UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Distributed Energy Resources – Technical Considerations for the Bulk Power System	Docket No. AD18-10-000

NOTICE INVITING POST-TECHNICAL CONFERENCE COMMENTS

(April 27, 2018)

On April 10 and April 11, 2018, Federal Energy Regulatory Commission (Commission) staff convened a technical conference to discuss the participation of distributed energy resource (DER) aggregations in Regional Transmission Organization (RTO) and Independent System Operator (ISO) markets and to more broadly discuss the potential effects of DERs on the bulk power system.

All interested persons are invited to file post-technical conference comments on the topics relating to the potential effects of DERs on the bulk power system as discussed during the technical conference, including the questions listed in the Supplemental Notices issued in this proceeding on March 29, 2018 and April 9, 2018. In addition, Commission staff is interested in comments on several follow-up topics and questions. Commenters need not respond to all topics or questions asked. Attached to this notice are the topics and questions related to Panels 4 and 5 from the two previous notices, as well as Commission staff's follow-up questions related to those panels. Please file comments relating to these areas in Docket No. AD18-10-000.

A notice inviting post-technical conference comments on the topics and questions concerning the Commission's DER aggregation proposal related to Panels 1, 2, 3, 6, and 7 is being concurrently issued in Docket No. RM18-9-000. Please separately file comments relating to Panels 1, 2, 3, 6, and 7 in Docket No. RM18-9-000.

Commenters may reference material previously filed in this docket but are encouraged to avoid repetition or replication of previous material. In addition, commenters are encouraged, when possible, to provide examples in support of their answers. Comments must be submitted on or before 60 days from the date of this notice.

For further information about this notice, please contact:

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Post-Technical Conference Questions for Comment

AD18-10-000

Collection and Availability of Data on DER Installations (Panel 4)

To plan and operate the bulk power system, it is important for transmission planners, transmission operators, and distribution utilities to collect and share validated data across the transmission-distribution interface. In September 2017, the North American Electric Reliability Corporation (NERC) published a Reliability Guideline on DER modeling (Guideline) that specified the minimum DER information needed by transmission planners and planning coordinators to assist in modeling and conducting assessments.[1] The Guideline references the importance of static data (such as the capacity, technical capabilities, and location of a DER installation) for the entities involved in the planning of the bulk power system. The following questions focus on understanding the need for bulk power system planners and operators to have access to accurate data to plan and operate the bulk power system, explore the types of data that are needed, and assess the current state of DER data collection. The following questions also address regional DER penetration levels and any potential effects of inaccurate long-term DER forecasting. The Commission Staff DER Technical Report,[2] issued on February 15, 2018, provides a common foundation for the topics raised in this panel.

Comments are requested on the following topics and questions that were included in previous supplemental notices:

1. What type of information do bulk power system planners and operators need regarding DER installations within their footprint to plan and operate the bulk power system? Would it be sufficient for distribution utilities to provide aggregate information about the penetration of DERs below certain points on the transmission-distribution interface? If greater granularity is needed, what level of detail would be sufficient? Is validation of the submitted data possible using data available?
2. What, if any, data on DER installations is currently collected, and by whom is it collected? Do procedures and appropriate agreements exist to share this data with affected bulk power system entities (i.e., those entities responsible for the

[1] *See* NERC Distributed Energy Resource Modeling Reliability Guideline, at 5 (Sept. 2017), *available at* http://www.nerc.com/comm/PC_Reliability_Guidelines_DL/Reliability_Guideline_-_DER_Modeling_Parameters_-_2017-08-18_-_FINAL.pdf.

[2] The report is available at https://www.ferc.gov/legal/staff-reports/2018/der-report.pdf.

reliable operation of the bulk power system or for modeling and planning for a reliable bulk power system)? Is there variation by entity or region?

3. At various DER penetration levels, what planning and operations impacts do you observe? Do balancing authorities with significant growth in DERs experience the need to address bulk power system reliability and operational considerations at certain DER penetration levels? What are they? Is the MW level of DER penetration the most important factor in whether DERs cause planning and operational impacts, or do certain characteristics of installed DERs affect the system operator's analysis? Is there a threshold that could trigger a need for distribution utilities to share information on DERs with the bulk power system operator, such as the point at which DER penetration causes bulk power system reliability and operational impacts, or some other, lower, level of penetration? How could the answer to these questions vary on a regional basis, and what factors may contribute to this variance?
4. How are long-term projections for DER penetrations developed? Are these projections currently included in related forecasting efforts? Do system operators study the potential effects of future DER growth to assess changing infrastructure and planning needs at different penetration levels?
5. What are the effects on the bulk power system if long-term forecasts of DER growth are inaccurate? Are these effects within current planning horizons? Are changes in the expected growth of DERs incorporated into ongoing planning efforts? Can these uncertainties be treated similarly to other uncertainties in the planning process?
6. How are DERs incorporated into production cost modeling studies? Do current tools allow for assessment of forecasting variations and their effects?
7. Noting that participation in the RTO/ISO markets by DER aggregators may provide more information to the RTOs/ISOs about DERs than would otherwise be available, should any specific information about DER aggregations or the individual DERs in them be required from aggregators to ensure proper planning and operation of the bulk power system?
8. Do the RTOs/ISOs need any directly metered data about the operations of DER aggregations to ensure proper planning and operation of the bulk power system?

Based on the discussion at the April 10-11 Technical Conference, comments are also requested on the following additional questions:

9. What can DERs offer to support or enhance bulk power system reliability? How can these benefits be quantified? Are these opportunities unique to DERs?
10. With the recently approved IEEE 1547-2018 Standard, what coordination or collaboration is needed to leverage the Standard's technical requirements (e.g., ride-through settings, communication capabilities) in a manner that supports bulk power system reliability?

11. Is a formal development of a grid architecture that includes distribution and transmission systems necessary to facilitate planning efforts to incorporate DERs?
12. What specific real-time DER data is needed to manage bulk power system reliability? Why is that data needed? Is there a specific penetration-level of DERs above which real-time data is needed? Without real-time DER data to ensure visibility of DER installations, what, if any, potential challenges and mitigating actions exist for RTOs/ISOs and transmission operators (e.g., the potential need to procure additional contingency reserves)? Please give examples.
13. What challenges exist for DER developers and owners to provide DER real-time data? Please give examples.

Incorporating DERs in Modeling, Planning, and Operations Studies (Panel 5)

Bulk power system planners and operators must select methods to feasibly model DERs at the bulk power system level with sufficient granularity to ensure accurate results. The chosen methodology for grouping DERs at the bulk power system level could affect planners' ability to predict system behavior following events, or to identify a need for different operating procedures under changing system conditions. Further, the operation of DERs can affect both bulk power systems and distribution facilities in unintended ways, suggesting that new tools to model the transmission and distribution interface may be needed. Staff is also aware of ongoing work in this area, for example efforts at NERC, national labs, and other groups, to evaluate options for studies in these areas, which could also inform future work. The following questions focus on the incorporation of DERs into different types of planning and operational studies, including options for modeling DERs and the methodology for the inclusion of DERs in larger regional models. The Commission Staff DER Technical Report, issued on February 15, 2018, provides a common foundation for the topics raised in this panel.

Comments are requested on the following topics and questions that were included in previous supplemental notices:

1. What are current and best practices for modeling DERs in different types of planning, operations, and production cost studies? Are options available for modeling the interactions between the transmission and distribution systems?
2. To what extent are capabilities and performance of DERs currently modeled? Do current modeling tools provide features needed to model these capabilities?
3. What methods, such as net load, composite load models, detailed models or others, are currently used in power flow and dynamic models to represent groups of DERs at the bulk power system level? Would more detailed models of DERs at the bulk power system level provide better visibility and enable

more accurate assessment of their impacts on system conditions? Does the appropriate method for grouping DERs vary by penetration level?

4. Do current contingency studies include the outage of DER facilities, and if they are considered, how is the contingency size chosen? At what penetration levels or under what system conditions could including DER outages be beneficial? Are DERs accounted for in calculations for Under Frequency Load Shedding and related studies?
5. What methods are used to calculate capacity needed for balancing supply and demand with large amount of solar DER (ramping and frequency control) and determining which resources can provide an appropriate response?

Based on the discussion at the April 10-11 Technical Conference, comments are also requested on the following additional questions:

6. For planning efforts, how are model parameters determined and incorporated into existing models using currently available data on DER capabilities? What types of validation techniques are used for the data in these models and how often are they applied?
7. Given the discussion on interactions between distribution and transmission operators, are further requirements for distributed controls, interoperability and/or cybersecurity protections being evaluated? Would advanced techniques and methods to simulate real-time systems, distributed controls and demand response or additional risk-based planning methods, forecasting techniques and data analytics provide a benefit in this area? Which of these methods would provide the most value to operators and why?

Document Content(s)