Inverter-Based Resource Performance Subcommittee (IRPS)

Website: IRPS
Chair: Julia Matevosyan
NERC Lead: Ryan Quint
Hierarchy: Reports to RSTC
Vice Chair: Rajat Majumder
Scope Update: December 2021

Updated: August 15, 2022

#	Task Description	Target Completion	Requested Action	Status
3	**IEEE 2800-2022 and .2 Monitoring and Support** *Monitor and support the activities of IEEE 2800-2022 and IEEE P2800.2*	Ongoing	None	IEEE 2800-2022 published; monitoring .2 efforts.
6	**Reliability Guideline: Electromagnetic Transient Modeling and Simulations** *Reliability Guideline on EMT modeling and simulations of BPS-connected inverter-based resources.* *(High Priority)* *(Related to 2021 NERC RISC Report Recommendations)*	Q1 2023	Approve	Date moved back to Q1 2023.
8	**Reliability Guideline: Recommended Approach to Interconnection Studies for BPS-Connected Inverter-Based Resources** *Focused guidance on improving the study process for BPS-connected inverter-based resources, particularly with increasing penetrations of these resources and the growing complexity of performing sufficient studies to ensure BPS reliability.* *(High Priority)*	Q4 2022	Approve	Moved to Q4 2022. Work underway.
13	**SAR: EOP-004-4 Gen Loss Criteria for IBRs** *Follow-up from San Fernando Disturbance report regarding recommendation for IRPS to draft a SAR to address the issue identified in EOP-004-4 regarding the generation loss criteria so that it is applicable for inverter-based resources as well synchronous generation.* *(High Priority)*	Q2 2022	Endorse	Going to RSTC for comment in September 2022; seeking final approval in December 2022.
16	**SAR: Revisions to FAC-001 and FAC-002** *IRPS will develop a SAR regarding revisions to FAC-001-3 and FAC-002-2 to ensure that: 1) TOPs, RCs, and BAs that identify abnormal performance issues can work with the GO to seek corrective actions for resources not meeting their established interconnection requirements, 2) seek improvements to the requirements developed by the TO, TP, or PC (per FAC-001-3 or FAC-002-2) if gaps are identified, and 3) that those abnormal performance issues are reported to NERC for continued risk assessment. The standard will need to consider how to handle legacy equipment that has equipment limitations and cannot be modified; however, the standard should seek to ensure effective feedback loops for improvements are developed.* *(High Priority)*	Q4 2022	Endorse	Moved to Q4 2022 due to inactivity.
18	**SAR: Revisions to PRC-004 (or Complementary Standard) on IBR Performance Issues** *IRPS will develop a SAR regarding either revisions to PRC-004 or a new standard that focuses specifically on analyzing, reporting, and correcting the abnormal performance of BES generating resources. These revisions may link with those identified above regarding the performance validation standard. Both topics may be accomplished with a singular SAR.* *(High Priority)* *(Related to 2021 NERC Cold Weather Report Recommendations)*	Q2 2022	Endorse	Going to RSTC for comment in September 2022; seeking final approval in December 2022.

19	**Follow-Up on Disturbance Monitoring** *IRPS will engage the Project 2021-04 Standard Drafting Team leadership to determine if any of the recommendations are within scope of their project. IRPS will develop a follow-on SAR if any recommendations outlined in the Odessa report are not being adopted by the SDT presently.* *(High Priority)* *(Related to 2021 NERC Cold Weather Report Recommendations)*	Monitoring	Endorse (if SAR needed)	IRPS leadership connected with Project 2021-04 leadership, and SAR DT is working to get an approved SAR and SDT stood up. IRPS now monitoring SAR DT/SDT activities.
20	**Assessment: Gap Analysis of Any IBR-Related Issues Not Addressed by NERC Standards** *IRPS will conduct a comprehensive assessment, considering all guidelines and technical reference documents developed thus far, including IEEE P2800, to determine any performance gaps not addressed by the NERC Reliability Standards and will provide recommendation for additional SARs, where applicable. Any modifications will seek to ensure the same outcome across resource types and ensure a similar intent is met with the language used in each standard requirement.* *(High Priority)* *(Related to 2021 NERC RISC Report Recommendations)*	Q4 2022	Approve	New task; on track.
22	**Grid Forming White Paper Follow-Up** *Follow-on activity to previously published IRPS white paper on grid forming, focused specifically on leveraging GFM technology in battery energy storage projects and providing recommendations for establishing minimum technical requirements for BESS GFM moving forward.* *(Related to 2021 NERC RISC Report Recommendations)*	Q2 2023	Approve	New task. Small sub-team working on first draft.
23	**Cold Weather Report Follow-Up** *Effort to address the recommendation from the RSTC Tiger Team Regarding the Cold Weather Report recommendation:* *"27: Beyond Recommendation 13 (Generator Owners within ERCOT review potential for units to trip due to low frequency or high rate-of-change of frequency conditions), the team recognizes that generating units tripping due to low frequency or high rate-of-change of frequency conditions could occur in the Eastern and Western Interconnections as well. Therefore, the team recommends that FERC, NERC, and the Regional Entities, in cooperation with Generator Owners, study the ERCOT low frequency event and past significant frequency disturbances. The study should consider the potential for protective relay settings associated with generator underfrequency relays, balance of plant relays, and tuning parameters associated with control systems on generating units to trip generating units during low frequency or high rate-of-change of frequency conditions in the other Interconnections, and determine the whether a new Reliability Standard is warranted, or whether other actions can best protect the reliability of the Bulk Electric System. (Winter 2022-2023)"*	TBD	TBD	No progress in 2022.
24	**White Paper: BPS-Connected IBR Commissioning Best Practices** *White paper to highlight best practices for commissioning BPS-connected inverter-based resources to ensure appropriate protection and controls are configured and that models and studies match actual installed operational capabilities.*	Q2 2023	Approve	New task.
Completed Tasks				
1	**Review IRPWG Scope** *Revised scope with new IRPWG group.*	Q4 2020	Approve	Approved by RSTC.
2	**San Fernando Disturbance Follow-Up White Paper** *Discussion of NERC San Fernando Disturbance Report and identification of any next steps for IRPWG to add to work plan.*	Q2 2021	None	Approved by RSTC at June 2021 meeting.
4	**Reliability Guideline: BPS-Connected BESS and Hybrid Plant Performance, Modeling, and Studies** *Reliability Guideline on recommended performance, modeling, and studies for BPS-connected BESS and hybrid power plants.*	Q1 2021	Approve	Approved by RSTC and published in March 2021.

5	**White Paper: BPS-Connected IBR and Hybrid Plant Capabilities for Frequency Response** *White paper on utilizing the full capabilities of inverter-based resources and hybrid plants for providing frequency response.*	Q3 2021	Approve	Approved by RSTC at December 2021 meeting.
5a	**Webinar: White Paper: BPS-Connected IBR and Hybrid Plant Capabilities for Frequency Response** *IRPWG will hold an industry informational webinar on the technical topic laid out in the white paper.* *(Related to 2021 NERC RISC Report Recommendations)*	Q2 2022	None	Complete
11	**TPL-001-5 SAR** *SAR regarding modifications to TPL-001-5 that align with the recommendations made in the approved IRPWG standards review white paper.*	Q4 2021	Approve	Approved by RSTC at December 2021 meeting.
12	**White Paper: Grid Forming Technology** *Paper covering perspectives for registered entities regarding the new grid forming technology and its use on the bulk power system.*	Q4 2021	Approve	Approved by RSTC at December 2021 meeting.
15	**Odessa Disturbance Follow-Up White Paper** *White paper proposing IRPWG actions to address the Odessa Report recommendations presented by NERC.*	Q4 2021	Approve	Approved by RSTC at December 2021 meeting.
17	**SAR: Revisions to PRC-024** *IRPWG will develop a SAR regarding revisions to PRC-024-3 to the effect described above, focusing specifically on all forms of protection and controls of the generator and collection systems associated with the resource (not protection of auxiliary systems). The SAR will ensure that PRC-024 revisions focus on a performance-based approach to resource ride-through for the plant rather than on only focusing on the protection system documentation alone.* *(High Priority)* *(Related to 2021 NERC Cold Weather Report Recommendations)*	Q2 2022	Endorse	NERC submitted SAR, endorsed by NERC Standards Committee at May 2022 meeting. Complete
21	**SAR: Model Quality Checks in FAC-002 and MOD-032 Standards** *IRPS will develop a SAR to ensure that model quality and model performance checks are conducted during the interconnection study process (FAC-002-2) and annual case creation process (MOD-032), and that model improvements are made by the generator owner. Those checks should clearly include model parameter validation to ensure that the models actually reflect the as-built equipment in the field. This applies to both positive sequence dynamic models and EMT models for existing in-service facilities (and newly interconnecting resources).* *(High Priority)*	Q2 2022	Endorse	Complete. Linked with Item #14. Approved by RSTC in June 2022; new NERC Standards Project underway.
14	**SAR: Inclusion of EMT Models into MOD, TPL, and FAC Standards** *Follow-up from San Fernando Disturbance report regarding recommendations for the modeling and study standards (e.g., MOD and TPL) to be reviewed by IRPS to consider the inclusion of EMT models for study purposes by the TP and PC. As note in the report, the IRPS guideline on EMT modeling does not ensure any one entity actually executes EMT studies, when needed.* *From Odessa Follow-Up: IRPWG will develop a SAR to incorporate EMT modeling (and model validation) requirements and EMT study requirements for the interconnection study process. FAC-002-2 will be reviewed to determine the best strategy for incorporating these types of requirements. IRPWG will also develop a white paper specifically aimed at policy makers to clarify EMT modeling considerations and trade-offs as planning groups begin to adopt EMT into their planning processes.* *From Odessa Follow-Up: IRPWG will develop a SAR to ensure that EMT modeling is included in the MOD-032 efforts and that MOD-032 is clear on using accurate and validated models.* *(High Priority)*	Q2 2022	Endorse	Complete. Linked with Item #21. Approved by RSTC in June 2022; new NERC Standards Project underway.
Cancelled Tasks				

7	**White Paper: Energy Transition to Increasing Penetrations of BPS-Connected Inverter-Based Resources** *Brief strategic white paper of ensuring BPS reliability with increasing BPS-connected inverter-based resources.*	Q4 2021	Approve	Cancelled due to low priority and being addressed by other in-depth topics.
Tabled Tasks				
9	**Reliability Guideline: Recommended Operating Procedures for Managing Abnormal BPS-Connected Inverter-Based Resource Oscillation Conditions** *Focused guideline for grid operators faced with any abnormal performance or grid conditions with BPS-connected inverter-based resources.*	Tabled Q4 2022 (?)	Approve	Tabled.
10	**Doc Type TBD: Day-Ahead and Short-Term Operational Studies with Increasing Inverter-Based Resources (Particularly BESSs and Hybrids)** *Paper covering day-ahead and short-term operational studies related to the inclusion and consideration of inverter-based resources (particularly BESSs and hybrids).*	Tabled Q4 2022 (?)	Approve	Tabled.