



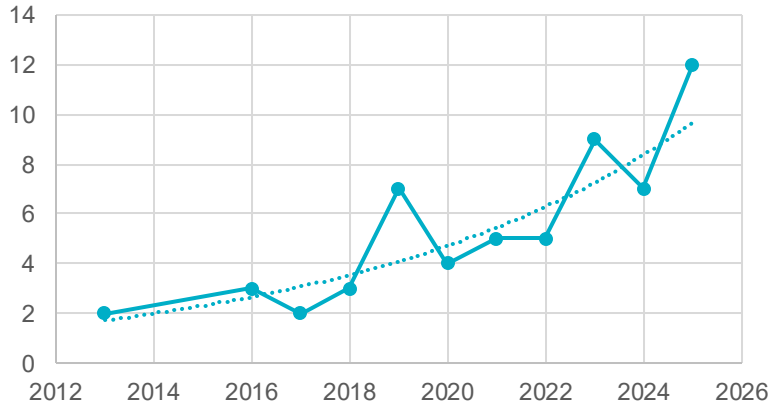
Welcome & Context Setting

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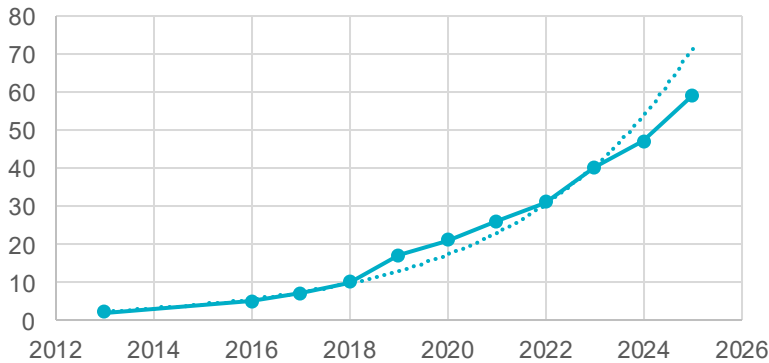
NOGRR245 Workshop 3
August 8, 2025

IBR Ride-Through Events Over Time

Ride-Through Events Over Time



Cumulative Ride-Through Events



2024 and YTD 2025

Date	Region	# Affected Facilities	IBR Type
1/16/2024	South	6	Wind
3/5/2024	West	4	Solar
5/22/2024	Central	1	Wind
5/23/2024	South	5	Wind
6/2/2024	Panhandle	3	Wind
7/24/2024	Coastal	1	Wind
9/21/2024	Panhandle	3	Wind
1/10/2025	West	1	BESS
1/21/2025	South	1	Wind
1/21/2025	South	7	Wind
1/21/2025	South	5	Wind
1/29/2025	West	1	BESS
3/4/2025	West	8	7 Wind, 1 Solar
3/4/2025	South	4	Wind
3/27/2025	South	2	Wind
4/9/2025	West	4	2 Wind, 2 Solar
4/14/2025	Panhandle	7	6 Wind, 1 Solar
4/15/2025	West	4	Wind
7/8/2025	West	6	5 Wind, 1 Solar

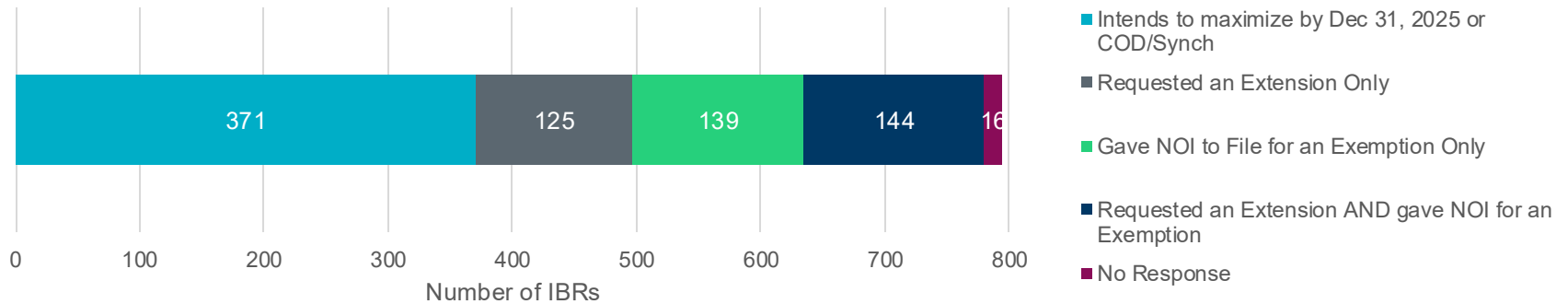
Key Takeaway: Ride-through failures remain a significant concern

How We Got Here

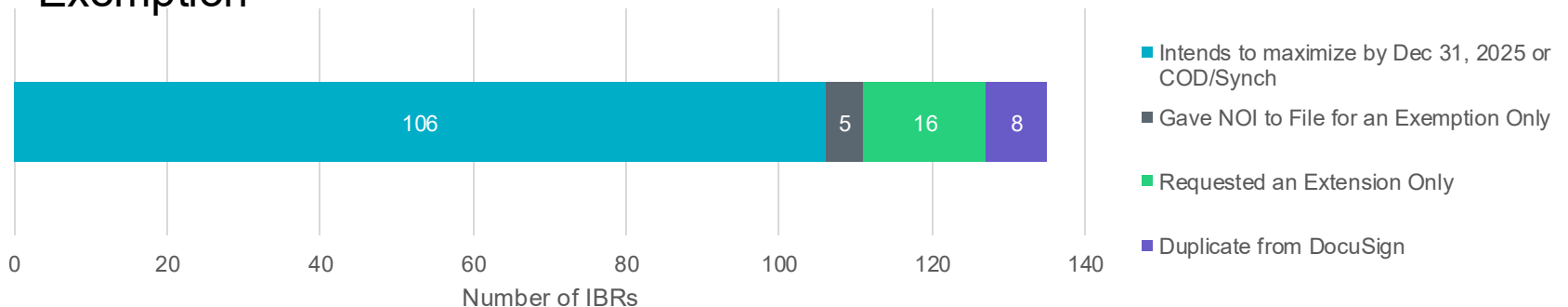
- ERCOT proposed NOGRR245 on 1/11/23
- Board and PUCT approved NOGRR245 with 4/1/25 date to submit required data
 - Effective 10/1/24
- ERCOT issued [Market Notice](#) on 1/8/25
- ERCOT issued 2nd [Market Notice](#) on 2/19/25
- To assist Resource Entities (REs)/Interconnecting Entities (IEs) to provide required info, ERCOT:
 - Developed data submission process via DocuSign/RIOO
 - Provided templates (ride-through capability questions/IFRTCR/IVRTCR)
 - Posted FAQ on website
 - Held two workshops (February / March)
 - Created dedicated email box for Qs (NOGRR245@ercot.com)
 - Answered 240 email Qs
- ERCOT extended original 4/1/25 deadline to 4/15/25

April Submittals Summary

- ERCOT sent RFIs to REs for 795 Resources in Network Operations Model and near commissioning or already commissioned



- IEs and REs in early stages of the interconnection process had to respond to RFIs only if requesting extension or submitting Notice of Intent to Request an Exemption



Key Takeaway: Initial assessment indicates no submission met all requirements in NOG

High-Level

- (1) **Exemption:** Resource cannot meet ride-through requirement(s)

- (2) **Extension:** Resource *can* meet ride-through requirements *but* needs more time to implement modifications to comply [NOG §§ 2.6.2.1(7); 2.9.1(6); 2.9.1.1(8), (9); 2.9.1.2(9)]
 - Extensions ***not*** available because Resource could not determine if it could comply w/ requirements

Key Takeaway: For either (1) or (2), NOG required ***all*** technical limitations (and associated support) by 4/1/25 [NOG § 2.11.1(2)]

No Subsequent NOGRR

- NOG § 2.12.1 refers to “...exemption based on standards established in a subsequent [NOGRR]”
- PUCT Order (Project 57374) approving 16 TAC § 25.517 states:

This rule takes the place of the additional NOGRR that had been planned, and this modification maintains the prospective orientation of the rule by not altering the substantive provisions of the requirements that have already been settled. (emphasis added)

Key Takeaway: Elec. Subst. Rule § 25.517 superseded the need for subsequent NOGRR in NOG § 2.12.1 and no subsequent NOGRR is forthcoming

IFRTCR/IVRTCR Requirements

NOG §§ 2.11.1 and 2.11.2

- (a) RE DUNS Number | (b) IBR/WGR Site Name | (c) IBR/WGR Unit Name(s)
- (d) NOG Section(s) with which Resource cannot comply
- (e) Current ride-through capability in a format similar to the table in NOG
- (f) Known ride-through limitations of Resource as compared to requirements in NOG
- (g) Detailed description of technical limitation preventing Resource from meeting ride-through requirement, including letter signed by officer or executive of OEM (or subsequent support company if OEM no longer in business) or engineering consulting firm verifying the limitations (w/ qualification)
- (h) Available software, firmware, settings or parameterization (SFSP) modifications RE will implement to maximize ride-through capability w/n known equipment limitations, to the greatest extent possible
- (i) To the extent RE chooses to implement changes to existing equipment other than SFSP modifications to increase ride-through capability, identify any such equipment modifications
- (j) Expected post-modification Resource capability in format similar to table in NOG and documentation of expected remaining limitation(s) following implementation of such modifications
- (k) Schedule for implementing modification(s)
- (l) **Model accurately representing expected performance reflecting all technical limitations** or statement no new post-modification models available other than currently submitted to ERCOT that already reflect all technical limitations in ride-through capability
- (m) Description of any limitation that cannot be accurately represented in a model

Submittal Deficiency Samples – Common Themes

- Entity providing data is not the registered RE
- Entity states “we provided best available information at this time”
- OEM did not provide required information
- OEM did not provide model
- Model to be provided

Deficiency: NOG and PUCT Rule § 25.503(f)(10) required complete and accurate info on technical limitations by 4/1/25 (extended to 4/15/25)

- “See attached letter” but letter was not attached

Deficiency: Letter was not attached

IFRTCR/IVRTCR Samples

(f) Known ride-through limitations of the IBR, Type 1 WGR or Type 2 WGR as compared to the requirements

- Balance of plant relays need investigation by qualified protection engineer to ensure settings meet post-maximization requirements
- Could not adequately gather sufficient information to assess compliance with NOGRR 245 requirements
- Facility needs exemption due to lack of cooperation from OEM
- Unknown whether [ROCOF/anti-islanding/phase jump/current blocking] can be disabled
- Need extension to work with [OEM/Consultant] to identify capabilities
- Need extension due to complexity of model development and limited engineering resources

Deficiency: NOG and PUCT Rule § 25.503(f)(1) required complete and accurate info on technical limitations by 4/1/25 (extended to 4/15/25)

IFRTCR/IVRTCR Samples (cont'd)

(g) Detailed description of technical limitation preventing Resource from meeting ride-through requirement(s), including letter signed by officer or executive of OEM (or subsequent support company if OEM is no longer in business) or engineering consulting firm verifying limitations

- Resource does not comply with ride-through curve in NOG
- Balance of plant ride-through capability is not maximized per NOG requirements
- Resource requires extension to meet ride-through curve in NOG
- Resource requires extension to complete maximization due to complexity of model development and limited engineering resources

Deficiency: Not ***detailed description*** of technical limitations preventing Resource from meeting ride-through requirements and, instead, provide logistical issues associated with determining technical limitations

Consultant Report Deficiencies re: Item (g)

- Balance of plant protection relays must be expanded to maximize ride-through capability and *require investigation by qualified protection engineer*
- Potential software update *may be available* to enable K-factor current injection during voltage disturbances
- Extension requested to evaluate advantages and disadvantages of control modes to determine which results in better performance

Deficiency: Not ***detailed description*** of technical limitation preventing Resource from meeting ride-through requirements and, instead, indicate RE *may* provide required info in future *after* investigation by qualified protection engineer or determining if software update is available

IFRTCR/IVRTCR Samples (cont'd)

(j) Expected post-modification Resource capability in a format similar to the table in NOG and documentation of any expected remaining limitation(s) following implementation of such modifications

- Unknown whether ROCOF/anti-islanding/phase jump protection/current blocking can be disabled
- OEM did not answer if inverters use a filter time window of at least 1 cycle of fundamental frequency for instantaneous over-voltage
- OEM did not answer if instantaneous tripping of voltage and frequency use filtering to prevent misoperation

Deficiency: Do not provide *expected post-modification Resource capability* and, instead, indicate RE *may* provide required detailed description in future

IFRTCR/IVRTCR Samples (cont'd)

(I) Model accurately representing expected performance reflecting all technical limitations

- Model must be updated
- Maximized settings will not be in model until final design is completed
- Expected performance will be modeled after final settings design is available
- Final as-built models will be modified to reflect ride-through capability to meet NOGRR 245 requirements

Deficiency: NOG and PUCT Rule § 25.503(f)(1) required complete and accurate info by 4/1/25 (extended to 4/15/25)

IFRTCR/IVRTCR Samples (cont'd)

(m) Description of any limitation that cannot be accurately represented in a model

- Maximized inverter and balance of plant settings will not be in model until final design is completed and coordinated w/ OEM
- Based on OEM feedback, there are limitations in building PSCAD model representing inverters
- PSCAD model is built out of library blocks and *bears little resemblance to actual inverter controls*

Deficiency: Statements do not *describe* limitations that cannot be represented in model but describe why RE will not or cannot provide a model

OEM Report Samples

- Ultimate assessment...*must be conducted at the site-specific level*, considering unique operational conditions, grid interconnections, and other factors that vary from one wind farm to another
- OEM did not provide assessment of *specific Resource* but – instead – assessment “***based on a typical wind farm configuration***” and “***not a definitive evaluation for plant***”
- Definitive statement on maximized ride-through capabilities is *incomplete w/o considering **specific conditions*** under which each turbine operates
- Ride-through capability optimized in turbine design limits but ***not guaranteed maximized*** due to site-specific constraints
- *Site-specific analysis* is essential, esp. under IEEE 2800-2022 framework
- Data at turbine level, ***not POIB*** as required by NOG
- ***For existing plants, [OEM] will provide User Defined Models parameterized for site-specific settings for RE/IE requesting them***

Deficiency: OEM provided generic info about equipment, not ***Resource-specific*** info or did not provide data based on POI

Common Questions

- Does market notice on 7/24/25 provide an opportunity to request extension/exemption **for the first time** by 9/15/25?
 - No - 9/15/25 deadline is for Resources that **already requested** extension or submitted Notice of Intent to Request an Exemption to correct submissions
- What models does ERCOT require?
 - Both PSSE and PSCAD models accurately reflecting Resource's expected performance incorporating all technical limitations following maximization (reach out to ERCOT if you need additional clarification)
- We plan to adjust protection thresholds including over-frequency, under-frequency, over-voltage and under-voltage, while leaving all dynamic response controls unchanged; do these changes trigger PGRR109 review?
 - PGRR109 model review process **is** required

Common Questions

- Project lacks OEM support —OEM indicates a lead time of several months to provide post-maximization models, meaning models will not be available by 9/15/25 - what are we supposed to do?
 - If Resource requested **extension** and submission is incomplete, ERCOT will follow process in NOG § 2.12.1.3(1) because extension gets Resource into compliance
 - If Resource requests an **exemption** and does not provide **all** required information by 9/15/25, ERCOT will likely deny exemption request

Next Steps

- Instead of submitting the information via NOGRR245@ercot.com we will again use DocuSign
- ERCOT will post IFRTCR, IVRTCR templates and Exemption Request Form on [Resource Integration](#) website
- REs/IEs should work on compiling information required by NOG §§ 2.11.1(1) and 2.11.2(1) and completing Exemption Request Form (if applicable) for submittal via DocuSign on or before 9/15/25
- If extension or exemption was not requested in April, you may **not** do so now
- Send Qs to NOGRR245@ercot.com

Questions?



Appendix - Requirements by NOG Section

All requirements had to be submitted by 4/1/25 (extended to 4/15/25)

- SGIA before 8/1/24 that cannot meet 2.6.2.1 by 12/31/25 must submit: (i) IFRTCR and (ii) request for extension by 4/1/25 [NOG § 2.6.2.1(7)]
- SGIA after 8/1/24 that cannot meet IEEE 2800 by 12/31/25 must submit a request for extension [NOG § 2.9.1(6)]
- SGIA after 8/1/24 that cannot meet 2.9.1.1(1)-(7) by 12/31/25 may request an extension to meet 2.9.1.1(7) by following process in NOG 2.12 [NOG § 2.9.1.1(8)]
- Type 3 WGR may request extension to meet Table A in NOG §2.9.1.1(1) by following extension process [NOG § 2.9.1.1(9)]
- SGIA before 8/1/24 that cannot meet NOG § 2.9.1.2(1)-(7) by 12/31/25 must submit: (i) IVRTCR and (ii) request for extension by 4/1/25 [NOG § 2.9.1.2(9)]
- SGIA before 8/1/24 that cannot meet NOG § 2.9.1.2(1)-(7) even w/ extension must submit NOITRE per NOG § 2.12 [NOG § 2.9.1.2(9)]

Appendix - Requirements by NOG Section (cont'd)

- If RE does not provide IFRTCR by 4/1/25 it is not eligible for an extension or exemption [NOG § 2.11.1(2)]
- If Resource cannot meet: NOG §§ 2.6.2.1(1)-(5); 2.9.1.2(1)-(7); 2.9.1(5)-(7); 2.9.1.1(9) RE may request extension or submit NOITRE [NOG § 2.12.1(1)]
- Resource w/ SGIA before 8/1/24 must submit NOITRE by 4/1/25 as part of IFRTCR or IVRTCR [NOG § 2.12.1(2)]
- No new NOITREs allowed after 4/1/25 for technical limitations not submitted by 4/1/25 [NOG § 2.12.1(2)]
- RE may only request exemption based on technical limitations identified in 4/1/25 IFRTCR and/or IVRTCR [NOG § 2.12.1(2)]
- SGIA before 8/1/24 may seek exemption from NOG § 2.6.2.1(1)-(5) or § 2.9.1.2 [NOG § 2.12.1.1(1)(a)]
- Type 3 WGR w/ SGIA before 8/1/24 that meets criteria in NOG § 2.9.1(5) may seek exemption [NOG § 2.12.1.1(1)(b)]

General Information

ERCOT 1/8/25 Market Notice

https://www.ercot.com/services/comm/mkt_notices/M-A010825-01

ERCOT 2/19/25 Market Notice

https://www.ercot.com/services/comm/mkt_notices/M-A010825-03

ERCOT 7/24/25 Market Notice

https://www.ercot.com/services/comm/mkt_notices/M-A010825-06