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| NOGRR Number | [245](https://www.ercot.com/mktrules/issues/NOGRR245) | NOGRR Title | Inverter-Based Resource (IBR) Ride-Through Requirements |

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| Date | August 03, 2023 |

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| Submitter’s Information | |
| Name | Keith Smith |
| E-mail Address | [keism@orsted.com](mailto:keism@orsted.com) |
| Company | Ørsted Americas |
| Phone Number | 737-610-4256 |
| Cell Number | 737-610-4256 |
| Market Segment | Independent Generators |

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| Comments |

Ørsted, either directly or through its affiliates, develops, constructs, owns, and operates offshore and onshore wind Resources, solar farms, storage, and offshore transmission facilities. Ørsted is among the world’s largest renewable energy companies. We own and operate approximately 2.5 GW of wind, solar and storage Resources in ERCOT. As a large Inverter-Based Resource (IBR) developer with over 1 GW of Resources in development, and potentially many more on the way, NOGRR 245, Inverter-Based Resource (IBR) Ride-Through Requirements has the potential to directly impact Ørsted. Overall, we recognize that maintaining reliability with a grid made up of growing numbers of large IBRs will be challenging and critically important. We realize that standards like 2800-2022 – IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems (“IEEE 2800-2022 standard”) will have an important role in the grid of the future and we look forward to continued dialog with ERCOT on how NOGRR 245 can improve system reliability.

However, it is important to note that some technologies used by IBR developers may not be able to demonstrate conformance with IEEE 2800-2022 standard. The standard itself plainly recognizes this fact. Section 1.4, General remarks and limitations, of the IEEE 2800-2022 standard provides:

“It is not the intent of this standard to limit the adoption of emerging use cases of synchronous machines, for example, the use of a synchronous condenser as a supplemental IBR device to improve the ride-through capability of an IBR plant under extreme contingency conditions. At the time of writing of this standard, neither design details, test data, nor technical literature is available to confirm that these emerging use cases (i.e., synchronous condenser as a supplemental IBR device) will be able to meet all specified requirements of this standard, unless the synchronous condenser exceeds applicable equipment standards, for example, IEEE Std C50.12™ [B60], IEEE Std C50.13 [B61], and IEC 60034-3 [B30] for synchronous machines, including synchronous condensers, and ANSI/NEMA MG-1 [B4] for motors and generators. Due consideration should be given to the benefits and risks of the emerging use cases of synchronous machines in deciding which IBR plant requirements of this standard should be adopted and which may be exempted. This should be done in coordination between IBR owner and TS owner/TS operator not later than the IBR plant design evaluation where capabilities and performance of a synchronous condenser are adequately considered.”

Therefore, Ørsted recommends that ERCOT establish a “good cause” exemption provision. Under such a provision, IBR plants that need technologies, such as synchronous condensers, would qualify for a good cause exemption if they cannot practically demonstrate conformance with all clauses of the IEEE 2800-2022 standard. Similarly, IBR plants in ERCOT have varied capabilities, some may be able to demonstrate compliance with some clauses of NOGRR245 and the plant response may even be superior than the minimum requirement. But the same IBR plant may not be able to meet some other NOGRR245 requirement. Hence, Ørsted requests ERCOT to consider a case-by-case evaluation and exemptions to certain requirements of NOGRR245 as a practical solution for IBR plants that have demonstrated technology limitations.

Ørsted also notes that several wind turbine “Original Equipment Manufacturers” (OEMs) had repeatedly commented and presented to ERCOT that their existing turbine model types will not be able to comply with NOGRR245 requirements. OEMs are still evaluating which of their installed turbine models require software updates, hardware retrofits or both to be in compliant with new NOGRR245 requirements. When OEMs of individual IBRs need time to evaluate their equipment’s compliance, it is impossible for a Resource Entity to demonstrate compliance of their existing IBRs at a plant level with a greater confidence within the required timelines as stated in NOGRR245.

Additionally, ERCOT did not identify any tests in their Protocols and Nodal Operating Guides that can be used for a new or existing Resource Entity to demonstrate its compliance at the full IBR plant level. Without proper test guidelines either from ERCOT or from IEEE 2800-2022 standard, Resource Entities cannot confidently verify their plant performance to meet new NOGRR245 requirements. The timelines for existing IBRs to comply with new requirements did not consider the time it takes for IEEE P2800.2 - Recommended Practice for Test and Verification Procedures for Inverter-based Resources (IBRs) Interconnecting with Bulk Power Systems (“IEEE P2800.2 standard”) to become effective and for engineering firms to fully evaluate and implement the recommendations. This approach is necessary to ensure the right models are available for ERCOT to effectively plan and operate the grid.

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| Revised Cover Page Language |

None

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| Revised Proposed Guide Language |

None