DER Report

4/11/19

NERC SPIDER – Meeting at CAISO 4/10, 4/11 – Some selected topics:

- **Update on MOD-032-1 SAR Effort**
- **Interconnection-Wide Case Creation – MOD-032**
- Update and review of latest draft of SAR to improve MOD-032-1 by clearly articulating DER as part of the data to be provided for modeling purposes.
- **Modeling Sub-Group Kickoff**

  Technical Presentations:

  - CAISO Studies using DER_A Model for System Planning Analyses – Irina Green, CAISO
  - National Grid Studies using DER_A Model for UFLS Program: Experience with DER_A Model and Recommendations for industry action – Dean Latulipe, National Grid
- **Studies Sub-Group Kickoff**

  Discuss Studies Sub-Group activities

  - Overview of Studies Sub-Group
  - S1 – Guideline: BPS Planning under Increasing Penetration of DER (Up
  - S2 – TPL-001 Review for DER Incorporation
  - S3 – Simulation Improvements and Techniques
  - S4 – Guideline: Recommended Approach for Developing UFLS and UVLS Programs with Increasing DER Penetration
  - S5 – White Paper: Beyond Positive Sequence RMS Simulations for High Penetration Conditions

  Technical Presentation:

  - UFLS Studies Incorporated DER – Kannan Sreenivasachar, ISO-NE

- **See SPIDER website for details**

NERC SPIDER – 2nd Quarter Milestones in Brief (* items requested by NERC PC)

- **Modeling Subgroup:**
  - Survey industry use of DER planning models in BPS studies
  - Review of MOD-032-1 for DER data collection* – interconnection wide modeling
  - Modeling notification – recommended practices for dispatching other than at Pmax (proper response)
- **Studies Subgroup:**
  - No Q2 deliverables

- Q4 deliverables include:
  - Reliability Guideline-BPS Planning under increasing penetration*
  - Review existing study approaches currently used by industry
  - Review worldwide study approaches
  - How to represent DER for potential reliability issues
  - Study assumptions and approaches considering single phase DER
  - Reliability issues with high penetration
  - Recommended practices for reporting gross load, net load and DER tripping/reconnection

- **Coordination Subgroup:**
  - Review of MOD-032-1 for data collection*
  - Coordination of terminology
  - Tracking and reporting DER growth (on going)
- **Verification Subgroup:**
  - Nothing for 2nd quarter – for 4th Quarter Guideline on DER performance and model verification

New York ITWG:

- **Meeting** 2/27/19 – postponed due to weather impacts- **held 3/27/19**
- **Appendix K** – Energy Storage System (ESS) Application Requirements / System Operating Characteristics/ Market participation –
    - **Discussion on submission and related information with examples**
    - **Operating options for hybrid systems:**
        - **A-ESS charged only by DG**
        - **B-ESS cannot export- can charge from grid and from DG, system can only export when ESS not active**
        - **C-ESS can charge from grid or DER-both can export to grid**
        - **D-Default option when no load and applicant doesn't choose one of above**
    - **JU presented proposed changes to Appendix K**
    - **JU presented metering preliminary metering configurations**
    - **Industry to review and propose changes by 4/10**
- **STEM (a consulting firm based in California) presented a "no export/minimum export limits" approach using controls as opposed to conventional relay/breaker control…….more on this**
- **Afternoon session focused on flicker issue (voltage variations due to variable generation)**
- **All presentation materials available on NY ITWG website**
    - **Next meeting 4/24**

APPENDIX K
Energy Storage System (ESS) Application Requirements /
System Operating Characteristics / Market Participation
Application Requirements:

a. Provide a general overview / description and associated scope of work for the proposed project. Is the new ESS project associated with a new or existing DG facility?

b. Identify whether this is a Stand-Alone or Hybrid ESS proposal, or a change to the operating characteristics of an existing system.

c. Indicate the type of Energy Storage (ES) technology to be used. For example, NaS, Dry Cell, PB-acid, Li-ion, vanadium flow, etc.

d. Indicate how the ESS will be charged and/or act as a load: (1) Electrical Grid Only, (2) Unrestricted charging from Electrical Grid and/or DG system, (3) Restricted charging from Electrical Grid and/or DG Systems, or (4) charging from DG only.

e. If the intended use case for the ES includes behind-the-meter backup services, please provide a description and documentation illustrating how the entire system disconnects from utility during an outage (e.g. mechanical or electronic, coordination, etc.).

f. Provide the data sheet for the battery portion of the energy storage equipment. including the model, capacity (kWh), and manufacturer

g. Provide specification data/rating sheets including the manufacturer, model, and nameplate ratings (kW) of the inverter(s)/converters(s) for the energy storage and/or DG system.

h. Indicate any impacts of ambient temperatures on charging and discharging capabilities, specifically noting any restrictions on available capacity as a function of temperature and listed on the system facility's nameplate.

i. Provide details on cycling (anticipated maximum cycles before replacement), depth of discharge restrictions, and overall expected lifetime regarding the energy storage components.

j. Provide proposed inverter(s) power factor operating range and whether inverter(s) are single quadrant, two-quadrant, or four-quadrant operation.

k. Provide specification data/rating sheets including the manufacturer, model, and nameplate ratings (kW) of the inverter(s)/converters(s) for the energy storage and/or DG system.

l. Provide details on whether the inverter(s)/converter(s) have any intrinsic grid support functions, such as autonomous or interactive voltage and frequency support. If they do, please describe these functions and default settings.

m. Indicate whether the ES and DG system inverter(s)/converter(s) are DC-coupled or AC-coupled.

n. Indicate whether the system inverter(s)/converter(s) is/are listed on the NY DPS “Certified Interconnection Equipment List"

1. If the interconnected inverter(s)/converter(s) are not listed on the “Certified

Interconnection Equipment List” but are certified, provide a copy of the certificate of compliance.
2. If the interconnected inverter(s)/converter(s) are not listed on the “Certified Interconnection Equipment List, or the storage and paired DG are AC coupled, please detail the use of control systems such as utility grade relays including AC and DC control schematics and relay logic.

3. If the interconnected inverter(s)/converter(s) are not listed on the “Certified Interconnection Equipment List”, please detail the verification of protection operation in equivalent deployments of the equipment configuration. For example, if this exact configuration has been previously deployed, please describe the project and reference the commissioning/test report.

4. Identify if inverter analytical models are available for use in the utility’s power flow analysis program, and if there are any restrictions on their use.

o. Indicate whether the interconnected inverters inverter(s)/converter(s) is/are compliant to the latest versions of the following additional standards. If partially compliant to subsections of the latest standards, please list those subsections: 1. IEEE 1547a 2. UL 1741 and its supplement SA

p. If the interconnected inverter(s)/converters are not compliant with the previously listed additional standards, please describe show utility grade protection, relay and controls are implemented between your hardware and the utility.
q. Detail any integrated protection that is included in the interconnected inverter(s)/converters. For example, describing over/under-voltage/current frequency behavior and reconnection behavior would comply, such as solid state transfer switching or other.

System Operating Characteristics:

a. Identify the maximum nameplate rating in kW ac for each source (storage, any paired inverter-based distributed generation).

b. Identify the maximum net export and import of the Hybrid or Stand-Alone system in kW ac

c. Indicate the maximum ramp rates during charging and discharging.

d. Indicate the maximum frequency of change of operating modes (i.e. charging to discharging and vice-versa) that will be allowed based upon control system configurations

e. Indicate any specific and/or additional operational limitations that will be imposed (e.g. will not charge between 2-7pm on weekdays).

f. Provide a summary of protection and control scheme functionality and provide details of any integrated protection of control schematics and default settings within controllers.

g. Provide descriptions of any software functionality that enables intelligent charging and discharging of the ESS using interconnected DG, such as PV. For example, if the ESS can be charged only through the DG input, or if the ESS can be switched to be charged from the line input, provide those details in a sequence of operations. Provide details on grounding of the interconnected energy storage and/or DG system to meet utility effective grounding requirements.

h. Provide short circuit current capabilities and harmonic output from the Hybrid Project or stand-alone storage system

i. Provide details on standard communication hardware interfaces that are available, e.g., TCP/IP, serial, etc.

j. Provide details on standard communication protocols that are available, e.g., MODBUS, DNP-3, 2030.5, etc.

k. Provide details on standard communication data models that are available, e.g., 61850-90-7, SunSpec, MESA, etc.

Market Participation:

a. Will the system operate in the NYISO markets? If yes, please specify.

b. Will the system be compensated under a utility tariff(s)? If yes, please specify.

The market participation information is non-binding; however, the operating characteristics as defined above will be used for technical study.
Date: