



TEXAS RE

NERC Modelling Alert and NERC Update to IBRWG

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NERC IBR Modeling Deficiency Alert Summary

❑ NERC Level 2 Alert issued June 4, 2024

- Issued as a result of multiple disturbance events, to followup on previous IBR performance alerts
- Pertained specifically to Generator Owners of all BPS-connected IBR generating facilities, as well as Transmission Planners and Planning Coordinators.
- Purpose was to gather dynamic modeling information to understand whether additional actions are necessary to mitigate observed deficiencies
- Data collection included specific settings for inverter and plant level controls

❑ Due date extended to November 1, 2024

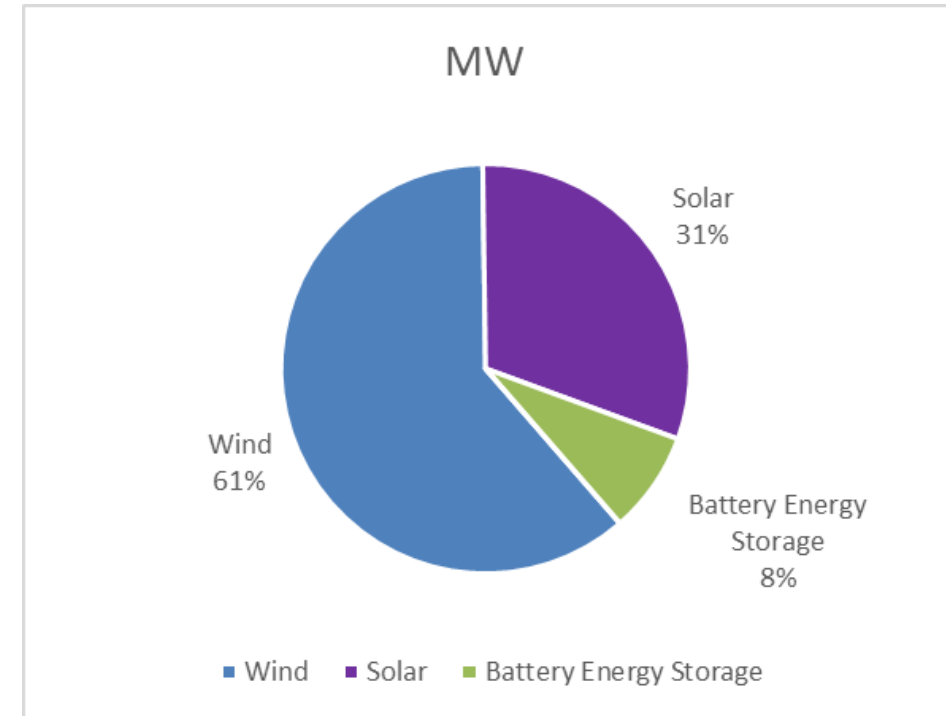
❑ NERC-wide data collection included responses from

- 1,601 generation facilities
- Over 185,461 MW
- 17 different OEM's



NERC Alert MW by Resource Technology Type

MW by Technology Type	MW	%
Wind	32,428	61%
Solar	16,331	31%
Battery Energy Storage	4,261	8%
Other	-	0%
Total	53,020	100%

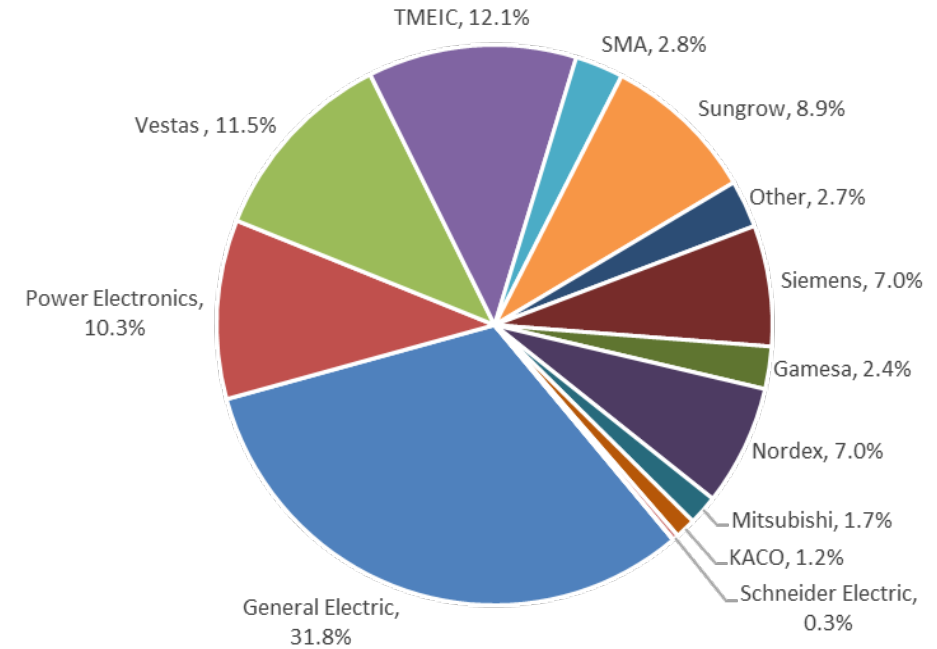


Key takeaway: Previous IBR NERC Alerts focused only on solar



NERC IBR Alert Summary for ERCOT Region

Inverter Manufacturer	# Facilities	# Inverters	# MW	% MW
General Electric	136	8096	16886.66	31.85%
TMEIC	25	5613	6437.094	12.14%
Vestas	50	2552	6114.27	11.53%
Power Electronics	38	1727	5484.005	10.34%
Sungrow	26	1436	4738.307	8.94%
Siemens	28	1696	3700.315	6.98%
Nordex	23	1083	3695.51	6.97%
SMA	12	424	1489.38	2.81%
Other	15	1123	1454.405	2.74%
Gamesa	10	571	1297.627	2.45%
Mitsubishi	6	457	907.8	1.71%
KACO	6	532	632.2	1.19%
Schneider Electric	1	91	182	0.34%
Advanced Energy	-	-	-	0.00%
GP Tech	-	-	-	0.00%
Bonifiglioli	-	-	-	0.00%
Solectria	-	-	-	0.00%
Total	376	25401	53019.57	100%

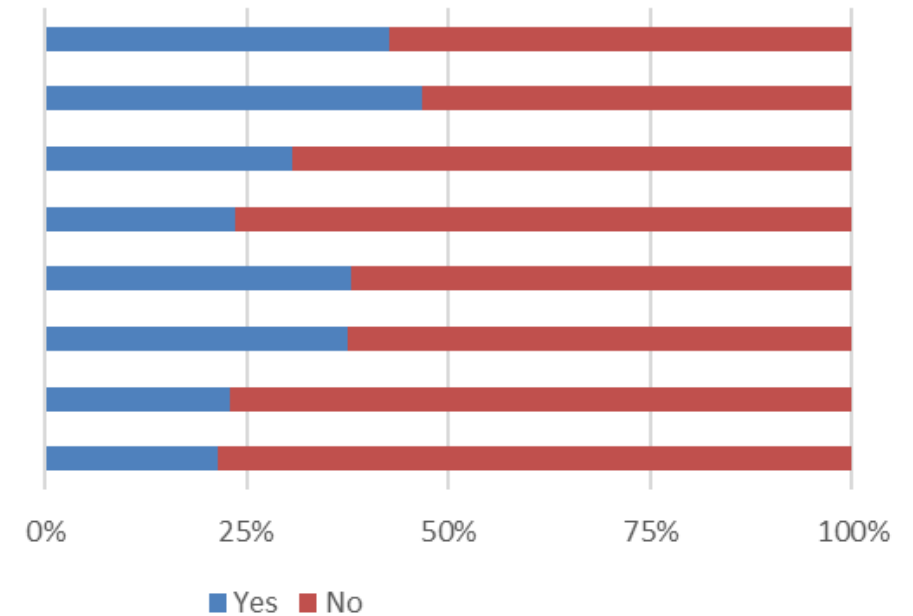


Key Takeaways: At the time the Alert was issued, this represented all NERC-registered solar and wind facilities



NERC Alert Settings at Maximum Capability

Settings	Yes	No	% No
HVRT	561	754	57%
LVRT	626	715	53%
Overvoltage Protection	182	411	69%
Undervoltage Protection	118	384	76%
HFRT	303	497	62%
LFRT	318	529	62%
Overfrequency Protection	81	271	77%
Underfrequency Protection	79	289	79%
Total	2,268	3,850	63%

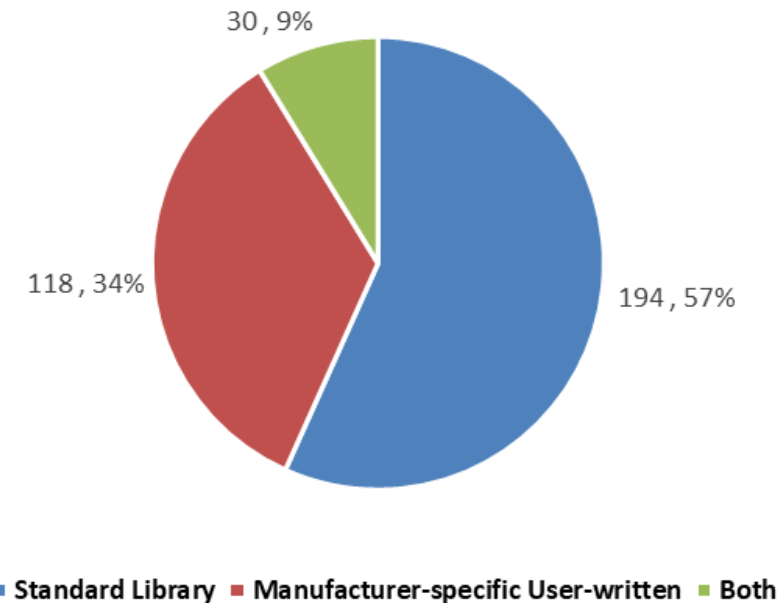


Key Takeaways: The utilization of IBR capability for voltage/frequency ride through/protection needs to be evaluated further, this will increase system ability to cope with events.



NERC Alert Standard and User-Defined Models

Model Type	# Facilities	%
Standard Library	194	57%
Manufacturer-specific User-written	118	35%
Both	30	9%
Total	342	100%

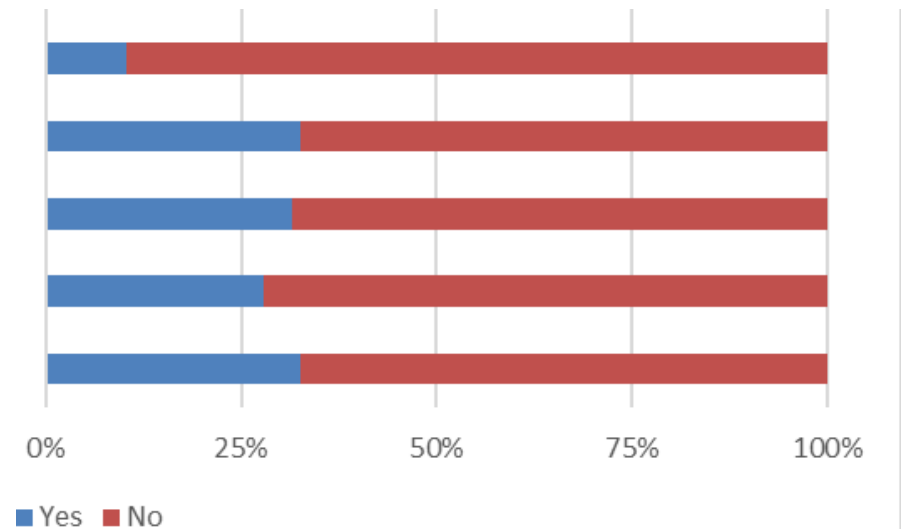


Key Takeaways: FERC 901 favors use of generic over user-defined models because the latter's internal model components cannot be viewed or modified. FERC Order 2023 and 2023-A suggest both are needed and will be part of jurisdictional large and small generator interconnection processes (outside ERCOT).



As-left control setting matches model parameter

As-left control setting matches model parameter	Yes	No	% No
Frequency Deadbands Model vs Reported	12	104	90%
Downward Regulation Droop Settings Model vs Reported	38	79	68%
Upward Regulation Droop Settings Model vs Reported	35	76	68%
High Voltage Threshold Settings Model vs Reported	38	98	72%
Low Voltage Threshold Settings Model vs Reported	43	89	67%



Key Takeaways: The percentage of as left settings that match the reported model parameters needs to increase to provide a more accurate picture of how the units will respond.



Federal Energy Regulatory Commission (FERC) Order No. 901 Milestone 2 – Standards Awaiting FERC Approval

Project	Standard(s)	Recent Action
2020-06	IBR Definition	11/4/2024 NERC submitted Petition for Approval with FERC
2020-02 Modifications to PRC-024 (Generator Ride-Through for synchronous generators and Type 1 and 2 wind)	PRC-024-4	11/4/2024 NERC submitted Petition for Approval with FERC
2020-02 Modifications to PRC-024 (Generator Ride-Through for IBRs)	PRC-029-1	11/4/2024 NERC submitted Petition for Approval with FERC
2021-04 Modifications to PRC-002	PRC-002-5 PRC-028-1	11/4/2024 NERC submitted Petition for Approval with FERC
2023-02 Analysis and Mitigation of BES IBR Performance Issues	PRC-030-1	11/4/2024 NERC submitted Petition for Approval with FERC



FERC Order No. 901 Milestone 3 – Target FERC Filing Nov. 2025

Technical Conference January 15-16 in Phoenix - presentations and recordings will be available

<u>SAR Title</u>	<u>Date Submitted</u>	<u>NERC Project</u>	<u>Dates/Actions</u>
FERC Order No. 901 Milestone 3, Part 3: System Model Validation with IBRs (PRC-019 and MOD-025)	4/29/2024	2021-01	5/23/2024 - 6/28/2024 SAR Comment Period. Drafting Team nominations open through Dec 20, 2024
FERC Order No. 901 – Milestone 3, Part 2: IBR Model Validation (MOD-026 and MOD-027)	4/29/2024	2020-06	5/23/2024 - 6/28/2024 SAR Comment Period
FERC Order No. 901 – Milestone 3, Part 1: Modeling and Data Sharing Requirement (TPL-001 and MOD-032)	4/29/2024	2022-02	5/17/2024 - 6/24/2024 SAR Comment Period

Project 2022-04 EMT Modeling (FAC-002, MOD-032, TPL-001) while not in Milestone 3 now has the same priority and target date.



Texas RE Regional Standards Project SAR-013

Purpose for Revisions to Regional Standard BAL-001-TRE-2

- provide for widening generator Governor deadband
- clarify roles of Generator Owner (GO), Balancing Authority (BA) and Compliance Enforcement Authority (CEA) pertaining to compliance time periods
- Define PFR performance requirements for Battery Energy Storage Systems (BESS)

Note that this Standard Authorization Request (SAR) was not address concerns with impact of curtailment on wind generation discussed in recent IBRWG meetings. A separate SAR can be drafted if necessary.

Standard Drafting Team is populated as of December 11, 2024 with 7 members including one from a BESS. First meeting February 7, details to be posted on Texas RE website.



Other NERC Activities

Category 2 IBR Registration – 20-75 MW

- Status - identifying facilities and owners for registration between May 2025-26
- Reviewing second RFI to identify entities subject to registration
- CMEP Practice Guide in draft to assist in consistent determination for various configurations

GADS reporting for Q1-Q3 extended again until Jan 19th

- Applies to conventional, wind
- Also applies to solar (100 MW and up) connected at 100kV and up
- In 2025, applies to solar 20 MW and up (Q1 due April 15)



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Questions?



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