**IBRWG Meeting Minutes**

**March 2025**

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

**IBRWG met on March 14th (Webex, Open Meeting).**

The agenda and the presentation slides are available [here](https://www.ercot.com/calendar/03142025-IBRWG-Meeting-_-Webex)

106 people attended the meeting (at peak)

**IBRWG Main Meeting**

**BESS Ride Through in WECC**

Curtis Holland, WECC

* FERC Definition of Storage and typical BESS set up on slides 3&4
* Storage interconnection queue as per IEA on slide 5 and locations where it’s going on slide 6.
* Uses of BESS on slide 7 as per IEA data and an example usage profile on slide 8 and 9
* First BESS tripping events in 2022 in Californian that NERC did analysis on, slide 10, and causes of tripping on slide 11.
* Category 1i events on side 12. These are events when 500 MW or more of IBR resources trip offline (non-consequential)
* Incorrect IBR PFR response due to incorrect coordination between inverter responses (PFR) and power plant controller (AGC) (on slides 13-16).
* Oscillation issues (in inter-area frequency range) that have been identified in the WECC and mitigations that have been implemented on sides 17-19.
* BESS fires issue. EPRI tracks the incidents, slide 20-21. These are difficult to put out (depending on chemical characteristics of the BESS), not a lot of information on how to fight those fires and dangerous for firefighters to deal with. NERC Lessons Learned report LL20210301. Some useful references on slide 22.
* Julia: Question about lessons learned for PFR coordination with AGC commands, what was the mitigation.
* Curtis: The utility worked with storage operator, and they did identify that the system was programmed to freeze the output from BESS once they cross that low frequency threshold. The calculation of the PFR offset was correct but the implementation was wrong. It didn’t add to the dispatch signal to allow the BESS to follow. Once it was corrected, they have seen expected response, as shown on slide 16
* Fred Huang (ERCOT): on one of the slides, you show the battery suddenly changing from discharging to -514 MW charging what was the reason for this?
* Curtis: We thought it was due to the system event, but after the utility worked with the BESS operator and did the investigation, they found that it was not because of the event. BESS got the single to reduce production outside of the AGC ramp, and reduced power faster than expected and due to coincidence with the system event that made it look like a trip for the system
* Alex Shattuck (ESIG): When we used to do NERC event investigation, we used to play the event into the models of IBRs to see if similar behavior is observed from the models, did you do that in the events that you have shown?
* Curtis: not that I recall
* Alex: On the PFR performance issue. There are different ways to do PFR calculations. Could the issue be partly because these controls are manufacturer specific, not necessarily reflected in generic models and models might not have represented this behavior. What do we do about models and tools that are not representative of the actual behavior in the field?
* Curtis: This particular utility has identified that unfamiliarity with how they run the market and AGC led to starting training for the plant operators on what are the expectations of them as on operator of the resource responding to AGC and PFR. One of the problems is that these facilities are designed and handed off to the operators of the facilities and they also need to understand what’s in the plant and how it is expected to respond.
* Alex: If user-defined models are allowed maybe it can solve part of the issue. Do you think if OEM specific user defined models would be allowed to be used in WECC this would help to identify the issue before it happened?
* Curtis: I am not sure it would have been caught. All their calculations were correct, they were following the rules, but the implementation wasn’t what it needed to be. Unless the model covered that particular part of the wrong logic (and that includes following AGC too), it wouldn’t have been caught
* Alex: Based on my experience in my previous roles including in ERCOT area what we would do is to test the model’s response to an AGC signal simultaneously with the simulated frequency event and look at the response and coordination. And caught a lot of issues before the commissioning. The requirement to test it beforehand needs to allow the models to include all these manufacturer-specific details.
* Curtis: yes, overall, in the models of these large facilities we find a lot of discrepancies.
* Alex and Curtis exchanged comments on the benefits of use of HIL testing and that this is something we’ll see more frequently going forward.
* Pablo Rocamora (Ingeteam) On slide 19 you talk about potential implementation of HIL testing, what does “potential” mean?
* Curtis: This was one utility that encountered these oscillations events, and this utility decided that they may require HIL testing for the future facilities, this is not something that the whole Western Interconnection is going to require.
* Julia: Since we are talking about PFR and settings. I have been talking to one of the ESR owners and they have indicated that they are providing a lot of energy for PFR, and it is draining their SOC. Looking closer into this it turned out their droop setting was set at 1%. The ESR was not providing RRS\_PFR as a service just responding to PFR. ERCOT’s requirement for PFR is a maximum drop of 5%, so if a resource is not qualified for RRS\_PFR there is no real need to set the drop more aggressively than maximum of 5% required by ERCOT.

**HRL of a single resource vs an aggregated value of a defined IRR Group**

Abhi Masanna Gari, ERCOT

* Provided Recap of the issue from February IBRWG meeting, where Acciona Energy proposed allowing single HRL value when the IRR units are group instead of separate HRL value for each unit, to increase the stabilization of gen injection and reactive support. IRR unit within a group receives SCED BP at the unit level and the compliance (GREP, BP deviation) is evaluated at the group level.
* For this meeting ERCOT couldn’t bring a full resolution proposal but has some thoughts that they’ll share.
* Abhi stated that ERCOT Nodal Protocol Section 3.8.7 (introduced recently by NPRR026) may be relevant in this scenario.
* AS per this section the designated Self-Limiting Facility is required to operate in such a away that the power injection of withdrawal at the POI remains within agreed-upon limit
* ERCOT will continue the discussion and will also reach out to the entities to get the site-specific details to evaluate the applicability of this protocol section to the IRR groups and will bring further details to the upcoming IBRWG meetings.
* Ismael Moral Diaz (Acciona): We are aware of the SLF concept and have been reviewing this, but our concern is slightly different from what the SLF concept is proposing because our expectation is not on the MW at the POI but it is per unit in the IRR Group, we think this is something that is not aligned between the studies and real time operation.
* Abhi: We can touch base with you and talk offline and have more discussion at the future IBRWG meetings?
* Ismael: yes, let’s discuss offline and communicate the resolution to the rest of the IBRWG.
* Jose Villarreal (Acciona): Thank you for being willing to respond to the concern that Acciona brought up to IBRWG last month. Also, I would like to clarify we have been preparing two solar plants with more than one unit and each one has a dedicated transformer, but both are parts of the same plant. The main reason for that is that in solar plants typically you have more panels than AC capacity of the plant, for efficiency reasons. And the only way to get exactly the capacity at the POI is to get perfect irradiation. This issue became apparent when we were commissioning the same size, same OEM, same design plant in ERCOT and in PJM at the same time. And noticed that in PJM the plant is injecting more energy than in ERCOT. And realized that in ERCOT there is a limitation that technically can be removed, and they could inject more from that solar plant in ERCOT and that could potentially contribute to growing resource adequacy issue in ERCOT area.
* Julia: If any general solutions come out from this discussion, please bring to the future IBRWG meeting

**Julia brings out 3 items as a short industry update (not slides)**

* Related to today’s WECC presentation on IBR performance issues, DOE i2x FIRST workshop will be held on Monday, 3/17 to discuss conformity assessment of an IBR plant after it has been commission and during the lifetime of its operation, leaning on the draft proposed language of IEEE2800.2. <https://www.esig.energy/event/i2x-first-hybrid-workshop-interconnection-standards-workshop-spring-2025/> (the materials from the workshop are now posted and the video recording will appear on under the same link in a few weeks)
* Another update is that the first (in Great Britain) GFM BESS that was awarded as a part of their Stability Pathfinder, Phase 2 tender, has now been commissioned. The project is called Blackhillock, SMA is the inverter OEM there, the project is 200 MVA. This is first out of 5 GFM BESS that has been awarded as a part of that tender (we have discussed Great Britain’s Stability Pathfinder tenders before at IBRWG).
* Last update is, we talked about ESIG’s project on the Benefits of GFM BESS at IBRWG before. ESIG carried out a study on ATC system (in MISO footprint). We looked at connecting GFM BESS in weak grids and strong grids and looking at benefits and any potential adverse impacts. The webinar and the brief paper about the study are available here <https://www.esig.energy/benefits-of-gfm-bess-project-team/> as well as some supporting presentations from the project team meetings.
* Pablo Rocamora (Ingeteam): Where was Blackhillock BESS deployed?
* Julia: It’s in Great Britain, specifically in Scottland, but it’s a part of the GB power system, operated by National Energy System Operator (NESO). **This is the first GFM BESS in GB, not overall in the world.**