



California ISO

# Modeling Sub-Group Kick-off NERC SPIDER Work Group

Modeling Sub-Group Co-Chairs  
Irina Green, CAISO  
Mohab Elnashar, IESO

NERC SPIDER Work Group Meeting – Austin, Texas  
January 8-9, 2019

# Need for Modeling of DER

High penetration levels of distributed energy resources are being planned and with this there is a need to consider their impact on the transmission system and incorporate in transmission planning models and studies

- Important to have accurate and adequate models of the load at the transmission-distribution interface that include DERs
- DER includes a number of resource types, including behind the meter and utility-scaled distribution connected resources
  - Can be modeled in load models or as a generator
  - Due to large amount and numerous locations of DER, particularly behind the meter resources, modeling them as generators would significantly increase the required amount of data and slow down the simulations

# Need for Modeling of DER

## *Continued*

- Guidelines need to be developed to address:
  - Model data requirements
  - Consistency of methodologies of modeling approach for local and interconnection wide base cases and studies
  - Aggregation of DERs at load buses
  - Generic modeling parameters
- The DER models are available in software platforms as standalone and as a parts of composite load model
  - DER models need to be consistent across the different software platforms

# Modeling Sub-group Goals

The purpose of the SPIDERWG is to address issues of a growing penetration of distributed energy resources (DER) related to system planning, modeling, and reliability impacts to the Bulk Power System (BPS).

- A primary focuses of Modeling Sub-Group will be on DER data collection, modeling practices, model improvements for power flow, dynamic and voltage stability, and short circuit studies.
- To Develop detailed guidelines modeling of DER for bulk system planning assessments.
- Coordination of the model requirements with the other sub-groups, particularly Validation and Studies, will be required along with the NERC Load Modeling Task Force.

# Modeling Sub-Group Work Plan

## DER Modeling Survey (S1)

- Perform survey of industry use of DER planning models in BPS studies, dynamic load models and DER modeling guidelines.

# Modeling Sub-Group Work Plan

## *Modeling Guideline: DER Data Collection (S2)*

- 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.
- Review the documentation of existing data collection techniques and processes that has been developed by the industry.
- Recommendations for DER data collection technique suitable for various study types.
- Recommendations for the DER data complexity requirements based on DER penetration levels

# Modeling Sub-Group Work Plan

## *Modeling Guideline: DER Modeling (S3)*

- Guideline providing recommendation for DER modeling practices.
- Review the documentation of existing study approaches related to modeling aggregate DER for the purposes of BPS planning.
- 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.)
- 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.
- Coordinate with the Validation Sub-group on the validation of the aggregate DER models across software platforms for consistency.
- Develop default generic parameters of the DER for the purposes of BPS planning

# Modeling Sub-Group Work Plan

## *Modeling Guideline: DER Models to Represent Different Performance Characteristics (S4)*

- Guideline providing recommendations and industry practices for the supplementary models that may be needed to represent the performance characteristics of DERs.
- Recommendations on voltage and frequency ride through models that may be required to represent performance limitations in legacy DERs.
- Work with the Coordination Sub-group on recommendations on supplementary models that are required to represent the different categories in the new IEEE 1547-2018.
- Develop methodology on how to aggregate DERs with different performance characteristics



# Modeling Sub-Group Work Plan

## *Adding Requirements for DER Data Collection in MOD-032-1 (S5)*

- Recommendations on the DER data that is required to be included in NERC reliability Standard MOD-032-1 in order to sufficiently represent DERs in case creation process.