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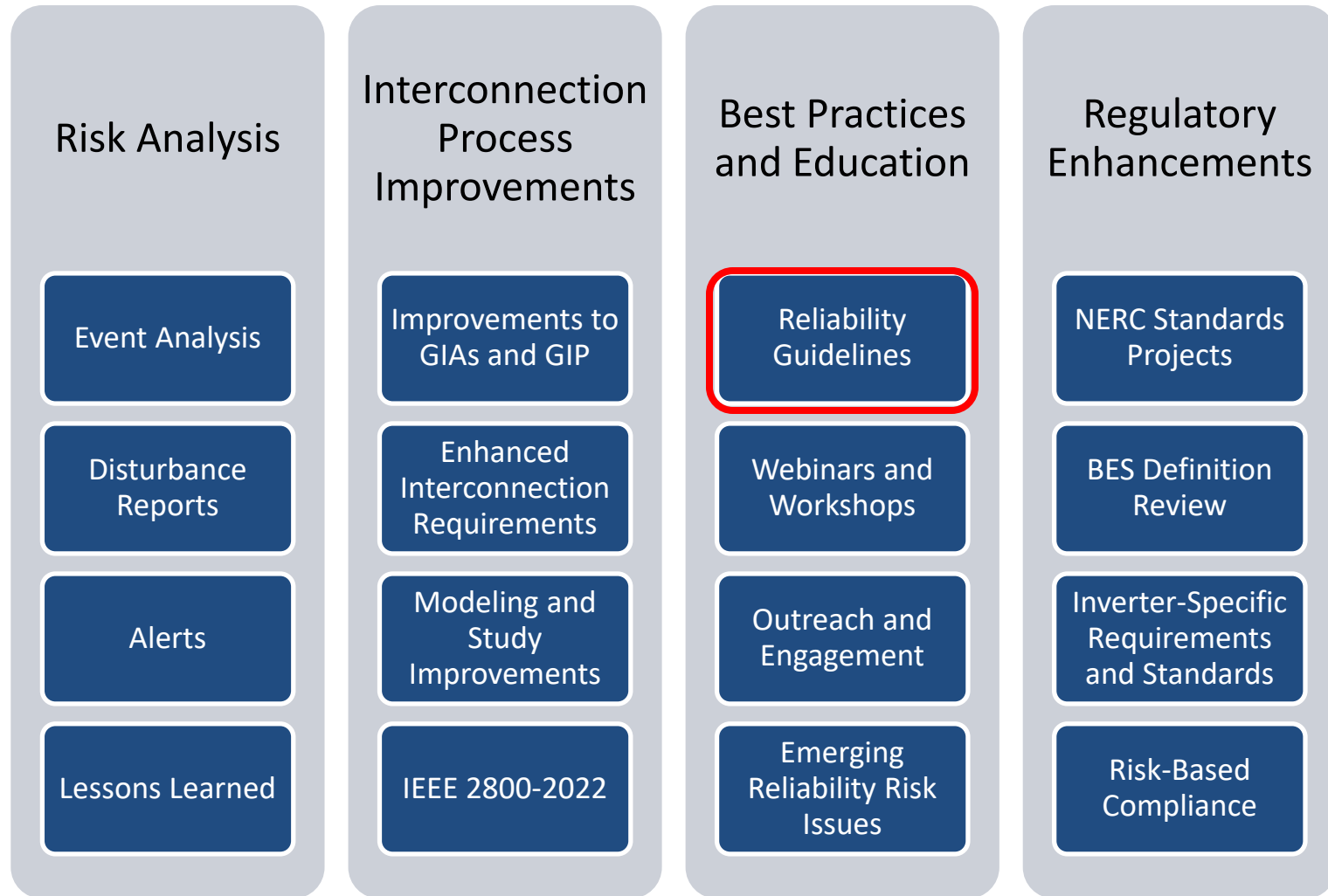
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability Guidelines: Electromagnetic Transient (EMT) Modeling for BPS-Connected Inverter-Based Resources – Requirements and Verification Practices & EMT Task Force

For: ERCOT IBRTF Meeting
NERC
January 2023

RELIABILITY | RESILIENCE | SECURITY





- Studying and derisking these is only possible with EMT models:
 - Majority of grid faults are unbalanced
 - Control instability and interaction with other IBRs
 - Causes of IBR trip/output reduction from recent disturbance reports
 - Instantaneous inverter AC overcurrent and overvoltage
 - Inverter DC unbalance protection
 - Unbalance current protection
- To address gaps identified in recent disturbance reports
 - Models not matching facilities
 - Inability to reproduce unreliable performance reported – trips, output reduction
- Reference for TPs and PCs as they begin performing or coordinating EMT studies during the interconnection study process or during planning assessments

Reliability Guideline: EMT Modeling and Simulation - in 2 parts

Vol. 1: EMT Model Requirements and Quality Control

Enable TP, PC, GO obtain and verify high quality EMT models

- Modeling requirements
- Model quality verification
- Screening for EMT study need
- Assess ride-through capability and performance
- Resourcing for EMT studies
- Different flavors of EMT models

Vol. 2: EMT Studies

- Scoping detailed EMT studies
- Building EMT study models
- Interconnection studies
- Transmission planning studies
- Material modification and model updates during interconnection study process and post COD

Schedule for Vol 1 Publication

Key Dates	Milestones
Dec 15, 2022	Consensus to post for public comment at IRPS monthly meeting
Dec 16, 2022	Draft out to RSTC for review to authorize via email ballot posting for comment
Jan 6 2023	Posted for industry comment
Feb 20 2023	Comment period ends
Mar 2023	RSTC final approval and publication

Click here for: [Draft Reliability Guideline: Electromagnetic Transient Modeling for BPS-Connected Inverter-Based Resources – Requirements and Verification Practices](#)

Click here for: [Comment Form](#)

- To support and accelerate industry adoption of EMT modeling and simulation in their interconnection and planning studies of BPS-connected IBRs
- Provide guidance and references materials to TPs and PCs to more adequately assess BPS impacts and reliability risks of interconnecting IBRs.
- Develop technical documents to support BPS planning under increasing penetrations of BPS-connected IBRs

- Develop guidance on electromagnetic transient modeling and studies related to BPS-connected IBRs
- Develop recommendations on model quality requirements and control processes to ensure availability of high-quality, facility-specific EMT models capable of identifying and proactively mitigating potential reliability risks
- Provide technical support, guidance, and industry leadership to accelerate industry adoption of EMT modeling and simulation into interconnection and planning studies of BPS-connected IBRs
- Support EMT standard drafting team developments

- Provide recommendations and references to educational materials, tutorials, workshop presentations by EMT experts, EMT modeling best practices, case studies, simulation automation approaches and computing resources
- Provide recommendations on screening criteria to identify interconnection projects and areas of BPS where EMT studies are warranted
- Identify gaps and confusions in EMT modeling space and drive clarify and alignment
- Conduct industry technical workshops and webinars to share best practices and case studies
- Coordinate with and monitor IEEE 2800-2022 and P2800.2 Working Group activities to align modeling requirements and needs
- EMTTF reports to IRPS.

- Reliability guidelines, technical reference documents, or white papers related to EMT studies including ride-through capabilities and system impacts
- Assessments and references of the modeling, modeling practices and requirements and studies being performed across North America and internationally involving BPS-connected IBRs
- Case studies on adoption of EMT modeling and studies in interconnection and planning assessments for BPS-connected IBRs
- A website hosting recommended study guides and references to educational materials, tutorials, workshop presentations, modeling best practices, case studies and automation approaches, Q&As, FAQs gathered from Q&A, webinars and outreach programs
- Revised or updated Reliability Guidelines previously developed by the group

- As EMTTF activities are entirely public, the EMTTF is open to all industry members.
- Please contact Aung Thant – aung.thant@nerc.net



Questions and Answers