**IBRWG Report To ROS**

**August 2023**

**Chair: Mohammad Albaijat, Vice-Chair: Julia Matevosyan**

**IBRWG met on August 11th, 2023 (Webex, Open Meeting)**

**August 11th meeting summary:**

**Discussion Items:**

**PGRR109 Dynamic Model Review Process Improvement for Inverter-Based Resource (IBR) Modification**

* + PGRR109 introduces a new requirement for IEs associated with IBRs to undergo a dynamic model review process prior to the commissioning
	+ Additionally, PGRR mandates that IBR RE undergo a review process before implementing any changes to settings or equipment (e.g., protection and control settings) that could impact electrical performance and necessitate dynamic model updates.
	+ As part of the review process, ERCOT shall review the model quality tests submitted by an IE or RE. In the case of operational IBRs, the review process may require the relevant TSP conducting a limited dynamic stability study to evaluate the electrical after the proposed modifications.
	+ The group was supportive of the changes proposed by PGRR109, but asked clarifying questions on the following which ERCOT staff responded:
		- what modifications qualify for the initiation of this process and who’s decision it is.
		- what parts of the interconnection process/studies will need to be repeated (as per paragraph (4)(a)(vi)(B) in PGRR109)
		- how ERCOT will determine if a resource may temporarily implement the proposed changes ahead of completion of the review process (as per (4)(a)(vii) in PGRR109
	+ There were no action items for ERCOT staff regarding PGRR 109

**IBR Ride-Through Requirements NOGRR 245 Update**

Presented by Stephen Solis (ERCOT)

ERCOT considering submitting for NOGRR 245 comments responsive to latest stakeholder comments & OEM discussions, potential concepts include:

* + Maintain balance of ride-through failure risk (actual, uncontrolled load loss risk) against resource adequacy risk (potential, controlled load loss risk) if REs chooses to not invest in available mitigations to reduce ride-through risks
	+ Incorporate Type 1 and Type 2 WGRs into requirements
	+ Allow alternative options for Type 1 and Type 2 WGRs to meet ride-through requirements with supplemental dynamic reactive resources or co-located Energy Storage Resources
	+ Allow additional time for reports [from March 1 to June 1, 2024 (post 1/16/14) and December 1, 2024 (pre-1/16/14)]
	+ Allow specific carve out for certain documented Type 3 WGRs for part of Frequency Ride-Through (FRT) requirements
	+ Allow extension for Type 3 WGRs to confirm phase angle jump and Multiple Fault Ride-Through (MFRT) capability up to 12/31/28, if needed
	+ Clarify Type 1 and Type 2 WGRs need not meet IEEE 2800-2022
	+ Clarify IBR retrofits implemented prior to 1/1/28 to comply with legacy IBR requirements need not meet IEEE 2800-2022

ERCOT will post the comments early the week of 8/14/23

Stephen also went through a number of WGR ride through events as this information was requested during the previous meetings:

* + 17% (13 of 77 WGRs) with an SGIA before 11/1/2008 experienced ≥1 ride-through failure
	+ 34% (23 of 67 WGRs) with an SGIA after 11/1/2008 and before 1/16/14 experienced ≥1 ride-through failure
	+ 25%(53 of 211 WGRs) with an SGIA after 1/16/14 experienced ≥1 ride-through failure

He provided more details on events from 2018/2019. It appears that these events primarily happened during lower wind conditions but could have resulted in larger MW loss, judging by installed capacity of involved WGRs, these events.

Stakeholders requested that future details presented, also capture actual aggregated MW output of the affected WGRs.

**Preliminary assessment of grid forming inverter-based energy storage resource (GFM-IBR-ESR) in ERCOT grid**

Presented by Yunzhi Cheng presented (ERCOT)

* + ERCOT continues to emphasize improving IBRs’ capability and performance combined with improvements on the transmission system are necessary to mitigate the reliability risk.
	+ Therefore, alongside NOGRR245 proposed requirements and recent recommendation for six new synchronous condensers in West Texas, ERCOT evaluated the potential benefits of grid forming (GFM) ESR.
	+ The preliminary GFM ESR evaluation focused on 3 scenarios: weak grid conditions in a simple test case that mimics known stability issue in ERCOT, West Texas 2022 Q4 QSA and local area (138 kV) with identified stability constraints.
	+ Each scenario is simulated with GFL ESR first, then with generic GFM ESR models (from EPRI and PNNL) and results are compared.
	+ The preliminary assessment results from all three scenarios indicate the GFM ESRs could be a viable option to improve system dynamic responses, but require headroom or energy buffer to provide adequate support, proper control setting tuning and coordination.
	+ As the next step ERCOT will work on the GFM ESR requirements including but not limited to performance, models, studies, and verification.
	+ ERCOT expects GFM ESR to be capable of meeting IEEE 2800 and existing ERCOT requirements along with additional performance requirements specific to GFM.
	+ ERCOT again stressed that there is no requirement that prohibits GFM enabling so long as it is properly tuned and coordinated.

**NERC and Other Industry Updates**

Presented by Julia Matevosyan (ESIG)

* + Transmission system operator in Finland developed “Specific Study Requirements for Grid Energy Storage Systems”, whereby Fingrid introduces requirements for grid forming batteries.
		- The document describes functional requirements, modeling requirements, simulation studies and field tests.
		- Fingrid finalized and sent the requirements to their customers in June 2023 and posted on their webpage in August 2023.
		- The plan is to require GFM capabilities from BESS connecting to weak grid areas and aim to make it a general requirement for all BESS next year.
	+ NERC has released a new Dynamic Modeling Guidance: Recommended Modeling Practices and List of Unacceptable Models, replacing the previous list and emphasizing recommended modeling practices.
	+ FERC Order “Interconnection: Improvements to Generator Interconnection Procedures and Agreement” was published 7/28/23. A brief description of what is covered in the order was presented.

**IBRTF Remaining Work Items, Update**

Presented by Julia Matevosyan (ESIG)

* + Some specific action items got dropped form IBRWG scope compared to IBRTF scope, due to the nature of WG vs TF
	+ The IBRWG leadership in collaboration with ERCOT was asked to provide an update on the status of IBRTF scope items.
	+ A progress document was presented during the meeting.
	+ Most of the items were addressed and specific details were provided in presentation.
	+ A few items remain due to NOGRR245 related work taking the highest priority.
	+ ERCOT updated the progress document to ensure proper terminology is used throughout.
	+ IBRWG will start an action items list (preferably online) to track the group’s progress.
	+ The few remaining items from IBRTF scope will be moved there as well.