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| NOGRR Number | TBD | NOGRR Title | Advanced Grid Support Requirements for Inverter-Based Resources (IBRs) |
| Date Posted | | TBD | |
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| Requested Resolution | | Normal | |
| Nodal Operating Guide Sections Requiring Revision | | 2.14, Advanced Grid Support Requirements for Inverter-Based Resources (new) | |
| Related Documents Requiring Revision/Related Revision Requests | | Planning Guide Revision Request (PGRR) xxx, Related to NOGRRXXX, Advanced Grid Support Requirements for Inverter-Based Resources (IBRs) | |
| Revision Description | | This Nodal Operating Guide Revision Request (NOGRR) establishes new requirements for inverter-based Energy Storage Resources (ESRs) connected to the ERCOT transmission grid. | |
| Reason for Revision | | [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 1 – Be an industry leader for grid reliability and resilience  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 2 - Enhance the ERCOT region’s economic competitiveness with respect to trends in wholesale power rates and retail electricity prices to consumers  [Strategic Plan](https://www.ercot.com/files/docs/2023/08/25/ERCOT-Strategic-Plan-2024-2028.pdf) Objective 3 - Advance ERCOT, Inc. as an independent leading industry expert and an employer of choice by fostering innovation, investing in our people, and emphasizing the importance of our mission  General system and/or process improvement(s)  Regulatory requirements  ERCOT Board/PUCT Directive  *(please select ONLY ONE – if more than one apply, please select the ONE that is most relevant)* | |
| Justification of Reason for Revision and Market Impacts | | ERCOT submits this PGRR to provide system resilience and maintain stable operation for an IBR dominated ERCOT grid. The highest instantaneous wind and solar generation penetration has exceeded 75% in 2024. And more than 20 Generic Transmission Constraints (GTCs) have been created and enforced in Real-Time operation to ensure reliable operation. Most GTCs created in the last 10 years were related to Inverter-Based Resources (IBRs) and several of those GTCs are among the top 10 constraints on the ERCOT System. According to the ERCOT monthly Generator Interconnection Status Report, the continuous growth of IBRs is projected requiring ERCOT to explore options and system needs to continuously maintain the desired system stability and resilience.  In 2021 and 2023, the North American Electric Reliability Corpration (NERC) published two white papers related to grid forming for Bulk Power System (BPS)-connected battery energy storage systems. In these white papers, NERC stated that grid forming IBRs are needed to maintain stable operation for grids dominated by IBRs. Globally, electric system operators with high penetration of IBRs, like the United Kingdom’s Electic System Operator (ESO) and Australia’s Energy Market Operator (AEMO), not only have developed specifications but also implemented several grid-forming ESRs. These industrial efforts have led to the development of new capabilities that are commercially available today.  ERCOT has assessed the impact of such advanced grid support capability provided by the ESRs and presented the preliminary results to the Inverter-Based Working Group (IBRWG) in July 2024 (see presentation [ERCOT Advanced Grid Support Inverter-based Energy Storage System Assessment and Adption Discussion](https://www.ercot.com/files/docs/2024/07/09/2024_07_ERCOT_IBRWG_ERCOT%20Advanced%20Grid%20Support%20Inverter-based%20ESRs%20Assessment%20and%20Adoption%20Discussion_v1_.pdf)). ERCOT believes the proposed requirements will help improve grid stability and resilience to maintain stable operation of the ERCOT Transmission Grid dominated by IBRs. The potential benefits observed in the ERCOT assessment include (1) improvement of voltage and frequency response during the events which would reduce the event impact to the ERCOT Transmission Grid, (2) reduction in risk of IBRs tripping or unstable operations, and (3) increase in GTC limits which could reduce the generation curtailment due to stability constraints.  For the ESRs not required to comply with proposed the advanced grid support requirements, ERCOT plans to consider ways to encourage existing ESRs to provide advanced grid support service when practical and feasible in future revision requests. ERCOT also plans to explore if such advanced grid support services can be provided by other IBRs like wind and solar. | |

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| Proposed Guide Language Revision |

**2.14 Advanced Grid Support Requirements for Inverter-Based Resources (IBRs)**

(1) An Energy Storage Resource (ESR) that interconnects to the ERCOT Transmission Grid pursuant to a Standard Generation Interconnection Agreement (SGIA) executed on or after April 1, 2025 shall comply with the requirements of this Section.

(a) An ESR shall maintain a constant or near-constant voltage phasor in the timeframe immediately after changes occur on the system, maintaining synchronism with the ERCOT Transmission Grid and continuing to provide normal grid supporting functions and services at all times.