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| NOGRR Number | [272](https://www.ercot.com/mktrules/issues/NOGRR272#summary) | NOGRR Title | Advanced Grid Support Requirements for Inverter-Based ESRs |

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| Date | June 04, 2025 |

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| Submitter’s Information | |
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| Market Segment | Not Applicable |

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| Comments |

ERCOT submits these comments to:

(1) incorporate several revisions to Nodal Operating Guide Revision Request (NOGRR)   
 272;

(2) highlight the urgency to adopt the advanced grid support requirements and   
 encourage stakeholders to move Nodal Operating Guide Revision Request   
 (NOGRR) 272, Advanced Grid Support Requirements for Inverter-Based ESRs, and   
 Planning Guide Revision Request (PGRR) 121, Related to NOGRR272, Advanced   
 Grid Support Requirements for Inverter-Based ESRs, forward for consideration at   
 the September 2025 Board of Directors meeting;

(3) describe the problems with the approach proposed in Nodal Protocol Revision   
 Request (NPRR)1278 and recommend that it not move forward; and

(4) propose to sponsor a future NPRR that would implement a one-time advanced grid   
 support (“AGS”) new technology incentive concept to encourage AGS adoption for   
 existing Inverter-Based Resources (IBRs). ERCOT is also open to working with   
 stakeholders on another future NPRR if circumstances change.

As of April 2025, a total of ~82 gigawatts (GW) of IBRs, including ~39 GW of wind Generation Resources (GRs), ~31 GW of solar GRs, and ~12 GW of battery Energy Storage Resources (ESRs), are operational and the highest instantaneous IBR penetration has reached to 76%. All of these connected IBRs are considered to be grid-following (“GFL”) IBRs, which are prone to stability issues especially in existing weak grids and the areas that will become weak as more GFL IBRs are integrated. An additional ~50 to 70 GW of IBRs are also projected to connect to the ERCOT Transmission Grid by 2028. ERCOT has worked with stakeholders to implement several improvements in recent years to address and mitigate existing stability challenges, including installing more synchronous condensers and sponsoring NOGRR245, Inverter-Based Resource (IBR) Ride-Through Requirements. Additional improvement options will be needed for further grid integration of IBRs and Loads. Widespread adoption of grid-forming (“GFM”) IBRs that provide AGS will significantly improve the stability of the grid in areas where they are installed. Therefore, adoption of NOGRR272 and PGRR121 is imperative to continue to support reliable grid operation and voltage/frequency response in both normal operations and during disturbances and to facilitate the continued integration of new Resources and Loads that are sensitive to grid voltage and frequency stability.

ERCOT provides several revisions to this NOGRR:

* Section 2.14, change the effective date of new ESRs to meet AGS requirements.
* Clarify performance requirements are based on dynamic model requirements described in the Planning Guide Section 6.2, Dynamics Model Development.

ERCOT has reviewed NPRR1278 and provides the following concerns with the proposed market service framework:

* **Consistent technical requirements**: The technical requirements described in NPRR1278 are generally consistent with those established in NOGRR272 and PGRR121.
* NOGRR272 and PGRR121 do not change the voltage support requirements for Resources and do not address the Public Utility Commission of Texas (PUCT) Blueprint requirement to create a service to compensate voltage support services.
* **Lack of defined services**: NPRR1278 mentioned the examples of other regions that have adopted AGS for ESRs. It should be noted that those examples, including National Energy System Operator in Great Britain, have different performance requirements compared with NOGRR272. Specific inertia and short-circuit contributions that are components of AGS in those regions typically require higher hardware specifications or require Resources to maintain headroom to meet the required performance requirements. NOGRR272 clarifies that ESRs are required to provide AGS when operating within their current limits. Specific service needs, such as inertia or short-circuit current contribution, would still need to be defined in NPRR1278 though. ERCOT has identified that the minimum inertia level must be maintained and will be monitoring the Real-Time inertia performance. Currently, ERCOT has not identified specific inertia or additional short-circuit current contribution needs from IBRs. In addition to the market service examples mentioned in NPRR1278, many regions in the US and globally are in the process of adopting AGS similar to that proposed, including MISO, Fingrid, and ENTSO-e.
* **Lack of details on how the proposed framework can be implemented**: NPRR1278 would require ERCOT to identify the need in advance on an annual basis both for the quantity and location of AGS and to procure sufficient AGS to meet the need through an annual Request for Proposal (RFP). Identification of stability needs depends on accurate models and specific grid conditions such as new generation, load, transmission, and outages. Therefore, identification of the annual need for AGS will require a significant technical assessment effort and may necessitate changes to existing interconnection processes to ensure that all required information is available well in advance of the technical assessment. Furthermore, given that grid conditions and stability challenges will vary, the identified stability needs will be limited to the information currently available at that time and cannot capture the potential stability issues arising from future integrations to the ERCOT System. To address both near-term and long-term stability challenges, it would be best to require all new Energy Storage Resources (ESRs) to provide AGS. It is not clear if it is practical to obtain a market service via an RFP to procure AGS from all new ESRs though.
* **Cost and resources:** NPRR1278 will require an ERCOT project to implement that will entail significant costs and time commitment.
* **Launch complications:** There are no existing ESRs with AGS capability available to bid into this service, so it is unclear how the initial round of this RFP would occur. It is also not clear what the performance requirement is if the service is no longer awarded to a Resource, which could further increase the challenges to and complexity of the technical assessment.

For these reasons, ERCOT recommends that NPRR1278 not move forward, at least in its current form.

ERCOT acknowledges the need for and benefit of incentivizing existing IBRs to adopt AGS. To better address this, ERCOT plans to propose a new concept that will provide a one-time incentive to existing IBRs. For example, if an IBR can implement AGS by a defined deadline, such as December 31, 2027, the Resource could receive this incentive based on its capacity, incentive price, and availability after 12 months of its AGS implementation. ERCOT plans to submit an NPRR with a more detailed implementation plan for this concept in summer 2025.

Finally, ERCOT encourages stakeholders to approve NOGRR272 and PGRR121 in time to be considered at the September meeting of the ERCOT Board of Directors. Although ERCOT does not consider NPRR1278, as written, to be needed at this time, if an ESR were to be required in the future to preserve headroom or State of Charge (SOC) for AGS, then ERCOT will work with stakeholders on an NPRR to provide an opportunity cost payment and will develop an NPRR for a future inertia service or similar service if such a service becomes necessary in the future.

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| Revised Cover Page Language |

None

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| Revised Proposed Guide Language |

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

(1) An Energy Storage Resource (ESR) shall provide the following advanced grid support when operating within the inverter current limit.

(a) An ESR shall maintain an internal voltage phasor that is constant or near-constant in the sub-transient to transient timeframe by meeting the modeling requirements described in the Planning Guide Section 6.2, Dynamics Model Development. An ESR shall immediately respond to changes in the external system and maintain ESR control stability during normal and disturbance conditions. The voltage phasor must be controlled to maintain synchronism with the ERCOT Transmission Grid and regulate real power and Reactive Power appropriately to support the ERCOT Transmission Grid.

(2) An ESR that interconnects to the ERCOT Transmission Grid pursuant to a Standard Generation Interconnection Agreement (SGIA) executed before October 1, 2025 and that has paid the required financial security in full to the Transmission Service Provider (TSP) before October 1, 2025, is not required to comply with the requirements of this Section.