NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Quick Reference Guide: Inverter-Based Resource Activities

June 2023

INSIDE THIS QUICK REFERENCE GUIDE

IBR Strategy | Webinars | Education & Outreach | Disturbance Reports | Alerts | Reliability Guidelines | White Papers | Technical Reports | Standards Activities | Other Activities | Stakeholder Groups | Upcoming Events

The electric power grid in North America is undergoing a significant transformation in technology, design, control, planning, and operation, and these changes are occurring more rapidly than ever before. Particularly, technological advances in inverter-based resources are having a major impact on generation, transmission, and distribution systems.

In most cases, inverter-based generating resources refer to Type 3 and Type 4 wind power plants and solar photovoltaic (PV) resources. Battery energy storage is also considered an inverter-based resource. Many transmission-connected reactive devices, such as STATCOMs and SVCs, are also inverter-based. Similarly, HVDC circuits also interface with the ac network though converters. Inverter-based resources are being interconnected at the bulk power system (BPS) level as well as at the distribution level; however, this reference guide focuses specifically on BPS-connected inverter-based resource efforts.

This document acts as a quick reference guide for the work that the ERO Enterprise has done regarding inverter-based resource activities over the past seven years to ensure the continued reliability of the North American power grid.

NERC Inverter-Based Resource Strategy

NERC has developed an Inverter-Based Resource Strategy document for addressing inverter-based resource performance issues that illustrates current and future work to mitigate emerging risks in this area. The strategy was developed to ensure industry awareness and alignment regarding ERO activities and activities of the NERC Reliability and Security Technical Committee. It was also developed in response to NERC Member Representatives Committee policy input for needed enhancements in this area. The strategy includes four key focus areas – risk analysis, interconnection process improvements, sharing best practices and industry education, and regulatory enhancements. Each focus area include specific activities and work items that are described in more detail throughout the strategy document.

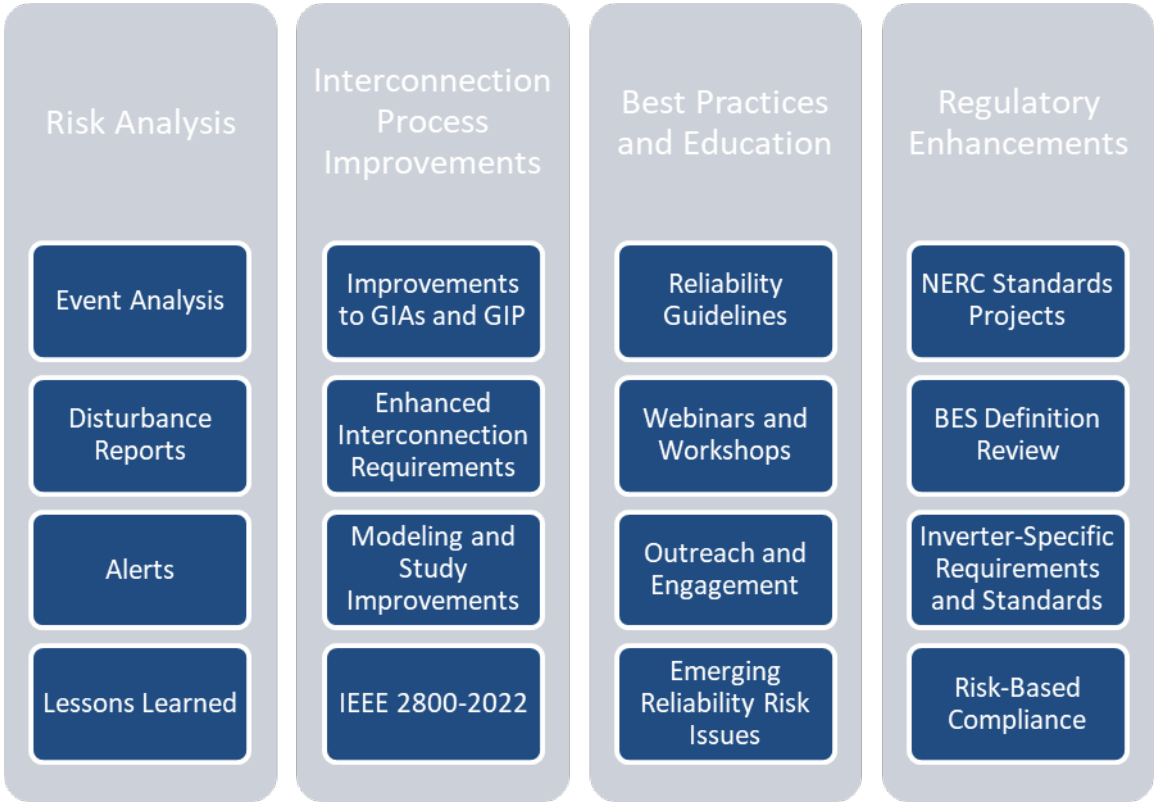

Figure 1: NERC Inverter-Based Resource Strategy

Webinars		
Published	**Title**	**Summary**
June - July 2023	IBR Webinar Series	As the grid continues to transform rapidly, inverter-based resources (IBRs) are at the forefront, playing an ever-more critical role. Over the past eight years, NERC has taken numerous actions to support the reliable integration of these resources and provide education around them. NERC is pleased to release the recordings and slides from its recent 11-part webinar series that provided a complete overview of bulk power system-connected IBRs—from a fundamental understanding of the technology to tackling the more complex and emerging risk issues—as well as an FAQ document covering the general themes of the more than 1000 comments and questions received throughout the series. Additionally, NERC has produced a video featuring remarks from NERC President and CEO Jim Robb and other series highlights. This series was made possible with the input of experts from 20 organizations across the industry. Ensuring reliable integration of IBRs is a top priority for NERC as the Electric Reliability Organization, and understanding these resources is imperative for a reliable, resilient, and secure bulk power system of the future. **Click here for**: **Announcement** | **Webinar Recordings and Slides** | **FAQ** | **Video**

Education and Outreach		
Published	**Title**	**Summary**
June 2023	*An Introductory Guide to Inverter-Based Resources on the Bulk Power System*	Inverter-based resources (IBRs) are playing an ever-more critical role during this period of unprecedented grid transformation. IBRs present unique opportunities moving forward and will shape a resilient and sustainable energy landscape of the future. To understand this complex landscape, NERC has developed, among a multitude of resources, a new guide focusing on IBRs in a high-level, easy-to-understand manner. The guide aims to inform industry, policymakers, and other stakeholders with a foundational understanding of IBRs and inverter technology.
June 2023	*Recommendations for Solar Energy Cybersecurity*	There is rapid and continued growth in grid-connected, large-scale solar inverter-based resources (IBR) and behind-the-meter distributed energy resources (DER). IBR/DER cybersecurity attacks may impact the energy critical infrastructure sector as these changes in the resource mix introduce risk. IBR/DER vendors, owners, operators, aggregators, grid operators, and government organizations must understand cyber threats targeting IBR/DER can create both localized and widespread impacts. This brochure provides valuable cybersecurity recommendations for the IBR / DER ecosystem.

Disturbance Reports			
Published	**Disturbance**	**Title**	**Summary**
October 2023	**2022 California Battery Energy Storage System Disturbances**	*2022 California Battery Energy Storage System Disturbances, NERC and WECC Staff Report*	This report assesses two events involving the unexpected, abnormal performance of bulk power system (BPS)-connected battery energy storage systems initiated by normally cleared faults in the Western Interconnection that occurred on March 9 and April 6 in 2022. These are the first significant events involving battery energy storage system facilities, highlighting the need to consider these systems in the same light as any other inverter-based resource.
September 2023	**2023 Southwest Utah Disturbance:** 04/10/23	*2023 Southwest Utah Disturbance: April 10, 2023, Joint NERC and WECC Staff Report*	This report contains the ERO analysis of the disturbance that occurred in Southwest Utah on April 10, 2023. This event is the first major widespread solar loss to occur in the Western Interconnection outside of California. Nine solar PV facilities (some with multiple phases) failed to ride through a normally cleared fault on a 345 kV transmission circuit. This resulted in an unexpected loss of 921 MW of generation, which is categorized as a Category 1i event in the NERC Event Analysis Process.
December 2022	**2022 Odessa**: 06/04/22	*2022 Odessa Disturbance: June 4, 2022 Joint NERC and Texas RE Staff Report*	This report contains the ERO analysis of the disturbance that occurred in Texas on June 4, 2022. The event involved the loss of multiple BPS solar PV facilities in addition to multiple synchronous generation facilities for a 2,555 MW resource loss. This event was categorized as a Category 3a event per the NERC Event Analysis Process. NERC and Texas RE work closely with ERCOT and the affected facility owners to identify root causes and determine appropriate mitigations to eliminate these types of risks moving forward. **Webinar:** Presentation | Streaming Webinar

Disturbance Reports			
Published	**Disturbance**	**Title**	**Summary**
August 2022	**Texas Panhandle Wind Event**: 03/22/22	*Panhandle Wind Disturbance Texas Event: March 22, 2022 Joint NERC and Texas RE Staff Report*	This report contains the ERO analysis of a reduction of wind resources across the Texas Panhandle area that occurred during two faults in the morning of March 22, 2022 up to around 200 miles from the initiating fault. While the event did not meet the qualified criteria for a Category 1i event per the ERO Event Analysis Process, NERC and Texas RE worked closely with ERCOT and the affected facility owners to conduct root cause analysis and identify recommendations related to the abnormal wind performance issues observed.
April 2022	**2021 CAISO Disturbances**: Victorville 06/24/21 Tumbleweed 07/04/21 Windhub 07/28/21 Lytle Creek Fire 08/25/21	*Multiple Solar PV Disturbances in CAISO Disturbances between June and August 2021 Joint NERC and WECC Staff Report*	This report contains the ERO analysis of four BPS disturbances with widespread reductions of solar PV output that occurred in the California Independent System Operator (CAISO) footprint between June and August of 2021. Each disturbance was categorized as a Category 1i event per the NERC Event Analysis Process and involved widespread reductions of active power output from solar PV resources in the Southern California area (specifically in areas of high penetrations of solar PV and wind resources). Two of these events also involved tripping of synchronous generating resources, and three involved some degree of distributed energy resource (DER) tripping or reduction. All initiating faults were normally cleared with proper protection system operation. **Webinar:** Presentation | Streaming Webinar
September 2021	**2021 Odessa**: 05/09/21 06/26/21	*Odessa Disturbance Texas Events: May 9, 2021 and June 26, 2021 Joint NERC and Texas RE Staff Report*	This report contains the ERO analysis of the BPS disturbance that occurred in Texas on May 9, 2021. While the ERO has analyzed multiple similar events in California, this is the first disturbance involving a widespread reduction of solar PV resource power output observed in the Texas Interconnection. The event involved solar PV facilities across a large geographic area of up to 200 miles away from the location of the initiating event. The Electric Reliability Council of Texas (ERCOT) provided Texas RE and NERC with a brief report as the disturbance was categorized as a Category 1i event. **Webinar:** Presentation | Streaming Webinar

Disturbance Reports			
Published	**Disturbance**	**Title**	**Summary**
November 2020	**San Fernando:** 07/07/20	*San Fernando Disturbance Southern California Event: July 7, 2020 Joint NERC and WECC Staff Report*	This report contains the ERO analysis of the BPS disturbance that occurred in Southern California on July 7, 2020. This event involved a widespread reduction of active power output from solar PV facilities across a relatively large geographic area, initiating a more detailed ERO review as this event was categorized as a Category 1i event. NERC and WECC worked with the California Independent System Operator (CAISO) to gather additional information and conduct a more detailed analysis.
January 2019	**Angeles Forest and Palmdale Roost:** 04/20/18 05/11/18	*April and May 2018 Fault Induced Solar Photovoltaic Resource Interruption Disturbances Report*	This report contains the ERO analysis of the BPS disturbances that occurred in the Southern California area on April 20, 2018, (Angeles Forest disturbance) and May 11, 2018, (Palmdale Roost disturbance). Both of these events consisted of a loss of solar PV facilities in response to transmission line faults. This report was prepared following data requests sent to Generator Owners subsequent to each event. The events were identified by NERC, WECC, CAISO, and Southern California Edison (SCE), and the report documents the findings and recommendations to industry.
February 2018	**Canyon 2 Fire:** 10/09/17	*900 MW Fault Induced Solar Photovoltaic Resource Interruption Disturbance Report*	The purpose of the report is to document the analysis, key findings, and recommendations from the Canyon 2 Fire disturbance. On October 9, 2017, the Canyon 2 Fire caused two transmission system faults near the Serrano substation east of Los Angeles. The first fault was a normally cleared phase-to-phase fault on a 220 kV transmission line that occurred at 12:12:16 Pacific time, and the second fault was a normally cleared phase-to-phase fault on a 500 kV transmission line that occurred at 12:14:30 Pacific time. Both faults resulted in the reduction of solar PV generation across a wide region of the Southern California Edison (SCE) footprint. Approximately 900 MW of solar PV resources were lost as a result of these events, and six solar PV plants accounted for most of the reduction in generation. **Webinar:** Presentation | Streaming Webinar

Disturbance Reports			
Published	**Disturbance**	**Title**	**Summary**
June 2017	**Blue Cut Fire:** 08/16/16	*1,200 MW Fault Induced Solar Photovoltaic Resource Interruption Disturbance Report*	This report contains the ERO analyses of the Blue Cut Fire, a system disturbance that occurred in the Southern California area on August 16, 2016. The Blue Cut Fire quickly moved toward an important transmission corridor that is comprised of three 500 kV lines owned by SCE and two 287 kV lines owned by Los Angeles Department of Water and Power (LADWP). The SCE transmission system experienced thirteen 500 kV line faults, and the LADWP system experienced two 287 kV faults as a result of the fire. Four of these fault events resulted in the loss of a significant amount of solar PV generation. The most significant event related to the solar PV generation loss occurred at 11:45 a.m. Pacific and resulted in the loss of nearly 1,200 MW. There were no solar PV facilities de-energized as a direct consequence of the fault event; rather, the facilities ceased output as a response to the fault on the system. **Webinar:** Presentation | Streaming Webinar

Alerts		
Distribution	**Title**	**Summary**
March 2022	*Industry Recommendation: Inverter-Based Resource Performance Issues*	NERC analyzed multiple large-scale disturbances on the BPS involving widespread loss of inverter-based resources. In 2021 and 2022, two disturbances in Odessa, Texas, resulted in abnormal performance across several BES solar PV resources. These resources exhibited systemic performance issues that could lead to unexpected losses of BPS-connected generation, with the potential to cause widespread outages. As the penetration of BPS-connected IBRs continues to rapidly increase, it is paramount that any performance deficiencies with existing (and future) generation resources be addressed in an effective and efficient manner. While the alert was distributed to GOs of BES solar PV resources, NERC strongly encouraged owners and operators of all BPS-connected solar PV resources to review and implement the recommendations as well as complete the data collection worksheet.
May 2018	*Industry Recommendation: Loss of Solar Resources during Transmission Disturbances due to Inverter Settings - II*	NERC identified adverse characteristics of inverter-based resource performance during grid faults that could present potential risks to reliability of the BPS. As the penetration of inverter-based resources (particularly solar PV resources) continues to increase in North America, these adverse characteristics need to be widely communicated. This Level 2 Industry Recommendation alerts industry to the performance issues observed with BPS-connected solar PV resources, and provides recommended actions to address fault ride-through and timely restoration of current injection. Although the alert pertains specifically to BES solar PV resources, the same characteristics may exist for all BPS-connected solar PV resources (as well as battery energy storage and wind resources) regardless of installed generating capacity or interconnection voltage. Owners and operators of those facilities are encouraged to consult their inverter manufacturers, review inverter settings, and implement the recommendations. **Webinar:** Presentation | Streaming Webinar
June 2017	*Industry Recommendation: Loss of Solar Resources during Transmission Disturbances due to Inverter Settings*	NERC identified a potential characteristic exhibited by some inverter-based resources, particularly utility-scale solar PV generation that reduce power output during BPS faults and pose potential risks to BPS reliability. With the recent and expected increases of utility-scale solar resources, the causes of this reduction in power output from utility-scale power inverters needs to be widely communicated and addressed by the industry. The industry should identify reliability preserving actions in the areas of power system planning and operations to reduce the system reliability impact in the event of widespread loss of solar resources during faults on the power system.

Reliability Guidelines		
Published	**Title**	**Summary**
March 2022	*Electromagnetic Transient Modeling for BPS-Connected Inverter-Based Resources: Recommended Model Requirements and Verification Practices*	This reliability guideline provides recommendations for the development of EMT model requirements, model quality checks, and verification practices specifically for EMT models used to represent BPS-connected inverter-based resources in reliability studies conducted by TPs and PCs. These recommendations are intended to help ensure that EMT models provided by GOs are representative of the expected behavior of the actual or planned facility to the greatest extent possible so that potential reliability risks are adequately captured in the modeling studies. The primary goal of this guideline is to enable TPs and PCs to obtain high-quality EMT models for BPS-connected inverter-based resources so that they can perform applicable simulations when necessary to proactively identify and better mitigate emerging reliability risks. **Webinar:** Presentation | Streaming Webinar
March 2021	*Performance, Modeling, and Simulations of BPS-Connected Battery Energy Storage Systems and Hybrid Power Plants*	This guideline contains detailed recommendations regarding BESS and hybrid power plant performance, modeling, and studies.
September 2019	*Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources*	This guideline serves as a resource for utilities to develop interconnection requirements. Chapter 1 provides a summarization of recommended improvements to interconnection requirements for TOs to consider as they continually develop and enhance interconnection requirements per FAC-001-3 and interconnection study requirements per FAC-002-2.11 Chapter 2 covers the performance aspects while Chapter 3 cover modeling considerations (both key components to the interconnection process). This guideline was retired in June 2023. **Webinar:** Presentation | Streaming Webinar
September 2018	*BPS-Connected Inverter-Based Resource Performance*	This guideline provides recommended steady-state and dynamic performance characteristics for inverter-based resources and also covers a wide range of related aspects from protective functions to monitoring capability. This guideline was retired in June 2023.
December 2017	*Integrating Inverter-Based Resources into Low Short Circuit Strength Systems*	This guideline provides the electric utility industry with background and useful reference information pertaining to the topics of identifying weak grid conditions and potential issues that may arise from weak grids when connecting or operating inverter-based resources. The goal of this guideline is to proactively provide the industry with information to consider as these types of issues emerge for increased penetrations of inverter-based resources.

White Papers		
Published	**Title**	**Summary**
December 2021	*IRPWG Grid Forming Technology*	This white paper compares grid-forming (GFM) and grid-following (GFL) inverter-based resource capability and their major performance characteristics and advantages. Currently, the most commonly used GFM control strategies of droop-based GFM control, virtual synchronous machine control, and virtual oscillator control are briefly summarized. This white paper also provides recommendations for entities across North America to consider studying and deploying GFM technology to support BPS reliability and resilience with increasing inverter-based resource penetration levels.
October 2021	*IRPWG Odessa Follow-Up*	This brief white paper was developed by the NERC Inverter-Based Resource Performance Working Group (IRPWG) as a follow-up to the *Odessa Disturbance Report* published by NERC in October 2021. That report contained a set of key findings and recommendations. The IRPWG discussed each of the key findings and recommendations in detail and is providing a brief technical discussion and technical basis for each recommendation. Where appropriate, follow-up action items are identified.
September 2021	*IRPWG Utilizing the Excess Capability of BPS-Connected Inverter-Based Resources for Frequency Support*	The Federal Energy Regulatory Commission (FERC) issued Order No. 842 in 2018, amending the pro forma Large Generator Interconnection Agreement (LGIA) and Small Generator Interconnection Agreement (SGIA) to require all "newly interconnecting large and small generating facilities, both synchronous and non-synchronous, to install, maintain, and operate equipment capable of providing primary frequency response (PFR) as a condition of interconnection." This work extends on the FERC Order NO. 842 and the March 2020 NERC white paper and recommends leveraging primary frequency response (PFR) and fast frequency response (FFR). PFR and FFR capabilities from inverter-based resources to the extent possible to support BPS frequency as an essential reliability service.
June 2021	*IRPWG San Fernando Follow-Up*	This brief white paper was developed by the NERC IRPWG as a follow-up to the July 2020 San Fernando Disturbance Report published by NERC. That report contained a set of key findings and recommendations. The IRPWG discussed each of the key findings and recommendations in detail, provides a brief technical discussion and basis for each item, and where appropriate recommends follow-up action items.
March 2020	*IRPTF Fast Frequency Response Concepts and Bulk Power System Reliability Needs*	This white paper describes the interrelationships between primary frequency response (PFR) and fast frequency response (FFR). **Webinar:** Presentation | Streaming Webinar

Technical Reports		
Published	**Title**	**Summary**
August 2020	*NERC-WECC Report on WECC Base Case Review for Inverter-Based Resources*	This report documents the review of the WECC 2020 HS3 base with the latest available WECC MDF dynamics models. Data is being updated and provided to WECC constantly, so it is likely that updates to models have been made even in the time duration between analysis and publication of this report. The goal of this report is to further document some of the issues identified during the cursory review of base case quality, highlight how this analysis was performed, and provide key findings and recommendations for industry next steps to address the modeling issues.
May 2020	*BPS-Connected Inverter-Based Resource Modeling and Studies*	The NERC Inverter-Based Resource Performance Task Force (IRPTF) and the industry have been working diligently on modeling and simulation activities to accurately represent inverter-based resources in dynamic stability analyses and explore the impacts of inverter-based resources on BPS reliability. This report outlines the activities of the IRPTF related to inverter-based resource modeling and studies. **Webinar:** Presentation | Streaming Webinar

NERC Reliability Standards Activities

Standards are one piece of the complex, dynamic endeavor of providing a comprehensive approach to reliability. NERC has various other tools to fulfill this mission, including guidelines, training, assessments, and alerts. This multi-pronged approach has resulted in a secure and reliable bulk power system for North America. New Reliability Standards begin with a Standards Authorization Request (SAR), which may be submitted by anyone but must have technical justification. SARs occasionally arise from other projects like informal development projects, periodic reviews, other standard projects, or if a reliability threat that may be mitigated by a standard arises.

- FERC NOPR on NERC Reliability Standards Enhancements for Inverter-Based Resources (2022): FERC issued a NOPR in November 2022 proposing to direct NERC to develop new or modify existing NERC Reliability Standards to address reliability gaps related to inverter-based resources. Topics focused on data sharing, modeling and model validation, planning and operational studies, and performance requirements. The ERO Enterprise submitted joint comments on the NOPR in February 2023, highlighting aligning with existing NERC Standards projects as well as the work done to-date to highlight potential risk issues.
- IRPTF Review of NERC Reliability Standards (2020): The industry was experiencing unprecedented growth in inverters-based resources, possibly creating circumstances where existing standards may not be sufficiently addressing reliability risks. As a result, the NERC Planning Committee (PC) and Operating Committee (OC) assigned the NERC IRPTF a task of evaluating the NERC Standards and their requirements. This white paper details the key findings and recommendations for future action.
- IRPTF PRC-024-2 Gaps Whitepaper (2019): The IRPTF scope document includes a deliverable on "recommendations on inverter-based resource performance and any modifications to NERC Reliability Standards related to the control and dynamic performance of these resources during abnormal grid conditions." The white paper presented here details the findings of the IRPTF as a result of investigations related to this deliverable. Specifically, the white paper details potential gaps and needed clarifications in PRC-024-2: Generator Frequency and Voltage Protective Relay Settings. There is some overlap between the findings of this white paper and the Integration of Variable Generation Task Force (IVGTF) Summary and Recommendations of 12 Tasks, which was published in 2015.
- NERC Standards Projects related to Inverter-based Resources:
  - Project 2018-04 – Modifications to PRC-024-2
  - Project 2020-02 – Modifications to PRC-024 (Generator Ride-Through)
  - Project 2020-05 – Modifications to FAC-001 and FAC-002
  - Project 2020-06 – Verifications of Models and Data for Generators
  - Project 2021-01 – Modifications to MOD-025 and PRC-019

- Project 2021-02 – Modifications to VAR-002
- Project 2021-04 – Modifications to PRC-002
- Project 2022-02 – Modifications to TPL-001-5.1 and MOD-032-1
- Project 2020-02 – Modifications to PRC-024 Generator Ride-Through
- Project 2022-04 – EMT Modeling
- Project 2023-01 – EOP-004 IBR Event Reporting
- Project 2023-02 – Performance of IBRs

Other Activities

- IEEE/NERC Impact of Inverter-Based Generation on Bulk Power System Dynamics and Short-Circuit Performance (2018): This report covers the various aspects of low fault current conditions and how to accommodate a changing resource mix.
- Inverter Manufacturer and Relay Manufacturer Coordination Meeting (2019): NERC facilitated an in-depth technical discussion between inverter manufacturers, protective relay manufacturers, and industry experts related to current injection of BPS-connected inverters during fault conditions and potential impacts and solutions for BPS protection schemes. This document contains the key takeaways, recommendations, and next steps that were an outcome of this discussion.
- IEEE 2800-2022: Uniform technical minimum requirements for the interconnection, capability, and lifetime performance of inverter-based resources interconnecting with transmission and sub-transmission systems are established in this standard. Included in this standard are performance requirements for reliable integration of inverter-based resources into the bulk power system, including, but not limited to, voltage and frequency ride-through, active power control, reactive power control, dynamic active power support under abnormal frequency conditions, dynamic voltage support under abnormal voltage conditions, power quality, negative sequence current injection, and system protection. This standard also applies to isolated inverter-based resources that are interconnected to an ac transmission system via dedicated voltage source converter high-voltage direct current (VSC-HVDC) transmission facilities; in these cases, the standard applies to the combination of the isolated inverter-based resources and the VSC-HVDC facility, and not to an isolated inverter-based resource on its own.
- ESIG-NERC-NAGF-EPRI Joint Workshop on Generator Interconnection (2022): NERC joint sponsored a virtual workshop focused on the important relationships between interconnection process reforms and new capability and performance standards for inverter-based

resources. The goal of the workshop was to provide education on both topics and how they interact for potentially expediting the interconnection process while also supporting a more economic, sustainable, and reliable future power system. The workshop focused on the technical aspects of the interconnection process – modeling, studies, technical minimum requirements, etc. – and was intended for a broad engineering, policy, and decision maker audience.

- NERC Board of Trustees/Member Representatives Committee Meeting Technical Session – Inverter-Based Resource Panel (2023): NERC held a technical session at its February 2023 MRC/BOT meetings with a panel dedicated to the challenges faced by BPS-connected inverter-based resources. The panel covered a wide range of challenges facing industry with respect to the rapidly changing resource mix and potential BPS reliability risks posed by this change. In particularly, the rapid integration of inverter-based resources was noted as the most significant driver of grid transformation, and a reliability risk that must be taken seriously moving forward.
- Registration Activities Related to Inverter-Based Resources (2022): In November 2022, FERC issued an order directing NERC to submit a work plan detailing how it plans to identify and register owners and operators of inverter-based resources connected to the BPS yet do not meet the BES definition. The registration focuses on "unregistered" inverter-based resources that have an aggregate, material impact on reliable operation of the BPS. NERC submitted its work plan to FERC and has initiated work regarding modifications to the NERC registration process and Rules of Procedure.

NERC Stakeholder Groups

- Inverter-Based Resource Subcommittee (IRPS): The NERC IRPS was formed to explore the performance characteristics of BPS-connected inverter-based resources and provide technical support to any analyses of BPS disturbances involving BPS-connected inverter-based resources. The group also focuses on developing technical documents to support BPS planning and operations under increasing penetrations of BPS-connected inverter-based resources. The technical materials are intended to help transmission and generation entities understand the performance aspects, modeling, and system studies of BPS-connected inverter-based resources. The IRPS reports to the NERC Reliability and Security Technical Committee (RSTC).
- Electromagnetic Transient Task Force (EMTTF): The NERC EMTTF was formed to support and accelerate industry adoption of electromagnetic transient (EMT) modeling and simulations during the interconnection and planning studies for BPS-connected inverter-based resources. The task force will provide guidance and reference materials to Transmission Planners and Planning Coordinators embarking on EMT modeling and simulations to more adequately assess BPS impacts and reliability risks of interconnecting inverter-based resources. The EMTTF reports to the IRPS under the NERC RSTC.

Upcoming Events		
Dates	**Event**	**Summary**
October 18, 2023	GMF Informational Webinar	NERC has scheduled an informational webinar on October 18 at 2:00-3:30 p.m. Eastern. The purpose of the webinar is to discuss grid forming technology, review key findings and recommendations from both documents, and outline next steps. **Date:** October 18, 2023 | 2:00 – 3:30 p.m. Eastern