

Quick Reference Sheet for Large PV Acceptance/Witness Testing – Ver 1.3

The following items will typically be verified by Xcel Energy during witness test of a large PV system. **This is not an exhaustive list of all requirements, nor does this replace the required test procedure unique to each system.** Large PV systems are required to meet all Minnesota Tariff Section 9, Minnesota Tariff Section 10, Xcel Energy Standards for Electric Installation and Use (Blue Book), and all applicable local regulations before being granted permission to operate. Xcel Energy may, while on site, request demonstration of compliance to any of these standards or regulations. Review the latest version of the “MN-Community-Solar-Commissioning-Guidelines” document at XcelEnergy.com for an in-depth review of commissioning and witness test requirements.

Site Security

- Site should have 24/7 keyless entry and drivable access if Xcel equipment is present within the site fence.
- If applicable, site should have 24/7 drivable access to any Xcel equipment installed outside of the site fence that is used for the sole purpose of feeding the PV system.
- Gate Signage – needs to have 24/7 emergency contact information, site name, address.

Proper Labelling

- Devices labelled clearly
 - AC Disconnect for each site labelled
 - Billing Meter socket for each site labelled, if present
 - Production Meter socket for each site labelled, if present*Each device should be labelled distinctly so as to be able to tell the difference between devices for each individual PV system, i.e. “Production Meter – Unit 1,” “Production Meter – Unit 2,” etc.*
- Placard indicating device locations
- Labelling matches at the billing meter (where the bi-directional A3 meter is located) and it’s corresponding inverter pad prior to setting production meter
- Verify telemetry cabinet hasn’t been altered
- Once meters are set, power flow in proper direction will be verified
- Polarity markings (white dot) on Production Meter CT must face towards inverters
- After the Production Meter is set, the telemetry test will begin:
 - Check that Ethernet connections are made
 - Developer must provide Female RJ45 plug for all Production and Billing Meters on site.
 - Check that the telemetry cabinet is powered up

One-Line (DG/AE)

- System Layout Resembles One-Line
 - Number of inverter pads, disconnects, etc. should be the same, OH vs UG metering points, etc.*
- Grounding Bank Nameplate Matches One-Line

Anti-Islanding Witness Test

- System is generating at fullest reasonable capacity.
 - System output may be limited by cloud cover. All PV panels should be cleared of snow prior to beginning test. For systems outputting less than 15% of rated capacity, the test may continue if the direction of power is shown with a fixed meter (i.e., customer-owned production meters or inverter displays. Handheld or temporary metering devices cannot be used to determine direction of power). **All inverters must be operational and in-service.***
- System ceased delivery of power within 2 seconds of loss of utility source
 - Developer will open a device to simulate a loss of utility source. Developer will provide the means to monitor power output. Analog displays will not be considered adequate. No Xcel Energy device (i.e. Production Meter) should be used.*
- Voltage on all phases must remain below 110% of the Area EPS nominal voltage. This voltage must be measured on the inverter side of the open point.
- Meter Tech has verified metering equipment
 - Metering will verify the correct Billing Meter indicates loss of generation*
- System resumed delivery of power no less than 5 minutes after utility source is restored

Developer will close disconnect to restore utility source. System should not begin generation until 5 minutes has elapsed. After 5 minutes, generation should not begin simultaneously. All PV sites are required to implement a staggered start of their inverters.

- Meter Tech has verified telemetry and communication
Metering will verify communication, telemetry, and other outstanding items necessary for commercial operation.
- Testing steps are repeated for each phase as a single-phase test, and as a three-phase test.