DER Report

11/7/19

NPCC DER 10/17/19 Notes

Introductory Comments

- **DER impact form** is available on the website- provide data on events impacting the BPS
- Guideline document it's a work in progress-Suggested updates are welcome
- Discussion of what is DER - as far as IEEE goes-any device not connected to the bulk system that can input power into the system
- Guy Zito repeated Duke Energy representative's statement that **communication** is the most important aspect with regard to DER integration into the electric system. Since Duke is a vertically integrated utility, communication between distribution and transmission is easier. Here in NY we have a far less integrated system so that enabling communication is much more challenging.

NERC inverter-based resource actions update

- IRPTF Inverter-based Resource Performance Task Force
- SPIDER working group activities
- P 2800 project- IEEE equivalent to IEEE 1547 but for transmission and subtransmission connected projects – in progress – note IEEE 1547 applies to distribution connected
- Inverter categories based on Control logarithms
    - Grid following-Current source-line-require system inertia
    - Grid forming-Voltage source inverters-can provide effective inertia – standards needed for manufacturers to develop control technology- one issue involves synchronizing multiple inverters – wave of the future
- Presentation lists various materials related to NERC activities in the DER area
- Great summary of NERC activities in this area.

Planning for DTRs and Storage (Clearview)

- Evolution from traditional transmission planning
- NARUC task force on comprehensive electric plan (NARUC is the National Association representing state public utility commissions) – check this out
- Impact of market structures on transition planning
- Statement was made "NYSRC scales every hour or particular load shaped by 12% so every load profile has more hours above peak"??? What does that mean?
- Focus seemed to be that transmission and resource planning are in a state of transition

DER-BES impact analysis and the TDC oh Sim tool-James Reiley representing Argonne

- Dynamic and steady-state models
- Benefit to provide an awareness and control capability
- NPCC staff evaluating
- Working with SPIDER WG
- Uses DVD-R (distributed) Model as opposed to DER_A
    - Aggregation not needed as individual distribution units are modeled
    - Could be used to test and calibrate DER_Aggregation
- A major challenge is computational time required for large models
- It is free software (PYTHON Code which works in conjunction with PSS/E)

IEEE standard 2030 DER management system

- Discussion of DER management system and needs for standard in this area
- Standard under development for management of distributed systems

National grid battery project

- Technical details associated with connecting battery project Pulaski
- Presentation focuses on practical considerations

STEM (California based resource aggregation company)-Use and coordination of distribution storage

- Provides ISOs with aggregated resource services and control
- Digital communications and control
- ISO-NE and CAISO use their service for behind the meter solar and battery systems
- ISO-NE– for in front of the meter solar and battery
- Where is NY in this picture?

DYNA Power presentation-DC coupled hybrid technology

- Cost savings
- Improved efficiency
- Other benefits include clipping, low-voltage harvesting and load ramp rate control
- Issue - DC meter grade metering available yet – needed for monitor of battery flows

ISO– NE 1547 presentation

- Looking at late 2020 before compliant inverters become available so all DER IBR's up till the "new" ones will be per IEEE 1547-2003

    - 1547.1 (standard for conformance test procedures) needs approval
    - UL 1741 needs update and final release to provide design requirements for new inverters
- A minor modification is in process two reduce category III undervoltage trip times
- MISO and ISO– specifications have been developed for ride through in recognition that IEEE 1547 won't be ready in a timely fashion
- Where is New York?

Take Aways

- NPCC and NERC bringing a wealth of useful information related to DER
- Impacts of large penetration of distribution DER to bulk system of increasing concern. On one hand, traditional entities (TOs, NERC, RTOs) are working hard to get ahead of the wave. Other entities (STEM, Clearway, GOs) are questioning the status quo.
- DERMS (DER Management Systems) of increasing importance – STEM providing control and coordination of aggregated DER to ISO operations via digital communications
- System planning and analysis is in a major state of transition
- New York should be enhancing communication at all levels with regard to planning and operations including standards and model development
    - Implementation of DER inverter setting rules (ride thru) as was done in New England and the MISO (IEEE 1547 – 2018 not ready until into 2020)
        - Possible help from ISO-NE?
    - Development of DER_A models to aggregate DER into the planning and analysis process – TOs as well as the NYISO
        - Possible help from Argonne and EPRI?
        - Possible NYSRC Reliability Rule?
- All presentation materials are available in a single PDF on the NPCC website – "Committees/Regional Standards/Documents"

NERC

SPIDER WG Meeting Notes 10/8 and 10/9/19 (* summarized at previous EC meeting)

- DER Survey effort – extensive form – issues with different entities
- Application of DER_A PJM*
    - Argonne did runs with EPRI input on modelling
    - Modeled all of NJ- 100 substations – 2021 case up to 2031
    - Included various levels of synch machines
    - 10 most severe transmission faults – 100 msec
    - Momentary cessation function worked

    - With ride thru – no problems
    - Without ride thru – major impacts for all contingencies
    - Main purpose – testing DER_A model
- Paper on DER Regulation by CAISO
    - Use of DER_A model in simulations of DER reactive power voltage control and active power frequency control – time ran short se presentation rescheduled for 11/4
    - Model appears to be working
- TDCOSIM
    - Co-simulation of transmission PSS/E and distribution (Argonne tool-open source)
- ESS Modeling and planning
    - Modeling issues
    - State of charge not known
    - FERC 841 – storage can respond to markets
    - Recommended practices???
    - Need guidance for DER_A
    - Can have big impact, TP's and DP's, start with data collection
- Performance and Reliability Model Verification Guideline – Lombardi NPCC
    - DER data collection
    - Event data collection
    - Aggregation of RDER and UDER
    - DER forecasting as related to modeling
    - Work in progress
- California DER Disaggregation*
    - Statewide down to system
    - Get distribution level load forecast
    - Based on:
        - Proportion – no of customers on a circuit
        - Propensity – EV's
        - Adoption – EV's and Solar
- Guideline on BPS perspective on IEEE 1547-2018*
    - Focus on elements of 1547 that have bearing on BPS
    - Encourage AGIRS to work with balancing authorities
    - Understand need for "shall trip" for safety but settings should be as wide as possible
    - ISO-NE, MISO and PJM have come up with ride thru setting requirements
- BPS Impacts from Behind the Meter Reactive Power Support and Frequency Support in Different Operating Modes

NERC ERO Reliability Risk Priorities Report

- Draft November 2019 – listing of high priority risks
  - Grid Transformation
    - Bulk PS Planning
    - Resource Adequacy and Performance
    - Increased Complexity of P&C Systems
    - Situational Awareness Challenges
    - Human Performance and Skilled Workforce
    - Changing Resource Mix
  - Extreme Natural Events
  - Security Risks
  - Critical Infrastructure Interdependencies

NY-ITWG

- Meeting at NY BEST 10/30 (unable to attend but topics listed below for reference)
- Open discussion on NYISO/NYSIR Coordination
- Monitoring and Control update by JU WG
- Smart Inverter functionality by JU/ Industry follow up
- Next meeting at NYSERDA 12/18