**IBRWG Update**

**November 2024**

**Chair: Julia Matevosyan, Vice-Chair: Miguel Cova Acosta**

**IBRWG met on November 15th (Webex, Open Meeting).**

The agenda and the presentation slides are available [here](https://www.ercot.com/calendar/11152024-IBRWG-Meeting-_-Webex)

108 people attended the meeting (at peak)

**IBRWG Main Meeting**

**PFR from IBRs under “Deep” Curtailment**

Evelyn Hernandez and Martin de Paz (Nordex)

* Presented similar concerns to Vestas (in September):
* Wear and tear responding to frequency just outside the deadband, especially when operating at low output / close to technical limit.
* Tech minimum of wind turbine production:
* Issues with providing PFR during underfrequency events at zero power production (curtailment down to 0 MW), at curtailment around or below wind turbine technical minimum; during over frequency when available power is close to or below wind turbine technical minimum.
* From the discussion, it appears there are varying strategies on how a power plant controller distributes frequency response signal between the turbines and also when and if turbines get turned on and off as they reach their technical minimum production level.

**Physical basics of low power operation of wind turbines**

Nicholas Miller (HickoryLedge)

* Providing perspective of system planner and modeler of frequency dynamics (among other things).
* Explaining the basics of wind turbine operation, particularly rotor dynamics, aerodynamic lift, and their interplay in maintaining stability at low power outputs.
* The concept of technical minimum was known even 20 years ago when PFR from wind was being developed.
* There is a need for precise control of blade pitch, rotational torque, and generator response to manage stability under low wind conditions.
* **In Conclusion:** Active power control from low power levels whether due to deep curtailment of low wind speed is extremely challenging and subject to multiple physical stability constraints.
* With all the information that ERCOT got at the IBRWG meeting, they’ll take back it and discuss some options and ideas internally.

**Review and Discussion of NOGRR272 and PGRR121 related to Advanced Grid Support Requirements for Inverter-Based ESRs**

Sun Wook Kang (ERCOT)

* NOGRR272 and PGRR121 are officially posted for stakeholder comments on October 31st..The RRs are focusing on adoption of advanced grid support (AGS) capabilities for inverter-based energy storage systems (ESRs) as presented at August and September IBRWG meetings.
* The goal is to improve stability and resiliency of ERCOT grid with higher shares of IBRs.
* ERCOT also posted AGS ESR testing requirements on September IBRWG meeting page.
* This will be discussed at the December ROS meeting. ROS will direct IBRWG and DWG to review the NOGR272 and PGRR121.
* What happens if SGIA was executed before 4/1/2025 but then resource got amended, would it then require having AGS? This is something that needs to be considered and discussed further.

**SPWG / IBRWG Coordination on Multiple-Ride Through and Next Steps Discussion**

**Mark McChesney (Oncor, SPWG chair)**

* Action item from ROS was around developing guidance and recommendations for transmission auto reclosing and sectionalizing schemes to improve IBR ride though probability.
* This is following up on the discussion from August SPWG/IBRWG coordination discussion item (during August IBWG)
* Mark provided an overview of IEEE 2800 requirements relevant here, i.e. consecutive ride-through capability and voltage phase angel change ride through and presented the results from TDSP survey (only five responses but from large TDSPs.
* The survey shows that the settings applied are very dependent on the location of IBRs and those lines. The conclusion is that there needs to be a dialogue between IBR developer/owner and their TDSP to understand auto-reclose practices that are applied not only on the interconnecting line but also on the lines adjacent to that IBR plant.
* During the interconnection process there is a meeting between ERCOT, TDSPs and IE to discuss the full interconnection study scope. May be this is when this coordination item on auto-reclosing can be captured as well. And in that case maybe it can be captured in ERCOT’s Resource Integration Handbook?
* Julia will follow up with ERCOT’s Resource Integration Team.

**NERC and Other Industry Updates**

Julia Matevosyan (ESIG)

* MISO [presented](https://cdn.misoenergy.org/20241016%20PAC%20Item%2006d%20Battery%20Energy%20Storage%20System%20Grid%20Forming%20Controls%20(PAC-2024-2)653147.pdf) the latest draft of the proposed performance requirements for GFM BESS at October Planning Advisory Committee (PAC) meeting.
* The proposal is **to require GFM control capabilities from all BESS, starting with the DPP 2023 Cycle**\* (i.e. next gen interconnection cycle). DPP – Definitive Planning Phase
* The requirements and process are outlined in [Business Practice Manual (BPM-015) redlines](https://cdn.misoenergy.org/20241016%20PAC%20Item%2006d%20BPM-015-r29%20GI_GFM%20BESS%20REDLINE%20(PAC-2024-2)653141.docx) (Section 5.3.7 on Page 52).
* PAC stakeholders were invited to review and submit feedback to MISO’s proposal. MISO responded to stakeholder feedback submitted by 2 parties and shared requested clarifications in the responses and [November PAC meeting materials](https://www.misoenergy.org/events/2024/planning-advisory-committee-pac---november-13-2024/).
* **Next Steps: Finalize BPM-015 redlines to implement proposed requirements**
* GFM Progress Globally: 5 system operators have developed and approved grid forming specifications for IBRs (or just battery energy storage); 2 more are in draft
* Nine manufacturers have commercial offerings of GFM inverters.
* NERC addressed Milestone 2 of FERC Order 901 through filing the following standards PRC-028, PRC-29, PRC-30. Links to filings and other information are on slide 7.
* Work is ongoing on Milestone 3, focused on modeling. NERC is holding a [Technical Workshop](https://nerc.webex.com/webappng/sites/nerc/webinar/webinarSeries/register/669456158ed648bba90fdd46a52493f3) on January 15-16, 2025 to get industry’s feedback.
* G-PST/ESIG Webinar: GFM Technology Adoption in ERCOT – Status Update, by Fred Huang (ERCOT) on November 12th. [Download Presentation](https://www.esig.energy/download/g-pst-esig-webinar-gfm-technology-adoption-in-ercot-status-update/?wpdmdl=12349&refresh=67348ca11a6111731497121) or [View Webinar Recording](https://youtu.be/kMiTP_85WVg)
* ESIG summarized the current status of efforts to improve interconnection standards for IBRs, [here](https://www.esig.energy/generation-interconnection-project-team/)
* ESIG summarized the IEEE PES GM 2024 Panel on IBR Integration. The panel included SMEs from Vestas, MISO, EPE, Elevate Energy and Dominion Energy. The summary is available [here](https://www.esig.energy/generation-interconnection-project-team/)
* DOE i2x Forum for the Implementation of Reliability Standards for Transmission held a [October 24th, 2024 hybrid, full day,](https://www.esig.energy/event/i2x-first-hybrid-workshop-interconnection-standards-workshop/) during ESIG Fall Workshop, Providence, RI, focusing on Conformity Assessment of IBR plants with applicable interconnection requirements (going through portions of IEEE P2800.2 draft)
* In October ESIG held a Fall Workshop, Providence, RI. Four sessions relevant for IBRWG scope, focused on EMT, high share of IBRs, Grid Forming and Large Load ineterconnection (see slides 12-13). Recordings of workshop sessions are [now available on the ESIG YouTube Channel](https://youtube.com/playlist?list=PL4JBq4uH3yMJAp-pmwuCsGqgz_q2PGcRB&si=FQmGPA70EiimMmh3).