DER Report For NYSRC Executive Committee Meeting 10/8/20

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The October edition of the Distributed Energy Resources (DER) Report is focused on the following items:

- FERC Order No. 2222, "Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators".
- NERC RTSC Presentation on Ensuring Energy Adequacy with Energy constrained Resources
- Three presentations from the NPCC September 17th Webinar on Improving Stakeholder Coordination to Support Dynamic Analysis of Transmission and Distribution Systems.

Upcoming Events of Interest:

- CIGRE Academy Webinar on Impact of High Penetration of Inverter based Generation on System Inertia of Networks, scheduled for October 14th from 11am to 1pm. Topics include: Control Strategies, Challenges with Low Inertia and High RoCoF, Frequency Containment Reserves, Inertia as an Ancillary Service, and a look at existing and future technologies. Registration is free for CIGRE corporate members.
- The NPCC DER Forum (registration required: see Information Link), is scheduled for October 15th, from 8:30am to 2pm. Topics include:
  - DER Approach to Regional Guidance and DER Impact Reporting
  - NY-ISO: DER Aggregation, Roadmap and Interconnection
  - NYSRC: High Renewables Capacity Study
  - HQ: Dynamic and Transient Behavior of Inverters used in Solar Residential Projects
  - ISO-NE: DER Interconnection and Aggregation
  - EPRI: Effective Grounding of DER
  - National Grid/TFSP: Substation Protection issues associated with DER
  - FERC Order 2222 relating to Participation DER Aggregation in Markets in ISOs and RTOs

FERC Issued Order No. 2222 on September 17th. FERC's announcement stated that it is amending its regulations to remove barriers to the participation of [DER] aggregations in the capacity, energy, and ancillary service markets operated by Regional Transmission Organizations and Independent System Operators. This rule allows several sources of distributed electricity to aggregate in order to satisfy minimum size and performance requirements that each may not be able to meet individually. Benefits include lower costs for consumers through enhanced competition, more grid flexibility and resilience, and more innovation within the electric power industry. Relevant information can be found at these locations:

Fact Sheet Order No. 2222 Staff Presentation

Presentation on Ensuring Energy Adequacy with Energy Constrained Resources was given by Mark Lauby at the NERC Reliability and Technical Security Committee (RTSC) Meeting on September 15th.
This link contains all the meeting presentations – The subject presentation begins on slide 40.

The presentation describes a whitepaper in which responses to 11 questions on Energy Adequacy were evaluated within respect to 3 time frames: Operations (1< day), Operational Planning (< 1 year), and Longer Term planning (1 to 5 years). The responses were grouped and prioritized, with most falling into concerns for 2 areas: Energy Adequacy and Flexibility for the evolving Resource mix, and Gas Delivery Security. For Gas Delivery, references were made to the NERC Reliability Guideline (link) on Fuel Assurance and Reliability Risk Analysis for the Bulk Power System (March 2020).

Some takeaways from the white paper include:

1. Generator flexibility is gaining importance as load ramps begin to stress the existing infrastructure.
2. The variability of the renewable resources will likely change how gas is utilized, requiring a higher precision of understanding to determine if the existing system is capable to serve the changing needs (e.g. larger swings of gas demand due to higher overall gas generation ramp rates and shorter periods of online time, burning 24 hours of gas in 8 hours instead of 16)
3. Seasonal differences of renewable resources will require evaluation to properly define storage requirements (e.g. snowstorms that eliminate the output of solar panels)
4. Strategic overbuilding of a similar technology (i.e. solar) augmented by either storage or some portion of the firm capacity fleet (albeit operating at low capacity factors only when needed.
5. Daily and seasonal variability of renewable resources should be considered when determining capacity values of the installed resources.

The presentation concludes with proposed next steps:

1. Coordinate energy assurance activities with industry working groups
2. Subject matter experts should be assembled to develop:
   a. Technical foundation for the 3 time horizons
   b. Ways to identify the levels of energy that are required to meet the operational needs
   c. Tool specifications needed to incorporate energy considerations into planning, operational planning and operations assessments
3. Engage industry R&D organizations (EPRI, DOE, Natural Resources Canada, National Laboratories, etc.) to validate the technical foundations and development of the tools and methods.
4. Coordinate studies and plans with adjacent Balancing Authorities to identify enhanced collaborative regional support.
5. Create a Standard Authorization Request to enhance existing or create new Reliability Standards to address fuel assurance and resulting energy limitations for the planning timeframe

Highlights from the three NPCC Webinar Presentations (Link)**:**

1. ISO-NE DER Modeling Process and Experience – DER Modeling in Dynamic Cases (Brad Marszalkowski, ISO-NE). ISO-NE anticipates that Bulk System essential reliability services will be addressed with the full implementation of IEEE 1547. Either DER will provide these services, or the transmission system will have to be upgraded to accommodate these needs. In addition to ride-through requirements, provisions under consideration include voltage control and frequency control. Detailed inverter operating requirements are provided in the presentation's appendices.

2. Distributed Energy Resources – Modeling and Implementation (Mohab Elnasher, Ontario IESO). This presentation provides details regarding the DER_A dynamic model representations in IESO dynamic cases, highlighting the differences between static models vs. evolving dynamic models. An overview layout shows various DER control modules supporting Active power-frequency, Reactive Power – Voltage, frequency tripping, and fractional tripping.

3. DER Model Data Usage and Intended Usage (Gary Custer, SMA). This company develops and maintains EMT and RMS models. Their presentation provides a broad overview of Inverter control capabilities for grid management, and the methods by which these capabilities are integrated into the firmware of the inverter. SMG anticipates further developments in the areas of Grid Interactive, Grid-forming, and Blackstart capabilities.