

## System Planning Impacts of Distributed Energy Resources Working Group (SPIDERWG)

Website: [SPIDERWG](http://SPIDERWG)

Chair: Jeff Billinton (July 2018)

NERC Lead: Ryan Quint

Hierarchy: Reports to PC

Vice-Chair: Bill Quaintance (July 2018)

Scope Approved: Dec 2018 PC Mtg

#	Task Description	Risk Profile(s)	Strategic Focus Area(s)	Target Completion	Requested PC Action	Status
<b>Modeling Subgroup</b> (Co-Leads: Irina Green, CAISO; Mohab Elnashar, IESO)						
M1	<b>DER Modeling Survey</b> <i>Perform survey of industry use of DER planning models in BPS studies, dynamic load models and DER modeling guidelines.</i>			Q2-2019	No	
M2	<b>Reliability Guideline: DER Data Collection for Modeling</b> <i>Guideline providing recommendations and industry practices for the mandatory and optional DER data to be collected by the Reliability Coordinator as well as on how, where, and when to gather such data.</i> <ul style="list-style-type: none"> <li>Review the documentation of existing data collection techniques and processes that has been developed by the industry.</li> <li>Recommendations for DER data collection technique suitable for various study types.</li> </ul> <i>Recommendations for the DER data complexity requirements based on DER penetration levels</i>			Q4-2019	Yes	
M3	<b>Reliability Guideline: DER Modeling</b> <i>Guideline providing recommendation for DER modeling practices.</i> <ul style="list-style-type: none"> <li>Review the documentation of existing study approaches related to modeling aggregate DER for the purposes of BPS planning.</li> <li>Recommendation on the level of details of DER models that are suitable for the studies being performed (e.g., steady-state analysis, stability analysis, short circuit analysis, etc.)</li> <li>Recommendation for developing and applying the new DER_A dynamic model including how to parameterize the model and default data sets that can be used as starting points.</li> <li>Coordinate with the Validation Sub-group on the validation of the aggregate DER models across software platforms for consistency.</li> <li>Develop default generic parameters of the DER for the purposes of BPS planning</li> <li>Considerations for energy storage modeling at the distribution level</li> <li>Recommendations on voltage and frequency ride through settings to represent performance in legacy and modern DERs.</li> <li>Develop methodology on how to aggregate DERs with different performance characteristics</li> </ul>			Q4-2019	Yes	
M4	<b>Review of MOD-032-1 for DER Data Collection</b> <i>(In coordination with activity M4) White paper reviewing MOD-032-1 and providing potential modifications to the standard to facilitate data collection for DERs for interconnection-wide modeling.</i>			Q2-2019	Yes	

## SYSTEM PLANNING IMPACTS FROM DISTRIBUTED ENERGY RESOURCES WORKING GROUP WORK PLAN

M5	<p><b>Modeling Notification: Dispatching DER off Pmax in Case Creation</b>  <i>Modeling notification on recommended practices and considerations for DER modeling when dispatching DER at output levels other than Pmax in the powerflow and dynamics data. Practices to ensure expected response from DER in these modeled conditions.</i></p>			Q2-2019	No	
<b>Verification Subgroup (Co-Leads: Michael Lombardi, NPCC; _____, _____)</b>						
V1	<p><b>Reliability Guideline: DER Performance and Model Verification</b>  <i>Reliability Guideline covering the following topics:</i></p> <ul style="list-style-type: none"> <li>• <i>Recommendations and industry practices for placement of recording devices, acceptable types of recording devices, measurement requirements, and how to use data for performance and model verification</i></li> <li>• <i>Recommended practices for tracking aggregate DER performance during large BPS disturbances.</i></li> <li>• <i>Recommendations for leveraging individual DER performance testing to develop aggregate level modeling, and how to perform model verification for aggregate DER performance.</i></li> <li>• <i>Guidance on how to perform model benchmarking, and when this is needed; benchmarking study results against different software platforms (e.g., positive sequence RMS simulations against more detailed three-phase distribution feeder modeling), and how this can be applied for model verification.</i></li> <li>• <i>Recommended approaches for localized model verification of individual feeders.</i></li> <li>• <i>Recommended approaches for accounting for DER in both steady state powerflow and dynamic model verification for system-wide model validation (i.e., MOD-033-1); consideration for DER in model conversion between real-time EMS model and planning model.</i></li> <li>• <i>Considerations of the ways to aggregate DER data depending on the types of studies being performed.</i></li> </ul>			Q4-2019	Yes	
V2	<p><b>Reliability Guideline: DER Forecasting Practices and Relationship to DER Modeling for Reliability Studies</b>  <i>Guidance providing how forecasting practices are linked to DER modeling for reliability studies. DER forecasting practices are important for accurately representing the correct amount and type of DER, particularly at an aggregate level representation for BPS studies.</i></p>			Q4-2019	Yes	
<b>Studies Subgroup (Co-Leads: Peng Wang, IESO; Jameson Thornton, PGE)</b>						

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S1	<p><b>Reliability Guideline: Bulk Power System Planning under Increasing Penetration of Distributed Energy Resources</b>  <i>Guideline providing recommendations and industry practices for performing planning studies considering the impacts of aggregate DER behavior.</i></p> <ul style="list-style-type: none"> <li>• Review and documentation of existing study approaches currently used by industry, development of findings and recommendations from these studies incorporating DER.</li> <li>• Review and highlight of DER study practices and known DER impacts from various entities around the world.</li> <li>• Guidelines on how to incorporate and represent DER in planning studies for potential reliability issues, such as selection of study scenarios with system gen/load conditions, and different approaches to incorporate DER in different types of studies.</li> <li>• Guidelines on study assumptions and approaches considering single-phase installation of DER; consideration of co-simulation tools and techniques.</li> <li>• Guidelines on types of reliability issues encountered with high DER penetration and potential solutions to these issues.</li> <li>• Recommended practices and approaches for reporting gross load, net load, and DER tripping/reconnection as part of simulation results.</li> </ul>			Q2-2020	Yes	
S2	<p><b>Review of TPL-001 Standard for Incorporation of DER</b>  <i>Technical review of NERC TPL-001-5, and development of any recommendations pertaining to consideration and study of DER impacts to the BPS.</i></p>			Q4-2019	Yes	
S3	<p><b>Recommended Simulation Improvements and Techniques</b>  <i>Guidance to software vendors on tools enhancements for improved accounting and study of aggregate DER.</i></p>			Q4-2019	Yes	
S4	<p><b>Reliability Guideline: Recommended Approaches for Developing Underfrequency and Undervoltage Load Shedding Programs with Increasing DER Penetration</b>  <i>Guidance on how to study UFLS and UVLS programs and ensure their effectiveness with increasing penetration of DER represented.</i></p>			Q4-2019	Yes	
S5	<p><b>White Paper: Beyond Positive Sequence RMS Simulations for High DER Penetration Conditions</b>  <i>Considerations for high penetration DER systems and the need for more advanced tools (e.g., co-simulation tools) for studying DER impacts on the BPS.</i></p>			Q4-2019	Yes	
<b>Coordination Subgroup (Co-Leads: Taylor Woodruff, Oncor; Kun Zhu, MISO)</b>						

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C1	<b>Review of IEEE Std. 1547-2018 for impacts to BPS</b> <i>Technical review of IEEE Std. 1547-2018 and development of any guidance on determination and effective use of performance requirements and settings within IEEE St. 1547-2018.</i>			Q3-2019	No	
C2	<b>Reliability Guideline: Communication and Coordination Strategies for Transmission Entities and Distribution Entities regarding Distributed Energy Resources</b> <i>Develop recommended strategies to encourage coordination between Transmission and Distribution entities on issues related to DER such as information sharing, performance requirements, DER settings, etc.</i>			Q4-2019	Yes	
C3	<b>Educational Material to Support Information Sharing between Industry Stakeholders</b> <i>Develop material to educate industry stakeholders on practices, recommendations and technical work developed by other industry organizations.</i>			C4-2019	No	
C4	<b>Review of MOD-032-1 for DER Data Collection</b> <i>(In coordination with activity M4) White paper reviewing MOD-032-1 and providing potential modifications to the standard to facilitate data collection for DERs for interconnection-wide modeling.</i>			Q2-2019	Yes	
C5	<b>Coordination of Terminology</b> <i>Review of existing definitions and terminology and development and coordination of new terms, for consistent reference across sub-groups.</i>			Q2-2019	No	
C6	<b>NERC Reliability Standards Review</b> <i>Review EPRI and prior NERC documentation regarding possible Reliability Standards modifications; work with NERC Staff to develop any prioritization of possible standards modifications.</i>			Q3-2019	Yes	
C7	<b>Tracking and Reporting DER Growth</b> <i>Coordinated review of information regarding DER growth, including types of DER, size of DER, etc. Consideration for useful tracking techniques for modeling and reliability studies.</i>			Ongoing	No	