DER Aggregation Descriptive Characteristics

Scope of Work Paper – The intent is to identify common information around heterogenous and homogeneous DER aggregations that may benefit from standardization and general information requirements

**DER aggregation descriptive characteristics that may benefit from standardization**

* Grid services under Order No. 2222
  + FERC Order No. 2222, Paragraph 27: Aggregations of new and existing distributed energy resources can provide new cost-effective sources of energy and grid services and enhance competition in wholesale markets as new market participants
* Locational information
  + 1. Geographic location
       1. Longitude and latitude (conditionally required i.e. offshore wind)
       2. Postal address
       3. Street name and number (conditionally required i.e. land-based facilities)
       4. City (conditionally required i.e. land-based facilities)
       5. State (required)
       6. County
       7. Country (required)
       8. Province (required)
       9. Apartment number
       10. Time zone
       11. PO Box numbers would not be allowed
    2. Grid specific location
       1. Manhole
       2. Utility pole
    3. Zonal information
       1. Load zone
       2. Reserve zone
       3. Dispatch zone
       4. Capacity zone
    4. Market nodal information (p-node)
       1. Hub p-node (aggregation)
       2. LMP node
    5. Electrical nodal information (e-node aka service points)
       1. Would this be the distribution provider’s description or a new description?
       2. Meter information
       3. Phase information
    6. LDC service area
       1. Operating area
       2. City
       3. Neighborhood
       4. Company
    7. Balancing Area
       1. Pseudo-ties
       2. Inter-area ties
       3. Intra-area ties
    8. Project location
       1. Construction site
       2. Land registry book and page number
    9. Price location
       1. LMP nodes/pricing nodes
       2. Distribution pricing node
    10. Service location
        1. Customer account
        2. Service delivery point
    11. Source location
        1. Substation
        2. Circuit
* Operational characteristics of resources comprising aggregation
* Number of resources in the aggregation
* Types of resources in the aggregation

**Proposed Information Requirements for DER aggregation for potential inclusion in registry database**

The DER registry is a common repository of information regarding DER aggregators (contact information) and the physical and operational characteristics of individual DER aggregations and contains regulatory, contact, and operational information regarding DERs participating within FERC jurisdictional wholesale markets.

The DER registry could serve as a shared repository of DER information for use by ISOs/RTOs and distribution companies.

A single registration process managed by the ISOs/RTOs could be used to populate the registry data may not be appropriate for some ISOs/RTOs

DER Aggregation-Level Information

* Name of DER aggregator
* Name of market participant representative (performs various market activities i.e. scheduling bids and offers, etc.)
* DER aggregation capacity (in MW)
* Maximum DER aggregation available energy (in MWh)
* Maximum DER aggregation consumption capability (in MWh)
* DER aggregation regulation capability (in MW) (similar to AGC concept)
* Is the DER aggregation homogenous (i.e. one technology type) or heterogenous (i.e. multiple technology types)?
* List of individual registered DERs in the DER aggregation
* Metering
  + Who owns the metering equipment?
  + Are the individual behind-the-meter DERs sub-metered?
  + What are the technical metering specifications?
  + What information is it collecting and over what time intervals?Who is responsible for reading and telemetering the data?
* Telemetry
  + Who is responsible for telemetry?
  + What are the technical telemetry requirements that must be satisfied?

Individual DER-Level Information

* Requirements applicable to every DER in an aggregation
* Name of DER owner
* Geographic location
* Electrical location
* Interconnection information
* Possible operating modes—*e.g.*, peak shaving, emergency power, etc.
* Intended use—*e.g.*, wholesale market, retail market, net metering, demand response, etc.
* Is the DER dispatchable?
* Inverter(s)
  + - [Note: Should inverter information vary based on resource technology—*e.g.*, solar, wind, storage?]
  + Metering
    - [Note: Should metering information vary based on resource technology—*e.g.*, solar, wind, storage, DR?]
  + Telemetry
    - [Note: Should information vary based on resource technology—*e.g.*, solar, wind, storage, DR?]
* Requirements specific to solar DERs
* Solar array information
  + - Number/capacity of PV cells
    - Azimuth
    - Autotracking capability
    - Obstructions
    - Historical production
    - Expected production
    - Forecasted/actual weather data
* Requirements specific to wind DERs
* Turbine information
  + - Number/capacity of turbines
    - Historical production
    - Expected production
    - Forecasted/actual weather data
* Requirements specific to storage DERs
* Storage asset(s)
  + - Two values: 1) MWh capacity; 2) MW rate of charge/discharge
    - Singular value: inclusion of just MWh capacity to avoid redundancy with more general DER aggregation capacity listed above
    - [Note: should we include here all of the requirements listed above for Order No. 841 storage resources?]
    - [Note: should this list also include requirements specific to electric vehicles used as DER storage devices?]
* Requirements specific to Demand Response DERs
* Demand reduction capability
* Historical performance
* Expected performance
* Forecasted/actual weather data
* Requirements specific to Energy Efficiency DERs
* Requirements specific to microgrids
* Requirements specific to other DERs