SERC, and NPCC. The SDT should be made aware of this and strongly consider utilization of the existing MOD-032 designees for each Interconnection.

The SAR also states, “Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners, and distribution providers to regularly update and communicate the verified data and models of registered IBRs, unregistered IBRs, and IBR-DERs by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models.” It may be impractical to compare all IBR-DER models to actual operational behavior due to the vast number of connections to the electric grid and operational scenarios. Consideration should be given to the utilization of sampling representative equipment, configurations, operational conditions, and/or delivery points rather than require the validation of thousands of IBR-DER installations. Will the SDT recommend different alternatives to achieve this or leave it up to each registered entity?

ReliabilityFirst appreciates the efforts of the drafting team on this important project.

Likes 0	
Dislikes 0	

Response

Mark Gray - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable

Answer	
Document Name	

Comment

The following comments are intended to address EEI concerns with the Proposed SAR. Our negative response also reflects our opinion that the SAR needs to be revised prior to final approval.

Detail Description/FERC Order 901 Directives for Milestone 3 Part 2 Comments

While EEI generally agrees that many of the FERC Order 901 directives allocated to this project are reflected in this proposed Project Scope (i.e., Items 1, 3, 5, 6, 7, & 10), we do not agree the following directives have been sufficiently addressed in the SAR:

Note: Item numbers below align with those contained in the Detailed Description Section of the SAR.

Item 2 contains a directive that requires the assessment and development of benchmark cases to test model performance as well as a report

comparing model performance and associated periodicity requirements. In our review of the Scope items, we do not find this task. We further note that if this task is to be done outside of this project, then it should be made clear where this work is being done and this directive should be removed from the Detail Scope section of the SAR.

Item 5 directs the establishment of uniform model verification processes. While we have included this item as being addressed in the proposed SAR, we do suggest that clearer language be added to certain SAR scope items to strengthen this directive and ensure it will be thoroughly addressed.

Items 4, 8, and 11 all contain directives that address issues with unregistered IBRs yet none of the language in the SAR scope clearly addresses those entities or the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where unregistered IBRs directives are to be addressed.

Items 8, and 11 contain directives that address issues with IBR-DERs yet none of the language in the SAR scope clearly address those entities and the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where IBR-DERs directives are to be addressed.

Item 8 addresses the verification of aggregated models for unregistered IBRs and IBR-DER that have a material impact on the BPS, but the proposed SAR contains nothing in the proposed Project Scope that addresses this issue. To address this issue, we suggest adding language to the proposed scope to address the associated directives on verifying aggregated unregistered IBRs and IBR DERs and the process differences associated with validating those models.

EEI also suggests that Items 9 and 12 be removed from the Detailed Description section of this SAR because the directives contained in these Items are directives for NERC not the DT.

Next, we offer the following comments on the specifics of the Project Scope items and offer some suggested comments, edits, and deletions that provide clearer alignment to the directives, noting not all of the concerns listed above are reflected in the comments below.

Phase 1 Objectives Comments:

Item 1: EEI is concerned that some of the suggested changes under the Item 1 work scope, which aligns to MOD-033 seem to confuse the intent of this Reliability Standard. Specifically, MOD-033 is intended to validate resource models against actual system events/data, whereas MOD-026 and MOD-027 are intended to verify individual resource models in dynamic simulations. We additionally ask that the phrase “actual performance data” be clarified, noting this is an undefined term and could be understood to mean many things. To address the clarity issue of Item 1 we suggest the following edits in boldface below:

Either revise MOD-033 or create a new system model validation Reliability Standard **that more accurately validates IBR performance within those interconnected transmission system studies** using actual performance data.

Item 1a: EEI suggests not using the phrase “validation expectations” because the phrase has no meaning in the context of a NERC Reliability Standard. Noting an expectation is not a requirement. EEI also suggests that given MOD-033 is the focus of Item 1, it is important to maintain context that MOD-033 is focused specifically on validating resource performance within system models. Verifying the accuracy of IBR models should be conducted under the new Reliability Standard that would be created under Item 2. We additionally suggest adding aggregated IBR models for non-registered IBR and IBR-DERs that have a material impact on the BPS because both need to be validated within MOD-033. Furthermore, additional clarity is needed regarding what performance data is going to be available for the aggregated unregistered IBRs and IBR DERs that have a material impact, while registered IBR owners will have specific data requirements through PRC-028, we are unaware of similar requirements for unregistered resources. To address all but the performance data issues for unregistered resources, we offer the following suggested changes in boldface for Item 1a:

include **criteria for validating system planning models that requires assessing and validating IBR performance, as well as assessing the impact of both unregistered IBRs (in aggregate) and IBR-DERs (in aggregate) that have been identified as having a material impact on the BPS through the use of using** performance data (must include performance data of IBR during disturbances as well as other performance measures);

Item 1b: EEI suggest deleting item 1b because it is unnecessary to include language within a NERC Reliability Standard that simply asks for accurate

and high quality standards.

Item 1c: As stated above, we suggest that the term “performance data” be clarified.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item. Moreover, we understand Phase 2 is necessary to fulfill other Milestones not Milestone 3, Part 2 and therefore should not be included in this SAR.

Item 1e: The SAR should not attempt to prescriptively define how system planning models are to be validated. The DT should only develop requirements that obligate Planning Coordinators to have processes in place that validate IBR models within system planning models and include methods to reconcile any model issues with resource owners (i.e., IBR-GOs).

include **requirements that ensure Planning Coordinators have processes in place that are capable of identifying IBR model problems within system planning models and requirements for insuring IBR GOs are held accountable for providing updated models that more accurately validate IBR performance against actual performance data.**;

Item 1f: EEI does not agree with Item 1f. As stated in paragraph 143 of FERC Order 901, what is required is the development of a new or revised Reliability Standard that establishes “uniform model verification processes” not specific performance criteria. For this reason, we suggest deleting Item 1f because this item goes beyond what was directed by the Commission.

Item 1g: EEI supports requirements that include expanded communication processes that obligate IBR owners and planners to cooperatively communicate to resolve issues with IBR model validation. However, we do not support including “performance criteria” because that is not what Order 901 directed. For this reason, we suggest the following changes to Item 1g:

Include Require requirements that obligate planner and operators to **incorporate in their model verification processes documented communications with IBR owners to address deficiencies in IBR models. Include requirements for IBR owners to provide timely updates to their IBR models in response to issues identified in communications from planners and operators.**

Item 1h: This item should be deleted because none of the directives associated with this project include the establishment of “performance criteria”, what is directed is the development of processes to validate IBR models. The development of performance criteria goes beyond the directives of FERC Order 901.

Item 1i: EEI believes that trying to add considerations for other future work overly complicates this project. Consider deleting this item.

Item 1j: EEI does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance within dynamic simulations (New Standard) and system planning models (MOD-033 or New Reliability Standard). Instead, we suggest that the DT develop requirements in that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of for both individual IBRs and aggregated IBR resources.

Item 2:

EEI suggests Items 1 & 2 do not fully capture the directives identified in FERC Order 901 specific to model verification. We also suggest that Item 2 should more clearly capture all of the directives noted in FERC Order 901 specific to model verification (see Items 5, 6, & 7). To address these directives, we offer the following:

Develop a new or revised Reliability Standard that address IBR model verification processes that:

- Establishes uniform processes regardless of the IBR type; and
- Provides consistency among verification processes with other NERC Reliability Standards; and
- Contains process timelines consistent with FERC Order No. 2023 modeling deadline requirements; and
- Removes IBRs from MOD-026 and MOD-027.

Item 3: No suggested changes.

Item 4 (Phase 2):

EEI does not agree that there is any benefit in adding scope items that fall outside of Milestone 3 at this time. The scope is already very large and including Phase 2 work that is so prescriptive and speculative when it is not clear exactly what additional work will be necessary does not add to the SAR and may only delay approval of the SAR. EEI recognizes that additional work will be needed to address all of the directives in FERC Order 901, but it is more important at this time to address those directives identified as Milestone 3. There will be plenty of time to add additional scope later. For these reasons we suggest deleting the Phase 2 work and submitting a revised SAR at a later date to address this work.

Likes 0	
Dislikes 0	

Response

Kyle Thomas - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable

Answer	
Document Name	

Comment

The SAR appears open-ended in terms of proposed revisions, detailed descriptions, and overlap with the other two modeling SARs (Milestone 3 Part 1 SAR and Part 3 SAR) – which are primarily text extracted from FERC Order 901. NERC, the NERC RSTC, the NERC Standards Committee, and industry have tended to avoid creating new standards projects with open-ended SARs as this shows insufficient supporting evidence and background to help a small SDT accomplish its mission. This seems particularly relevant given the massive scale, depth, and breadth of these proposed changes and do not believe this is the most effective/efficient SAR definition to address the directives and reliability risks, as it is unclear what the SARs are actually addressing from a reliability perspective. It also appears there are some FERC directives that are linked to a reliability risk that needs to be mitigated, but between this SAR and the other two it is unclear if they are being addressed or not – these risks should be mitigated between these SARs.

In the Purpose or Goal section, this SAR and the Project 2022-02 SAR both state the projects and SDTs will be a clearing house for the modeling work. It seems having two SARs act as a clearing house for modeling work is not necessary and should be clarified.

In the Project Scope, it is unclear which NERC entities have what roles for each of the IBR categories (registered IBRs, non-registered IBRs, and DERs) during the interconnection process are applicable to this SAR and the other two modeling related SARs.

In the Detailed Description section, repeating all FERC Order 901 directives in full and then only bolding the specific directives that this SAR addresses is confusing and inefficient. Recommend deleting all unrelated language and only keeping the specific directives that this SAR is addressing to add clarity to this SAR.

It seems there has been insufficient attention given to the cost-benefit analysis for this SAR. NERC has simply stated “currently unknown” and did not provide any additional analysis or consideration for costs and how to minimize such costs across all registered entities involved, except for one mention of if fewer reoccurring staged tests are performed, which is fairly vague. The vast proposed revisions will significantly increase costs to registered entities, affecting business operations and costs to consumers. Therefore, more due diligence and consideration should be given to cost across all the proposed standards projects.

We recommend that the SAR drafting team extend the comment period on this SAR and the other two modeling related SARs until after the July 10 NERC Webinar that will inform the industry further about these three SARs and have a question-and-answer period for attendees. This webinar seems

like it will be very informative and helpful to the industry in understanding these three SARs, which would further support the comment period and balloting process for getting the SARs approved.

There should be a much clearer linkage to the EMT-related NERC projects and EMT modeling requirements in general, which are the best models and studies to evaluated IBR ride-through and other technical performance criteria. While FERC did not call out EMT requirements in Order 901, it did recommend continuing to pursue efforts and those efforts should be closely aligned with this SAR.

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF

Answer	
Document Name	

Comment

Southern Indiana Gas and Electric Company d/b/a CenterPoint Energy Indiana South (SIGE) supports comments submitted by the Edison Electric Institute (EEI).

Regarding Phase 2 Objectives, SIGE believes that IBR validation requirements during the interconnection process should be addressed within the Generator Interconnection process itself instead of being addressed within a new or revised standard.

SIGE requests further detail surrounding FERC Order 901 Directive 1 regarding “Bulk-Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners’ disturbance monitoring equipment”.

Likes 0	
Dislikes 0	

Response

Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE

Answer	
Document Name	

Comment

CenterPoint Energy Houston Electric, LLC (CEHE) agrees with the comments as submitted by Edison Electric Institute (EEI) for Phase 1 Objective 1j as listed below.

EEI Item 1j: EEI does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance within dynamic simulations (New Standard) and system planning models (MOD-033 or New Reliability Standard). Instead, we suggest that the DT develop requirements in that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of for both individual IBRs and aggregated IBR resources.

Additionally, CEHE believes the associated cost with the implementation of a new standard with model validation will require Transmission Owners/Transmission Planners to incur high costs for additional resources to coordinate/validate data in the creation of these interconnection-wide models.	
Likes 0	
Dislikes 0	
Response	
Ijad Dewan - Hydro One Networks, Inc. - 1 - NPCC	
Answer	
Document Name	
Comment	
The SAR may clarify model validation by performance data is for what time scale, is it for PSS/E, PSLF type dynamic model only or also include EMT and short circuit model for IBR? In related standard list, PRC-028 (new) can be considered, since this SAR is for model validation by performance data, it may consider what data is available under PRC-028.	
Likes 0	
Dislikes 0	
Response	
David Jendras Sr - Ameren - Ameren Services - 1,3,6	
Answer	
Document Name	
Comment	
Ameren supports EEI's Comments on this project.	
Likes 0	
Dislikes 0	
Response	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	

Document Name	

Comment

From the proposed SAR, it is not possible to determine if it is intended to address only RMS models or also include EMT models. The scope of the SAR should be clarified.

Model requirements for existing IBR projects should be addressed by the DT, especially what to do for projects whose manufacturer does not exist anymore (for instance, propose a library of generic models to use for project owners who cannot provide OEM models, perhaps based on site tests to determine the parameters to use).

The required testing for model validation needs to be periodic and often enough to reflect software/firmware updates provided by the OEMs for the inverter controls. These software/firmware updates are expected to be released somewhat frequently over the lifespan of the equipment to provide both security and performance improvements. The controls of large synchronous generators did not change in any appreciable manner over decades unless completely replaced, but the functionality of IBR (either intermittent resource or storage-based) can be changed dramatically just by a simple upload of new firmware.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item.

Item 1 Part F seems to be missing some language since it doesn't have a complete thought and ends with a "-" instead of a ";" like the rest of the items.

The model data sharing related to FAC-002 must consider both the models and the model parameters.

Likes 0	
Dislikes 0	

Response

Daniela Atanasovski - APS - Arizona Public Service Co. - 1,3,5,6

Answer	
Document Name	

Comment

AZPS supports the following comments that were submitted by EEI on behalf of their members:

The following comments are intended to address EEI concerns with the Proposed SAR. Our negative response also reflects our opinion that the SAR needs to be revised prior to final approval.

Detail Description/FERC Order 901 Directives for Milestone 3 Part 2 Comments

While EEI generally agrees that many of the FERC Order 901 directives allocated to this project are reflected in this proposed Project Scope (i.e., Items

1, 3, 5, 6, 7, & 10), we do not agree the following directives have been sufficiently addressed in the SAR:

Note: Item numbers below align with those contained in the Detailed Description Section of the SAR.

- **Item 2** contains a directive that requires the assessment and development of benchmark cases to test model performance as well as a report comparing model performance and associated periodicity requirements. In our review of the Scope items, we do not find this task. We further note that if this task is to be done outside of this project, then it should be made clear where this work is being done and this directive should be removed from the Detail Scope section of the SAR.
- **Item 5** directs the establishment of uniform model verification processes. While we have included this item as being addressed in the proposed SAR, we do suggest that clearer language be added to certain SAR scope items to strengthen this directive and ensure it will be thoroughly addressed.
- **Items 4, 8, and 11** all contain directives that address issues with unregistered IBRs yet none of the language in the SAR scope clearly addresses those entities or the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where unregistered IBRs directives are to be addressed.
- **Items 8, and 11** contain directives that address issues with IBR-DERs yet none of the language in the SAR scope clearly address those entities and the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where IBR-DERs directives are to be addressed.
- **Item 8** addresses the verification of aggregated models for unregistered IBRs and IBR-DER that have a material impact on the BPS, but the proposed SAR contains nothing in the proposed Project Scope that addresses this issue. To address this issue, we suggest adding language to the proposed scope to address the associated directives on verifying aggregated unregistered IBRs and IBR DERs and the process differences associated with validating those models.

EEI also suggests that Items 9 and 12 be removed from the Detailed Description section of this SAR because the directives contained in these Items are directives for NERC not the DT.

Next, we offer the following comments on the specifics of the Project Scope items and offer some suggested comments, edits, and deletions that provide clearer alignment to the directives, noting not all of the concerns listed above are reflected in the comments below.

Phase 1 Objectives Comments:

Item 1: EEI is concerned that some of the suggested changes under the Item 1 work scope, which aligns to MOD-033 seem to confuse the intent of this Reliability Standard. Specifically, MOD-033 is intended to validate resource models against actual system events/data, whereas MOD-026 and MOD-027 are intended to verify individual resource models in dynamic simulations. We additionally ask that the phrase “actual performance data” be clarified, noting this is an undefined term and could be understood to mean many things. To address the clarity issue of Item 1 we suggest the following edits below:

Either revise MOD-033 or create a new system model validation Reliability Standard that more accurately validates IBR performance within those interconnected transmission system studies using actual performance data.

Item 1a: EEI suggests not using the phrase “validation expectations” because the phrase has no meaning in the context of a NERC Reliability Standard. Noting an expectation is not a requirement. EEI also suggests that given MOD-033 is the focus of Item 1, it is important to maintain context that MOD-033 is focused specifically on validating resource performance within system models. Verifying the accuracy of IBR models should be conducted under the new Reliability Standard that would be created under Item 2. We additionally suggest adding aggregated IBR models for non-registered IBR and IBR-DERs that have a material impact on the BPS because both need to be validated within MOD-033. Furthermore, additional clarity is needed regarding what performance data is going to be available for the aggregated unregistered IBRs and IBR DERs that have a material impact, while registered IBR owners will have specific data requirements through PRC-028, we are unaware of similar requirements for unregistered resources. To address all but the performance data issues for unregistered resources, we offer the following suggested changes in boldface for Item 1a:

include criteria for validating system planning models that requires assessing and validating IBR performance, as well as assessing the impact of both unregistered IBRs (in aggregate) and IBR-DERs (in aggregate) that have been identified as having a material impact on the BPS through the use of performance data (must include performance data of IBR during disturbances as well as other performance measures);

Item 1b: EEI suggest deleting item 1b because it is unnecessary to include language within a NERC Reliability Standard that simply asks for accurate and high quality standards.

Item 1c: As stated above, we suggest that the term “performance data” be clarified.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item. Moreover, we understand Phase 2 is necessary to fulfill other Milestones not Milestone 3, Part 2 and therefore should not be included in this SAR.

Item 1e: The SAR should not attempt to prescriptively define how system planning models are to be validated. The DT should only develop requirements that obligate Planning Coordinators to have processes in place that validate IBR models within system planning models and include methods to reconcile any model issues with resource owners (i.e., IBR-GOs).

include requirements that ensure Planning Coordinators have processes in place that are capable of identifying IBR model problems within system planning models and requirements for insuring IBR GOs are held accountable for providing updated models that more accurately validate IBR performance against actual performance data.

Item 1f: EEI does not agree with Item 1f. As stated in paragraph 143 of FERC Order 901, what is required is the development of a new or revised Reliability Standard that establishes “uniform model verification processes” not specific performance criteria. For this reason, we suggest deleting Item 1f because this item goes beyond what was directed by the Commission.

Item 1g: EEI supports requirements that include expanded communication processes that obligate IBR owners and planners to cooperatively communicate to resolve issues with IBR model validation. However, we do not support including “performance criteria” because that is not what Order 901 directed. For this reason, we suggest the following changes to Item 1g:

Include requirements that obligate planner and operators to incorporate in their model verification processes documented communications with IBR owners to address deficiencies in IBR models. Include requirements for IBR owners to provide timely updates to their IBR models in response to issues identified in communications from planners and operators.

Item 1h: This item should be deleted because none of the directives associated with this project include the establishment of “performance criteria”, what is directed is the development of processes to validate IBR models. The development of performance criteria goes beyond the directives of FERC Order 901.

Item 1i: EEI believes that trying to add considerations for other future work overly complicates this project. Consider deleting this item.

Item 1j: EEI does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance within dynamic simulations (New Standard) and system planning models (MOD-033 or New Reliability Standard). Instead, we suggest that the DT develop requirements in that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of for both individual IBRs and aggregated IBR resources.

Item 2:

EEI suggests Items 1 & 2 do not fully capture the directives identified in FERC Order 901 specific to model verification. We also suggest that Item 2 should more clearly capture all of the directives noted in FERC Order 901 specific to model verification (see Items 5, 6, & 7). To address these directives, we offer the following:

Develop a new or revised Reliability Standard that address IBR model verification processes that:

- Establishes uniform processes regardless of the IBR type; and
- Provides consistency among verification processes with other NERC Reliability Standards; and
- Contains process timelines consistent with FERC Order No. 2023 modeling deadline requirements; and
- Removes IBRs from MOD-026 and MOD-027.

Item 3: No suggested changes.

Item 4 (Phase 2):

EEI does not agree that there is any benefit in adding scope items that fall outside of Milestone 3 at this time. The scope is already very large and including Phase 2 work that is so prescriptive and speculative when it is not clear exactly what additional work will be necessary does not add to the SAR and may only delay approval of the SAR. EEI recognizes that additional work will be needed to address all of the directives in FERC Order 901, but it is more important at this time to address those directives identified as Milestone 3. There will be plenty of time to add additional scope later. For these reasons we suggest deleting the Phase 2 work and submitting a revised SAR at a later date to address this work.

Likes 0	
Dislikes 0	

Response

Christy Thompson - PPL - Louisville Gas and Electric Co. - 3,5,6 - SERC

Answer	
Document Name	

Comment

The FERC Directives assigned to this SAR, as listed in the Detailed Description, are not addressed in a straightforward manner in the Objectives listed in the Project Scope.

The Directives can be summarized in the following groups:

1. Providing accurate models (Directives 3, 4, and 12)

2. Developing a model verification process (Directives 2, 5, 6, 7, and 9)

3. Performing model validation (Directives 1, 8, 10, and 11)

The first group of Directives regarding the provision or maintenance of updated models is within the scope of MOD-032. Indeed, recent revisions the MOD-032 have already begun to address these issues, including the party responsible for models of unregistered IBRs and IBR-DERs (Directive 12). Requirement R1 of MOD-032-2 requires PCs and TPs to develop “modeling data requirements and reporting procedures.” Moreover, Requirement R2 of MOD-032-2 provides a mechanism for the correction of inaccurate models. The DT should not modify MOD-033 or create a new Reliability Standard that conflicts with or causes confusion with MOD-032. Thus, Directives 3, 4, and 12 should be coordinated appropriately with the DTs working on MOD-032.

The second group of Directives require the development of a model verification process. MOD-026 and MOD-027 already provide a framework for model verification that has been effective for synchronous generators. While the DT may consider a new standard for a model verification process due to some of the particular concerns of IBRs and IBR-DERs, there are several issues with the DT’s Objectives:

• Objective 1 identifies MOD-033 as a potential standard to revise. MOD-033 pertains exclusively model validation against actual system events/data. It is critical to understand the distinction between MOD-033 and MOD-026/027 in this regard.

• Objective 1(a) is a potential over-reach of FERC’s Directives in its requirement of a “complete set of validation expectations”.

• Objective 1(b) again over-specifies and is unnecessary. PCs and TPs should develop model requirements and verification processes including

the specification of required models and model types. Moreover, the “highest quality model type available” depends on the simulation being performed. EMT models have the potential for much higher accuracy than RMS models, but they cannot be used in interconnection-wide base cases. Again, PCs and TPs must have the flexibility to develop requirements on when each type of model should be used.

• Objective 1(d) introduces confusion between staged testing and system event response. The process used to validate models in interconnection studies or in plant commissioning is not suitable to be “followed” in validations against system event data.

• Objective 1(e) again over-reaches the FERC Directives. TPs are already required to justify their verification requirements through MOD-026 and MOD-027 (see Requirements R3 and R6). These processes are sufficient today, and the SAR scope should be modified to permit a similar process for IBRs. It should also be noted that the diverse and expert team developing IEEE Std 2800-2022 was unable to come to a consensus on what constitutes an acceptable “match” for model validation.

• Objective 1(f) is related to Objective 1(e). The FERC Directives only call for the Reliability Standard to address the development of a model verification process. The Directives do not call on NERC to establish minimum criteria for validation allowing TPs and TOs “some” flexibility.

• Objective 1(h) is related to Objective 1(e) and 1(f). Again, the DT is not responsible for establishing criteria, nor does the DT have responsibility to ensure TP or TO criteria is risk-based and region-specific. The DT is only tasked with developing or modifying a Reliability Standard to accomplish the FERC Directives, none of which require the establishment of specific performance criteria.

• Objective 1(j) needs to be removed. The development of CAPs for failed model validation is inconsistent with MOD-026/027. While a mitigation process should be defined, this process should not amount to a CAP.

The third group of Directives require model validation to be performed against actual system data. These Directives are consistent with the purpose of MOD-033 and may be adequately addressed by minor revisions to that standard. Specifically, Directive 1 requires model validations against disturbance data “from installed registered IBR generator owners’ disturbance monitoring equipment,” however provision of data from these entities is not covered by Requirement R2.

Given the issues and concerns presented above, it is recommended that the DT replace Objective 1 of the SAR with three items better aligned to FERC’s Directives. Below is a suggested structure:

1. Coordinate with the DT assigned to Project 2022-02 and any other DTs working on revisions to MOD-032 to ensure that:

a. Generator owners of registered IBRs, transmission owners that have unregistered IBRs on their system, and distribution providers that have IBR-DERs on their system to provide models that represent the dynamic behavior of these IBRs.

b. Provided models are at a sufficient level of fidelity to provide to Bulk-Power System planners and operators to perform valid interconnection-wide, planning, and operational studies on a basis comparable to synchronous generation resources.

c. Provided models accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior.

2. Either revise MOD-026 and MOD-027 or create a new Reliability Standard to require a model verification process that:

a. Determines whether the development of benchmark cases to test model performance and a subsequent report comparing model performance are needed and at what periodicity.

b. Provides a uniform model verification process that creates consistency among the model verification processes for existing and any new or modified Reliability Standards.

c. Utilizes a timeline consistent with FERC Order No. 2023 modeling deadline requirements.

d. Requires identified registered entities to coordinate, validate, and keep up to date their models.

3. Revise MOD-033 to ensure that:

a. Registered IBR models can be validated using disturbance monitoring data from installed registered IBR generator owners' disturbance monitoring equipment.

b. All generator owner, transmission owner, and distribution provider verified IBR models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and resulting system models are validated against actual system operational behavior.

Regarding Phase 2 Objective 4, the opportunity to do model verification using "actual performance data" "during the interconnection process" is extremely limited. Most model verification during the interconnection process is aimed at ensuring consistency in submitted data, adherence to model requirements, and evaluation of model performance. Only during the plant commissioning process is there an opportunity to validate models against "actual performance data" (in this case, from staged testing). Specific notes on the sub-items of Objective 2 follow:

• Items (a), (b), (e), (f), and (g) are also included under Objective 1, and the comments made on those items previously also apply under Objective 2.

• Item (c) is beyond the scope of FAC-002, and is covered by Phase 1 of this SAR. FAC-002 should remain focused on studies during the interconnection process, and allow other standard to address "post-interconnection validations" (as they already do).

• Item (d) does not make sense in the context of Objective 2 as the Objective pertains to the development of the validation process that item (d) says to leverage.

• Item (h) should also be removed as CAPs should not apply to facilities that are not yet commercially operational, and model verification should be required in the interconnection process prior to commercial operation.

Likes 0	
Dislikes 0	

Response

Hayden Maples - Evergy - 1,3,5,6 - MRO

Answer	
Document Name	

Comment

Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI) on question 2

Likes 0	
Dislikes 0	

Response

Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	

Condensation of the document is needed. Only the specific actions to be taken by the standard drafting team need to be included in the Purpose or Goal, Project Scope, and Detailed Description sections. The remainder of the background information needs to be removed from the SAR.

We provide the following additional comments for consideration:

a. IBR manufacturer-specific user written models are unique to each facility. These models require a significant investment of time and money to develop/test/validate and therefore sharing of such OEM proprietary models is unlikely. The NAGF proposes that NERC consider developing model specifications as a method for determining the most appropriate models for industry to use.

b. The NAGF notes that current IBR models do not accurately represent momentary cessation/tripping and ride through behavior.

Likes 0	
Dislikes 0	
Response	

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	

The NAGF provides the following additional comments for consideration:

a. The NAGF recommends that the SAR identify actions to be performed by the Drafting Team. Including unapplicable/background narrative from FERC Order 901 directives in the SAR only adds confusion and uncertainty as to the actions to be performed by the DT.

b. Project Scope Phase 1 Objectives (pages 2-3) – The NAGF notes that every time a system disturbance occurs, there is the possibility that an IBR model will need to be revised to accurately reflect actual IBR facility response. IBR facilities reaction to system conditions/disturbances will vary due to the type of system disturbance experienced. Trying to modify IBR models to replicate actual IBR performance for all types of system events is not feasible and would be an inefficient use of limited GO/GOP resources.

c. The NAGF notes that this project and other IBR related projects being fast tracked will apply to registered IBR, unregistered IBRs and IBR-DER. However, the new entry IBR facilities have yet to be identified and therefore are not stakeholders participating in the development process for NERC IBR related projects. This is unacceptable and must be addressed by NERC ASAP.

Likes 0	
Dislikes 0	
Response	

Junji Yamaguchi - Hydro-Quebec (HQ) - 1,5	
Answer	
Document Name	
Comment	
From the proposed SAR, it is not possible to determine if it is intended to address only RMS models or also include EMT models. The scope of the SAR should be clarified. Model requirements for existing IBR projects should be addressed by the DT, especially what to do for projects whose manufacturer does not exist anymore (for instance, propose a library of generic models to use for project owners who cannot provide OEM models, perhaps based on site tests to determine the parameters to use).	
Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	
Document Name	
Comment	
Texas RE supports the development of a new IBR model validation Reliability Standard and the phase 1 objectives. Texas RE encourages the drafting team to consider that the initial model should be developed based on staged testing to establish a baseline model data. These data parameters should be verified at the Point of Interconnection through field testing at individual unit model and aggregated unit models to accurately represent the actual system operating conditions. Any adjustments to the model parameters should be done to meet the Transmission Planner or Planning Coordinator's requirements. Periodic model validations must be conducted based on actual performance data from disturbance events or periodic testing timeframe to verify that the system changes are not impacting the IBR performances.	
Likes 0	
Dislikes 0	
Response	

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	

Duke Energy agrees with and supports EEI comments for Question 2.

Additionally, Duke Energy submits the following Project Scope comments in addition to EEI comments:

Item 1c: Please clarify the phrase "staged testing".

Item 1j: Suggest the implementation of a hybrid two-stage process that:

(a) initially utilizes requirements that model some of the processes successfully used in MOD-026/027 (and MOD-033) for synchronous resources but tailored to the model verification process needs of transmission planners for both individual IBRs and aggregated IBR resources, and, (b) transitions to a CAP if the MOD-026/027/033 efforts are inadequate.

Likes 0	
Dislikes 0	
Response	

Chantal Mazza - Hydro-Quebec (HQ) - 1 - NPCC	
Answer	
Document Name	
Comment	

From the proposed SAR, it is not possible to determine if it is intended to address only RMS models or also include EMT models. The scope of the SAR should be clarified.

Model requirements for existing IBR projects should be addressed by the DT, especially what to do for projects whose manufacturer does not exist anymore (for instance, propose a library of generic models to use for project owners who cannot provide OEM models, perhaps based on site tests to determine the parameters to use).

The required testing for model validation needs to be periodic and often enough to reflect software/firmware updates provided by the OEMs for the inverter controls. These software/firmware updates are expected to be released somewhat frequently over the lifespan of the equipment to provide both security and performance improvements. The controls of large synchronous generators did not change in any appreciable manner over decades unless completely replaced, but the functionality of IBR (either intermittent resource or storage-based) can be changed dramatically just by a simple upload of new firmware.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item.

Item 1 Part F seems to be missing some language since it doesn’t have a complete thought and ends with a “-“ instead of a “;” like the rest of the items.

The model data sharing related to FAC-002 must consider both the models and the model parameters.

Likes 0	
Dislikes 0	

Response

Rachel Schuldt - Black Hills Corporation - 1,3,5,6, Group Name Black Hills Corporation - All Segments

Answer	
Document Name	

Comment

Black Hills Corporation agrees with additional comments from NAGF and EEI, as follows:

The NAGF provides the following additional comments for consideration:

a. The NAGF recommends that the SAR identify actions to be performed by the Drafting Team. Including unapplicable/background narrative from FERC Order 901 directives in the SAR only adds confusion and uncertainty as to the actions to be performed by the DT.

b. Project Scope Phase 1 Objectives (pages 2-3) – The NAGF notes that every time a system disturbance occurs, there is the possibility that an IBR model will need to be revised to accurately reflect actual IBR facility response. IBR facilities reaction to system conditions/disturbances will vary due to the type of system disturbance experienced. Trying to modify IBR models to replicate actual IBR performance for all types of system events is not feasible and would be an inefficient use of limited GO/GOP resources.

c. The NAGF notes that this project and other IBR related projects being fast tracked will apply to registered IBR, unregistered IBRs and IBR-DER. However, the new entry IBR facilities have yet to be identified and therefore are not stakeholders participating in the development process for NERC IBR related projects. This is unacceptable and must be addressed by NERC ASAP.

EEI provides the following additional comments for consideration:

While EEI generally agrees that many of the FERC Order 901 directives allocated to this project are reflected in this proposed Project Scope, when EEI edits are included (i.e., Items 1, 3, 5, 6, 7, 10,), we do not agree the following directives have been sufficiently addressed in the SAR:

Note: Item numbers below align with those contained in the Detailed Description Section of the SAR.

· **Item 2** contains a directive that requires the assessment and development of benchmark cases to test model performance as well as a report comparing model performance and associated periodicity requirements. In our review of the Scope items, we do not find this task. We further note that if this task is to be done outside of this project, then it should be made clear where this work is being done and this directive should be removed from the Detail Scope section of the SAR.

· **Item 5** directs the establishment of uniform model verification processes. While we have included this item as being addressed in the proposed SAR, we do suggest that clearer language be added to certain SAR scope items to strengthen this directive and ensure it will be thoroughly addressed.

· **Items 4, 8, and 11** all contain directives that address issues with unregistered IBRs yet none of the language in the SAR scope clearly addresses those entities or the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where unregistered IBRs

directives are to be addressed.

· **Items 8, and 11** contain directives that address issues with IBR-DERs yet none of the language in the SAR scope clearly address those entities and the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where IBR-DERs directives are to be addressed.

· **Item 8** addresses the verification of aggregated models for unregistered IBRs and IBR-DER that have a material impact on the BPS, but the proposed SAR contains nothing in the proposed Project Scope that addresses this issue. To address this issue, we suggest adding language to the proposed scope to address the associated directives on verifying aggregated unregistered IBRs and IBR DERs and the process differences associated with validating those models.

EEI also suggests that Items 9 and 12 be removed from the Detailed Description section of this SAR because the directives contained in these Items are directives for NERC not the DT.

Next, we offer the following comments on the specifics of the Project Scope items and offer some suggested comments, edits, and deletions that provide clearer alignment to the directives, noting not all of the concerns listed above are reflected in the comments below.

Phase 1 Objectives Comments:

Item 1: Please clarify what is meant by actual performance data, noting this is an undefined term and could be understood to mean many things.

Item 1a: EEI suggests not using the phrase "validation expectations" because the phrase has no meaning in the context of a NERC Reliability Standard. Noting an expectation is not a requirement. We additionally suggest adding aggregated IBR models for non-registered IBR and IBR-DERs that have a material impact on the BPS because both need to be validated. Finally, we suggest that the DT clarify the term performance data by adding "from disturbance monitoring equipment", unless something else was meant by that term and if so, please clarify the intended meaning. To address our concerns, we offer the following suggested changes:

Include (*remove:* ***a complete set of criteria validation expectations***) **for validating models received from registered IBR-GOs and TOs (non-registered aggregated IBRs with material impacts on the BPS) and DPs (aggregated IBR-DERs with material impacts on the BPS)** using performance data **from disturbance monitoring equipment** (must include performance data of IBR during disturbances as well as other performance measures);

Item 1b: EEI suggest deleting item 1b because it is unnecessary to include language within a NERC Reliability Standard that simply asks for accurate and high quality standards.

Item 1c: As stated above, we suggest that the term "performance data" be clarified.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item. Moreover, we understand Phase 2 is necessary to fulfill other Milestones not Milestone 3, Part 2 and therefore should not be included in this SAR.

Item 1e: The SAR should not attempt to prescriptively define how IBR models are to be validated. The DT should only develop requirements that obligate transmission planners to have processes for model validation and records to demonstrate they followed those processes.

include **requirements that require transmission planners to have processes for model validation that include documentation that those processes were followed.** (*remove:* ***minimum criteria for performing validation (e.g., time, tolerance, impact)***);

Item 1f: EEI does not agree with Item 1f. As stated in paragraph 143 of FERC Order 901, what is required is the development of a new or revised Reliability Standard that establishes "uniform model verification processes" not specific performance criteria. For this reason, we suggest deleting Item 1f because this item goes beyond what was directed by the Commission.

Item 1g: EEI supports requirements that include expanded communication processes that obligate IBR owners and planners to cooperatively communicate to resolve issues with IBR model validation. However, we do not support including "performance criteria" because that is not what Order 901 directed. For this reason, we suggest the following changes to Item 1g:

Include (remove: ***Require***) **requirements that obligate** planner and operators to **incorporate in their model verification processes documented communications with** (*remove: **communicate any performance criteria to Generator Owners**)* **IBR owner to address deficiencies in IBR models.**

Item 1h: This item should be deleted because none of the directives aligned with this project include the establishment of “performance criteria”, what is directed is the development of processes to validate IBR models. The development of performance criteria goes beyond the directives of FERC Order 901.

Item 1i: EEI believes that trying to add considerations for other future work overly complicates this project. Consider deleting this item.

Item 1j: EEI does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance. Instead, we suggest that the DT develop requirements in a new Reliability Standard that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of transmission planners for both individual IBRs and aggregated IBR resources.

Item 2:

EEI suggests Items 1 & 2 do not fully capture the directives identified in FERC Order 901 specific to model verification. We also suggest that Item 2 should more clearly capture all of the directives noted in FERC Order 901 specific to model verification (see Items 5, 6, & 7). To address these directives, we offer the following:

Develop a new or revised Reliability Standard that address IBR model verification processes that:

· Establishes uniform processes regardless of the IBR type; and

· Provides consistency among verification processes with other NERC Reliability Standards; and

· Contains process timelines consistent with FERC Order No. 2023 modeling deadline requirements; and

· Removes IBRs from MOD-026 and MOD-027.

Item 3: No suggested changes.

Item 4 (Phase 2):

EEI does not agree that there is any benefit in adding scope items that fall outside of Milestone 3 at this time. The scope is already very large and including Phase 2 work that is so prescriptive and speculative when it is not clear exactly what additional work will be necessary does not add to the SAR and may only delay approval of the SAR. EEI recognizes that additional work will be needed to address all of the directives in FERC Order 901, but it is more important at this time to address those directives identified as Milestone 3. There will be plenty of time to add additional scope later. For these reasons we suggest deleting the Phase 2 work and submitting a revised SAR at a later date to address this work.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5,6	
Answer	
Document Name	

Comment
NERC needs to find a way to incorporate the intent of this standard into existing/future standards. Competing projects have made it very difficult to track in conjunction with FERC 901 and areas should be consolidated as much as possible which it sounds the intent of this SAR. Alison Mackellar on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Stephen Stafford - Georgia Transmission Corporation - 1 - SERC	
Answer	
Document Name	

Comment

• The developers of the SAR did not answer the question: Are there alternatives (e.g. guidelines, white papers, alerts, etc.) that have been considered or could meet the objectives? The question should be answered. The answer should paraphrase the following:
  ○ Since the directives of FERC Order 901 instruct NERC to develop new or modified standards, there were no other alternatives considered.
• Regarding the Objective 4 (Either revise FAC-002 or create a new SAR to incorporate similar changes to IBR validation during the interconnection process or create a new IBR model validation standard to require model validation using actual performance data to validate model quality during the interconnection process.):
  ○ GTC opposes such a requirement on the basis that you do not have an actual disturbance from which to collect data when the generator is initially interconnected. Therefore, a staged test should be done by the Generator Owner.
• Regarding Directives 3 & 4 which (among other things) require Transmission Owners that have unregistered IBRs on their system to provide dynamic models that accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior:
  ○ GTC objects to such a requirement; we recommend NERC consider a different approach that places the requirement on the generator owner.

Likes 0	
Dislikes 0	

Response

Julie Hall - Entergy - 1,3,6, Group Name Entergy

Answer	
Document Name	
Comment	

Phase1 – Item 1.a – How will actual performance data be useful for IBR validation if no appropriate disturbance (e.g. fault response or steady-state voltage dip) has occurred near a particular IBR plant?

Phase1 – Item 1.a – Requiring PC validation for faults/events near each of the IBR plants to perform effective model validation (stability, short circuit, & EMT models) and compare each IBR response against performance criteria is a significant scope addition for MOD-033.

Likes 0	
Dislikes 0	
Response	
Joshua London - Eversource Energy - 1,3	
Answer	
Document Name	
Comment	

The required testing for model validation needs to be periodic and often enough to reflect software/firmware updates provided by the OEMs for the inverter controls. These software/firmware updates are expected to be released somewhat frequently over the lifespan of the equipment in order to provide both security and performance improvements. The controls of large synchronous generators did not change in any appreciable manner over decades unless completely replaced, but the functionality of IBR (either intermittent resource or storage-based) can be changed dramatically just by a simple upload of new firmware.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item.

Item 1 Part F seems to be missing some language since it doesn't have a complete thought and ends with a "-" instead of a ";" like the rest of the items.

The model data sharing related to FAC-002 must consider both the models and the model parameters.

Likes 0	
Dislikes 0	
Response	
Kimberly Turco - Constellation - 5,6	
Answer	
Document Name	

Comment
NERC needs to find a way to incorporate the intent of this standard into existing/future standards. Competing projects have made it very difficult to track in conjunction with FERC 901 and areas should be consolidated as much as possible which it sounds the intent of this SAR. Kimberly Turco on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Jennifer Weber - Tennessee Valley Authority - 1,3,5,6 - SERC

Answer	
Document Name	

Comment
As with Project 2022-02 (Uniform Modeling Framework for IBR), it's unreasonable to place requirements on TOs for "unregistered IBRs" as they (the unregistered IBRs) have no requirements to provide any information (test data, models, etc.) that would allow the TOs to do the things the SAR is requiring. If the "unregistered IBRs" models are that important to the planning studies, they should have to register and provide required data like registered generators. If NERC is going to go down this path such that TO provided models, based on operational data, are acceptable for unregistered IBRs, why can't the TOs provide the models for other generators and, thereby, get rid of the requirements for the GOs to provide verified models in MOD-026 and MOD-027?

Likes 0	
Dislikes 0	

Response

Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy

Answer	
Document Name	

Comment
What is the threshold for IBR-DER to be required to provide this information to the TO's or DP's. How will this be enforced as it will be the responsibility of the generator owner/operator of the site to provide the information to the TO/DP If the GO/GOP does not want to provide the necessary information for whatever reason, the TO/DP should not be considered non-compliant with the Standard. This needs responsibility needs to be placed on the GO/GOP to provide the information to the TO/DP.

Likes 0	
Dislikes 0	
Response	
Jessica Cordero - Unisource - Tucson Electric Power Co. - 1	
Answer	
Document Name	
Comment	
TEPC agrees with the following EEI comments: EEI does not agree that the proposed Project SAR is sufficiently clear or covers all of the items listed in the Detailed Description Section of this SAR and needs further work before this SAR is approved.	
Likes 0	
Dislikes 0	
Response	
Thomas Foltz - AEP - 3,5,6	
Answer	
Document Name	
Comment	
This SAR does not seem to recognize that MOD-026-2 is well along and on track to eventually replace MOD-026-1 and MOD-027-1. If the SAR's intent is to remove IBRs from MOD-026-2, that would be a disruption to the progress made by the MOD-026-2 standard drafting team. AEP advises against redirecting Project 2020-06 SDT in this manner. MOD-026-2 under draft by the Project 2020-06 SDT already allows for (though is not dependent on) use of performance data as recorded during system events to verify and validate dynamic modeling, including dynamic modeling of IBRs. Some aspects of this SAR's phase 1 scope may be appropriate for the Project 2020-06 SDT to consider but not under MOD-033. MOD-033 is system level model verification and validation, not individual plant verification and validation. Project 2020-06 should be allowed to proceed with MOD-026-2 under the original plan and SAR. This will cover post-commissioning model verification and validation well enough. The need at present is for IBR dynamic model verification and validation prior to interconnection to support the interconnection study process. This newly proposed SAR does address that in phase 2 of its scope. However, introducing model verification and validation (which is a big piece of IEEE 2800.2, now underway) will slow down the interconnection process, which FERC order 2023 seeks to accelerate. If NERC desires to support interconnection study process with model verification and validation, then the existing SAR should be revised to merely expand the scope of 2020-06 to encompass pre-commissioning model verification and validation of IBRs and stay clear of MOD-033 and FAC-002. FAC-002 is concerned with the reliability impact of interconnections and should not get diverted into model verification and validation and the correcting of substandard IBR performance. CAPs are typically executed by the same entity who creates the CAP. This SAR mentions corrective action plans devised by TPs and TOPs for GOs and TOs to execute which is an arrangement that GOs and TOs may not view favorably. At the very least, there would need to be some agreement between the two parties so that an entity is not expected to execute a CAP that they believe is not practical or feasible.	

This SAR seems to seek performance data as recorded during system events as the chief basis on which to validate dynamic modeling. However, dependence on chance events cannot be the basis for any systematic or periodic validation and should be considered only as a supplemental basis if suitable events occur. As stated above, MOD-026-2 allows for the use of performance data as recorded during system events to verify and validate dynamic modeling including dynamic modeling of IBRs but is not dependent on it. AEP believes that the process being defined in MOD-026-2 sets forth the proper perspective on the use of performance data for model validation.

Likes 0	
Dislikes 0	

Response

Patricia Lynch - NRG - NRG Energy, Inc. - 5,6

Answer	
Document Name	

Comment

None

Likes 0	
Dislikes 0	

Response

Comments received from Gail Elliott/ITC

1. Are there any areas of concern that duplicative coverage or competing expectations would occur, if so, what are these areas the team should be aware of when drafting?

   ☒ Yes
   ☐ No

   Comments: Consideration should be given to the existing MOD-026 Project 2020-06 and other standards to determine if these requirements can be incorporated into this standard revision. Maintaining a one standard approach should be evaluated for ease in both GOs and TPs making sure evaluations both by generators and planners of the submitted data.

2. Provide any additional comments for the drafting team to consider, if desired.

   ☐ Yes
   ☒ No

   Comments: ITC submits following comments:

   1. Consider the inclusion of Planning Coordinators as an entity that may be included in the required work.

2. Disturbance Monitoring - Review the requirements in PRC-028 to confirm that no duplication of work will be required for the GOs, including Category 2 IBRs, for the installation of disturbance monitoring. A consideration if disturbance monitoring should be required for synchronous machines connected to the 60kV – 100 kV BPS.

The following comments are intended to address ITC's concerns with the Proposed SAR. Our negative response also reflect our opinion that the SAR needs to be revised prior to final approval.

Detail Description/FERC Order 901 Directives for Milestone 3 Part 2 Comments

While ITC generally agrees that many of the FERC Order 901 directives allocated to this project are reflected in this proposed Project Scope (i.e., Items 1, 3, 5, 6, 7, & 10), we do not agree the following directives have been sufficiently addressed in the SAR:

Note: Item numbers below align with those contained in the Detailed Description Section of the SAR.

- **Item 2** contains a directive that requires the assessment and development of benchmark cases to test model performance as well as a report comparing model performance and associated periodicity requirements. In our review of the Scope items, we do not find this task. We further note that if this task is to be done outside of this project, then it should be made clear where this work is being done and this directive should be removed from the Detail Scope section of the SAR.
- **Item 5** directs the establishment of uniform model verification processes. While we have included this item as being addressed in the proposed SAR, we do suggest that clearer language be added to certain SAR scope items to strengthen this directive and ensure it will be thoroughly addressed.
- **Items 4, 8, and 11** all contain directives that address issues with unregistered IBRs yet none of the language in the SAR scope clearly addresses those entities or the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where unregistered IBRs directives are to be addressed.
- **Items 8, and 11** contain directives that address issues with IBR-DERs yet none of the language in the SAR scope clearly address those entities and the associated NERC obligations. To address this issue, we ask that the SAR be modified to make it clearer where IBR-DERs directives are to be addressed.
- **Item 8** addresses the verification of aggregated models for unregistered IBRs and IBR-DER that have a material impact on the BPS, but the proposed SAR contains nothing in the proposed Project Scope that addresses this issue. To address this issue, we suggest adding language to the proposed scope to address the associated directives on verifying aggregated unregistered IBRs and IBR DERs and the process differences associated with validating those models.

ITC also suggests that Items 9 and 12 be removed from the Detailed Description section of this SAR because the directives contained in these Items are directives for NERC not the DT.

Next, we offer the following comments on the specifics of the Project Scope items and offer some suggested comments, edits, and deletions that provide clearer alignment to the directives, noting not all of the concerns listed above are reflected in the comments below.

Phase 1 Objectives Comments:

Item 1: ITC is concerned that some of the suggested changes under the Item 1 work scope, which aligns to MOD-033 seem to confuse the intent of this Reliability Standard. Specifically, MOD-033 is intended to validate resource models against actual system events/data, whereas MOD-026 and MOD-027 are intended to verify individual resource models in dynamic simulations. We additionally ask that the phrase "actual performance data" be clarified, noting this is an undefined term and could be understood to mean many things. To address the clarity issue of Item 1 we suggest the following edits in boldface below:

Either revise MOD-033 or create a new ~~**IBR model**~~ system model validation Reliability Standard **that more accurately validates IBR performance within those interconnected transmission system studies** ~~**to require model validation**~~ using actual performance data.

Item 1a: ITC suggests not using the phrase "validation expectations" because the phrase has no meaning in the context of a NERC Reliability Standard. Noting an expectation is not a requirement. ITC also suggests that given MOD-033 is the focus of Item 1, it is important to maintain context that MOD-033 is focused specifically on validating resource performance within system models. Verifying the accuracy of IBR models should be conducted under the new Reliability Standard that would be created under Item 2. We additionally suggest adding aggregated IBR models for non-registered IBR and IBR-DERs that have a material impact on the BPS because both need to be validated within MOD-033. Furthermore, additional clarity is needed regarding what performance data is going to be available for the aggregated unregistered IBRs and IBR DERs that have a material impact, while registered IBR owners will have specific data requirements through PRC-028, we are unaware of similar requirements for unregistered resources. To address all but the performance data issues for unregistered resources, we offer the following suggested changes in boldface for Item 1a:

include ~~**a complete set of validation expectations**~~ **criteria for validating system planning models that requires assessing and validating IBR performance, as well as assessing the impact of both unregistered IBRs (in aggregate) and IBR-DERs (in aggregate) that have been identified as having a material impact on the BPS through the use of** ~~**using**~~ performance data (must include performance data of IBR during disturbances as well as other performance measures);

Item 1b: ITC suggest deleting item 1b because it is unnecessary to include language within a NERC Reliability Standard that simply asks for accurate and high quality standards.

Item 1c: As stated above, we suggest that the term "performance data" be clarified.

Item 1d: Suggest deleting Item 1d because it lacks clarity about what the DT is expected to do to fulfill this item. Moreover, we understand Phase 2 is necessary to fulfill other Milestones not Milestone 3, Part 2 and therefore should not be included in this SAR.

Item 1e: The SAR should not attempt to prescriptively define how system planning models are to be validated. The DT should only develop requirements that obligate Planning Coordinators to have processes in place that validate IBR models within system planning models and include methods to reconcile any model issues with resource owners (i.e., IBR-GOs).

include **requirements that ensure Planning Coordinators have processes in place that are capable of identifying IBR model problems within system planning models and requirements for insuring IBR GOs are held accountable for providing updated models that more accurately validate IBR performance against actual performance data.** ~~**minimum criteria for performing validation (e.g., time, tolerance, impact)**~~;

Item 1f: ITC does not agree with Item 1f. As stated in paragraph 143 of FERC Order 901, what is required is the development of a new or revised Reliability Standard that establishes "uniform model verification processes" not specific performance criteria. For this reason, we suggest deleting Item 1f because this item goes beyond what was directed by the Commission.

Item 1g: ITC supports requirements that include expanded communication processes that obligate IBR owners and planners to cooperatively communicate to resolve issues with IBR model validation. However, we do not support including "performance criteria" because that is not what Order 901 directed. For this reason, we suggest the following changes to Item 1g:

Include ~~**Require**~~ **requirements that obligate** planner and operators to **incorporate in their model verification processes documented communications with** ~~**communicate any performance criteria to Generator Owners**~~ **IBR owners to address deficiencies in IBR models. Include requirements for IBR owners to provide timely updates to their IBR models in response to issues identified in communications from planners and operators.**

Item 1h: This item should be deleted because none of the directives associated with this project include the establishment of "performance criteria", what is directed is the development of processes to validate IBR models. The development of performance criteria goes beyond the directives of FERC Order 901.

Item 1i: ITC believes that trying to add considerations for other future work overly complicates this project. Consider deleting this item.

Item 1j: ITC does not agree that the use of Corrective Action Plans is the right tool for addressing issues with IBR model performance within dynamic simulations (New Standard) and system planning models (MOD-033 or New Reliability Standard). Instead, we suggest that the DT develop requirements in that model some of the processes successfully used in MOD-026 & MOD-027 for synchronous resources but tailored to the model verification process needs of for both individual IBRs and aggregated IBR resources.

Item 2:

ITC suggests Items 1 & 2 do not fully capture the directives identified in FERC Order 901 specific to model verification. We also suggest that Item 2 should more clearly capture all of the directives noted in FERC Order 901 specific to model verification (see Items 5, 6, & 7). To address these directives, we offer the following:

Develop a new or revised Reliability Standard that address IBR model verification processes that:

- Establishes uniform processes regardless of the IBR type; and
- Provides consistency among verification processes with other NERC Reliability Standards; and
- Contains process timelines consistent with FERC Order No. 2023 modeling deadline requirements; and
- Either include the new work required into the new MOD-026 or develop a new standard for this work and remove IBRs from MOD-026 and MOD-027.

Item 3: No suggested changes.

Item 4 (Phase 2):

ITC does not agree that there is any benefit in adding scope items that fall outside of Milestone 3 at this time. The scope is already very large and including Phase 2 work that is so prescriptive and speculative when it is not clear exactly what additional work will be necessary does not add to the SAR and may only delay approval of the SAR. ITC recognizes that additional work will be needed to address all of the directives in FERC Order 901, but it is more important at this time to address those directives identified as Milestone 3. There will be plenty of time to add additional scope later. For these reasons we suggest deleting the Phase 2 work and submitting a revised SAR at a later date to address this work.

Description of Current Draft

This is the third draft of the proposed Glossary Term posted for formal comment and additional ballot.

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024
45-day formal comment period with additional ballot	February 22 – April 8, 2024
Standards Committee approved Standards Authorization Request (SAR)	May 15, 2024

Anticipated Actions	Date
30-day formal comment period with additional ballot	June 21 – July 22, 2024
10-day final ballot	TBD
NERC Board adoption	August 2025

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The term proposed below is intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

Version History

Version	Date	Action	Change Tracking
0	TBD	New IBR Definition	

Description of Current Draft

This is the third draft of the proposed Glossary Term posted for a formal comment period and additional ballot.

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024
45-day formal comment period with additional ballot	February 22, 2024 – April 8, 2024
Standards Committee approved Standards Authorization Request (SAR)	May 15, 2024

Anticipated Actions	Date
30-day formal comment period with additional ballot	June 21 – July 19, 2024
10-day final ballot	TBD
NERC Board adoption	August 2025

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The ~~terms~~term proposed below is~~are~~ intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A plant/facility ~~that is connected to the electric system, consisting of one or more IBR Unit(s)~~consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. ~~IBRs~~ Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

~~**Inverter-Based Resource Unit (IBR Unit):** An individual device that uses a power electronic interface, such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connects at a single point on the collector system; or a grouping of multiple devices that uses a power electronic interface(s), such as an inverter or converter, capable of exporting Real Power from a primary energy source or energy storage system, and that connect together at a single point on the collector system.~~

Version History

Version	Date	Action	Change Tracking
0	TBD	New IBR Definition	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Definition

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definitions must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the drafting team (DT) that would coalesce development efforts for these definitions and coordinate proposed definitions with the other NERC developers. The DT proposes the two definitions of IBR and IBR Unit to be used in Reliability Standard MOD-026-2, as well as other IBR- related standards development projects.

General Considerations

Multiple standards in development will use the definition(s), and the proposed implementation timeframe is intended to reflect that any one of those standards may be the first to use one or more of the definitions. Additionally, this implementation plan only affects the date that these new definitions will become effective terms in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use these proposed definitions.

Effective Date

The effective date(s) for the proposed definitions for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed definitions shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the definitions, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed definitions shall become effective on the first day of the first calendar quarter after the date the definitions are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Technical Rationale

Project 2020-06 Verification of Models and Data for Generators
Inverter-based Resource Definition | July 2024

Inverter-based Resource (IBR) Definition

The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted, as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions. The DT also used recent FERC and NERC documents, which included inverter-based resource related terms and descriptions, as the basis for the IBR definitions.

The IBR definition is intended to describe technologies that shall be considered IBR. An IBR is defined by technology, thus voltage connection level (kV), facility capability level (MW/MVA), or other factors do not impact the inclusion as an IBR. An IBR can be connected to any part the transmission system, sub-transmission system, or distribution system. For Reliability Standards that use the IBR term, the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable. Each of these Reliability Standards, including the Applicability Section(s) will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section. For example, an Applicability Section may specify that IBR Facilities (BES), IBRs that are owned by a Generator Owner (Category 2), or IBRs that are operated by a Generator Operator (Category 2), are considered applicable.

IBRs have commonly been referred to as “generating resources.” An IBR is not a HVDC system (except for a VSC HVDC with a dedicated connection to an IBR, as this is part of the IBR facility), stand-alone flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. A list of IBRs is provided in Table 1 below.

IBRs may include any hybrid combination of IBR types (e.g., BESS and solar PV). IBRs also include co-located portions of a facility that are IBR technologies (e.g., a BESS, which is co-located at synchronous generation facility), see table below.

Examples	
IBR	**Not an IBR**
• Solar photovoltaic • Type 3 wind • Type 4 wind • Battery energy storage system (BESS) • Fuel cell(s) • Hybrid combination of IBRs • Portions of co-located facility that are IBR • VSC HVDC with dedicated connection to IBR • This is not an all-inclusive list.	• Stand-alone FACTS device (e.g., STATCOM or SVC) • Flywheels • Synchronous generator • Synchronous condenser • VSC HVDC • LCC HVDC • This is not an all-inclusive list.

An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.

Figure 1 shows an example diagram of an IBR. The IBR (red box) includes the IBR Units (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the IBR plant. If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system is part of the IBR.

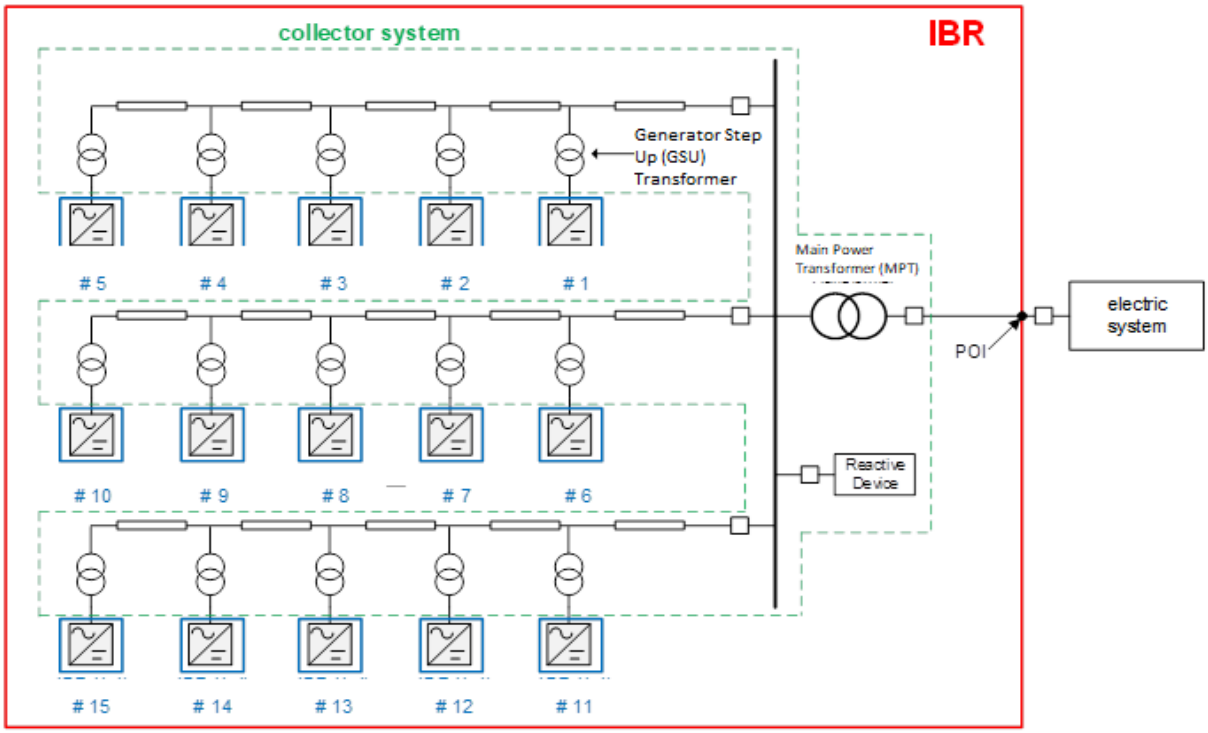

Figure 1 Example diagram of an IBR depicting the IBR (red box), collector system (green box), and devices (blue boxes).

The inclusion of 'capable of exporting Real Power' is to clarify that loads connected to the electric system via power electronics are not IBRs. IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power. The DT contemplated adding the phrase "may also be capable of providing Reactive Power" in the definition(s). However, the DT believed this may be misinterpreted that IBRs include technologies such as FACTS devices or HVDC.

Battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. Within each Reliability Standard, a DT may draft operating mode-specific Requirements, as needed.

The Project 2020-06 DT intends to use the Glossary Term of IBR for MOD-026-2. Additional standard development projects and related standards that may use this defined term include:

- Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)

- Project 2021-01 Modifications to PRC-019 and MOD-025
- Project 2021-04 Modifications to PRC-002 (new PRC-028)
- Project 2022-04 EMT Modeling
- Project 2023-01 EOP-004 IBR Event Reporting
- Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues (new PRC-030)

Distributed Energy Resources (DER) related projects that may or may not need to use IBR (if they end up with their own definition)

- Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
- Project 2023-05 FAC-001/FAC-002 DER
- Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Project 2020-06 Verification of Models and Data for Generators Inverter-based Resource-related Definition

Do not use this form for submitting comments. Use the Standards Balloting and Commenting System (SBS) to submit comments on draft three of the **Inverter-based Resource (IBR)-related Glossary Term** by **8 p.m. Eastern, Monday, August 12, 2024.**

Additional information is available on the project page. If you have questions, contact Standards Developer, Josh Blume (via email).

Background

The NERC IBR Performance Task Force (IRPTF) performed a comprehensive review of all NERC Reliability Standards to identify any potential gaps and/or improvements. The IRPTF discovered several issues as part of this effort and documented its findings and recommendations in the IRPTF Review of NERC Reliability Standards White Paper, which was approved in March 2020 by the Operating Committee and the Planning Committee (now part of the Reliability and Security Technical Committee (RSTC)). Among the findings noted in the white paper, the IRPTF identified issues with MOD-026-1 and MOD-027-1 that should be addressed by a project. The RSTC endorsed the standard authorization request (SAR) June 10, 2020.

The Standards Committee accepted two revised SARs at its July 21, 2021 meeting. The scope of the project includes the potential to add, modify, or retire Glossary Terms for NERC Reliability Standards. The term IBR originally gained industry approval during the initial ballot, but due to a term within the definition that was not accepted, the IBR definition would be unenforceable. The Project 2020-06 drafting team (DT) proposes a new term as part of this formal comment and additional ballot period.

Please provide your responses to the questions listed below, along with any detailed comments.

Questions

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

   ☐ Yes
   ☐ No

   Comments:

2. Provide any additional comments for the DT to consider, if desired.

   Comments:

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Technical Rationale

Project 2020-06 Verification of Models and Data for Generators
Inverter-based Resource Definition | July 2024

Inverter-based Resource (IBR) Definition

The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions. The DT also used recent FERC and NERC documents, which included inverter-based resource related terms and descriptions, as the basis for the IBR definitions.

The IBR ~~and IBR Unit~~ definition~~s~~ is ~~are~~ intended to describe technologies that shall be considered IBR ~~and to distinguish between a unit and resource~~. An IBR is defined by technology, thus voltage connection level (kV), facility capability level (MW/MVA), or other factors do not impact the inclusion as an IBR. An IBR can be connected to any part the transmission system, sub-transmission system, or distribution system. For a Reliability Standard(s) that use~~s~~ ~~either the~~ IBR ~~or IBR Unit~~ term~~s~~, the Applicability Section for that Reliability Standard(s) will specific which IBRs are applicable. Each of these Reliability Standards, including the Applicability Section(s) will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section. For ~~example~~example, an Applicability Section may specify that IBR Facilities (BES), IBRs that are owned by a Generator Owner (Category 2), or IBRs that are operated by a Generator Operator (Category 2), are considered applicable.

IBRs have commonly been referred to as “generating resources.” An IBR is not a HVDC system (except for a VSC HVDC with a dedicated connection to an IBR, as this is part of the IBR facility), stand-alone flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. A list of IBRs is provided in Table 1 below.

IBRs may include any hybrid combination of IBR types (e.g., BESS and solar PV), see ~~T~~table ~~1~~below. IBRs also include co-located portions of a facility that are IBR technologies (e.g., a BESS, which is co-located at synchronous generation facility), see ~~T~~table below~~1~~.

Examples	
IBR	**Not an IBR**
• Solar photovoltaic	• Stand-alone FACTS device (e.g., STATCOM or SVC)
• Type 3 wind	• Flywheels
• Type 4 wind	• Synchronous generator

Examples	
IBR	**Not an IBR**
• Battery energy storage system (BESS) • Fuel cell(s) • Hybrid combination of IBRs • Portions of co-located facility that are IBR • VSC HVDC with dedicated connection to IBR • This is not an all-inclusive list.	• Synchronous condenser • VSC HVDC • LCC HVDC • This is not an all-inclusive list.

~~Examples of IBRs include:~~

~~Inverter-Based Resource (IBR)~~	~~Not an IBR~~
• ~~Solar photovoltaic~~ • ~~Type 3 wind~~ • ~~Type 4 wind~~ • ~~Battery energy storage system (BESS)~~ • ~~Fuel cell(s)~~ • ~~Hybrid combination of IBRs~~ • ~~Portions of co-located facility that are IBR~~ • ~~VSC HVDC with dedicated connection to IBR~~ • ~~This is not an all-inclusive list.~~	• ~~Stand-alone FACTS device (e.g. STATCOM or SVC)~~ • ~~Flywheels~~ • ~~Synchronous generator~~ • ~~Synchronous condenser~~ • ~~VSC HVDC~~ • ~~LCC HVDC~~ • ~~This is not an all-inclusive list.~~

~~Table 1: Inverter-Based Resource (IBR) examples~~

An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.

Figure 1~~ABC~~ shows an example diagram of an IBR. The IBR (red box) includes the IBR Units (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the

IBR plant. If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system is part of the IBR.

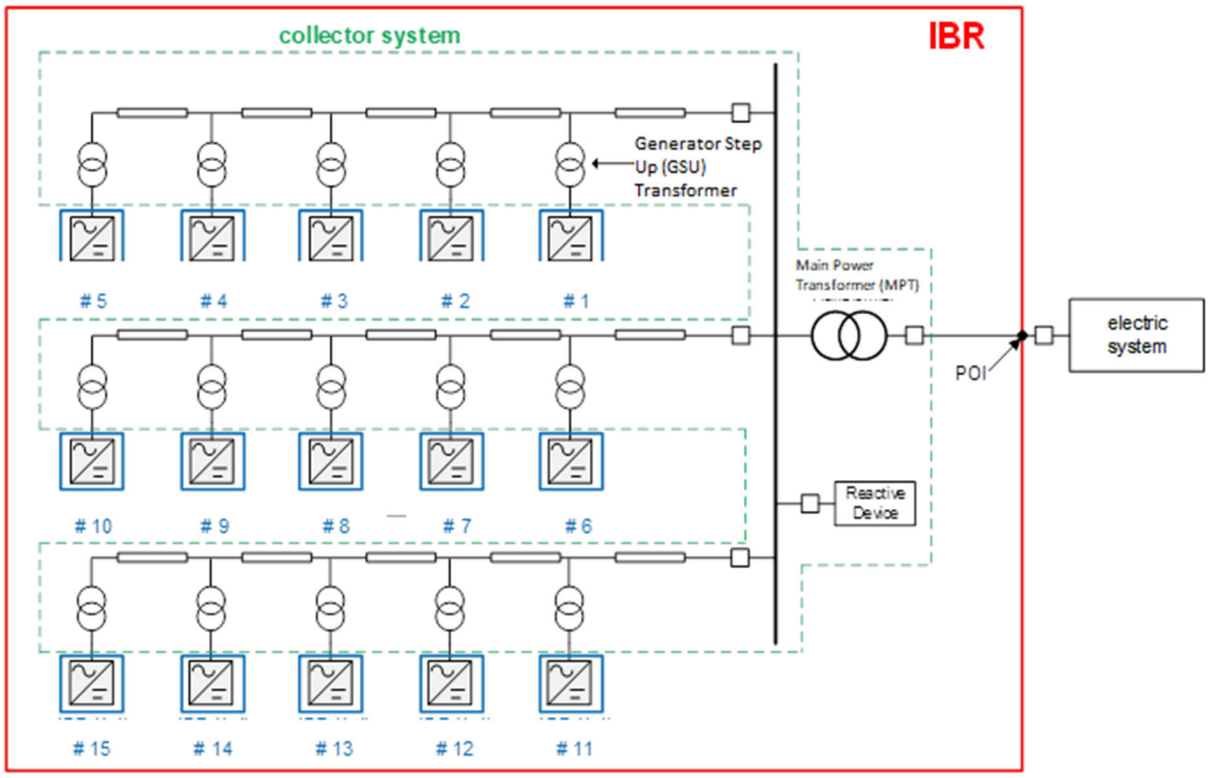

Figure 1~~2.1~~ Example diagram of an IBR depicting the IBR (red box), collector system (green box), and devices ~~IBR Units~~ (blue boxes).

The inclusion of 'capable of exporting Real Power' is to clarify that loads connected to the electric system via power electronics are not IBRs. IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power. The DT contemplated adding the phrase "may also be capable of providing Reactive Power" in the definition(s). However, the DT believed this may be misinterpreted that IBRs include technologies such as FACTS devices or HVDC.

Battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. Within each Reliability Standard, a DT may draft operating mode-specific Requirements, as needed.

The Project 2020-06 DT intends to use the Glossary Term~~s~~ of ~~IBR Unit and~~ IBR for MOD-026-2. Additional standards development projects and related standards that may use these defined terms include:

- Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)
- Project 2021-01 Modifications to PRC-019 and MOD-025

- Project 2021-04 Modifications to PRC-002 (new PRC-028)
- Project 2022-04 EMT Modeling
- Project 2023-01 EOP-004 IBR Event Reporting
- Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues~~Performance of IBRs~~ (new PRC-030)

Distributed Energy Resources (DER) related projects that may or may not need to use IBR~~/IBR Unit~~ if they end up with their own definition)

- Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
- Project 2023-05 FAC-001/FAC-002 DER
- Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

UPDATED
Standards Announcement
Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Term

Formal Comment Period Open through August 12, 2024

Now Available

A formal comment period for the **Inverter-based Resource Glossary Term** is open through **8 p.m. Eastern, Monday, August 12, 2024**.

The standard drafting team's considerations of the responses received from the previous comment period are reflected in this draft of the definition.

Reminder Regarding Corporate RBB Memberships
Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Commenting
Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps
Additional ballots will be conducted **August 2-12, 2024**.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Josh Blume (via email) or at 404-446-2593. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Term

Formal Comment Period Open through August 13, 2024

Now Available

A formal comment period for the **Inverter-based Resource Glossary Term** is open through **8 p.m. Eastern, Tuesday, August 13, 2024**.

The standard drafting team's considerations of the responses received from the previous comment period are reflected in this draft of the definition.

Reminder Regarding Corporate RBB Memberships

Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

Additional ballots will be conducted **August 2-13, 2024**.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Josh Blume (via email) or at 404-446-2593. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Comment Report

Project Name:	2020-06 Verifications of Models and Data for Generators | Draft 3 of IBR Definitions
Comment Period Start Date:	7/12/2024
Comment Period End Date:	8/12/2024
Associated Ballots:	2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan AB 3 OT 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) AB 3 DEF

There were 52 sets of responses, including comments from approximately 147 different people from approximately 100 companies representing 10 of the Industry Segments as shown in the table on the following pages.

Questions

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Provide any additional comments for the DT to consider, if desired.

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
MRO	Anna Martinson	1,2,3,4,5,6	MRO	MRO Group	Shonda McCain	Omaha Public Power District (OPPD)	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jamison Cawley	Nebraska Public Power District	1,3,5	MRO
					Jay Sethi	Manitoba Hydro (MH)	1,3,5,6	MRO
					Husam Al-Hadidi	Manitoba Hydro (System Preformance)	1,3,5,6	MRO
					Kimberly Bentley	Western Area Power Adminstration	1,6	MRO
					Jaimin Patal	Saskatchewan Power Coporation (SPC)	1	MRO
					George Brown	Pattern Operators LP	5	MRO
					Larry Heckert	Alliant Energy (ALTE)	4	MRO
					Terry Harbour	MidAmerican Energy Company (MEC)	1,3	MRO
					Dane Rogers	Oklahoma Gas and Electric (OG&E)	1,3,5,6	MRO
					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO
					Michael Ayotte	ITC Holdings	1	MRO
					Andrew Coffelt	Board of Public Utilities-Kansas (BPU)	1,3,5,6	MRO

					Peter Brown	Invenergy	5,6	MRO
					Angela Wheat	Southwestern Power Administration	1	MRO
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
Dominion - Dominion Resources, Inc.	Barbara Marion	5,6		Dominion	Victoria Crider	Dominion	3	NA - Not Applicable
					Barbara Marion	Dominion	5	NA - Not Applicable
					Sean Bodkin	Dominion	6	NA - Not Applicable
					Steven Belle	Dominion	1	NA - Not Applicable
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,NPCC,RF,SERC,SPP RE,Texas RE,WECC	SRC 2024	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Matt Goldberg	ISO New England	2	NPCC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,NPCC,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	1	WECC
					Jason Procuniar	Buckeye Power, Inc.	4	RF
					Jolly Hayden	East Texas Electric Cooperative, Inc.	NA - Not Applicable	Texas RE
					Scott Brame	North Carolina Electric Membership Corporation	3,4,5	SERC
					Nick Fogleman	Prairie Power, Inc.	1,3	SERC
FirstEnergy - FirstEnergy	Mark Garza	4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy	1	RF

Corporation						Corporation		
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy-FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF
Michael Johnson	Michael Johnson		WECC	PG&E All Segments	Marco Rios	Pacific Gas and Electric Company	1	WECC
					Sandra Ellis	Pacific Gas and Electric Company	3	WECC
					Tyler Brun	Pacific Gas and Electric Company	5	WECC
DTE Energy - Detroit Edison Company	Mohamad Elhusseini	3,5		DTE Energy	Mohamad Elhusseini	DTE Energy	5	RF
					Patricia Ireland	DTE Energy	4	RF
					Marvin Johnson	DTE Energy - Detroit Edison Company	3	RF
Southern Company - Southern Company Services, Inc.	Pamela Hunter	1,3,5,6	SERC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Leslie Burke	Southern Company - Southern	5	SERC

						Company Generation		
Black Hills Corporation	Rachel Schuldt	6		Black Hills Corporation - All Segments	Micah Runner	Black Hills Corporation	1	WECC
					Josh Combs	Black Hills Corporation	3	WECC
					Rachel Schuldt	Black Hills Corporation	6	WECC
					Carly Miller	Black Hills Corporation	5	WECC
					Sheila Suurmeier	Black Hills Corporation	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC
					Deidre Altobell	Con Edison	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael Ridolfino	Central Hudson Gas & Electric Corp.	1	NPCC
					Randy Buswell	Vermont Electric Power Company	1	NPCC
					James Grant	NYISO	2	NPCC
					Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
					David Burke	Orange and Rockland	3	NPCC
					Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC
					Salvatore Spagnolo	New York Power Authority	1	NPCC
					Sean Bodkin	Dominion - Dominion	6	NPCC

	Resources, Inc.		
David Kwan	Ontario Power Generation	4	NPCC
Silvia Mitchell	NextEra Energy - Florida Power and Light Co.	1	NPCC
Sean Cavote	PSEG	4	NPCC
Jason Chandler	Con Edison	5	NPCC
Tracy MacNicoll	Utility Services	5	NPCC
Shivaz Chopra	New York Power Authority	6	NPCC
Vijay Puran	New York State Department of Public Service	6	NPCC
David Kiguel	Independent	7	NPCC
Joel Charlebois	AESI	7	NPCC
Joshua London	Eversource Energy	1	NPCC
Jeffrey Streifling	NB Power Corporation	1,4,10	NPCC
Joel Charlebois	AESI	7	NPCC
John Hastings	National Grid	1	NPCC
Erin Wilson	NB Power	1	NPCC
James Grant	NYISO	2	NPCC
Michael Couchesne	ISO-NE	2	NPCC
Kurtis Chong	IESO	2	NPCC
Michele Pagano	Con Edison	4	NPCC
Bendong Sun	Bruce Power	4	NPCC
Carvers Powers	Utility Services	5	NPCC
Wes Yeomans	NYSRC	7	NPCC

Dominion - Dominion Resources, Inc.	Sean Bodkin	6		Dominion	Victoria Crider	Dominion Energy	3	NA - Not Applicable
					Sean Bodkin	Dominion Energy	6	NA - Not Applicable
					Steven Belle	Dominion Energy	1	NA - Not Applicable
					Barbara Marion	Dominion Energy	5	NA - Not Applicable
Western Electricity Coordinating Council	Steven Rueckert	10		WECC	Steve Rueckert	WECC	10	WECC
					Curtis Crews	WECC	10	WECC
Tim Kelley	Tim Kelley		WECC	SMUD and BANC	Nicole Looney	Sacramento Municipal Utility District	3	WECC
					Charles Norton	Sacramento Municipal Utility District	6	WECC
					Wei Shao	Sacramento Municipal Utility District	1	WECC
					Foung Mua	Sacramento Municipal Utility District	4	WECC
					Nicole Goi	Sacramento Municipal Utility District	5	WECC
					Kevin Smith	Balancing Authority of Northern California	1	WECC

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

Sean Steffensen - IDACORP - Idaho Power Company - 1

Answer	No
Document Name	

Comment

Idaho Power Company believes a definition of an IBR Unit is still needed and would be a helpful addition. It also seems like keeping the last section of the original definition could serve useful as this detail was excluded from the new proposed definition.

Likes 0	
Dislikes 0	

Response

Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter

Answer	No
Document Name	

Comment

FirstEnergy supports EEI's proposed changes which state:

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources to the BPS,** and fuel cell devices.

In addition, FirstEnergy requests the DT provide a definition for Type 3 and Type 4 wind devices to ensure intent and applicability of compliance toward this definition.

Likes 0	
Dislikes 0	

Response

Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF

Answer	No

Document Name	

Comment

Renewable generation must at some point cover Reactive Power if we are moving towards all renewable generation in the future. Due to this, Southern Indiana Gas & Electric, Company recommends adding “Reactive Power” to the definition.

Likes 0	
Dislikes 0	

Response

Devin Shines - PPL - Louisville Gas and Electric Co. - 1,3,5,6 - SERC,RF

Answer	No
Document Name	

Comment

LG&E/KU suggest the following revisions to the proposed definition, with a clean version of the edits provided at the bottom.

1. Describing an IBR as a “plant/facility” risks confusion around IBRs that are co-located with synchronous generators as components of a hybrid plant. Suggesting the more generic “generating resource”.
2. An IBR may consist of only one inverter. The definition should use “one or more device(s)” from IEEE Std 2800-2022 rather than the current “individual devices”.
3. The phrase “to the electric system” should be moved to the immediate context of exporting power through the power electronic interface.
4. The wording “at a common point of interconnection” risks confusion at locations where multiple IBRs share a point of interconnection. Here also it should be noted that the NERC IBR definition parallels the IEEE Std 2800-2022 definition of “IBR Plant” rather than “IBR”. In any case, it is recommended to use IEEE Std 2800-2022 wording: “operated by a common facility-level controller” (however, due to the use of “facility” in various NERC contexts, “facility-level” should be removed; it is also unnecessary as “common” already requires that the controller operates all devices).
5. The wording of the last sentence implies a plant with a BESS is an IBR. Again (see point 1), this risks confusion for IBRs that are co-located with synchronous generators as part of a hybrid plant. Only the IBR components should be defined as IBRs.

"A generating resource consisting of one or more device(s) capable of exporting Real Power through a power electronic interface to the electric system and operated by a common controller. Examples include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system, and fuel cell generating resources."

Likes 0	
Dislikes 0	

Response

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF

Answer	No
Document Name	

Comment
Duke Energy suggests the following modifications: Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together “through a common facility-level control system” “STRIKE” at a common point of interconnection to the electric system. The above enhancement will eliminate the vagueness of the phrase single resource at a point of interconnect. Using the "facility-level control system" prevents confusion of plant/facility since some locations may have a feeder bus with multiple GO's connecting to the feeder that feed to a single point of interconnect. Additionally, this modification would clarify that each plant/facility is responsible for their own PRC-028 thru -030 requirements, among others.

Likes 0	
Dislikes 0	

Response

Brian Van Gheem - Radian Generation - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	

Comment
1. We believe the proposed definition should align with the Category 2 Generator Owner language recently added to the NERC Rules of Procedure. Instead of referencing “operated” and “point of interconnection to the electric system,” the definition of a Category 2 Generator Owner uses “delivering capacity” and “point of connection.” We propose the following definition in its place, “Plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s), such as an inverter or converter, delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV...” We believe such a definition could be applied to Category 1 Generator Owners with IBR Facilities as well. 2. We propose a minor, non-content modification to the definition. We recommend adding a comma after the word “interface(s)” to separate the word from the prepositional phrase.

Likes 0	
Dislikes 0	

Response

Jennifer Weber - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	

Comment
The entire definition could be consolidated slightly for ease of reading and understanding.

Example:

Inverter-Based Resource (IBR): A plant/facility comprising of individual devices capable of exporting Real Power through power electronics e.g. inverters or converters. These devices operate collectively at a single connection point to the electric system. Examples include but are not limited to, solar photovoltaic (PV), Type 3 & 4 wind, battery energy storage system (BESS), and fuel cell devices.

Likes 0	
Dislikes 0	

Response

Israel Perez - Israel Perez On Behalf of: Laura Somak, Salt River Project, 3, 6, 5, 1; Mathew Weber, Salt River Project, 3, 6, 5, 1; Thomas Johnson, Salt River Project, 3, 6, 5, 1; Timothy Singh, Salt River Project, 3, 6, 5, 1; - Israel Perez

Answer	No
Document Name	

Comment

Proposed Definition: A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

Likes 0	
Dislikes 0	

Response

Scott Thompson - PNM Resources - Public Service Company of New Mexico - 1,3,5 - WECC

Answer	No
Document Name	

Comment

PNM agrees with the comment of EEI:

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources to the BPS,** and fuel cell devices.

Likes 0	
Dislikes 0	

Response	
LaTroy Brumfield - LaTroy Brumfield On Behalf of: Amy Wilke, American Transmission Company, LLC, 1; - LaTroy Brumfield	
Answer	No
Document Name	
Comment	

The definition should make clear that standalone HVDC facilities are not included in the definition. If the phrases, “plant/facility” are intended to do that, it could still be confusing as an HVDC could theoretically be called a facility. Adding the phrase, “from a primary energy source or energy storage system” to the definition might help make this more clear

The suggested definition could read like the example below:

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power (active power) from a primary energy source or energy storage system through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system.

Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, inverter-interfaced battery energy storage systems (BESS), and fuel cell devices.

Likes 0	
Dislikes 0	
Response	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	

Texas RE recommends the drafting team consider using the terms generator or generator plant instead of the term “plant/facility”. Since Facility is a defined term, using lower-case facility could cause confusion.

Texas RE inquires as to whether the term “turbines” should be added after the phrase “Type 3 and 4 wind.”

Likes 0	
Dislikes 0	

Response

Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments

Answer	Yes
Document Name	

Comment

Black Hills Corporation supports the addition of the proposed IBR definition from the EEI that would provide improved clarity. That definition is as follows:

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources,** and fuel cell devices.

Likes 0	
Dislikes 0	

Response

Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC

Answer	Yes
Document Name	

Comment

No comments

Likes 0	
Dislikes 0	

Response

Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
As BPA understands, power electronic interfaces are flexible. BPA believes adding "devices *capable* of exporting real power through a power electronic interface" would now include a broad spectrum of equipment that can produce electric power. BPA recommends revising the following language: **from**: "…consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s)…" **to**: "…consisting of individual devices that export Real Power through a power electronic interface(s)…"	
Likes 0	
Dislikes 0	
Response	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes
Document Name	
Comment	
SMUD and BANC support this definition for IBR but strongly feel that a definition for "IBR Unit" is needed to help drafting teams in future NERC Order 901 Work Plan Projects. The drafting team should consider adding the word "turbines" after "wind" and defining what Type 3 and Type 3 wind turbines are. Adding the word "turbines" is a non-substantive change and could be made in the final ballot.	
Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy	
Answer	Yes

Document Name	
Comment	
I have reviewed the proposed definition of IBR and support the proposed definition.	
Likes 0	
Dislikes 0	
Response	
Hayden Maples - Hayden Maples On Behalf of: Jeremy Harris, Evergy, 3, 5, 1, 6; Kevin Frick, Evergy, 3, 5, 1, 6; Tiffany Lake, Evergy, 3, 5, 1, 6; - Evergy - 1,3,5,6 - MRO	
Answer	Yes
Document Name	
Comment	
Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI) and Midwest Reliability Organization's NERC Standards Review Forum (MRO NSRF) on question 1	
Likes 0	
Dislikes 0	
Response	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	
The NAGF supports the proposed IBR definition.	
Likes 0	
Dislikes 0	
Response	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	Yes
Document Name	

Comment
The NSRF supports the proposed IBR definition, but would request the standard drafting team consider the following non-substantive changes to improve clarity. **Inverter-Based Resource (IBR)**: A plant/facility consisting of individual devices capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, on shore and off-shore wind and solar plants/facilities, Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5	
Answer	Yes
Document Name	

Comment
Constellation aligns with the NAGF comments. Alison Mackellar on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Kimberly Turco - Constellation - 6	
Answer	Yes
Document Name	

Comment
Constellation aligns with NAGF comments. Kimberly Turco on behalf of Constellation Energy Segments 5 and 6.

Likes 0	
Dislikes 0	

Response

Kristine Martz - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	

Comment

EEI does not object to the revisions made to the proposed IBR definition but there are some non-substantive changes (in boldface text) that we feel would provide improved clarify to the intent of the definition.

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources,** and fuel cell devices.

Likes 0	
Dislikes 0	

Response

Hillary Creurer - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	

Comment

Minnesota Power supports the definition for IBR as proposed, but also supports EEI and MRO's NERC Standards Review Forum's (NSRF) suggestions to improve clarity.

Likes 0	
Dislikes 0	

Response

Selene Willis - Edison International - Southern California Edison Company - 5	
Answer	Yes
Document Name	

Comment

"Please see EEI Comments"

Likes 0	
Dislikes 0	
Response	
Nick Leathers - Nick Leathers On Behalf of: David Jendras Sr, Ameren - Ameren Services, 3, 6, 1; - Nick Leathers	
Answer	Yes
Document Name	
Comment	
Ameren does not have any additional comments for consideration by the drafting team.	
Likes 0	
Dislikes 0	
Response	
Carver Powers - Utility Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
1. Recommend clarifying “Type 3 and Type 4 wind” by including “turbine” after wind in the proposed IBR definition. 2. Without a clear definition of “power electronic interface(s)” it could be determined that it includes transformers which we believe is not the intent of this definition. Can the SDT provide clarity on what is and what is not a “power electronic interface(s)”	
Likes 0	
Dislikes 0	
Response	
George E Brown - Pattern Operators LP - 5	
Answer	Yes
Document Name	
Comment	
Pattern Energy supports Midwest Reliability Organization’s NERC Standards Review Forum’s (MRO NSRF) comments on this question.	

Likes 0	
Dislikes 0	
Response	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	Yes
Document Name	
Comment	
It is the opinion of ACES that the inclusion of the phrase “plant/facility” within the proposed IBR definition introduces additional confusion into this definition. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that the term facility should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) to be consistent with other uses of this phrase within the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	
Response	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	Yes
Document Name	
Comment	
AEPC signed on to ACES comments: It is the opinion of ACES that the inclusion of the phrase “plant/facility” within the proposed IBR definition introduces additional confusion into this definition. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that the term facility should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) to be consistent with other uses of this phrase within the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	
Response	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC,Texas RE,NPCC,SERC,RF, Group Name SRC 2024	
Answer	Yes
Document Name	

Comment
The ISO/RTO Council (IRC) Standards Review Committee (SRC) supports the revised term, but notes that the deletion of “connected to the electric system” from the IBR definition, implies that the IBR term is not in and of itself applicable to BES or non-BES interconnections. Therefore, those reliability requirements applicable to IBRs will need to specify whether they apply to the new registration categories of “GO/GOP Category 1” and “GO/GOP Category 2” to complement the IBR definition. Any and all current and proposed standards applicable to IBR should be reviewed and updated to clarify their applicability. In addition, the SRC proposes the changes in red below. ***Inverter-Based Resource (IBR):*** *A plant/facility that includes one or more individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection{C}**[1]** to the electric system. Examples include, but are not limited to, plants/facilities with that include one or more solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.* The SRC proposes that a definition or examples of what constitutes a “common point of interconnection” be provided (such as in a footnote) since this term is not defined in the NERC Glossary of Terms and it is unclear whether it refers to a transformer, a bus, or some other point of interconnection. Illustrative examples are also useful to clarify how a hybrid plant, in which only a portion of the interconnected facility employs an inverter or converter, falls under the definition. The SRC proposes that the language “one or more” be restored in the first sentence of the definition and added to the second sentence for clarity and consistency. Finally, the SRC is concerned that the word “with” in the second sentence of the definition is unclear. Therefore, we propose replacing the word “with” with “that include.” Footnote: ISO NE is a party to these comments however does not support the comments provided in reponse to Q1.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	

Comment
ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and adopts them as its own.

Likes 0	
Dislikes 0	

Response

Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Jessica Cordero - Unisource - Tucson Electric Power Co. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Barbara Marion - Dominion - Dominion Resources, Inc. - 5,6, Group Name Dominion	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Sing Tay - AES - AES Corporation - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Casey Jones - Berkshire Hathaway - NV Energy - 5 - WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Stephen Stafford - Stephen Stafford On Behalf of: Greg Davis, Georgia Transmission Corporation, 1; - Stephen Stafford	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	

Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Patricia Lynch - NRG - NRG Energy, Inc. - 5	
Answer	
Document Name	
Comment	
NRG Energy Inc is in support of the comments made by EPSA.	
Likes 0	
Dislikes 0	
Response	
Martin Sidor - NRG - NRG Energy, Inc. - 5,6	
Answer	
Document Name	
Comment	
NRG agrees with the EPSA comments.	
Likes 0	
Dislikes 0	
Response	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	
Document Name	
Comment	

ITC has no comments on the proposed definition for Project 2020-06.	
Likes 0	
Dislikes 0	
Response	

2. Provide any additional comments for the DT to consider, if desired.

Kyle Thomas - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable

Answer	
Document Name	

Comment

Elevate appreciates the opportunity to comment on the draft NERC standards, particularly those pertaining to future IBR NERC Reliability Standards, and FERC Order No. 901 directives.

The IBR definition appears to be using IEEE 2800-2022 as a reference; however, there are notable differences between definitions. Most importantly, IEEE 2800-2022 is careful in its consideration of supplemental devices, defined as “any equipment within an IBR plant, which may or may not be inverter-based…” These could include capacitor banks, STATCOMs, harmonic filters, protection systems, plant-level controllers, etc., which should all be considered as part of the overall IBR facility. If the resource (or part of the resource) is deemed “IBR”, then all applicable components that support that resource (such as those listed above) should be considered part of the IBR.

We also would like to see the re-introduction of an IBR Unit definition, which we believe is necessary for meaningful standards applications. The difference between IBR Unit requirements/capabilities and IBR requirements/capabilities can be significant, so defining these two clearly is strongly encouraged. Creating an IBR Unit definition that matches the IEEE 2800 standard would help facilitate this process efficiently and is recommended for the definition.

Likes 0	
Dislikes 0	

Response

Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2

Answer	
Document Name	

Comment

ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.

Likes 0	
Dislikes 0	

Response

Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC

Answer	
Document Name	

Comment
WECC voted yes but offers the following for consideration. WECC appreciates the efforts to provide a definition for Inverter-Based Resource (IBR). WECC asks if the DT is planning to provide some examples so that “misunderstanding” will be avoided when the definition is applied within Standards/Requirements? Compliance can create interesting arguments that ignore the reliability (and risk) concerns. It is understood that the registration candidate pool will be limited to the definition of Generator Operator and Generator Owner recently approved by FERC. The definitions did not use IBR directly and, instead, used “non-BES inverter based generating resources” (for Cat 2) and “generating Facility(ies)” for Cat 1. It is clear to WECC that the proposed IBR definition is applicable for Cat 1 and Cat 2 GOs and GOPs.

Likes 0	
Dislikes 0	

Response

Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC,Texas RE,NPCC,SERC,RF, Group Name SRC 2024

Answer	
Document Name	2020-06_IBR_Definition_Unofficial_Comment_Form_SRCFinal.docx

Comment

Concerns Associated with Removing the IBR Unit Definition

The SRC is aware of a draft **Standards Authorization Request (SAR)** entitled *Revisions to FAC-001-4 and FAC-002-4* that the **Inverter-Based Resource Performance Subcommittee (IRPS)** is currently composing that seeks to address modeling conformity. The SRC believes that this may require unit-level model validation and benchmarking (where the original manufacturer conducts laboratory tests to compare the actual equipment response to the modeled response) before models can be accurately applied at the plant/facility level. This may make the elimination of the IBR Unit definition problematic if this term will be needed when drafting future standard requirements.

See Purpose or Goal, bullet item #2 (on page 3):

2.” …require Transmission Planners (TPs) and Planning Coordinators (PCs) to assess IBR plant capability and performance conformity for example through a combination of review of documentation, simulation studies, and physical tests that a newly interconnecting IBR complies with applicable IBR performance requirements.”

See Purpose or Goal, paragraph (on page 4):

“Having a specific conformity assessment process (in addition to currently performed interconnection studies) will ensure that the TP and PC verify generator conformity with applicable interconnection requirements, preferably prior to IBR plant commissioning. Standard drafting team should consider FERC GIA/GIP requirements to determine an aligning timeline to resolve discrepancies in plant conformity. Enhancing current generator interconnection processes with clear conformity assessment processes will ensure that new BPS-connected IBR facilities are designed with the capabilities necessary for reliable operation.”

Further, the SRC notes that existing NERC standards apply requirements at the unit level. For instance, **MOD-026, Requirement R2, Part 2.1** has unit-specific requirements for excitation control systems.

2.1. Each applicable unit’s model shall be verified by the Generator Owner using one or more models acceptable to the Transmission Planner. Verification for individual units less than 20 MVA (gross nameplate rating) in a generating plant (per Section 4.2.1.2, 4.2.2.2, or 4.2.3.2) may be

performed using either individual unit or aggregate unit model(s), or both. Each verification shall include the following: . . .

Similarly, **PRC-024, Section 4 Applicability, Part 4.2 Facilities**, **Part 4.2.1.4** includes individual dispersed power producing resource(s) as applicable facilities identified in Inclusion I4 of the BES Definition.

4.2.1.4 Individual dispersed power producing resource(s) identified in the BES Definition, Inclusion I4.

For these reasons, the SRC believes consideration should be given to retaining a definition of “IBR Unit” as it will engender common understanding and application of the term among Registered Entities. While an “IBR Unit” definition may not need to be finalized in this immediate project, there will likely be a need to complete this task in the future to align with developing frameworks.

Likes 0	
Dislikes 0	

Response

Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1

Answer	
Document Name	

Comment

AEPC signed on to ACES comments:

We at ACES applaud the SDT for the work that has been put into developing the IBR definition. We are greatly encouraged by the SDT’s willingness to heed industry feedback and implement changes to the IBR definition. However, it is the opinion of ACES that consolidating the IBR Unit and IBR Facility definitions into a single definition is a mistake.

It is the perspective of ACES that, without a way to clearly define what constitutes the individual devices of an IBR, each individual Standards Drafting Team is left to provide their own (potentially unique) definition. We believe that this will be a detriment to consistency and will potentially have a negative impact on compliance. We suggest utilizing terms and/or language already contained within the Glossary of Terms whenever possible. Thus, we recommend using the following terms to define these types of generating resources (a:

Inverter-Based Resource (IBR) Facility: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of Interconnection.

Inverter-Based Resource (IBR) Unit: An individual generating resource capable of exporting electric power that uses a power electronic interface, such as an inverter or converter, and connects at a single point to a system designed primarily for delivering such electric power to a common point of Interconnection (note: a system designed primarily for delivering such electric power to a common point of Interconnection is commonly referred to as a collector system).

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	

We at ACES applaud the SDT for the work that has been put into developing the IBR definition. We are greatly encouraged by the SDT's willingness to heed industry feedback and implement changes to the IBR definition. However, it is the opinion of ACES that consolidating the IBR Unit and IBR Facility definitions into a single definition is a mistake.

It is the perspective of ACES that, without a way to clearly define what constitutes the individual devices of an IBR, each individual Standards Drafting Team is left to provide their own (potentially unique) definition. We believe that this will be a detriment to consistency and will potentially have a negative impact on compliance. We suggest utilizing terms and/or language already contained within the Glossary of Terms whenever possible. Thus, we recommend using the following terms to define these types of generating resources (a:

Inverter-Based Resource (IBR) Facility: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of Interconnection.

Inverter-Based Resource (IBR) Unit: An individual generating resource capable of exporting electric power that uses a power electronic interface, such as an inverter or converter, and connects at a single point to a system designed primarily for delivering such electric power to a common point of Interconnection (note: a system designed primarily for delivering such electric power to a common point of Interconnection is commonly referred to as a collector system).

Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

George E Brown - Pattern Operators LP - 5	
Answer	
Document Name	
Comment	

Pattern Energy supports Midwest Reliability Organization's NERC Standards Review Forum's (MRO NSRF) comments on this question.

Likes 0	
Dislikes 0	

Response

Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	
Document Name	
Comment	
NPCC RSC supports the project.	
Likes 0	
Dislikes 0	
Response	
Scott Thompson - PNM Resources - Public Service Company of New Mexico - 1,3,5 - WECC	
Answer	
Document Name	
Comment	
Any and all items listed items/assets in the proposed IBR definition should be defined and in the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	
Southern Company has no further comments.	
Likes 0	
Dislikes 0	
Response	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	

Document Name	
Comment	
OPG supports NPCC Regional Standards Committee’s comments.	
Likes 0	
Dislikes 0	
Response	
Nick Leathers - Nick Leathers On Behalf of: David Jendras Sr, Ameren - Ameren Services, 3, 6, 1; - Nick Leathers	
Answer	
Document Name	
Comment	
Ameren does not have any additional comments for consideration by the drafting team.	
Likes 0	
Dislikes 0	
Response	
Romel Aquino - Edison International - Southern California Edison Company - 3	
Answer	
Document Name	Project 2020-06 _ EEI Near Final Revised IBR Definition Draft 3 Rev 0a 8_06_2024.docx
Comment	
See comments submitted by the Edison Eclectic Institute in the attached file	
Likes 0	
Dislikes 0	
Response	
Kimberly Turco - Constellation - 6	
Answer	
Document Name	
Comment	

Constellation has no additional comments

Kimberly Turco on behalf of Constellation Energy Segments 5 and 6.

Likes 0	
Dislikes 0	

Response

Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott

Answer	
Document Name	

Comment

ITC has no comments on the proposed definition for Project 2020-06.

Likes 0	
Dislikes 0	

Response

Alison MacKellar - Constellation - 5

Answer	
Document Name	

Comment

Constellation has no additional comments.

Alison Mackellar on behalf of Constellation Segments 5 and 6

Likes 0	
Dislikes 0	

Response

Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF

Answer	
Document Name	

Comment	
The NAGF has no additional comments.	
Likes 0	
Dislikes 0	
Response	
Martin Sidor - NRG - NRG Energy, Inc. - 5,6	
Answer	
Document Name	
Comment	
NRG agrees with the EPSA comments.	
Likes 0	
Dislikes 0	
Response	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy	
Answer	
Document Name	
Comment	
No other comments to provide.	
Likes 0	
Dislikes 0	
Response	
Jennifer Weber - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	

Technical Rationale:

- Need to define the acronym “LCC” as, while it may be obvious to some, it isn’t necessarily known to all. Note that the definition of “VSC HVDC” should be moved up to the first time it’s used.
- Contains the term “IBR Unit,” which is no longer a defined term, and, as such, should not be included in the document.

Implementation Plan:

- The Background section contains the term “IBR Unit,” which is no longer a defined term, and, as such, should not be included in the document.
- The General Considerations section makes reference to multiple definitions, but there is only one (“IBR”) now.

Likes 0	
Dislikes 0	

Response

Brian Van Gheem - Radian Generation - NA - Not Applicable - NA - Not Applicable

Answer	
Document Name	

Comment

1. Thank you for the opportunity to comment.

Likes 0	
Dislikes 0	

Response

Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments

Answer	
Document Name	

Comment

PGAE is curious why the SDT did not use the IEEE definition of an IBR and IBR Unit so there is alignment between NERC and IEEE? The difference does not appear to change the overall meaning but may lead to confusion/conflict down the road between product developers and compliance related tasks.

Likes 0	
Dislikes 0	

Response

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Devin Shines - PPL - Louisville Gas and Electric Co. - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
LG&E/KU thanks the DT for their work on this desperately needed definition. The suggested edits sharpen the proposed definition and reduce the risk of confusion regarding IBRs co-located with synchronous generators and separate IBRs sharing a point of interconnection. Most of these edits are believed to be non-substantive relative to the intent of the DT.	
Likes 0	
Dislikes 0	
Response	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Sing Tay - AES - AES Corporation - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	

Answer	
Document Name	
Comment	
AES Clean Energy believes that a definition for IBR Unit is still required. Currently, PRC-028 proposed Draft 4 has its own “IBR unit” definition within the standard in order to create the requirement language needed. Since other Standards are being revised or created to meet FERC Order 901, AES Clean Energy believes that having a NERC Glossary definition for IBR Unit will help maintain consistency between all the different Standards that will be applicable to IBRs. AES Clean Energy strongly recommends that NERC continues to pursue a definition for IBR Unit.	
Likes 0	
Dislikes 0	
Response	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	

Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Sean Steffensen - IDACORP - Idaho Power Company - 1	
Answer	
Document Name	
Comment	
IPC has concerns about removing the entire current definition of IBR Units. Will “IBR Unit” be defined somewhere else, or excluded altogether? IPC believes a broader definition of IBR (unit) is still necessary and would be helpful to the process.	
Likes 0	
Dislikes 0	
Response	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments

Project Name:	2020-06 Verifications of Models and Data for Generators | Draft 3 of IBR Definitions
Comment Period Start Date:	7/12/2024
Comment Period End Date:	8/12/2024
Associated Ballot(s):	2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan AB 3 OT 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) AB 3 DEF

There were 52 sets of responses, including comments from approximately 147 different people from approximately 100 companies representing 10 of the Industry Segments as shown in the table on the following pages.

All comments submitted can be reviewed in their original format on the project page.

If you feel that your comment has been overlooked, let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, contact Manager of Standards Information, Nasheema Santos (via email) or at (404) 446-2564.

Questions

1. Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support.

2. Provide any additional comments for the DT to consider, if desired.

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
MRO	Anna Martinson	1,2,3,4,5,6	MRO	MRO Group	Shonda McCain	Omaha Public Power District (OPPD)	1,3,5,6	MRO
					Michael Brytowski	Great River Energy	1,3,5,6	MRO
					Jamison Cawley	Nebraska Public Power District	1,3,5	MRO
					Jay Sethi	Manitoba Hydro (MH)	1,3,5,6	MRO
					Husam Al-Hadidi	Manitoba Hydro (System Performance)	1,3,5,6	MRO
					Kimberly Bentley	Western Area Power Administration	1,6	MRO
					Jaimin Patal	Saskatchewan Power Corporation (SPC)	1	MRO
					George Brown	Pattern Operators LP	5	MRO

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Larry Heckert	Alliant Energy (ALTE)	4	MRO
					Terry Harbour	MidAmerican Energy Company (MEC)	1,3	MRO
					Dane Rogers	Oklahoma Gas and Electric (OG&E)	1,3,5,6	MRO
					Seth Shoemaker	Muscatine Power & Water	1,3,5,6	MRO
					Michael Ayotte	ITC Holdings	1	MRO
					Andrew Coffelt	Board of Public Utilities- Kansas (BPU)	1,3,5,6	MRO
					Peter Brown	Invenergy	5,6	MRO
					Angela Wheat	Southwestern Power Administration	1	MRO
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
	Barbara Marion	5,6		Dominion	Victoria Crider	Dominion	3	NA - Not Applicable

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Dominion - Dominion Resources, Inc.					Barbara Marion	Dominion	5	NA - Not Applicable
					Sean Bodkin	Dominion	6	NA - Not Applicable
					Steven Belle	Dominion	1	NA - Not Applicable
Southwest Power Pool, Inc. (RTO)	Charles Yeung	2	MRO,NPCC,RF,SERC,SPP RE,Texas RE,WECC	SRC 2024	Charles Yeung	SPP	2	MRO
					Ali Miremadi	CAISO	1	WECC
					Bobbi Welch	Midcontinent ISO, Inc.	2	MRO
					Greg Campoli	NYISO	1	NPCC
					Matt Goldberg	ISO New England	2	NPCC
ACES Power Marketing	Jodirah Green	1,3,4,5,6	MRO,NPCC,RF,SERC,Texas RE,WECC	ACES Collaborators	Bob Soloman	Hoosier Energy Electric Cooperative	1	RF
					Kris Carper	Arizona Electric Power Cooperative, Inc.	1	WECC
					Jason Procuniar	Buckeye Power, Inc.	4	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Jolly Hayden	East Texas Electric Cooperative, Inc.	NA - Not Applicable	Texas RE
					Scott Brame	North Carolina Electric Membership Corporation	3,4,5	SERC
					Nick Fogleman	Prairie Power, Inc.	1,3	SERC
FirstEnergy - FirstEnergy Corporation	Mark Garza	4		FE Voter	Julie Severino	FirstEnergy - FirstEnergy Corporation	1	RF
					Aaron Ghodooshim	FirstEnergy - FirstEnergy Corporation	3	RF
					Robert Loy	FirstEnergy - FirstEnergy Solutions	5	RF
					Mark Garza	FirstEnergy-FirstEnergy	1,3,4,5,6	RF
					Stacey Sheehan	FirstEnergy - FirstEnergy Corporation	6	RF

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Michael Johnson	Michael Johnson		WECC	PG&E All Segments	Marco Rios	Pacific Gas and Electric Company	1	WECC
					Sandra Ellis	Pacific Gas and Electric Company	3	WECC
					Tyler Brun	Pacific Gas and Electric Company	5	WECC
DTE Energy - Detroit Edison Company	Mohamad Elhusseini	3,5		DTE Energy	Mohamad Elhusseini	DTE Energy	5	RF
					Patricia Ireland	DTE Energy	4	RF
					Marvin Johnson	DTE Energy - Detroit Edison Company	3	RF
Southern Company - Southern Company Services, Inc.	Pamela Hunter	1,3,5,6	SERC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Leslie Burke	Southern Company - Southern Company Generation	5	SERC
Black Hills Corporation	Rachel Schuldt	6		Black Hills Corporation - All Segments	Micah Runner	Black Hills Corporation	1	WECC
					Josh Combs	Black Hills Corporation	3	WECC
					Rachel Schuldt	Black Hills Corporation	6	WECC
					Carly Miller	Black Hills Corporation	5	WECC
					Sheila Suurmeier	Black Hills Corporation	5	WECC
Northeast Power Coordinating Council	Ruida Shu	1,2,3,4,5,6,7,8,9,10	NPCC	NPCC RSC	Gerry Dunbar	Northeast Power Coordinating Council	10	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Deidre Altobell	Con Edison	1	NPCC
					Michele Tondalo	United Illuminating Co.	1	NPCC
					Stephanie Ullah-Mazzuca	Orange and Rockland	1	NPCC
					Michael Ridolfino	Central Hudson Gas & Electric Corp.	1	NPCC
					Randy Buswell	Vermont Electric Power Company	1	NPCC
					James Grant	NYISO	2	NPCC
					Dermot Smyth	Con Ed - Consolidated Edison Co. of New York	1	NPCC
					David Burke	Orange and Rockland	3	NPCC
					Peter Yost	Con Ed - Consolidated Edison Co. of New York	3	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Salvatore Spagnolo	New York Power Authority	1	NPCC
					Sean Bodkin	Dominion - Dominion Resources, Inc.	6	NPCC
					David Kwan	Ontario Power Generation	4	NPCC
					Silvia Mitchell	NextEra Energy - Florida Power and Light Co.	1	NPCC
					Sean Cavote	PSEG	4	NPCC
					Jason Chandler	Con Edison	5	NPCC
					Tracy MacNicoll	Utility Services	5	NPCC
					Shivaz Chopra	New York Power Authority	6	NPCC
					Vijay Puran	New York State Department of Public Service	6	NPCC
					David Kiguel	Independent	7	NPCC
					Joel Charlebois	AESI	7	NPCC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Joshua London	Eversource Energy	1	NPCC
					Jeffrey Streifling	NB Power Corporation	1,4,10	NPCC
					Joel Charlebois	AESI	7	NPCC
					John Hastings	National Grid	1	NPCC
					Erin Wilson	NB Power	1	NPCC
					James Grant	NYISO	2	NPCC
					Michael Couchesne	ISO-NE	2	NPCC
					Kurtis Chong	IESO	2	NPCC
					Michele Pagano	Con Edison	4	NPCC
					Bendong Sun	Bruce Power	4	NPCC
					Carvers Powers	Utility Services	5	NPCC
					Wes Yeomans	NYSRC	7	NPCC
Dominion - Dominion Resources, Inc.	Sean Bodkin	6		Dominion	Victoria Crider	Dominion Energy	3	NA - Not Applicable
					Sean Bodkin	Dominion Energy	6	NA - Not Applicable

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Steven Belle	Dominion Energy	1	NA - Not Applicable
					Barbara Marion	Dominion Energy	5	NA - Not Applicable
Western Electricity Coordinating Council	Steven Rueckert	10		WECC	Steve Rueckert	WECC	10	WECC
					Curtis Crews	WECC	10	WECC
Tim Kelley	Tim Kelley		WECC	SMUD and BANC	Nicole Looney	Sacramento Municipal Utility District	3	WECC
					Charles Norton	Sacramento Municipal Utility District	6	WECC
					Wei Shao	Sacramento Municipal Utility District	1	WECC
					Foung Mua	Sacramento Municipal Utility District	4	WECC
					Nicole Goi	Sacramento Municipal Utility District	5	WECC

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
					Kevin Smith	Balancing Authority of Northern California	1	WECC

1. *Do you support the definition for IBR as proposed, or with non-substantive changes? If you do not support the definition as proposed, please explain the changes that, if made, would result in your support*.	
Sean Steffensen - IDACORP - Idaho Power Company - 1	
Answer	No
Document Name	
Comment	
Idaho Power Company believes a definition of an IBR Unit is still needed and would be a helpful addition. It also seems like keeping the last section of the original definition could serve useful as this detail was excluded from the new proposed definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response, the Drafting Team (DT) is considering using the term IBR Unit as a standard only definition for MOD-026. Other DTs can use the standard only definition approach as needed.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	No
Document Name	
Comment	
FirstEnergy supports EEI's proposed changes which state: **Inverter-Based Resource (IBR):** A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources to the BPS,** and fuel cell devices.	

In addition, FirstEnergy requests the DT provide a definition for Type 3 and Type 4 wind devices to ensure intent and applicability of compliance toward this definition.	
Likes 0	
Dislikes 0	
Response	
The DT considered adding this to the IBR definition, however decided against it due to Type 3 and Type 4 wind already being listed within the definition. An offshore wind IBR is still an IBR whether or not it is connected via an AC or HVDC cable. Further, the DT felt as though the discussion within the technical rationale was sufficient to explain that the HVDC terminals are part of the IBR in this case.	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	No
Document Name	
Comment	
Renewable generation must at some point cover Reactive Power if we are moving towards all renewable generation in the future. Due to this, Southern Indiana Gas & Electric, Company recommends adding “Reactive Power” to the definition.	
Likes 0	
Dislikes 0	
Response	
By requiring active capabilities the DT is referring to generating resources, and not transmission connected reactive resources. The DT includes the fact that an IBR produces reactive power, and does not define IBR by having to create reactive power.	
Devin Shines - PPL - Louisville Gas and Electric Co. - 1,3,5,6 - SERC,RF	
Answer	No
Document Name	
Comment	

LG&E/KU suggest the following revisions to the proposed definition, with a clean version of the edits provided at the bottom.

1. Describing an IBR as a “plant/facility” risks confusion around IBRs that are co-located with synchronous generators as components of a hybrid plant. Suggesting the more generic “generating resource”.
2. An IBR may consist of only one inverter. The definition should use “one or more device(s)” from IEEE Std 2800-2022 rather than the current “individual devices”.
3. The phrase “to the electric system” should be moved to the immediate context of exporting power through the power electronic interface.
4. The wording “at a common point of interconnection” risks confusion at locations where multiple IBRs share a point of interconnection. Here also it should be noted that the NERC IBR definition parallels the IEEE Std 2800-2022 definition of “IBR Plant” rather than “IBR”. In any case, it is recommended to use IEEE Std 2800-2022 wording: “operated by a common facility-level controller” (however, due to the use of “facility” in various NERC contexts, “facility-level” should be removed; it is also unnecessary as “common” already requires that the controller operates all devices).
5. The wording of the last sentence implies a plant with a BESS is an IBR. Again (see point 1), this risks confusion for IBRs that are co-located with synchronous generators as part of a hybrid plant. Only the IBR components should be defined as IBRs.

"A generating resource consisting of one or more device(s) capable of exporting Real Power through a power electronic interface to the electric system and operated by a common controller. Examples include, but are not limited to, solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system, and fuel cell generating resources."

Likes 0	
Dislikes 0	

Response

1. The DT had found that the plant/facility was the most fitting wording for the definition. The DT wanted to stay away from the NERC definition “Facility”
2. The DT agrees that IBR may only consist of one inverter, the definition does not exclude this.
3. Thank you for the comment and concern. The DT intent was for the whole facility connecting to the system.
4. The key part of the IBR definition is “operating together as a single resource at a common point of interconnection.” Please review the TR as that goes into more detail.
5. The DT BESS would be considered an IBR but a Hybrid IBR. The IBR language would apply to the BESS, please see the TR for further explanation.

Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF

Answer	No

Document Name	
Comment	
Duke Energy suggests the following modifications: Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together “through a common facility-level control system” “STRIKE” at a common point of interconnection to the electric system. The above enhancement will eliminate the vagueness of the phrase single resource at a point of interconnect. Using the "facility-level control system" prevents confusion of plant/facility since some locations may have a feeder bus with multiple GO's connecting to the feeder that feed to a single point of interconnect. Additionally, this modification would clarify that each plant/facility is responsible for their own PRC-028 thru -030 requirements, among others.	
Likes 0	
Dislikes 0	
Response	
DT believes the phrase “operated together as a single resource” is sufficiently clear. Please review the TR as that goes more into depth.	
Brian Van Gheem - Radian Generation - NA - Not Applicable - NA - Not Applicable	
Answer	No
Document Name	
Comment	
1. We believe the proposed definition should align with the Category 2 Generator Owner language recently added to the NERC Rules of Procedure. Instead of referencing “operated” and “point of interconnection to the electric system,” the definition of a Category 2 Generator Owner uses “delivering capacity” and “point of connection.” We propose the following definition in its place, “Plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s), such as an inverter or converter, delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV...” We believe such a definition could be applied to Category 1 Generator Owners with IBR Facilities as well. 2. We propose a minor, non-content modification to the definition. We recommend adding a comma after the word “interface(s)” to separate the word from the prepositional phrase.	
Likes 0	

Dislikes 0	
Response	
1. The DT decided the “capable of exporting Real Power” is preferable to “delivering such capacity”. The DT does not want to insert applicability into the definition and the DT does not want to add the phrase “voltage greater than or equal to 60 kV.” 2. The DT does not feel this is a necessary change.	
Jennifer Weber - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
The entire definition could be consolidated slightly for ease of reading and understanding. Example: Inverter-Based Resource (IBR): A plant/facility comprising of individual devices capable of exporting Real Power through power electronics e.g. inverters or converters. These devices operate collectively at a single connection point to the electric system. Examples include but are not limited to, solar photovoltaic (PV), Type 3 & 4 wind, battery energy storage system (BESS), and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Israel Perez - Israel Perez On Behalf of: Laura Somak, Salt River Project, 3, 6, 5, 1; Mathew Weber, Salt River Project, 3, 6, 5, 1; Thomas Johnson, Salt River Project, 3, 6, 5, 1; Timothy Singh, Salt River Project, 3, 6, 5, 1; - Israel Perez	
Answer	No
Document Name	
Comment	

Proposed Definition: A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT feels the proposed removed wording, "...and that are operated together as a single resource at a common point of interconnection to the electric system" is necessary for reliability in the IBR Definition.	
Scott Thompson - PNM Resources - Public Service Company of New Mexico - 1,3,5 - WECC	
Answer	No
Document Name	
Comment	
PNM agrees with the comment of EEI: **Inverter-Based Resource (IBR):** A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources to the BPS,** and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
Please see response to EEI's comment.	
LaTroy Brumfield - LaTroy Brumfield On Behalf of: Amy Wilke, American Transmission Company, LLC, 1; - LaTroy Brumfield	
Answer	No

Document Name	
Comment	
The definition should make clear that standalone HVDC facilities are not included in the definition. If the phrases, “plant/facility” are intended to do that, it could still be confusing as an HVDC could theoretically be called a facility. Adding the phrase, “from a primary energy source or energy storage system” to the definition might help make this more clear The suggested definition could read like the example below: Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power (active power) from a primary energy source or energy storage system through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, inverter-interfaced battery energy storage systems (BESS), and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please refer to the TR. The TR has a table of what qualifies as an IBR and what does not qualify. HVDC is listed in the “Not qualifying” as an IBR column.	
Rachel Coyne - Texas Reliability Entity, Inc. - 10	
Answer	Yes
Document Name	
Comment	
Texas RE recommends the drafting team consider using the terms generator or generator plant instead of the term “plant/facility”. Since Facility is a defined term, using lower-case facility could cause confusion. Texas RE inquires as to whether the term “turbines” should be added after the phrase “Type 3 and 4 wind.”	
Likes 0	

Dislikes 0	
Response	
The DT had found that the plant/facility was the most fitting wording for the definition. The DT wanted to stay away from the NERC definition "Facility." The DT felt the Glossary definition for Facility was too vague. Thank you for the concern, but the DT feels the wording is clear enough as stated.	
Rachel Schuldt - Black Hills Corporation - 6, Group Name Black Hills Corporation - All Segments	
Answer	Yes
Document Name	
Comment	
Black Hills Corporation supports the addition of the proposed IBR definition from the EEI that would provide improved clarity. That definition is as follows: **Inverter-Based Resource (IBR):** A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources,** and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
Please see response to EEI's comment.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	Yes
Document Name	
Comment	
No comments	
Likes 0	

Dislikes 0	
Response	
Thank you for the response.	
Cain Braveheart - Bonneville Power Administration - 1,3,5,6 - WECC	
Answer	Yes
Document Name	
Comment	
As BPA understands, power electronic interfaces are flexible. BPA believes adding "devices *capable* of exporting real power through a power electronic interface" would now include a broad spectrum of equipment that can produce electric power. BPA recommends revising the following language: **from**: "…consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s)…" **to**: "…consisting of individual devices that export Real Power through a power electronic interface(s)…"	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT is going to retain the current wording of the IBR definition as the change does not appear to be substantive or enhance the intent of the IBR definition.	
Tim Kelley - Tim Kelley On Behalf of: Charles Norton, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Foung Mua, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Kevin Smith, Balancing Authority of Northern California, 1; Nicole Looney, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Ryder Couch, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; Wei Shao, Sacramento Municipal Utility District, 3, 6, 4, 1, 5; - Tim Kelley, Group Name SMUD and BANC	
Answer	Yes

Document Name	
Comment	
SMUD and BANC support this definition for IBR but strongly feel that a definition for “IBR Unit” is needed to help drafting teams in future NERC Order 901 Work Plan Projects. The drafting team should consider adding the word “turbines” after “wind” and defining what Type 3 and Type 3 wind turbines are. Adding the word “turbines” is a non-substantive change and could be made in the final ballot.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response, the (DT) is considering using the term IBR Unit as a standard only definition for MOD-026. Other DTs can use the standard only definition approach as needed. Thank you for the suggestion the DT feels this change is not needed and the wording is clear as stated from posting.	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy	
Answer	Yes
Document Name	
Comment	
I have reviewed the proposed definition of IBR and support the proposed definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment and support.	
Hayden Maples - Hayden Maples On Behalf of: Jeremy Harris, Evergy, 3, 5, 1, 6; Kevin Frick, Evergy, 3, 5, 1, 6; Tiffany Lake, Evergy, 3, 5, 1, 6; - Evergy - 1,3,5,6 - MRO	
Answer	Yes

Document Name	
Comment	
Evergy supports and incorporates by reference the comments of the Edison Electric Institute (EEI) and Midwest Reliability Organization's NERC Standards Review Forum (MRO NSRF) on question 1	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please see the response to EEI's and NAGF's comment.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	
The NAGF supports the proposed IBR definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Anna Martinson - MRO - 1,2,3,4,5,6 - MRO, Group Name MRO Group	
Answer	Yes
Document Name	
Comment	
The NSRF supports the proposed IBR definition, but would request the standard drafting team consider the following non-substantive changes to improve clarity.	

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, on shore and off-shore wind and solar plants/facilities, Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the DT agrees that these changes are non-substantive and are not inclined to make these modifications.	
Alison MacKellar - Constellation - 5	
Answer	Yes
Document Name	
Comment	
Constellation aligns with the NAGF comments. Alison Mackellar on behalf of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please see the response to NAGF's comment.	
Kimberly Turco - Constellation - 6	
Answer	Yes
Document Name	
Comment	
Constellation aligns with NAGF comments.	

Kimberly Turco on behalf of Constellation Energy Segments 5 and 6.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, please see the response to NAGF's comment.	
Kristine Martz - Edison Electric Institute - NA - Not Applicable - NA - Not Applicable	
Answer	Yes
Document Name	
Comment	
EEI does not object to the revisions made to the proposed IBR definition but there are some non-substantive changes (in boldface text) that we feel would provide improved clarification of the intent of the definition. **Inverter-Based Resource (IBR):** A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together **through a common facility-level controller** as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), **VSC-HVDC systems used to connect off-shore renewable resources,** and fuel cell devices.	
Likes 0	
Dislikes 0	
Response	
The DT considered adding this to the IBR definition, however decided against it due to already listed Type 3 and Type 4 wind within the definition. An offshore wind IBR is still an IBR whether it is connected via an AC or HVDC cable. Further, the DT felt as though the discussion within the technical rationale was sufficient to explain that the HVDC terminals are part of the IBR in this case.	
Hillary Creurer - Allete - Minnesota Power, Inc. - 1	
Answer	Yes
Document Name	

Comment	
Minnesota Power supports the definition for IBR as proposed, but also supports EEI and MRO's NERC Standards Review Forum's (NSRF) suggestions to improve clarity.	
Likes 0	
Dislikes 0	
Response	
Please see the responses to EEI's and MRO NSRF's comments.	
Selene Willis - Edison International - Southern California Edison Company - 5	
Answer	Yes
Document Name	
Comment	
"Please see EEI Comments"	
Likes 0	
Dislikes 0	
Response	
Please see response to EEI's comment.	
Nick Leathers - Nick Leathers On Behalf of: David Jendras Sr, Ameren - Ameren Services, 3, 6, 1; - Nick Leathers	
Answer	Yes
Document Name	
Comment	
Ameren does not have any additional comments for consideration by the drafting team.	
Likes 0	

Dislikes 0	
Response	
Thank you for the comment.	
Carver Powers - Utility Services, Inc. - 4	
Answer	Yes
Document Name	
Comment	
1. Recommend clarifying “Type 3 and Type 4 wind” by including “turbine” after wind in the proposed IBR definition. 2. Without a clear definition of “power electronic interface(s)” it could be determined that it includes transformers which we believe is not the intent of this definition. Can the SDT provide clarity on what is and what is not a “power electronic interface(s)”	
Likes 0	
Dislikes 0	
Response	
1. Please see the response to Texas RE’s comment. 2. DT believes transformers are decidedly not power electronic interfaces.	
George E Brown - Pattern Operators LP - 5	
Answer	Yes
Document Name	
Comment	
Pattern Energy supports Midwest Reliability Organization’s NERC Standards Review Forum’s (MRO NSRF) comments on this question.	
Likes 0	
Dislikes 0	
Response	

Please see response to MRO's NSRF's comment.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	Yes
Document Name	
Comment	
It is the opinion of ACES that the inclusion of the phrase "plant/facility" within the proposed IBR definition introduces additional confusion into this definition. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that the term facility should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) to be consistent with other uses of this phrase within the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	
Response	
The DT believes the plant/facility is sufficiently described by what follows the term in the first sentence of the definition. There should not be confusion, but one can refer to the TR for further explanation.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	Yes
Document Name	
Comment	
AEPC signed on to ACES comments: It is the opinion of ACES that the inclusion of the phrase "plant/facility" within the proposed IBR definition introduces additional confusion into this definition. As this term is not explicitly defined, it allows for a considerable amount of interpretation by the industry. It is our opinion that the term facility should instead be included within the defined term itself (i.e., Inverter-Based Resource Facility) to be consistent with other uses of this phrase within the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	

Response	
Please see response to ACES's comment.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC,Texas RE,NPCC,SERC,RF, Group Name SRC 2024	
Answer	Yes
Document Name	
Comment	

The ISO/RTO Council (IRC) Standards Review Committee (SRC) supports the revised term, but notes that the deletion of "connected to the electric system" from the IBR definition, implies that the IBR term is not in and of itself applicable to BES or non-BES interconnections. Therefore, those reliability requirements applicable to IBRs will need to specify whether they apply to the new registration categories of "GO/GOP Category 1" and "GO/GOP Category 2" to complement the IBR definition. Any and all current and proposed standards applicable to IBR should be reviewed and updated to clarify their applicability.

In addition, the SRC proposes the changes in red below.

Inverter-Based Resource (IBR): *A plant/facility that includes one or more individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection{C}**[1]** to the electric system. Examples include, but are not limited to, plants/facilities with that include one or more solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.*

The SRC proposes that a definition or examples of what constitutes a "common point of interconnection" be provided (such as in a footnote) since this term is not defined in the NERC Glossary of Terms and it is unclear whether it refers to a transformer, a bus, or some other point of interconnection.

Illustrative examples are also useful to clarify how a hybrid plant, in which only a portion of the interconnected facility employs an inverter or converter, falls under the definition.

The SRC proposes that the language "one or more" be restored in the first sentence of the definition and added to the second sentence for clarity and consistency.

Finally, the SRC is concerned that the word "with" in the second sentence of the definition is unclear. Therefore, we propose replacing the word "with" with "that include."

Footnote: ISO NE is a party to these comments however does not support the comments provided in response to Q1.

Likes 0	

Dislikes 0	
Response	
The DT agrees to leave applicability to the specific Drafting Teams. DT believes the phrase “operated together as a single resource” is sufficiently clear. Please review the Technical Rationale (TR) as that goes more into depth. The drafting team agrees the definition by itself is not applicable to BES or non-BES interconnections as this is the intent of the language. Decisions about applicability are left to the standard drafting team using the definition. For example: BES-IBR, DER-IBR, BPS-IBR, Category 1 IBR, Category 2 IBR, etc. The DT also agrees that proposed standards will need to be reviewed for conformance. The DT views the wording of the second sentence as easy to understand and will retain the current wording.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	Yes
Document Name	
Comment	
ERCOT joins the comments submitted by the ISO/RTO Council (IRC) Standards Review Committee (SRC) and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Please see response to IRC SRC comment.	
Thomas Foltz - AEP - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	

Jessica Cordero - Unisource - Tucson Electric Power Co. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Sean Bodkin - Dominion - Dominion Resources, Inc. - 6, Group Name Dominion	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Barbara Marion - Dominion - Dominion Resources, Inc. - 5,6, Group Name Dominion	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the comment.	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Diana Aguas - CenterPoint Energy Houston Electric, LLC - 1 - Texas RE	
Answer	Yes
Document Name	
Comment	

Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Sing Tay - AES - AES Corporation - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Casey Jones - Berkshire Hathaway - NV Energy - 5 - WECC	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Stephen Stafford - Stephen Stafford On Behalf of: Greg Davis, Georgia Transmission Corporation, 1; - Stephen Stafford	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	

Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Mike Magruder - Avista - Avista Corporation - 1	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	

Response	
Thank you for the comment.	
Patricia Lynch - NRG - NRG Energy, Inc. - 5	
Answer	
Document Name	
Comment	
NRG Energy Inc is in support of the comments made by EPSA.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response please see response to EPSA.	
Martin Sidor - NRG - NRG Energy, Inc. - 5,6	
Answer	
Document Name	
Comment	
NRG agrees with the EPSA comments.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response please see response to EPSA.	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	
Document Name	

Comment	
ITC has no comments on the proposed definition for Project 2020-06.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	

2. *Provide any additional comments for the DT to consider, if desired*.	
Kyle Thomas - Elevate Energy Consulting - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
Elevate appreciates the opportunity to comment on the draft NERC standards, particularly those pertaining to future IBR NERC Reliability Standards, and FERC Order No. 901 directives. The IBR definition appears to be using IEEE 2800-2022 as a reference; however, there are notable differences between definitions. Most importantly, IEEE 2800-2022 is careful in its consideration of supplemental devices, defined as "any equipment within an IBR plant, which may or may not be inverter-based…" These could include capacitor banks, STATCOMs, harmonic filters, protection systems, plant-level controllers, etc., which should all be considered as part of the overall IBR facility. If the resource (or part of the resource) is deemed "IBR", then all applicable components that support that resource (such as those listed above) should be considered part of the IBR. We also would like to see the re-introduction of an IBR Unit definition, which we believe is necessary for meaningful standards applications. The difference between IBR Unit requirements/capabilities and IBR requirements/capabilities can be significant, so defining these two clearly is strongly encouraged. Creating an IBR Unit definition that matches the IEEE 2800 standard would help facilitate this process efficiently and is recommended for the definition.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Kennedy Meier - Electric Reliability Council of Texas, Inc. - 2	
Answer	
Document Name	
Comment	

ERCOT joins the comments submitted by the IRC SRC and adopts them as its own.	
Likes 0	
Dislikes 0	
Response	
Please see the response to IRC SRC's comment.	
Steven Rueckert - Western Electricity Coordinating Council - 10, Group Name WECC	
Answer	
Document Name	
Comment	
WECC voted yes but offers the following for consideration. WECC appreciates the efforts to provide a definition for Inverter-Based Resource (IBR). WECC asks if the DT is planning to provide some examples so that "misunderstanding" will be avoided when the definition is applied within Standards/Requirements? Compliance can create interesting arguments that ignore the reliability (and risk) concerns. It is understood that the registration candidate pool will be limited to the definition of Generator Operator and Generator Owner recently approved by FERC. The definitions did not use IBR directly and, instead, used "non-BES inverter based generating resources" (for Cat 2) and "generating Facility(ies)" for Cat 1. It is clear to WECC that the proposed IBR definition is applicable for Cat 1 and Cat 2 GOs and GOPs.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comments, DT has provided examples in the TR on this topic but did not want to create an exhaustive list within the definition. The drafting team agrees the definition by itself is not applicable to BES or non-BES interconnections as this was the intent of the language. Decisions about applicability are left to the standard drafting team using the definition. For example: BES-IBR, DER-IBR, BPS-IBR, Category 1 IBR, Category 2 IBR, etc. The drafting team also agrees that proposed standards will need to be reviewed for conformance.	
Charles Yeung - Southwest Power Pool, Inc. (RTO) - 2 - MRO,WECC,Texas RE,NPCC,SERC,RF, Group Name SRC 2024	
Answer	

Document Name	2020-06_IBR_Definition_Unofficial_Comment_Form_SRCFinal.docx

Comment

Concerns Associated with Removing the IBR Unit Definition

The SRC is aware of a draft **Standards Authorization Request (SAR)** entitled *Revisions to FAC-001-4 and FAC-002-4* that the **Inverter-Based Resource Performance Subcommittee (IRPS)** is currently composing that seeks to address modeling conformity. The SRC believes that this may require unit-level model validation and benchmarking (where the original manufacturer conducts laboratory tests to compare the actual equipment response to the modeled response) before models can be accurately applied at the plant/facility level. This may make the elimination of the IBR Unit definition problematic if this term will be needed when drafting future standard requirements.

See Purpose or Goal, bullet item #2 (on page 3):

2." …require Transmission Planners (TPs) and Planning Coordinators (PCs) to assess IBR plant capability and performance conformity for example through a combination of review of documentation, simulation studies, and physical tests that a newly interconnecting IBR complies with applicable IBR performance requirements."

See Purpose or Goal, paragraph (on page 4):

"Having a specific conformity assessment process (in addition to currently performed interconnection studies) will ensure that the TP and PC verify generator conformity with applicable interconnection requirements, preferably prior to IBR plant commissioning. Standard drafting team should consider FERC GIA/GIP requirements to determine an aligning timeline to resolve discrepancies in plant conformity. Enhancing current generator interconnection processes with clear conformity assessment processes will ensure that new BPS-connected IBR facilities are designed with the capabilities necessary for reliable operation."

Further, the SRC notes that existing NERC standards apply requirements at the unit level. For instance, **MOD-026, Requirement R2, Part 2.1** has unit-specific requirements for excitation control systems.

2.1. Each applicable unit's model shall be verified by the Generator Owner using one or more models acceptable to the Transmission Planner. Verification for individual units less than 20 MVA (gross nameplate rating) in a generating plant (per Section 4.2.1.2, 4.2.2.2, or 4.2.3.2) may be performed using either individual unit or aggregate unit model(s), or both. Each verification shall include the following: . . .

Similarly, **PRC-024, Section 4 Applicability, Part 4.2 Facilities**, **Part 4.2.1.4** includes individual dispersed power producing resource(s) as applicable facilities identified in Inclusion I4 of the BES Definition.

4.2.1.4 Individual dispersed power producing resource(s) identified in the BES Definition, Inclusion I4.

For these reasons, the SRC believes consideration should be given to retaining a definition of “IBR Unit” as it will engender common understanding and application of the term among Registered Entities. While an “IBR Unit” definition may not need to be finalized in this immediate project, there will likely be a need to complete this task in the future to align with developing frameworks.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response, however the (DT) is considering using the term IBR Unit as a standard only definition for MOD-026 at this time. Other DTs can use the standard only definition approach as needed.	
Jennifer Bray - Arizona Electric Power Cooperative, Inc. - 1	
Answer	
Document Name	
Comment	

AEPC signed on to ACES comments:

We at ACES applaud the SDT for the work that has been put into developing the IBR definition. We are greatly encouraged by the SDT’s willingness to heed industry feedback and implement changes to the IBR definition. However, it is the opinion of ACES that consolidating the IBR Unit and IBR Facility definitions into a single definition is a mistake.

It is the perspective of ACES that, without a way to clearly define what constitutes the individual devices of an IBR, each individual Standards Drafting Team is left to provide their own (potentially unique) definition. We believe that this will be a detriment to consistency and will potentially have a negative impact on compliance. We suggest utilizing terms and/or language already contained within the Glossary of Terms whenever possible. Thus, we recommend using the following terms to define these types of generating resources (a:

Inverter-Based Resource (IBR) Facility: One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of Interconnection.

Inverter-Based Resource (IBR) Unit: An individual generating resource capable of exporting electric power that uses a power electronic interface, such as an inverter or converter, and connects at a single point to a system designed primarily for delivering such electric power to a common point of

Interconnection (note: a system designed primarily for delivering such electric power to a common point of Interconnection is commonly referred to as a collector system). Thank you for the opportunity to comment.	
Likes 0	
Dislikes 0	
Response	
Please see response to ACES' comment.	
Jodirah Green - ACES Power Marketing - 1,3,4,5,6 - MRO,WECC,Texas RE,SERC,RF, Group Name ACES Collaborators	
Answer	
Document Name	
Comment	
We at ACES applaud the SDT for the work that has been put into developing the IBR definition. We are greatly encouraged by the SDT's willingness to heed industry feedback and implement changes to the IBR definition. However, it is the opinion of ACES that consolidating the IBR Unit and IBR Facility definitions into a single definition is a mistake. It is the perspective of ACES that, without a way to clearly define what constitutes the individual devices of an IBR, each individual Standards Drafting Team is left to provide their own (potentially unique) definition. We believe that this will be a detriment to consistency and will potentially have a negative impact on compliance. We suggest utilizing terms and/or language already contained within the Glossary of Terms whenever possible. Thus, we recommend using the following terms to define these types of generating resources (a: **Inverter-Based Resource (IBR) Facility:** One or more IBR Unit(s), and any associated Element(s) required for the operation thereof, connected to the electric system and operated as a single resource at a common point of Interconnection. **Inverter-Based Resource (IBR) Unit**: An individual generating resource capable of exporting electric power that uses a power electronic interface, such as an inverter or converter, and connects at a single point to a system designed primarily for delivering such electric power to a common point of Interconnection (note: a system designed primarily for delivering such electric power to a common point of Interconnection is commonly referred to as a collector system). Thank you for the opportunity to comment.	

Likes 0	
Dislikes 0	
Response	
The DT will consider this if the DT decides to create a standard only definition for IBR Unit. It was not the teams intention to combine IBR Unit and IBR Facility into the same the definition, the team is not using “Facility” in the definition but using the undefined “facility” term.	
George E Brown - Pattern Operators LP - 5	
Answer	
Document Name	
Comment	
Pattern Energy supports Midwest Reliability Organization’s NERC Standards Review Forum’s (MRO NSRF) comments on this question.	
Likes 0	
Dislikes 0	
Response	
Please see the response to MRO NSRFs comment.	
Ruida Shu - Northeast Power Coordinating Council - 1,2,3,4,5,6,7,8,9,10 - NPCC, Group Name NPCC RSC	
Answer	
Document Name	
Comment	
NPCC RSC supports the project.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	

Scott Thompson - PNM Resources - Public Service Company of New Mexico - 1,3,5 - WECC	
Answer	
Document Name	
Comment	
Any and all items listed items/assets in the proposed IBR definition should be defined and in the NERC Glossary of Terms.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment, the team did not want to make an limiting and exhaustive list within the definition, this information can be found in the TR.	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	
Document Name	
Comment	
Southern Company has no further comments.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Constantin Chitescu - Ontario Power Generation Inc. - 5	
Answer	
Document Name	
Comment	

OPG supports NPCC Regional Standards Committee's comments.	
Likes 0	
Dislikes 0	
Response	
Please see the response to NPCC's RS comment.	
Nick Leathers - Nick Leathers On Behalf of: David Jendras Sr, Ameren - Ameren Services, 3, 6, 1; - Nick Leathers	
Answer	
Document Name	
Comment	
Ameren does not have any additional comments for consideration by the drafting team.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Romel Aquino - Edison International - Southern California Edison Company - 3	
Answer	
Document Name	Project 2020-06 _ EEI Near Final Revised IBR Definition Draft 3 Rev 0a 8_06_2024.docx
Comment	
See comments submitted by the Edison Eclectic Institute in the attached file	
Likes 0	
Dislikes 0	
Response	

Thank you for the comments, please response to EEI's comment.	
Kimberly Turco - Constellation - 6	
Answer	
Document Name	
Comment	
Constellation has no additional comments Kimberly Turco on behalf of Constellation Energy Segments 5 and 6.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Gail Elliott - Gail Elliott On Behalf of: Michael Moltane, International Transmission Company Holdings Corporation, 1; - Gail Elliott	
Answer	
Document Name	
Comment	
ITC has no comments on the proposed definition for Project 2020-06.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Alison MacKellar - Constellation - 5	
Answer	
Document Name	

Comment	
Constellation has no additional comments. Alison Mackellar on behalf of Constellation Segments 5 and 6	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Wayne Sipperly - North American Generator Forum - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	
The NAGF has no additional comments.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Martin Sidor - NRG - NRG Energy, Inc. - 5,6	
Answer	
Document Name	
Comment	
NRG agrees with the EPSA comments.	
Likes 0	

Dislikes 0	
Response	
Please see EPSA comment for response.	
Mohamad Elhusseini - DTE Energy - Detroit Edison Company - 3,5, Group Name DTE Energy	
Answer	
Document Name	
Comment	
No other comments to provide.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Jennifer Weber - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	

Technical Rationale:

- Need to define the acronym “LCC” as, while it may be obvious to some, it isn’t necessarily known to all. Note that the definition of “VSC HVDC” should be moved up to the first time it’s used.
- Contains the term “IBR Unit,” which is no longer a defined term, and, as such, should not be included in the document.

Implementation Plan:

- The Background section contains the term “IBR Unit,” which is no longer a defined term, and, as such, should not be included in the document.
- The General Considerations section makes reference to multiple definitions, but there is only one (“IBR”) now.

Likes 0	
Dislikes 0	
Response	
Thank you for these comments, the team has made the conforming changes to the IP and TR regarding IBR Unit. The DT has made the TR conforming changes.	
Brian Van Gheem - Radian Generation - NA - Not Applicable - NA - Not Applicable	
Answer	
Document Name	
Comment	
1. Thank you for the opportunity to comment.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Michael Johnson - Michael Johnson On Behalf of: Marco Rios, Pacific Gas and Electric Company, 3, 1, 5; Sandra Ellis, Pacific Gas and Electric Company, 3, 1, 5; Tyler Brun, Pacific Gas and Electric Company, 3, 1, 5; - Michael Johnson, Group Name PG&E All Segments	
Answer	
Document Name	
Comment	
PGAE is curious why the SDT did not use the IEEE definition of an IBR and IBR Unit so there is alignment between NERC and IEEE? The difference does not appear to change the overall meaning but may lead to confusion/conflict down the road between product developers and compliance related tasks.	
Likes 0	
Dislikes 0	

Response	
The DT does align the NERC IBR definition with IEEE 2800 definition, but the NERC definition only applies to NERC standards.	
Andy Thomas - Duke Energy - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
None.	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Devin Shines - PPL - Louisville Gas and Electric Co. - 1,3,5,6 - SERC,RF	
Answer	
Document Name	
Comment	
LG&E/KU thanks the DT for their work on this desperately needed definition. The suggested edits sharpen the proposed definition and reduce the risk of confusion regarding IBRs co-located with synchronous generators and separate IBRs sharing a point of interconnection. Most of these edits are believed to be non-substantive relative to the intent of the DT.	
Likes 0	
Dislikes 0	
Response	
Thank you for the support.	
Anna Todd - Southern Indiana Gas and Electric Co. - 3,5,6 - RF	
Answer	

Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Sing Tay - AES - AES Corporation - 5 - MRO,WECC,Texas RE,NPCC,SERC,RF	
Answer	
Document Name	
Comment	
AES Clean Energy believes that a definition for IBR Unit is still required. Currently, PRC-028 proposed Draft 4 has its own "IBR unit" definition within the standard in order to create the requirement language needed. Since other Standards are being revised or created to meet FERC Order 901, AES Clean Energy believes that having a NERC Glossary definition for IBR Unit will help maintain consistency between all the different Standards that will be applicable to IBRs. AES Clean Energy strongly recommends that NERC continues to pursue a definition for IBR Unit.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response, however the (DT) is considering using the term IBR Unit as a standard only definition for MOD-026 at this time. Other DTs can use the standard only definition approach as needed. PRC-028 is including IBR Unit in a footnote.	
Mark Garza - FirstEnergy - FirstEnergy Corporation - 4, Group Name FE Voter	
Answer	
Document Name	
Comment	

None	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Srikanth Chennupati - Entergy - Entergy Services, Inc. - 1,3,5,6 - SERC	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Daniela Atanasovski - APS - Arizona Public Service Co. - 1	
Answer	
Document Name	
Comment	
None	
Likes 0	
Dislikes 0	
Response	

Thank you for the comment.	
Donna Wood - Tri-State G and T Association, Inc. - 1	
Answer	
Document Name	
Comment	
N/A	
Likes 0	
Dislikes 0	
Response	
Thank you for the comment.	
Sean Steffensen - IDACORP - Idaho Power Company - 1	
Answer	
Document Name	
Comment	
IPC has concerns about removing the entire current definition of IBR Units. Will “IBR Unit” be defined somewhere else, or excluded altogether? IPC believes a broader definition of IBR (unit) is still necessary and would be helpful to the process.	
Likes 0	
Dislikes 0	
Response	
Thank you for the response, however the (DT) is considering using the term IBR Unit as a standard only definition for MOD-026 at this time. Other DTs can use the standard only definition approach as needed.	

End of Report

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

UPDATED
Standards Announcement
Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Term

Formal Comment Period Open through August 12, 2024

Now Available

A formal comment period for the **Inverter-based Resource Glossary Term** is open through **8 p.m. Eastern, Monday, August 12, 2024**.

The standard drafting team's considerations of the responses received from the previous comment period are reflected in this draft of the definition.

Reminder Regarding Corporate RBB Memberships
Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Commenting
Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps
Additional ballots will be conducted **August 2-12, 2024**.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Josh Blume (via email) or at 404-446-2593. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Inverter-based Resource Glossary Term

Formal Comment Period Open through August 13, 2024

Now Available

A formal comment period for the **Inverter-based Resource Glossary Term** is open through **8 p.m. Eastern, Tuesday, August 13, 2024**.

The standard drafting team's considerations of the responses received from the previous comment period are reflected in this draft of the definition.

Reminder Regarding Corporate RBB Memberships

Under the NERC Rules of Procedure, each entity and its affiliates is collectively permitted one voting membership per Registered Ballot Body Segment. Each entity that undergoes a change in corporate structure (such as a merger or acquisition) that results in the entity or affiliated entities having more than the one permitted representative in a particular Segment must withdraw the duplicate membership(s) prior to joining new ballot pools or voting on anything as part of an existing ballot pool. Contact ballotadmin@nerc.net to assist with the removal of any duplicate registrations.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments. An unofficial Word version of the comment form is posted on the project page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

Additional ballots will be conducted **August 2-13, 2024**.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Josh Blume (via email) or at 404-446-2593. Subscribe to this project's observer mailing list by selecting "NERC Email Distribution Lists" from the "Service" drop-down menu and specify “Project 2020-06 Verifications of Models and Data for Generators Observer List” in the Description Box.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/337)
Ballot Name: 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) AB 3 DEF
Voting Start Date: 8/2/2024 12:01:00 AM
Voting End Date: 8/12/2024 8:00:00 PM
Ballot Type: DEF
Ballot Activity: AB
Ballot Series: 3
Total # Votes: 241
Total Ballot Pool: 282
Quorum: 85.46
Quorum Established Date: 8/12/2024 3:52:35 PM
Weighted Segment Value: 91.57

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	47	0.887	6	0.113	0	13	8
Segment: 2	8	0.8	8	0.8	0	0	0	0	0
Segment: 3	57	1	42	0.894	5	0.106	0	2	8
Segment: 4	17	1	12	0.923	1	0.077	0	2	2
Segment: 5	72	1	45	0.9	5	0.1	1	8	13
Segment: 6	47	1	30	0.857	5	0.143	0	2	10
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	7	0.6	6	0.6	0	0	0	1	0
Totals:	282	6.4	190	5.861	22	0.539	1	28	41

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Affirmative	N/A
1	Ameren - Ameren Services	Tamara Evey		Affirmative	N/A
1	American Transmission Company, LLC	Amy Wilke	LaTroy Brumfield	Negative	Comments Submitted
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Affirmative	N/A
1	Arkansas Electric Cooperative Corporation	Emily Corley		None	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		None	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Abstain	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Affirmative	N/A
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Abstain	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Affirmative	N/A
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Affirmative	N/A
1	Dominion - Dominion Virginia Power	Steven Belle		Affirmative	N/A
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Hayden Maples	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Negative	Comments Submitted
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Affirmative	N/A
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		Abstain	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Lincoln Electric System	Josh Johnson		Affirmative	N/A
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		None	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	None	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard		Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Affirmative	N/A
1	National Grid USA	Michael Jones		Abstain	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Affirmative	N/A
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Affirmative	N/A
1	Omaha Public Power District	Doug Peterchuck		Affirmative	N/A
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		None	N/A
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Affirmative	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		Abstain	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Negative	Comments Submitted
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		None	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Laura Somak	Israel Perez	Negative	Comments Submitted
1	Santee Cooper	Chris Wagner		Affirmative	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Affirmative	N/A
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell		Affirmative	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Affirmative	N/A
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Affirmative	N/A
3	AEP	Leshel Hutchings		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr	Nick Leathers	Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Negative	Comments Submitted
3	BC Hydro and Power Authority	Ming Jiang		Abstain	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Affirmative	N/A
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	Affirmative	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		None	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Victoria Crider		Affirmative	N/A
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A
3	Entergy	James Keele		Affirmative	N/A
3	Evergy	Marcus Moor		Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		None	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Affirmative	N/A
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Lakeland Electric	Steven Marshall		None	N/A
3	Lincoln Electric System	Sam Christensen		Affirmative	N/A
3	Los Angeles Department of Water and Power	Fausto Serratos		None	N/A
3	Manitoba Hydro	Mike Smith	Stephen Sines	None	N/A
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Affirmative	N/A
3	Muscatine Power and Water	Seth Shoemaker		Affirmative	N/A
3	National Grid USA	Brian Shanahan		Abstain	N/A
3	Nebraska Public Power District	Tony Eddleman		Affirmative	N/A
3	New York Power Authority	Richard Machado		Affirmative	N/A
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Affirmative	N/A
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Affirmative	N/A
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Affirmative	N/A
3	OTP - Otter Tail Power Company	Wendi Olson		Affirmative	N/A
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Affirmative	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Negative	Comments Submitted
3	Santee Cooper	Vicky Budreau		Affirmative	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Negative	Comments Submitted
3	Tennessee Valley Authority	Ian Grant		Negative	Comments Submitted
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Affirmative	N/A
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Affirmative	N/A
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Negative	Comments Submitted
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Affirmative	N/A
4	Northern California Power Agency	Marty Hostler		None	N/A
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho		Affirmative	N/A
4	Utility Services, Inc.	Carver Powers		Affirmative	N/A
4	WEC Energy Group, Inc.	Matthew Beilfuss		Affirmative	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		Affirmative	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		None	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Abstain	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		None	N/A
5	Black Hills Corporation	Sheila Suurmeier		Affirmative	N/A
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Affirmative	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Michelle Pagano		Affirmative	N/A
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Affirmative	N/A
5	Decatur Energy Center LLC	Megan Melham		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Entergy - Entergy Services, Inc.	Gail Golden		Affirmative	N/A
5	Evergy	Jeremy Harris	Hayden Maples	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Negative	Comments Submitted
5	Great River Energy	Jacalynn Bentz		Affirmative	N/A
5	Greybeard Compliance Services, LLC	Mike Gabriel		None	N/A
5	Hydro-Quebec (HQ)	Junji Yamaguchi	Chantal Mazza	Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Affirmative	N/A
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Abstain	N/A
5	National Grid USA	Robin Berry		Abstain	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Affirmative	N/A
5	New York Power Authority	Zahid Qayyum		Affirmative	N/A
5	NextEra Energy	Richard Vendetti		Negative	No Comment Submitted
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Affirmative	N/A
5	Northern California Power Agency	Jeremy Lawson		None	N/A
5	NRG - NRG Energy, Inc.	Patricia Lynch		Abstain	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Affirmative	N/A
5	Omaha Public Power District	Kayleigh Wilkerson		None	N/A
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Affirmative	N/A
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Affirmative	N/A
5	Platte River Power Authority	Jon Osell		Affirmative	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Salt River Project	Thomas Johnson	Israel Perez	Negative	Comments Submitted
5	Santee Cooper	Carey Salisbury		Affirmative	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Negative	Comments Submitted
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	Comments Submitted
5	TransAlta Corporation	Ashley Scheelar		None	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Michelle Hribar		Affirmative	N/A
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Affirmative	N/A
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Cleco Corporation	Robert Hirchak		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Affirmative	N/A
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Affirmative	N/A
6	Evergy	Tiffany Lake	Hayden Maples	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		None	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Los Angeles Department of Water and Power	Anton Vu		None	N/A
6	Manitoba Hydro	Brandin Stoesz		None	N/A
6	Muscatine Power and Water	Nicholas Burns		None	N/A
6	New York Power Authority	Shelly Dineen		Affirmative	N/A
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Affirmative	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		None	N/A
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Affirmative	N/A
6	Omaha Public Power District	Shonda McCain		Affirmative	N/A
6	Platte River Power Authority	Sabrina Martz		Affirmative	N/A
6	Portland General Electric Co.	Stefanie Burke		Abstain	N/A
6	Powerex Corporation	Raj Hundal		Abstain	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Negative	Comments Submitted
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Robert Witham		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Negative	Comments Submitted
6	Santee Cooper	Marty Watson		Affirmative	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Negative	Comments Submitted
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	Comments Submitted
6	WEC Energy Group, Inc.	David Boeshaar		Affirmative	N/A
6	Western Area Power Administration	Jennifer Neville		Affirmative	N/A
6	Xcel Energy, Inc.	Steve Szablya		Affirmative	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	New York State Reliability Council	Wesley Yeomans		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman	Greg Sorenson	Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Showing 1 to 282 of 282 entries

BALLOT RESULTS

Comment: View Comment Results (/CommentResults/Index/337)
Ballot Name: 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan AB 3 OT
Voting Start Date: 8/2/2024 12:01:00 AM
Voting End Date: 8/12/2024 8:00:00 PM
Ballot Type: OT
Ballot Activity: AB
Ballot Series: 3
Total # Votes: 238
Total Ballot Pool: 280
Quorum: 85
Quorum Established Date: 8/12/2024 3:53:04 PM
Weighted Segment Value: 92.45

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	48	0.889	6	0.111	0	12	8
Segment: 2	8	0.8	8	0.8	0	0	0	0	0
Segment: 3	57	1	43	0.915	4	0.085	0	2	8
Segment: 4	17	1	11	0.917	1	0.083	0	2	3
Segment: 5	72	1	47	0.922	4	0.078	0	8	13
Segment: 6	46	1	30	0.882	4	0.118	0	2	10
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	6	0.5	5	0.5	0	0	0	1	0
Totals:	280	6.3	192	5.824	19	0.476	0	27	42

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Affirmative	N/A
1	Ameren - Ameren Services	Tamara Evey		Affirmative	N/A
1	American Transmission Company, LLC	Amy Wilke	LaTroy Brumfield	Negative	Comments Submitted
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Affirmative	N/A
1	Arkansas Electric Cooperative Corporation	Emily Corley		None	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		None	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Abstain	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Affirmative	N/A
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Affirmative	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Affirmative	N/A
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Affirmative	N/A
1	Dominion - Dominion Virginia Power	Steven Belle		Affirmative	N/A
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	Comments Submitted
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Hayden Maples	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Negative	Comments Submitted
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Affirmative	N/A
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		Abstain	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Lincoln Electric System	Josh Johnson		Affirmative	N/A
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A
1	Los Angeles Department of Water and Power	faranak sarbaz		None	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu	Jay Sethi	None	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard		Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Affirmative	N/A
1	National Grid USA	Michael Jones		Abstain	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Affirmative	N/A
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Affirmative	N/A
1	Omaha Public Power District	Doug Peterchuck		Affirmative	N/A
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		None	N/A
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		None	N/A
1	Platte River Power Authority	Marissa Archie		Affirmative	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		Abstain	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Negative	Comments Submitted
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		None	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Laura Somak	Israel Perez	Negative	Comments Submitted
1	Santee Cooper	Chris Wagner		Affirmative	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Affirmative	N/A
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell		Affirmative	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Abstain	N/A
1	Tennessee Valley Authority	David Plumb		Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Affirmative	N/A
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Affirmative	N/A
3	AEP	Leshel Hutchings		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr	Nick Leathers	Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Negative	Comments Submitted
3	BC Hydro and Power Authority	Ming Jiang		Abstain	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Affirmative	N/A
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	Affirmative	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		None	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Victoria Crider		Affirmative	N/A
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	Comments Submitted
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A
3	Entergy	James Keele		Affirmative	N/A
3	Evergy	Marcus Moor		Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		None	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Affirmative	N/A
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Lakeland Electric	Steven Marshall		None	N/A
3	Lincoln Electric System	Sam Christensen		Affirmative	N/A
3	Los Angeles Department of Water and Power	Fausto Serratos		None	N/A
3	Manitoba Hydro	Mike Smith	Stephen Sines	None	N/A
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Affirmative	N/A
3	Muscatine Power and Water	Seth Shoemaker		Affirmative	N/A
3	National Grid USA	Brian Shanahan		Abstain	N/A
3	Nebraska Public Power District	Tony Eddleman		Affirmative	N/A
3	New York Power Authority	Richard Machado		Affirmative	N/A
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Affirmative	N/A
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Affirmative	N/A
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Affirmative	N/A
3	OTP - Otter Tail Power Company	Wendi Olson		Affirmative	N/A
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Affirmative	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Negative	Comments Submitted
3	Santee Cooper	Vicky Budreau		Affirmative	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Negative	Comments Submitted
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Affirmative	N/A
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Affirmative	N/A
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Negative	Comments Submitted
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Affirmative	N/A
4	Northern California Power Agency	Marty Hostler		None	N/A
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho		Affirmative	N/A
4	Utility Services, Inc.	Carver Powers		Affirmative	N/A
4	WEC Energy Group, Inc.	Matthew Beilfuss		None	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		Affirmative	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		None	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Abstain	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		None	N/A
5	Black Hills Corporation	Sheila Suurmeier		Affirmative	N/A
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Affirmative	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Michelle Pagano		Affirmative	N/A
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Affirmative	N/A
5	Decatur Energy Center LLC	Megan Melham		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Negative	Comments Submitted
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Entergy - Entergy Services, Inc.	Gail Golden		Affirmative	N/A
5	Evergy	Jeremy Harris	Hayden Maples	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Negative	Comments Submitted
5	Great River Energy	Jacalynn Bentz		Affirmative	N/A
5	Greybeard Compliance Services, LLC	Mike Gabriel		None	N/A
5	Hydro-Quebec (HQ)	Junji Yamaguchi	Chantal Mazza	Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Affirmative	N/A
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Abstain	N/A
5	National Grid USA	Robin Berry		Abstain	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Affirmative	N/A
5	New York Power Authority	Zahid Qayyum		Affirmative	N/A
5	NextEra Energy	Richard Vendetti		Affirmative	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Affirmative	N/A
5	Northern California Power Agency	Jeremy Lawson		None	N/A
5	NRG - NRG Energy, Inc.	Patricia Lynch		Abstain	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Affirmative	N/A
5	Omaha Public Power District	Kayleigh Wilkerson		None	N/A
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Affirmative	N/A
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Affirmative	N/A
5	Platte River Power Authority	Jon Osell		Affirmative	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Negative	Comments Submitted

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Santee Cooper	Carey Salisbury		Affirmative	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Affirmative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	Comments Submitted
5	TransAlta Corporation	Ashley Scheelar		None	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Michelle Hribar		Affirmative	N/A
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Affirmative	N/A
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Affirmative	N/A
6	Duke Energy	John Sturgeon		Negative	Comments Submitted
6	Entergy	Julie Hall		Affirmative	N/A
6	Evergy	Tiffany Lake	Hayden Maples	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		None	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		None	N/A
6	Los Angeles Department of Water and Power	Anton Vu		None	N/A
6	Manitoba Hydro	Brandin Stoesz		None	N/A
6	Muscatine Power and Water	Nicholas Burns		None	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	New York Power Authority	Shelly Dineen		Affirmative	N/A
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Affirmative	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		None	N/A
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Affirmative	N/A
6	Omaha Public Power District	Shonda McCain		Affirmative	N/A
6	Platte River Power Authority	Sabrina Martz		Affirmative	N/A
6	Portland General Electric Co.	Stefanie Burke		Abstain	N/A
6	Powerex Corporation	Raj Hundal		Abstain	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Negative	Comments Submitted
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Robert Witham		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Negative	Comments Submitted
6	Santee Cooper	Marty Watson		Affirmative	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	Comments Submitted
6	WEC Energy Group, Inc.	David Boeshaar		Affirmative	N/A
6	Western Area Power Administration	Jennifer Neville		Affirmative	N/A
6	Xcel Energy, Inc.	Steve Szablya		Affirmative	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman	Greg Sorenson	Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 280 of 280 entries

Description of Current Draft

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024
45-day formal comment period with additional ballot	February 22 – April 8, 2024
Standards Committee approved Standards Authorization Request (SAR)	May 15, 2024
30-day formal comment period with additional ballot	June 21 – July 22, 2024

Anticipated Actions	Date
NERC Board adoption	October 8-9, 2024

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The term proposed below is intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

Version History

Version	Date	Action	Change Tracking
1	TBD	New IBR Definition	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource Definition

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definition must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the drafting team (DT) that would coalesce development efforts for the definition and coordinate proposed definition with the other NERC developers. The DT proposes the definition of IBR to be used in Reliability Standard MOD-026-2, as well as other IBR related standards development projects.

General Considerations

Multiple standards in development will use the definition, and the proposed implementation timeframe is intended to reflect that any one of those standards may be the first to use the definition. Additionally, this implementation plan only affects the date that this new definition will become an effective term in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use the proposed definition.

Effective Date

The effective date(s) for the proposed definition for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed definition shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the definition, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed definition shall become effective on the first day of the first calendar quarter after the date the definition are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

Description of Current Draft

Completed Actions	Date
Standards Committee approved Standards Authorization Request (SAR)	September 24, 2020
SAR posted for comment	December 16, 2020 – January 14, 2021
45-day formal comment period with initial ballot	November 16, 2023 – January 9, 2024
45-day formal comment period with additional ballot	February 22 – April 8, 2024
Standards Committee approved Standards Authorization Request (SAR)	May 15, 2024
30-day formal comment period with additional ballot	July 12 – August 12, 2024

Anticipated Actions	Date
10-day final ballot	September 3 – September 12, 2024
NERC Board adoption	October 8-9, 2024

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. The term proposed below is intended to be used in MOD-026-2 and other inverter-based resource related standards.

Term(s):

Inverter-Based Resource (IBR): A plant/facility consisting of individual devices that are capable of exporting Real Power through a power electronic interface(s) such as an inverter or converter, and that are operated together as a single resource at a common point of interconnection to the electric system. Examples include, but are not limited to, plants/facilities with solar photovoltaic (PV), Type 3 and Type 4 wind, battery energy storage system (BESS), and fuel cell devices.

Version History

Version	Date	Action	Change Tracking
1	TBD	New IBR Definition	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource Definition

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definition must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the drafting team (DT) that would coalesce development efforts for the definition and coordinate proposed definition with the other NERC developers. The DT proposes the definition of IBR to be used in Reliability Standard MOD-026-2, as well as other IBR related standards development projects.

General Considerations

Multiple standards in development will use the definition, and the proposed implementation time frame is intended to reflect that any one of those standards may be the first to use the definition. Additionally, this implementation plan only affects the date that this new definition will become an effective term in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use the proposed definition.

Effective Date

The effective date(s) for the proposed definition for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed definition shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the definition, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed definition shall become effective on the first day of the first calendar quarter after the date the definition are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Implementation Plan

Project 2020-06 Verifications of Models and Data for Generators
Inverter-Based Resource Definition

Applicable Standard(s)

- None

Requested Retirement(s)

- None

Prerequisite Standard(s)

These standard(s) or definition must be approved before the Applicable Standard becomes effective:

- None

Applicable Entities

- None

New/Modified/Retired Terms in the NERC Glossary of Terms

- Inverter-Based Resource (IBR)

Background

As multiple standards development projects are actively addressing risks related to inverter-based generation, NERC evaluated the need for a single standards project to move forward with definitions that would be leveraged by all other projects. Project 2020-06 was identified as the drafting team (DT) that would coalesce development efforts for ~~these definitions~~the definition and coordinate proposed ~~definitions~~definition with the other NERC developers. The DT proposes the ~~two definitions~~definition of IBR ~~and IBR Unit~~ to be used in Reliability Standard ~~MOD026-2~~MOD-026-2, as well as other IBR~~–~~ related standards development projects.

General Considerations

Multiple standards in development will use the definition~~(s)~~, and the proposed implementation time frame is intended to reflect that any one of those standards may be the first to use ~~one or more of~~ the ~~definitions~~definition. Additionally, this implementation plan only affects the date that ~~these~~this new ~~definitions~~definition will become an effective ~~terms~~term in the NERC Glossary of Terms. A separate implementation plan will be developed for MOD-026-2, including requirements that use ~~these~~the proposed ~~definitions~~definition.

Effective Date

The effective date(s) for the proposed ~~definitions~~definition for Glossary of Terms are provided below.

Where approval by an applicable governmental authority is required, the proposed ~~definitions~~definition shall become effective on the first day of the first calendar quarter after the applicable governmental authority's order approving the ~~definitions~~definition, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the proposed ~~definitions~~definition shall become effective on the first day of the first calendar quarter after the date the ~~definitions~~definition are adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Technical Rationale

Project 2020-06 Verification of Models and Data for Generators
IBR Definition | August 2024

Inverter-based Resource Definition

The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted, as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions. The DT also used recent FERC and NERC documents, which included inverter-based resource related terms and descriptions, as the basis for the IBR definitions.

The IBR definition is intended to describe technologies that shall be considered IBR. An IBR is defined by technology, thus voltage connection level (kV), facility capability level (MW/MVA), or other factors do not impact the inclusion as an IBR. An IBR can be connected to any part the transmission system, sub-transmission system, or distribution system. For Reliability Standards that use the IBR term, the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable. Each of these Reliability Standards, including the Applicability Section(s) will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section. For example, an Applicability Section may specify that IBR Facilities (BES), IBRs that are owned by a Generator Owner (Category 2), or IBRs that are operated by a Generator Operator (Category 2), are considered applicable.

IBRs have commonly been referred to as “generating resources.” An IBR is not a HVDC system (except for a high-voltage direct current (VSC HVDC) with a dedicated connection to an IBR, as this is part of the IBR facility), stand-alone flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. A list of IBRs is provided in Table 1 below.

IBRs may include any hybrid combination of IBR types (e.g., BESS and solar PV). IBRs also include co-located portions of a facility that are IBR technologies (e.g., a BESS, which is co-located at synchronous generation facility), see table below.

Examples	
IBR	**Not an IBR**
• Solar photovoltaic • Type 3 wind • Type 4 wind • Battery energy storage system (BESS) • Fuel cell(s) • Hybrid combination of IBRs • Portions of co-located facility that are IBR • VSC HVDC with dedicated connection to IBR • This is not an all-inclusive list.	• Stand-alone FACTS device (e.g., STATCOM or SVC) • Flywheels • Synchronous generator • Synchronous condenser • VSC HVDC • Line-Commutated Converters (LCC) HVDC • This is not an all-inclusive list.

An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.

Figure 1 shows an example diagram of an IBR. The IBR (red box) includes the devices (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the IBR plant. If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system is part of the IBR.

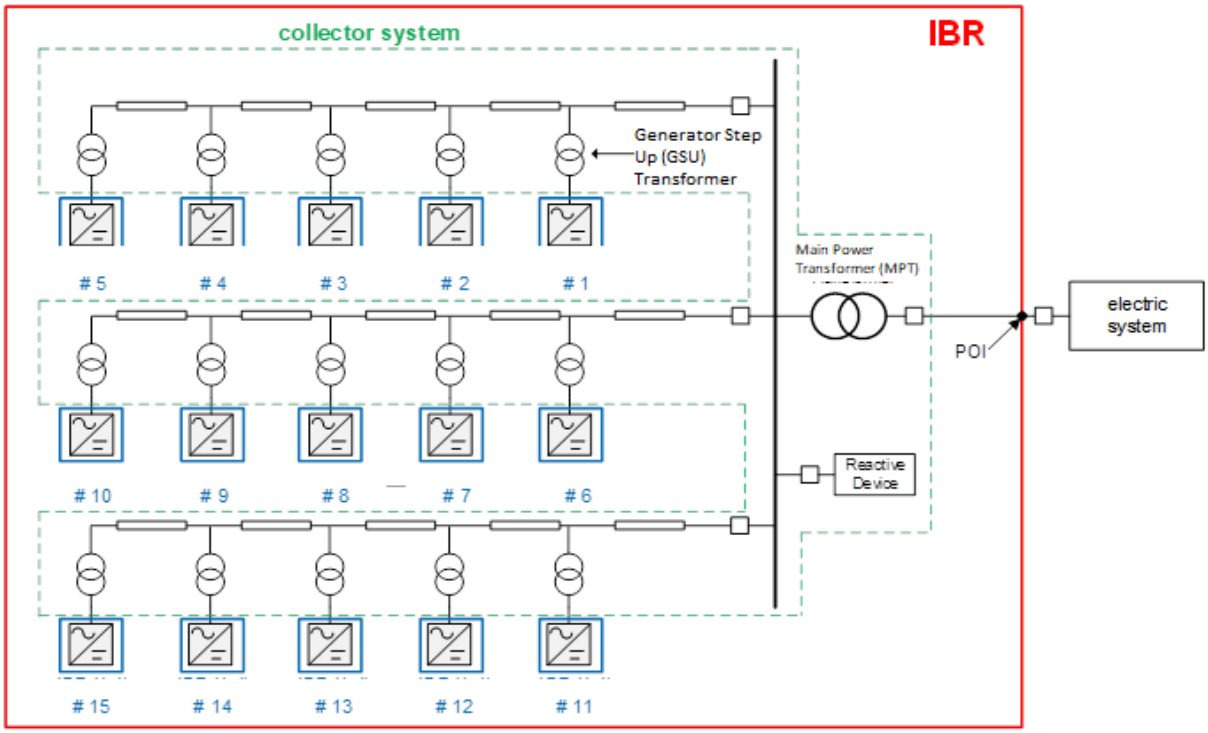

Figure 1 Example diagram of an IBR depicting the IBR (red box), collector system (green box), and devices (blue boxes).

The inclusion of 'capable of exporting Real Power' is to clarify that loads connected to the electric system via power electronics are not IBRs. IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power. The DT contemplated adding the phrase "may also be capable of providing Reactive Power" in the definition(s). However, the DT believed this may be misinterpreted that IBRs include technologies such as FACTS devices or HVDC.

Battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. Within each Reliability Standard, a DT may draft operating mode-specific Requirements, as needed.

The Project 2020-06 DT intends to use the Glossary Term of IBR for MOD-026-2. Additional standard development projects and related standards that may use this defined term include:

- Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)

- Project 2021-01 Modifications to PRC-019 and MOD-025
- Project 2021-04 Modifications to PRC-002 (new PRC-028)
- Project 2022-04 EMT Modeling
- Project 2023-01 EOP-004 IBR Event Reporting
- Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues (new PRC-030)

Distributed Energy Resources (DER) related projects that may or may not need to use IBR (if they end up with their own definition)

- Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
- Project 2023-05 Modifications to FAC-001 and FAC-002 (DER)
- Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Technical Rationale

Project 2020-06 Verification of Models and Data for Generators
IBR Definition | August 2024

Inverter-based Resource Definition

The drafting team (DT) utilized the IEEE 2800-2022 definitions as an initial basis for the inverter-based resource terms for the NERC Glossary of Terms and adjusted, as necessary. The DT acknowledges the efforts of the P2800 Wind and Solar Plant Interconnection Performance Working Group and IEEE members in developing those definitions. The DT also used recent FERC and NERC documents, which included inverter-based resource related terms and descriptions, as the basis for the IBR definitions.

The IBR definition is intended to describe technologies that shall be considered IBR. An IBR is defined by technology, thus voltage connection level (kV), facility capability level (MW/MVA), or other factors do not impact the inclusion as an IBR. An IBR can be connected to any part the transmission system, sub-transmission system, or distribution system. For Reliability Standards that use the IBR term, the Applicability Section for that Reliability Standard(s) will specify which IBRs are applicable. Each of these Reliability Standards, including the Applicability Section(s) will be balloted in accordance with the NERC Rules of Procedure, and the Applicability Section. For example, an Applicability Section may specify that IBR Facilities (BES), IBRs that are owned by a Generator Owner (Category 2), or IBRs that are operated by a Generator Operator (Category 2), are considered applicable.

IBRs have commonly been referred to as "generating resources." An IBR is not a high-voltage direct current (HVDC) system (except for a VSC HVDC with a dedicated connection to an IBR, as this is part of the IBR facility), stand-alone flexible ac transmission systems (FACTS) (e.g., static synchronous compensators (STATCOM) and static VAR compensators (SVC)), or any resources that are not inverter-based, e.g., gas and steam power plants with synchronous generators. A list of IBRs is provided in Table 1 below.

IBRs may include any hybrid combination of IBR types (e.g., BESS and solar PV). IBRs also include co-located portions of a facility that are IBR technologies (e.g., a BESS, which is co-located at synchronous generation facility), see table below.

Examples	
IBR	**Not an IBR**
• Solar photovoltaic • Type 3 wind • Type 4 wind • Battery energy storage system (BESS) • Fuel cell(s) • Hybrid combination of IBRs • Portions of co-located facility that are IBR • VSC HVDC with dedicated connection to IBR • This is not an all-inclusive list.	• Stand-alone FACTS device (e.g., STATCOM or SVC) • Flywheels • Synchronous generator • Synchronous condenser • VSC HVDC • Line-Commutated Converters (LCC) HVDC • This is not an all-inclusive list.

An inverter is a power electronic device that inverts DC power to AC sinusoidal power. A rectifier is a power electronic device that rectifies AC sinusoidal power to DC power. A converter is a power electronic device that performs rectification and/or inversion.

Figure 1 shows an example diagram of an IBR. The IBR (red box) includes the devices (blue boxes), collection system (green boxes), power plant controller(s) (not shown), and reactive resources within the IBR plant. If the IBR is connected to the electric system via a dedicated voltage source converter high-voltage direct current (VSC HVDC) system, the VSC HVDC system is part of the IBR.

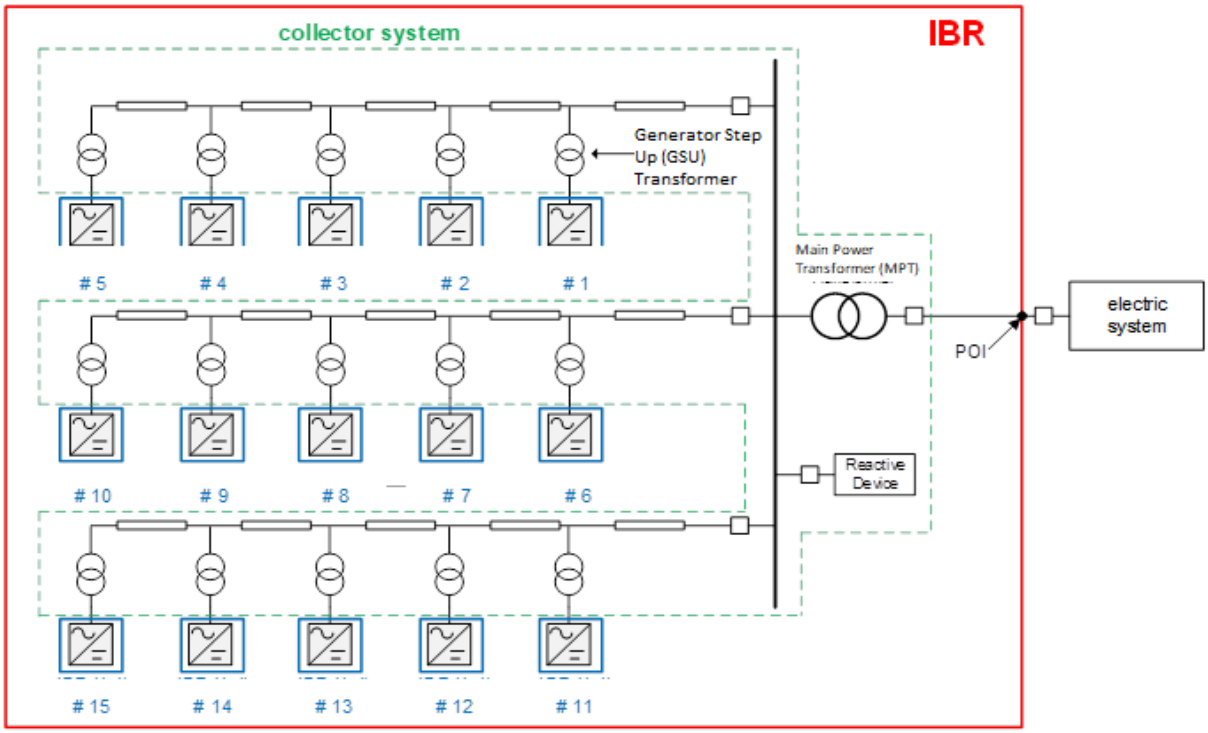

Figure 1 Example diagram of an IBR depicting the IBR (red box), collector system (green box), and devices (blue boxes).

The inclusion of 'capable of exporting Real Power' is to clarify that loads connected to the electric system via power electronics are not IBRs. IBRs are capable of exporting Real Power and may also be capable of providing Reactive Power. The DT contemplated adding the phrase "may also be capable of providing Reactive Power" in the definition(s). However, the DT believed this may be misinterpreted that IBRs include technologies such as FACTS devices or HVDC.

Battery energy storage systems (BESS) are considered IBRs whether the device is operating in a charging, idle, or discharging mode. Within each Reliability Standard, a DT may draft operating mode-specific Requirements, as needed.

The Project 2020-06 DT intends to use the Glossary Term of IBR for MOD-026-2. Additional standard development projects and related standards that may use this defined term include:

- Project 2020-02 Generator Ride-through (new PRC-029, modified PRC-024)

- Project 2021-01 Modifications to PRC-019 and MOD-025
- Project 2021-04 Modifications to PRC-002 (new PRC-028)
- Project 2022-04 EMT Modeling
- Project 2023-01 EOP-004 IBR Event Reporting
- Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues (new PRC-030)

Distributed Energy Resources (DER) related projects that may or may not need to use IBR (if they end up with their own definition)

- Project 2022-02 Modifications to TPL-001 and MOD-032 (DER)
- Project 2023-05 Modifications to FAC-001 and FAC-002 (DER)
- Project 2023-08 MOD-031 Demand and Energy (DER)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Announcement

Project 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) Glossary Term

Final Ballot Open through September 12, 2024

Now Available

A final ballot for the **Inverter-Based Resource (IBR) Glossary Term** is open through **8 p.m. Eastern, Thursday, September 12, 2024.**

Balloting

In the final ballot, votes are counted by exception. Votes from the previous ballot are automatically carried over in the final ballot. Only members of the applicable ballot pools can cast a vote. Ballot pool members who previously voted have the option to change their vote in the final ballot. Ballot pool members who did not cast a vote during the previous ballot can vote in the final ballot.

Members of the ballot pool(s) associated with this project can log into the Standards Balloting and Commenting System (SBS) and submit votes here.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Next Steps

The voting results will be posted and announced after the ballots close. If approved, the standard will be submitted to the Board of Trustees for adoption and then filed with the appropriate regulatory authorities.

For information on the Standards Development Process, refer to the Standard Processes Manual.

For more information or assistance, contact Standards Developer, Josh Blume (via email) or at 470-755-0346.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

BALLOT RESULTS

Ballot Name: 2020-06 Verifications of Models and Data for Generators Inverter-Based Resource (IBR) FN 4 DEF
Voting Start Date: 9/3/2024 11:37:06 AM
Voting End Date: 9/12/2024 8:00:00 PM
Ballot Type: DEF
Ballot Activity: FN
Ballot Series: 4
Total # Votes: 254
Total Ballot Pool: 282
Quorum: 90.07
Quorum Established Date: 9/4/2024 10:02:37 AM
Weighted Segment Value: 92.82

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	52	0.929	4	0.071	0	14	4
Segment: 2	8	0.8	8	0.8	0	0	0	0	0
Segment: 3	57	1	44	0.898	5	0.102	0	3	5
Segment: 4	17	1	13	0.929	1	0.071	0	2	1
Segment: 5	72	1	49	0.925	4	0.075	0	8	11
Segment: 6	47	1	31	0.861	5	0.139	0	4	7
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	7	0.6	6	0.6	0	0	0	1	0
Totals:	282	6.4	203	5.941	19	0.459	0	32	28

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Affirmative	N/A
1	Ameren - Ameren Services	Tamara Evey		Affirmative	N/A
1	American Transmission Company, LLC	Amy Wilke	LaTroy Brumfield	Affirmative	N/A
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Affirmative	N/A
1	Arkansas Electric Cooperative Corporation	Emily Corley		None	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		None	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Abstain	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Affirmative	N/A
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Abstain	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Affirmative	N/A
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Affirmative	N/A
1	Dominion - Dominion Virginia Power	Steven Belle		Affirmative	N/A
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	N/A
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Hayden Maples	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Negative	N/A
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Affirmative	N/A
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		Abstain	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Lincoln Electric System	Josh Johnson		Affirmative	N/A
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Los Angeles Department of Water and Power	faranak sarbaz		Abstain	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu		Affirmative	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard		Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Affirmative	N/A
1	National Grid USA	Michael Jones		Abstain	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Affirmative	N/A
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Affirmative	N/A
1	Omaha Public Power District	Doug Peterchuck		Affirmative	N/A
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		None	N/A
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		Abstain	N/A
1	Platte River Power Authority	Marissa Archie		Affirmative	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		Abstain	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Negative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		Affirmative	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Laura Somak	Israel Perez	Affirmative	N/A
1	Santee Cooper	Chris Wagner		Affirmative	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Affirmative	N/A
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell		Affirmative	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Affirmative	N/A
1	Tennessee Valley Authority	David Plumb		Negative	N/A
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Affirmative	N/A
3	AEP	Leshel Hutchings		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr	Nick Leathers	Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Negative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Abstain	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Affirmative	N/A
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	Affirmative	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		None	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Victoria Crider		Affirmative	N/A
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	N/A
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A
3	Entergy	James Keele		Affirmative	N/A
3	Evergy	Marcus Moor		Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Negative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Affirmative	N/A
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		None	N/A
3	Lincoln Electric System	Sam Christensen		Affirmative	N/A
3	Los Angeles Department of Water and Power	Fausto Serratos		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Manitoba Hydro	Mike Smith	Stephen Sines	Affirmative	N/A
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Affirmative	N/A
3	Muscatine Power and Water	Seth Shoemaker		Affirmative	N/A
3	National Grid USA	Brian Shanahan		Abstain	N/A
3	Nebraska Public Power District	Tony Eddleman		Affirmative	N/A
3	New York Power Authority	Richard Machado		Affirmative	N/A
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Affirmative	N/A
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Affirmative	N/A
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Affirmative	N/A
3	OTP - Otter Tail Power Company	Wendi Olson		Affirmative	N/A
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Affirmative	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Affirmative	N/A
3	Santee Cooper	Vicky Budreau		Affirmative	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Negative	N/A
3	Tennessee Valley Authority	Ian Grant		Negative	N/A
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Affirmative	N/A
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Affirmative	N/A
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Affirmative	N/A
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Negative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Affirmative	N/A
4	Northern California Power Agency	Marty Hostler		Affirmative	N/A
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho		Affirmative	N/A
4	Utility Services, Inc.	Carver Powers		Affirmative	N/A
4	WEC Energy Group, Inc.	Matthew Beilfuss		Affirmative	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		Affirmative	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		None	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Abstain	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Affirmative	N/A
5	Black Hills Corporation	Sheila Suurmeier		Affirmative	N/A
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Affirmative	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Michelle Pagano		Affirmative	N/A
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Affirmative	N/A
5	Decatur Energy Center LLC	Megan Melham		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Negative	N/A
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		Abstain	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Affirmative	N/A
5	Evergy	Jeremy Harris	Hayden Maples	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Negative	N/A
5	Great River Energy	Jacalynn Bentz		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Greybeard Compliance Services, LLC	Mike Gabriel		None	N/A
5	Hydro-Quebec (HQ)	Junji Yamaguchi	Chantal Mazza	Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Affirmative	N/A
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Abstain	N/A
5	National Grid USA	Robin Berry		Abstain	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Affirmative	N/A
5	New York Power Authority	Zahid Qayyum		Affirmative	N/A
5	NextEra Energy	Richard Vendetti		Affirmative	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Affirmative	N/A
5	Northern California Power Agency	Jeremy Lawson		None	N/A
5	NRG - NRG Energy, Inc.	Patricia Lynch		Abstain	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Affirmative	N/A
5	Omaha Public Power District	Kayleigh Wilkerson		None	N/A
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Affirmative	N/A
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Affirmative	N/A
5	Platte River Power Authority	Jon Osell		Affirmative	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Affirmative	N/A
5	Santee Cooper	Carey Salisbury		Affirmative	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Negative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	N/A
5	TransAlta Corporation	Ashley Scheelar		Affirmative	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Michelle Hribar		Affirmative	N/A
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Affirmative	N/A
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Cleco Corporation	Robert Hirchak		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Affirmative	N/A
6	Duke Energy	John Sturgeon		Negative	N/A
6	Entergy	Julie Hall		Affirmative	N/A
6	Evergy	Tiffany Lake	Hayden Maples	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Negative	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		None	N/A
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Brandin Stoesz		None	N/A
6	Muscatine Power and Water	Nicholas Burns		None	N/A
6	New York Power Authority	Shelly Dineen		Affirmative	N/A
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Affirmative	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Affirmative	N/A
6	Omaha Public Power District	Shonda McCain		Affirmative	N/A
6	Platte River Power Authority	Sabrina Martz		Affirmative	N/A
6	Portland General Electric Co.	Stefanie Burke		Abstain	N/A
6	Powerex Corporation	Raj Hundal		Abstain	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Negative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Robert Witham		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Affirmative	N/A
6	Santee Cooper	Marty Watson		Affirmative	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Negative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	N/A
6	WEC Energy Group, Inc.	David Boeshaar		Affirmative	N/A
6	Western Area Power Administration	Jennifer Neville		Affirmative	N/A
6	Xcel Energy, Inc.	Steve Szablya		Affirmative	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	New York State Reliability Council	Wesley Yeomans		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman	Greg Sorenson	Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 282 of 282 entries

BALLOT RESULTS

Ballot Name: 2020-06 Verifications of Models and Data for Generators IBR-related Definitions | Implementation Plan FN 4 OT
Voting Start Date: 9/3/2024 11:38:03 AM
Voting End Date: 9/12/2024 8:00:00 PM
Ballot Type: OT
Ballot Activity: FN
Ballot Series: 4
Total # Votes: 251
Total Ballot Pool: 280
Quorum: 89.64
Quorum Established Date: 9/4/2024 10:02:44 AM
Weighted Segment Value: 93.66

Segment	Ballot Pool	Segment Weight	Affirmative Votes	Affirmative Fraction	Negative Votes w/ Comment	Negative Fraction w/ Comment	Negative Votes w/o Comment	Abstain	No Vote
Segment: 1	74	1	53	0.93	4	0.07	0	13	4
Segment: 2	8	0.8	8	0.8	0	0	0	0	0
Segment: 3	57	1	45	0.918	4	0.082	0	3	5
Segment: 4	17	1	12	0.923	1	0.077	0	2	2
Segment: 5	72	1	50	0.943	3	0.057	0	8	11
Segment: 6	46	1	31	0.886	4	0.114	0	4	7
Segment: 7	0	0	0	0	0	0	0	0	0
Segment: 8	0	0	0	0	0	0	0	0	0
Segment: 9	0	0	0	0	0	0	0	0	0
Segment: 10	6	0.5	5	0.5	0	0	0	1	0
Totals:	280	6.3	204	5.9	16	0.4	0	31	29

BALLOT POOL MEMBERS

Show All entries Search: Search

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	AEP - AEP Service Corporation	Dennis Sauriol		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Allete - Minnesota Power, Inc.	Hillary Creurer		Affirmative	N/A
1	Ameren - Ameren Services	Tamara Evey		Affirmative	N/A
1	American Transmission Company, LLC	Amy Wilke	LaTroy Brumfield	Affirmative	N/A
1	APS - Arizona Public Service Co.	Daniela Atanasovski		Affirmative	N/A
1	Arizona Electric Power Cooperative, Inc.	Jennifer Bray		Affirmative	N/A
1	Arkansas Electric Cooperative Corporation	Emily Corley		None	N/A
1	Associated Electric Cooperative, Inc.	Mark Riley		Affirmative	N/A
1	Austin Energy	Thomas Standifur		None	N/A
1	Avista - Avista Corporation	Mike Magruder		Affirmative	N/A
1	Balancing Authority of Northern California	Kevin Smith	Tim Kelley	Affirmative	N/A
1	BC Hydro and Power Authority	Adrian Andreoiu		Abstain	N/A
1	Berkshire Hathaway Energy - MidAmerican Energy Co.	Terry Harbour		Affirmative	N/A
1	Black Hills Corporation	Micah Runner		Affirmative	N/A
1	CenterPoint Energy Houston Electric, LLC	Daniela Hammons		Affirmative	N/A
1	City Utilities of Springfield, Missouri	Michael Bowman		Affirmative	N/A
1	Con Ed - Consolidated Edison Co. of New York	Dermot Smyth		Affirmative	N/A
1	Dairyland Power Cooperative	Karrie Schuldt		Affirmative	N/A
1	Dominion - Dominion Virginia Power	Steven Belle		Affirmative	N/A
1	Duke Energy	Katherine Street	Ellese Murphy	Negative	N/A
1	Edison International - Southern California Edison Company	Robert Blackney		Affirmative	N/A
1	Entergy	Brian Lindsey		Affirmative	N/A
1	Evergy	Kevin Frick	Hayden Maples	Affirmative	N/A
1	Eversource Energy	Joshua London		Affirmative	N/A
1	Exelon	Daniel Gacek		Affirmative	N/A
1	FirstEnergy - FirstEnergy Corporation	Theresa Ciancio		Negative	N/A
1	Georgia Transmission Corporation	Greg Davis	Stephen Stafford	Affirmative	N/A
1	Glencoe Light and Power Commission	Terry Volkmann		Affirmative	N/A
1	Hydro One Networks, Inc.	Emma Halilovic	Ijad Dewan	Abstain	N/A
1	Hydro-Quebec (HQ)	Nicolas Turcotte	Chantal Mazza	Affirmative	N/A
1	IDACORP - Idaho Power Company	Sean Steffensen		Abstain	N/A
1	Imperial Irrigation District	Jesus Sammy Alcaraz	Denise Sanchez	Affirmative	N/A
1	International Transmission Company Holdings Corporation	Michael Moltane	Gail Elliott	Affirmative	N/A
1	JEA	Joseph McClung		Affirmative	N/A
1	Lakeland Electric	Larry Watt		None	N/A
1	Lincoln Electric System	Josh Johnson		Affirmative	N/A
1	Long Island Power Authority	Isidoro Behar		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Los Angeles Department of Water and Power	faranak sarbaz		Abstain	N/A
1	LS Power Transmission, LLC	Jennifer Richardson		Abstain	N/A
1	Manitoba Hydro	Nazra Gladu		Affirmative	N/A
1	Minnkota Power Cooperative Inc.	Theresa Allard		Affirmative	N/A
1	Muscatine Power and Water	Andrew Kurriger		Affirmative	N/A
1	National Grid USA	Michael Jones		Abstain	N/A
1	NB Power Corporation	Jeffrey Streifling		Abstain	N/A
1	Nebraska Public Power District	Jamison Cawley		Affirmative	N/A
1	NextEra Energy - Florida Power and Light Co.	Silvia Mitchell		Affirmative	N/A
1	NiSource - Northern Indiana Public Service Co.	Alison Nickells		Affirmative	N/A
1	OGE Energy - Oklahoma Gas and Electric Co.	Terri Pyle		Affirmative	N/A
1	Omaha Public Power District	Doug Peterchuck		Affirmative	N/A
1	Oncor Electric Delivery	Byron Booker	Tammy Porter	Abstain	N/A
1	OTP - Otter Tail Power Company	Charles Wicklund		None	N/A
1	Pacific Gas and Electric Company	Marco Rios	Michael Johnson	Affirmative	N/A
1	Pedernales Electric Cooperative, Inc.	Bradley Collard		Abstain	N/A
1	Platte River Power Authority	Marissa Archie		Affirmative	N/A
1	PNM Resources - Public Service Company of New Mexico	Lynn Goldstein		Affirmative	N/A
1	Portland General Electric Co.	Brooke Jockin		Abstain	N/A
1	PPL Electric Utilities Corporation	Michelle McCartney Longo		Negative	N/A
1	PSEG - Public Service Electric and Gas Co.	Karen Arnold		Affirmative	N/A
1	Public Utility District No. 1 of Chelan County	Diane E Landry		Affirmative	N/A
1	Public Utility District No. 1 of Snohomish County	Alyssia Rhoads		Affirmative	N/A
1	Sacramento Municipal Utility District	Wei Shao	Tim Kelley	Affirmative	N/A
1	Salt River Project	Laura Somak	Israel Perez	Affirmative	N/A
1	Santee Cooper	Chris Wagner		Affirmative	N/A
1	SaskPower	Wayne Guttormson		Abstain	N/A
1	Sempra - San Diego Gas and Electric	Mohamed Derbas		Affirmative	N/A
1	Southern Company - Southern Company Services, Inc.	Matt Carden		Affirmative	N/A
1	Sunflower Electric Power Corporation	Paul Mehlhaff		Affirmative	N/A
1	Tacoma Public Utilities (Tacoma, WA)	John Merrell		Affirmative	N/A
1	Tallahassee Electric (City of Tallahassee, FL)	Scott Langston		Affirmative	N/A
1	Tennessee Valley Authority	David Plumb		Negative	N/A
1	Tri-State G and T Association, Inc.	Donna Wood		Affirmative	N/A
1	U.S. Bureau of Reclamation	Richard Jackson		Abstain	N/A
1	Western Area Power Administration	Ben Hammer		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
1	Xcel Energy, Inc.	Eric Barry		Affirmative	N/A
2	California ISO	Darcy O'Connell		Affirmative	N/A
2	Electric Reliability Council of Texas, Inc.	Kennedy Meier		Affirmative	N/A
2	Independent Electricity System Operator	Helen Lainis	Pirouz Honarmand	Affirmative	N/A
2	ISO New England, Inc.	John Pearson		Affirmative	N/A
2	Midcontinent ISO, Inc.	Bobbi Welch		Affirmative	N/A
2	New York Independent System Operator	Gregory Campoli		Affirmative	N/A
2	PJM Interconnection, L.L.C.	Thomas Foster	Elizabeth Davis	Affirmative	N/A
2	Southwest Power Pool, Inc. (RTO)	Joshua Phillips		Affirmative	N/A
3	AEP	Leshel Hutchings		Affirmative	N/A
3	Ameren - Ameren Services	David Jendras Sr	Nick Leathers	Affirmative	N/A
3	APS - Arizona Public Service Co.	Jessica Lopez		Affirmative	N/A
3	Arkansas Electric Cooperative Corporation	Ayslynn Mcavoy		Affirmative	N/A
3	Avista - Avista Corporation	Robert Follini		Negative	N/A
3	BC Hydro and Power Authority	Ming Jiang		Abstain	N/A
3	Berkshire Hathaway Energy - MidAmerican Energy Co.	Joseph Amato		Affirmative	N/A
3	Black Hills Corporation	Josh Combs	Carly Miller	Affirmative	N/A
3	Buckeye Power, Inc.	Tom Schmidt	Ryan Strom	Affirmative	N/A
3	CMS Energy - Consumers Energy Company	Karl Blaszkowski		Affirmative	N/A
3	Colorado Springs Utilities	Hillary Dobson		None	N/A
3	Con Ed - Consolidated Edison Co. of New York	Peter Yost		Affirmative	N/A
3	Dominion - Dominion Virginia Power	Victoria Crider		Affirmative	N/A
3	DTE Energy - Detroit Edison Company	Marvin Johnson		Affirmative	N/A
3	Duke Energy - Florida Power Corporation	Marcelo Pesantez		Negative	N/A
3	Edison International - Southern California Edison Company	Romel Aquino		Affirmative	N/A
3	Entergy	James Keele		Affirmative	N/A
3	Evergy	Marcus Moor		Affirmative	N/A
3	Eversource Energy	Vicki O'Leary		Affirmative	N/A
3	FirstEnergy - FirstEnergy Corporation	Aaron Ghodooshim		Negative	N/A
3	Georgia System Operations Corporation	Scott McGough		Affirmative	N/A
3	Great River Energy	Michael Brytowski		Affirmative	N/A
3	Imperial Irrigation District	George Kirschner	Denise Sanchez	Affirmative	N/A
3	JEA	Marilyn Williams		Affirmative	N/A
3	Lakeland Electric	Steven Marshall		None	N/A
3	Lincoln Electric System	Sam Christensen		Affirmative	N/A
3	Los Angeles Department of Water and Power	Fausto Serratos		Abstain	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
3	Manitoba Hydro	Mike Smith	Stephen Sines	Affirmative	N/A
3	MGE Energy - Madison Gas and Electric Co.	Benjamin Widder		Affirmative	N/A
3	Muscatine Power and Water	Seth Shoemaker		Affirmative	N/A
3	National Grid USA	Brian Shanahan		Abstain	N/A
3	Nebraska Public Power District	Tony Eddleman		Affirmative	N/A
3	New York Power Authority	Richard Machado		Affirmative	N/A
3	NextEra Energy - Florida Power and Light Co.	Karen Demos		Affirmative	N/A
3	NiSource - Northern Indiana Public Service Co.	Steven Taddeucci		Affirmative	N/A
3	North Carolina Electric Membership Corporation	Chris Dimisa	Scott Brame	Affirmative	N/A
3	Ocala Utility Services	Neville Bowen	LaKenya Vannorman	None	N/A
3	OGE Energy - Oklahoma Gas and Electric Co.	Donald Hargrove		Affirmative	N/A
3	Old Dominion Electric Coop.	William Pezalla		None	N/A
3	Omaha Public Power District	David Heins		Affirmative	N/A
3	OTP - Otter Tail Power Company	Wendi Olson		Affirmative	N/A
3	Pacific Gas and Electric Company	Sandra Ellis	Michael Johnson	Affirmative	N/A
3	PNM Resources - Public Service Company of New Mexico	Amy Wesselkamper		Affirmative	N/A
3	PPL - Louisville Gas and Electric Co.	James Frank		None	N/A
3	PSEG - Public Service Electric and Gas Co.	Christopher Murphy		Affirmative	N/A
3	Public Utility District No. 1 of Chelan County	Joyce Gundry		Affirmative	N/A
3	Sacramento Municipal Utility District	Nicole Looney	Tim Kelley	Affirmative	N/A
3	Salt River Project	Mathew Weber	Israel Perez	Affirmative	N/A
3	Santee Cooper	Vicky Budreau		Affirmative	N/A
3	Sempra - San Diego Gas and Electric	Bryan Bennett		Affirmative	N/A
3	Snohomish County PUD No. 1	Holly Chaney		Affirmative	N/A
3	Southern Company - Alabama Power Company	Joel Dembowski		Affirmative	N/A
3	Southern Indiana Gas and Electric Co.	Ryan Snyder		Affirmative	N/A
3	Tennessee Valley Authority	Ian Grant		Negative	N/A
3	Tri-State G and T Association, Inc.	Ryan Walter		Affirmative	N/A
3	WEC Energy Group, Inc.	Christine Kane		Affirmative	N/A
3	Xcel Energy, Inc.	Nicholas Friebel		Affirmative	N/A
4	Alliant Energy Corporation Services, Inc.	Larry Heckert		Affirmative	N/A
4	Austin Energy	Tony Hua		Affirmative	N/A
4	Buckeye Power, Inc.	Jason Procuniar	Ryan Strom	Affirmative	N/A
4	CMS Energy - Consumers Energy Company	Aric Root		Affirmative	N/A
4	DTE Energy	Patricia Ireland		Affirmative	N/A
4	Electricities of North Carolina	Marcus Freeman		None	N/A
4	FirstEnergy - FirstEnergy Corporation	Mark Garza		Negative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
4	Georgia System Operations Corporation	Katrina Lyons		Affirmative	N/A
4	Illinois Municipal Electric Agency	Mary Ann Todd		Abstain	N/A
4	North Carolina Electric Membership Corporation	Richard McCall	Scott Brame	Affirmative	N/A
4	Northern California Power Agency	Marty Hostler		Affirmative	N/A
4	Public Utility District No. 1 of Snohomish County	John D. Martinsen		Affirmative	N/A
4	Public Utility District No. 2 of Grant County, Washington	Karla Weaver		Abstain	N/A
4	Sacramento Municipal Utility District	Foung Mua	Tim Kelley	Affirmative	N/A
4	Tacoma Public Utilities (Tacoma, WA)	Hien Ho		Affirmative	N/A
4	Utility Services, Inc.	Carver Powers		Affirmative	N/A
4	WEC Energy Group, Inc.	Matthew Beilfuss		None	N/A
5	AEP	Thomas Foltz		Affirmative	N/A
5	AES - AES Corporation	Ruchi Shah		Affirmative	N/A
5	Ameren - Ameren Missouri	Sam Dwyer		Affirmative	N/A
5	APS - Arizona Public Service Co.	Andrew Smith		Affirmative	N/A
5	Associated Electric Cooperative, Inc.	Chuck Booth		Affirmative	N/A
5	Austin Energy	Michael Dillard		Affirmative	N/A
5	Avista - Avista Corporation	Glen Farmer		None	N/A
5	Basin Electric Power Cooperative	Amanda Wangler		None	N/A
5	BC Hydro and Power Authority	Quincy Wang		Abstain	N/A
5	Berkshire Hathaway - NV Energy	Dwanique Spiller		Affirmative	N/A
5	Black Hills Corporation	Sheila Suurmeier		Affirmative	N/A
5	Bonneville Power Administration	Juergen Bermejo		Affirmative	N/A
5	Buckeye Power, Inc.	Kevin Zemanek	Ryan Strom	Affirmative	N/A
5	CMS Energy - Consumers Energy Company	David Greyerbiehl		Affirmative	N/A
5	Colorado Springs Utilities	Jeffrey Icke		Affirmative	N/A
5	Con Ed - Consolidated Edison Co. of New York	Michelle Pagano		Affirmative	N/A
5	Constellation	Alison MacKellar		Affirmative	N/A
5	Dairyland Power Cooperative	Tommy Drea		Affirmative	N/A
5	Decatur Energy Center LLC	Megan Melham		Affirmative	N/A
5	Duke Energy	Dale Goodwine		Negative	N/A
5	Edison International - Southern California Edison Company	Selene Willis		Affirmative	N/A
5	Enel Green Power	Natalie Johnson		Abstain	N/A
5	Entergy - Entergy Services, Inc.	Gail Golden		Affirmative	N/A
5	Evergy	Jeremy Harris	Hayden Maples	Affirmative	N/A
5	FirstEnergy - FirstEnergy Corporation	Matthew Augustin		Negative	N/A
5	Great River Energy	Jacalynn Bentz		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Greybeard Compliance Services, LLC	Mike Gabriel		None	N/A
5	Hydro-Quebec (HQ)	Junji Yamaguchi	Chantal Mazza	Affirmative	N/A
5	Imperial Irrigation District	Tino Zaragoza	Denise Sanchez	Affirmative	N/A
5	Invenergy LLC	Rhonda Jones		Affirmative	N/A
5	JEA	John Babik		Affirmative	N/A
5	Lincoln Electric System	Brittany Millard		Affirmative	N/A
5	Los Angeles Department of Water and Power	Robert Kerrigan		None	N/A
5	Lower Colorado River Authority	Teresa Krabe		Affirmative	N/A
5	LS Power Development, LLC	C. A. Campbell		Abstain	N/A
5	National Grid USA	Robin Berry		Abstain	N/A
5	NB Power Corporation - New Brunswick Power Transmission Corporation	Fon Hiew		Abstain	N/A
5	Nebraska Public Power District	Ronald Bender		Affirmative	N/A
5	New York Power Authority	Zahid Qayyum		Affirmative	N/A
5	NextEra Energy	Richard Vendetti		Affirmative	N/A
5	NiSource - Northern Indiana Public Service Co.	Kathryn Tackett		Affirmative	N/A
5	North Carolina Electric Membership Corporation	Reid Cashion	Scott Brame	Affirmative	N/A
5	Northern California Power Agency	Jeremy Lawson		None	N/A
5	NRG - NRG Energy, Inc.	Patricia Lynch		Abstain	N/A
5	OGE Energy - Oklahoma Gas and Electric Co.	Patrick Wells		Affirmative	N/A
5	Omaha Public Power District	Kayleigh Wilkerson		None	N/A
5	Ontario Power Generation Inc.	Constantin Chitescu		Affirmative	N/A
5	OTP - Otter Tail Power Company	Stacy Wahlund		Affirmative	N/A
5	Pacific Gas and Electric Company	Tyler Brun	Michael Johnson	Affirmative	N/A
5	Pattern Operators LP	George E Brown		Affirmative	N/A
5	Platte River Power Authority	Jon Osell		Affirmative	N/A
5	Portland General Electric Co.	Ryan Olson		None	N/A
5	PSEG Nuclear LLC	Tim Kucey		None	N/A
5	Public Utility District No. 1 of Chelan County	Rebecca Zahler		Affirmative	N/A
5	Public Utility District No. 1 of Snohomish County	Becky Burden		Affirmative	N/A
5	Public Utility District No. 2 of Grant County, Washington	Nikkee Hebdon		None	N/A
5	Sacramento Municipal Utility District	Ryder Couch	Tim Kelley	Affirmative	N/A
5	Salt River Project	Thomas Johnson	Israel Perez	Affirmative	N/A
5	Santee Cooper	Carey Salisbury		Affirmative	N/A
5	Seminole Electric Cooperative, Inc.	Melanie Wong		Abstain	N/A
5	Sempra - San Diego Gas and Electric	Jennifer Wright		Affirmative	N/A
5	Southern Company - Southern Company Generation	Leslie Burke		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
5	Southern Indiana Gas and Electric Co.	Larry Rogers		Affirmative	N/A
5	Tacoma Public Utilities (Tacoma, WA)	Ozan Ferrin	Jennie Wike	None	N/A
5	Talen Generation, LLC	Donald Lock		None	N/A
5	Tennessee Valley Authority	Darren Boehm		Negative	N/A
5	TransAlta Corporation	Ashley Scheelar		Affirmative	N/A
5	Tri-State G and T Association, Inc.	Sergio Banuelos		Affirmative	N/A
5	U.S. Bureau of Reclamation	Wendy Kalidass		Abstain	N/A
5	Vistra Energy	Daniel Roethemeyer	David Vickers	Affirmative	N/A
5	WEC Energy Group, Inc.	Michelle Hribar		Affirmative	N/A
5	Xcel Energy, Inc.	Gerry Huitt		Affirmative	N/A
6	AEP	Mathew Miller		Affirmative	N/A
6	Ameren - Ameren Services	Robert Quinlivan		Affirmative	N/A
6	APS - Arizona Public Service Co.	Marcus Bortman		Affirmative	N/A
6	Arkansas Electric Cooperative Corporation	Bruce Walkup		Affirmative	N/A
6	Austin Energy	Imane Mrini		Affirmative	N/A
6	Black Hills Corporation	Rachel Schuldt		Affirmative	N/A
6	Bonneville Power Administration	Tanner Brier		Affirmative	N/A
6	Con Ed - Consolidated Edison Co. of New York	Jason Chandler		Affirmative	N/A
6	Constellation	Kimberly Turco		Affirmative	N/A
6	CPower	Aaron Breidenbaugh		None	N/A
6	Dominion - Dominion Resources, Inc.	Sean Bodkin		Affirmative	N/A
6	Duke Energy	John Sturgeon		Negative	N/A
6	Entergy	Julie Hall		Affirmative	N/A
6	Evergy	Tiffany Lake	Hayden Maples	Affirmative	N/A
6	FirstEnergy - FirstEnergy Corporation	Stacey Sheehan		Negative	N/A
6	Imperial Irrigation District	Diana Torres	Denise Sanchez	Affirmative	N/A
6	Invenergy LLC	Colin Chilcoat		Affirmative	N/A
6	Lakeland Electric	Paul Shipps		Affirmative	N/A
6	Lincoln Electric System	Eric Ruskamp		None	N/A
6	Los Angeles Department of Water and Power	Anton Vu		Abstain	N/A
6	Manitoba Hydro	Brandin Stoesz		None	N/A
6	Muscatine Power and Water	Nicholas Burns		None	N/A
6	New York Power Authority	Shelly Dineen		Affirmative	N/A
6	NextEra Energy - Florida Power and Light Co.	Justin Welty		Affirmative	N/A
6	NiSource - Northern Indiana Public Service Co.	Dmitriy Bazylyuk		Affirmative	N/A
6	Northern California Power Agency	Dennis Sismaet		Abstain	N/A
6	OGE Energy - Oklahoma Gas and Electric Co.	Ashley F Stringer		Affirmative	N/A

Segment	Organization	Voter	Designated Proxy	Ballot	NERC Memo
6	Omaha Public Power District	Shonda McCain		Affirmative	N/A
6	Platte River Power Authority	Sabrina Martz		Affirmative	N/A
6	Portland General Electric Co.	Stefanie Burke		Abstain	N/A
6	Powerex Corporation	Raj Hundal		Abstain	N/A
6	PPL - Louisville Gas and Electric Co.	Linn Oelker		Negative	N/A
6	PSEG - PSEG Energy Resources and Trade LLC	Laura Wu		None	N/A
6	Public Utility District No. 1 of Chelan County	Robert Witham		Affirmative	N/A
6	Sacramento Municipal Utility District	Charles Norton	Tim Kelley	Affirmative	N/A
6	Salt River Project	Timothy Singh	Israel Perez	Affirmative	N/A
6	Santee Cooper	Marty Watson		Affirmative	N/A
6	Seminole Electric Cooperative, Inc.	Bret Galbraith		None	N/A
6	Snohomish County PUD No. 1	John Liang		Affirmative	N/A
6	Southern Company - Southern Company Generation	Ron Carlsen		Affirmative	N/A
6	Southern Indiana Gas and Electric Co.	Kati Barr		Affirmative	N/A
6	Tacoma Public Utilities (Tacoma, WA)	Terry Gifford	Jennie Wike	None	N/A
6	Tennessee Valley Authority	Armando Rodriguez		Negative	N/A
6	WEC Energy Group, Inc.	David Boeshaar		Affirmative	N/A
6	Western Area Power Administration	Jennifer Neville		Affirmative	N/A
6	Xcel Energy, Inc.	Steve Szablya		Affirmative	N/A
10	Midwest Reliability Organization	Mark Flanary		Affirmative	N/A
10	Northeast Power Coordinating Council	Gerry Dunbar		Abstain	N/A
10	ReliabilityFirst	Tyler Schwendiman	Greg Sorenson	Affirmative	N/A
10	SERC Reliability Corporation	Dave Krueger		Affirmative	N/A
10	Texas Reliability Entity, Inc.	Rachel Coyne		Affirmative	N/A
10	Western Electricity Coordinating Council	Steven Rueckert		Affirmative	N/A

Previous 1 Next

Showing 1 to 280 of 280 entries

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit F

Standard Drafting Team Roster

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Drafting Team Roster

Project 2020-06 Verifications of Models and Data for Generators

	Name	Entity
Chair	Brad Marszalkowski	ISO-New England
Vice Chair	Katie Iverson	S Power
Members	Andrew Arana	Florida Power & Light
	Jonathan Rose	ERCOT
	Sam Li	BC Hydro
	Jason MacDowell	GE Energy Consulting
	Robert J. O'Keefe	American Electric Power
	Biju Gopi N.	California ISO
	Michael (Bing) Xia	Powertech Labs
	Emily Greene	AES Corp
	Zhibo Wang	Mitsubishi Electric Power Product Inc
	Husam Al-Hadidi	Manitoba Hydro
	Mohamed El Khatib	Invenergy
	Mohamed Elnozahy	IESO
	David Marshall	Southern Company
PMOS Liaison	Sarah Habriga	ATC
	Ellese Murphy	Duke Energy
NERC Staff	Josh Blume – Standards Developer	North American Electric Reliability Corporation
	Alain Rigaud – Counsel	North American Electric Reliability Corporation