Ameren Illinois Requirements for DER Interconnection Application One-Line Diagrams and Site Plans: Behind the Meter (BTM) Projects with a Nameplate Capacity of 200 kW and Above

Requirements Applicable to Both One-Line and Site Plan Documents

Title Block Requirements

1. Developer name and contact information
2. Consulting engineering firm (if applicable) and contact information
3. Project name
4. GPS coordinates (Latitude/longitude)
5. Site address
    a. Provide if available at time of application. If not available, update documents with 911 address once known.
6. Revision number and revision date

Other Required Information

1. Total DC rating (kW)
2. Inverter quantity, rated AC output, and model number
3. Total AC rating of generation system
4. Export limit of DER system
    a. KVA
    b. KW
    c. kVar
5. Total AC rating of energy storage system (ESS) if applicable
    a. kW
    b. kWh

One-line Diagram Requirements:

General Requirements:

1. Total AC and DC system size must be clearly indicated.
2. These requirements are in force for any BTM DER project that is 200 kW or larger.
3. One-line diagram must be computer drawn. Hand drawn documents will not be accepted.
4. For three-phase projects, the diagram must be a single-line schematic of the system.
    a. Single phase projects must also utilize a one-line format (i.e., a 2-line diagram is not required).
5. The diagram must provide the level of detail as noted in the "Items to be Included" section.
6. Block diagrams are acceptable only if they meet the following criteria:
    a. Each block's text must clearly identify it.
    b. Connections inside a "block" device must be clearly indicated.

i. Simply showing lines connecting to a block is not sufficient.

c. Example: For a load side tap, a block must:
   i. Clearly indicate it is a load side tap
   ii. Specifically call out main size and sub-protective device size
   iii. Show where the line is coming in and out

Specific Items to be Included on BTM One-lines:

1. Existing or proposed Ameren Illinois revenue metering equipment.
   A. Existing or proposed CT cabinet.
   B. Utility metering section in switchboard.
   C. Show revenue meter number.
   D. Existing or proposed service voltage should be indicated.
2. All existing and new electric service panels / switchgear / panel boards. For each, indicate new or existing. Use of a separate color or line style to indicate new/existing facilities is preferred.
3. All required disconnect switches / breakers. Device size must be clearly indicated. If using a fused switch, switch frame size and fuse size must both be indicated.
   A. If the proposed DER includes installation of a switchgear, capture the bus rating of the switchgear.
   B. For primary voltage (greater than 1000 V) interconnections, proposed main protective device protective relay functions (i.e. 50, 51, 27, 59, 59N, 81) and/or proposed protection settings when applicable.
4. All solar and energy storage system inverters must be shown. Inverter model and AC rating must be shown on the one-line. If there are "*n*" multiples of the same model/size of inverter, only one needs to be shown, but the total number must be indicated. The output voltage of inverters should also be indicated on the one-line.
5. A representation of the solar panels must be shown. If the system uses PV strings, a typical string, including its number of panels must be indicated.
6. The point of interconnection for the DER facilities with the existing premise wiring, including:
   A. Tap location clearly indicated such that the reviewer can understand the type of enclosure (i.e.: main breaker panel, switchboard, switchgear, etc.) and where within the enclosure the tap will be made.
   B. For line (supply) side taps, the physical tap method must be shown. For example: tap blocks, piercing connectors, terminal lugs on bus bar, etc.
   C. For load side taps, the breaker panel must be shown, including the tap breaker size, location in the panel, and the rating of the bus. The panel main breaker size must be shown as well.
7. The service and service entrance conductor size and number of conductors must be shown.
8. For primary voltage (greater than 1000 V) interconnections, the site's main step transformer that will interconnect the site to the utility voltage lines must be shown along with the three-phase winding configuration (Y-Y, Δ-Y, etc.) and voltage on both sides of the transformer.
9. At each applicable panel, the bonding/grounding approach must be indicated. (i.e.: is the neutral and earth ground bonded or is the neutral floated.)

10. The location of the generation metering cabinet and associated instrument transformers (required for all BTM DER 200 kW and larger).
11. For three-phase systems that include a step transformer between the DER disconnect and the inverters, this transformer must be shown, including the kVA capacity and three-phase winding configuration (i.e.: Y-Y, Δ-Y, etc.). The voltage on both sides of the step transformer should be indicated on the one-line.
12. Customer owned, supplemental reactive power devices
    A. The location of supplemental, reactive power devices.
    B. Reactive power device ratings at nominal voltage.
13. If the system is capable of forming a microgrid:
    A. The microgrid interrupting device (MID) must be clearly indicated.
    B. Any additional transfer switches and any other automatic standby generators must be shown
14. If the system contains an export limiting control such as a Power Control System (PCS) with the intent of limiting the export level of the DER system:
    A. The export limiting controller or PCS must be shown. Indicate any certifications for the export controller or PCS (i.e.: UL 3141.)
    B. The metering or instrument transformers that provide voltage and current data to the export controller or PCS must be shown and indicated as such.
    C. All voltage / current input signal wiring related to the export control system must be shown and all communication pathways from the export controller to the controlled inverters must be shown.
    D. The AC export limit of the system must be clearly indicated on the one-line.
    E. Include a table of hierarchy that identifies the export limiting functions and their order of precedence. This includes the hierarchy of logic in the controller and any fall back or fail-safe controls that are in place to ensure that the export limit is not exceeded if the controller fails.
15. If the system contains a Power Plant Control system (PPC) for the purpose of managing the DER plant behavior at the point of interconnection:
    A. All 34 kV and 69 kV connected DER systems must utilize a PPC to ensure the RPA is as close to the PCC as practicable.
    B. The PPC controller must be shown.
    C. The metering or instrument transformers that provide voltage and current data to the PPC must be shown and indicated as such.
    D. All voltage / current input signal wiring to the PPC must be shown and all communication pathways from the PPC to the controlled inverters must be shown.

Site Plan Requirements:

General Requirements:

1. Site plans are required for any BTM DER interconnection project that has an AC nameplate capacity of 200 kW or larger.
2. All site plans must be computer drawn. No hand drawn documents will be accepted.
3. All site plans must provide the level of detail as noted in the "Items to be Included" section, including dimensions from proposed structures to existing points of reference.

Specific Items to be Included on BTM Site Plans:

1. The location of all new and existing structures with an indication of each one (new / existing).
2. Site access details including entrance drives, parking lots, etc.
3. The proposed location of the Ameren Illinois facilities to be constructed on the property.
4. Depict the location and footprint of buildings and structures located on the premise
5. The proposed location of the DER and electric service facilities, including:
    a. Service cable runs
    b. Revenue meter location(s)
    c. Generation metering location(s) (generation metering is required for all BTM projects 200 kW or larger)
    d. Ameren Illinois transformer location or primary metering location
6. Proposed location of the DER facilities including:
    a. Solar panels or energy source location
        i. Indicate where equipment is going to be mounted to a building or structure (new or existing)
    b. Inverter location(s)
    c. DER disconnect switch location(s)
7. Property Information:
    a. Property boundaries
    b. North arrow
    c. Scale of the drawing
8. Setbacks and Clearances:
    a. Required setbacks from property lines
    b. Clearances from existing structures and utilities