NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Announcement

NERC Releases Findings and Critical Recommendations from Inverter-Based Resource Level 2 Alert

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ATLANTA – As the penetration of inverter-based resources (IBR) connected to the bulk power system continues to rapidly increase, it is paramount that any performance deficiencies with existing and future generating resources be addressed in an effective and efficient manner. As part of its *IBR Strategy* to proactively identify and address IBR integration challenges and drive risk mitigation activities, NERC has analyzed multiple large-scale disturbances involving widespread loss of IBRs that have resulted in abnormal performance across several Bulk Electric System solar photovoltaic generating resources. These systemic performance issues could lead to potential widespread outages if they persist, NERC has warned.

To help mitigate this risk, NERC issued a Level 2 alert in March that provided strong recommendations for Generator Owners of all bulk power system-connected IBR facilities to improve performance of their resources and required owners of bulk power system-connected solar photovoltaic facilities to provide site-specific information via a data submission worksheet. The resulting report, released today, provides key findings and critical recommendations based on the analysis NERC conducted using the data collected through the alert and details the extent of the potential risks posed to the bulk power system.

"For many years, NERC has been working collaboratively with industry to produce world-class recommended practices to help ensure reliability around this evolving technology," said Ryan Quint, NERC's director of Engineering and Security Integration. "The findings in this report demonstrate that potential reliability gaps exist when those recommended practices are not implemented."

Some of the report's key findings include:

- Many Generator Owners indicated that they did not have the requested facility data readily available.
- About 5,200 MW of Bulk Electric System IBRs have voltage and frequency protection settings within the NERC PRC-024 "no trip zone."

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- About one-quarter of the reported facilities use phase lock loop loss of synchronism protection with a trip threshold that results in an increased likelihood of inadvertent tripping during normally cleared grid faults.
- About one-quarter of the reported facilities use a fault ride-through mode that does not adequately support bulk power system reliability.
- About one-third of the reported facilities use a "triangle-shaped" facility reactive power capability curve, indicating a significant amount of underused reactive power capability.

The report also includes crucial recommendations that should be addressed in a timely manner:

- The NERC Inverter-Based Resource Performance Subcommittee of the Reliability and Security Technical Committee will develop a standard authorization request (SAR) for enhancements to FAC-001 to support the uniform IBR performance requirements established by Transmission Owners. Based on this and other NERC reports, the subcommittee should also consider proposing commissioning requirements for Generator Owners of IBRs; the SAR might mention that the standard could be applied at commercial operation to ensure adequate risk mitigation steps occurred during the commissioning process.
- NERC will develop two Reliability Standard Projects — Project 2020-02 – Modifications to PRC-024 and Project 2023-02 – Performance of IBRs — to produce performance and post-disturbance analytical expectations that will address the systemic IBR performance issues and support a more reliable IBR fleet. Both projects are considered high priority given the recent FERC Order No. 901. This report reiterates the criticality of implementing these standards in a timely manner to ensure adequate ride-through performance of IBRs as well as proactive risk mitigation by Generator Owners.
- NERC will issue a Level 2 alert in early 2024 to gather modeling and study information from Generator Owners and Transmission Providers. This alert will share recommended practices regarding modeling and study enhancements as well as gather data to assess the extent of condition of possible modeling and study risks. Both the upcoming Level 2 alert on modeling and study practices and this alert on IBR performance issues will inform the contents of a Level 3 alert, providing essential actions for high-risk IBR Issues that will be issued in the first half of 2024.

NERC recognizes the need to harness all the unique capabilities of and provide a solution to the challenges presented by IBRs to maintain grid stability, ensure a strong security posture and reliably integrate these resources and technologies to achieve a resilient system capable of meeting 21st century energy demands. NERC's efforts in this area are a component of its 2023 work plan priorities, which strive to keep NERC at the forefront of the transformation by focusing on four key areas: Energy, Security, Agility and Sustainability. To learn more about NERC's work surrounding IBRs, visit the *Inverter-Based Resource Activities Quick Reference Guide*.

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Electricity is a key component of the fabric of modern society and NERC, as the Electric Reliability Organization, serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of NERC and the six Regional Entities, is a highly reliable and secure North American bulk power system. Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.