DER Report

3/8/19

NERC SPIDER - Mod-032-1 SAR issued by SPIDER working group on 2/13/19.

- Purpose is to provide DER information to those planning and operating the grid.
- Data requested in initial version is minimal. SFor steady state and dynamic studies, only the aggregate maximum and minimum power along with BPS location are required.
- Questions include how DPs to provide data for projects under construction and future planned projects.

NERC SPIDER - Reliability Guideline – Parametrization of the DER_A model

- Outgrowth of previous guidelines by LMTF and DERTF
- For modeling standalone as well aggregated resources in stability studies
- Retail scale DER as well as Utility DER
    - U-DER connected closely or directly to a transmission bus – Range 0.5 to 20 MW
    - R-DER offsets customer load, can be residential, commercial or industrial typically single phase
- Suggested parameters for vintage DERS by 1547-2003,1547a-2014,1547-2018, CA21
- For PCs, TPs, TOs, RCs
- Final draft to be posted at PC meeting in March for 45 day posting

New York ITWG:

- Meeting 2/27/19 – postponed due to weather impacts – date TBD
- Major Planned Topic is ESS – Appendix K of the SIR
    - SIR is NY's Standardized Interconnection Requirements issued by PSC (10/2018)
    - 50 kW or less, 50kW up to 5 MW
- Appendix K – Energy Storage System (ESS) Application Requirements / System Operating Characteristics/ Market participation –
- Planned discussion on submission and related information- discussion by Joint Utilities with examples
- Some excerpts:
    - 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
    - Identify the maximum nameplate rating in kW ac for each source (storage, any paired inverter-based distributed generation).
    - Identify the maximum net export and import of the Hybrid or Stand-Alone system in kW ac

- Indicate the maximum ramp rates during charging and discharging. 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 s that will be imposed (e.g. will not charge between 2-7pm on weekdays).
- Indicate any specific and/or additional operational limitations that will be imposed (e.g. will not charge between 2-7pm on weekdays).
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- Also planned presentation on California lessons learned

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.