DER Report For NYSRC Executive Committee Meeting 6/12/20

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The June edition of the DER Report is focused on 3 areas with extensive publications / presentations in May:

NERC IRPTF – Publication of Technical Report on BPS connected IBR (5/28/20)
NPCC RSC – DER Forum Meeting with presentations (5/15/20)
NERC SPIDERWG – Two Day Meeting with presentations (5/12-13/20)

Wherever possible, direct links to the documents, presentations and websites have been provided for further inquiry.

NERC Planning Committee: IRPTF (inverter-Based Resource Performance Task Force)

- Technical Report (56 pages): BPS-Connected Inverter-Based Resource Modeling and Studies (5/28/20)

  This report provides in-depth info regarding IRPTF inverter-based resource modeling and studies:
  - NERC staff activities related to disturbance analyses, NERC Alerts, and response data from the NERC Alerts
  - Transmission Planner (TP) and Planning Coordinator (PC) efforts to improve the accuracy of RMS[1] positive sequence dynamic models for inverter-based resources
  - IRPTF modeling sub-team activities to perform interconnection-wide stability analyses
  - IRPTF technical discussions and work product developments

  Contents:
  - Modeling activities and issues related to BPS-connected inverter-based resources
  - System reliability studies performed by the IRPTF, focusing on the Western Interconnection and including sensitivity analyses on various inverter controls considerations.
  - Appendix A: Complete list of key findings and recommendations from this report
    - Analysis of the NERC Alert data and industry follow-up activities
    - Simulations and studies performed by the IRPTF of Western Interconnection dynamic performance
    - IRPTF modeling work and technical discussions
  - Appendix B: Model verification issues regarding large disturbance behavior of inverter-based resources
    Appendix C: Follow-up findings after the Canyon 2 disturbance NERC Alert.

- Webinar (90 Minutes): Fast Frequency Response Concepts and Bulk Power System Reliability Needs (4/16/20)
  Based on White Paper published in March 2020. Presentation Material, White Paper
  Webinar is Highly Recommended for sharper focus on topics including:
  Factors affecting Fast Frequency Response (FFR), Critical Inertia
  Inverter Based FFR Technology
  Application of FFR in ERCOT and around the World
  Key Findings and Takeaways

- Webinar: 6/8/20 Noon: IRPTF Informational Webinar on BPS-Connected IBR Modeling and Studies – Overview
  Note that this webinar occurred after the publication deadline, but prior to this meeting.

Comments: The FFR webinar is highly recommended, as the speakers enhance the flow of information. The technical report is an excellent resource for defining challenges related to massive IBR deployment and exploring potential solutions. Example: There is significant concern for the impact of Momentary Cessation (MC) behavior and a strong push to enhance modeling to better capture the impact, as well as implement a regulatory environment in which DER behavior can be better applied for dynamic support of the BPS.

NPCC RSC (Regional Standards Committee)

NPCC DER Forum Meeting held on 5/15/20. Materials included in DRAFT NPCC DER Guidance Document, titled: Distributed Energy Resources (DER) Considerations to Optimize and Enhance System Resilience and Reliability. Published on Website: 6/2/20. Length = 192 Pages.

NPCC's stated goal is to provide guidance and not additional regulation for their region's growing DER resource pool. As such, there is considerable overlap with NERC concerns as well as guidelines. The first portion of the Guidance Document includes topical material related to Impact Reporting, Voltage Response, Frequency Support, Reconnection Inverters, Protection, Metering, PQ, PF, Islanding, UFLS, Grounding, Resource Adequacy, Energy Storage, SCADA and Communications, and DER Recommendations.

The following 5 presentations are also contained within the document link above:

- **EPRI** T&D Research Related to DER Integration Page 43 Devin Van Zandt
  Presentation Topics:
  - EPRI Support for Utilities impacted by Covid-19
  - IEEE 1547-2018 Review
  - EPRI DER Integration Engagement
  - DER Autonomous Functions
  - DER Control / Management (DERMS)
  - Key EPRI DER Interconnection Research
  - Aggregate DER Impacts on BPS
  -
- **Joint Utilities** Intro to Organization interests and Work Page 106 David Conroy
  Benefits of coordinated utility efforts to standardize and streamline DER process
  Quarterly Newsletter: Link

- **EverSource** DER Experience Page 118 Vandan Divatia
  Impact of DER's blurring the line between T&D. Hosting Capacity Maps - Link

- **Utility Services** Automatic UFLS and DER's Page 124 Dan Kopin
  The coming divergence of UFLS intent vs. actual impact due to increasing DER penetration

- **NREL** Autonomous Energy Systems Page 156 Ben Kropowski
  Compelling presentation on the "Smart" DER management with these characteristics:
  - Optimize and Control Massive DER in real-time
  - Distributed, Scalable, Data-Aware (millions of devices)
  - Integration of asynchronous data and communications
  - ADMM = Alternating Direction of Method Multipliers – Small local solutions aggregate up to system
  - Lab site: PHIL = Power Hardware in the Loop

Comments: EPRI is working through multiple programs having significant focus on the implementation and impact of the expanding DER environment. Their outreach extends through cooperative efforts with NERC, NATF, the ISO's and participating utilities. Access to research, results, and software is limited to members and based on their level of sponsorship and interest areas. However, there is ample public information available, as exemplified in three program summary websites listed below.

P94: Energy Storage and DG
P173: Bulk System Renewables and DER Integration
P174: DER Integration

NERC Planning Committee: SPIDER Working Group

- 2 Day Meeting on May 12/13, 2020 @11:00 am – 5:00 pm; Links to list of Contents and Agenda

Topical Areas included Sub-group developments and external contributors. Links provided for available presentations.

Comments: This massive collection of information provides a useful snapshot for the state of the 4 SPIDER sub-groups. Guideline review and publication efforts are ongoing. Subgroups can always use additional volunteers to support.

Modeling

- Update on DER Modeling Survey: Elnasar/Green - Link
  Initial documentation of key findings and takeaways from industry survey of DER modeling practices.
- Discussion: DER Data Collection Guideline: Update on draft guideline and review of materials.
- Discussion: Distributed Battery Energy Storage Modeling Guideline:
- Technical Presentations
  - CAISO Studies of Category II/III for IEEE 1547-2018: Green - Link
  - EPRI PV-MOD DOE-Funded Project: Boemer - Link

Verification

- Guideline: DER Performance and Model Verification: Skeath/Lombardi/Tabrizi - Link for both topics
  Review of the latest version of the DER verification guideline; technical discussion on verification activities
- Guideline: DER Forecasting Related to DER Modeling:
  Review of the latest version of the DER forecasting guideline; technical discussion on verification activities

Studies

- Overview of Studies Sub-Group Updates
  Updates on Reliability Guideline; technical discussion on relevant topics
- Guideline: BPS Planning under Increasing DER: Wang/Elnashar - Link
  Updates on Reliability Guideline; technical discussion on relevant topics
- TPL-001 White Paper and Next Steps: Zhu/Shrestha
  Update SPIDERWG TPL-001 White Paper and next steps planned for activity.
- Simulation Improvements and Techniques: Beil - Link
  Status update on tracking potential improvements to software platforms for ease of tracking/modeling/studying DER and its impacts
- Guideline: Developing UFLS Programs with Increasing DER Penetration: Kopin/Quint - Link
  Update on guideline developments for DERs and UFLS programs
- DER and UFLS – The Writing on the Wall: Kopin - Link
  increasing DER will diminish the impact of conventional UFLS to the point of adverse customer impact
  Look to evolve DER autonomous and voluntary responses, with a wider variety of essential reliability services
- White Paper: Beyond Positive Sequence RMS Simulations for High Penetration: Allen/Egunjobi - Link
  Conditions Status update on white paper and studies inform positive sequence studies.
- Technical Presentation - Steady-State and Dynamic impacts of DERs on Entergy's Footprint: Peterson - Link
  regarding use of three-phase modeling techniques to help

Coordination

- NERC Standards Review and DERs: Zhang/Kandel/Stice/Kopin - LInk
  Update on standards review; volunteers for standards, standards template, plans for review.
- DER Terminology Updates: Stice/Zhang/Quint - Link
  Updates to DER terminology documentation; discussion of latest working definitions.
  Tracking and Reporting DER Growth: Stice / Zhang (In same presentation)
  Review of methods and documents showing DER growth in various areas.
- Guideline: Communication and Coordination Strategies for T-D Regarding DER: Kopin/Zhu - Link
  Update on development of Reliability Guideline -

External

- A Proactive Approach to DERs: Lew / Miller - Link
  Presentation on proactive approaches to integrating increasing amounts of DERs; considerations for future system needs.
- NARUC Publications on DER and Grid Resilience: Zitelman - Link
  Informational presentation on two NARUC publications – Advancing Electric System Resilience with Distributed Energy Resources: A Review of State Policies and Advancing Electric System Resilience with Distributed Energy Resources: Resources
- Kauai Experience with DERs on an Islanded System: Kruse/Rockwell - Link
  Overview of Kauai grid challenges, particularly related to distributed energy resources and islanded network challenges.
- Updates to IESO Market Rules Regarding DERs: Elnashar - Link
  Proposed updates to the IESO Market Rules regarding DER performance related to off-nominal frequency operation, speed/frequency regulation, and voltage ride-through operation. Updates to technical interconnection requirements to comply with Canadian Standard Association's (CSA) recently published standard about DER interconnection.
- NREL Report on DER Performance Categories and their Impact on BPS Reliability: Mather - Link
  Presentation from NREL on a recently published report investigating IEEE 1547-2018 performance categories and their impact in the WECC footprint. Report Link
- IEEE 1547.2 Update: Boemer - Link
  Technical presentation on the updates to IEEE 1547.2 Application Guide.

Upcoming Meetings / Events:

As of now, there are no significant NERC SPIDER, IRTPF or NPCC RSC events scheduled for the June / July period.