Design Standard

Electrical Requirements for Solar Photovoltaic (PV) Installations on Campus Buildings

UES recognizes the important role renewable energy sources can play in helping the campus to reduce its carbon footprint and meet energy efficiency goals. As the campus energy provider, it is our responsibility to ensure that photovoltaic installations on campus buildings don’t impose safety hazards to UES employees working on the electrical system and that there are no problems with power quality when solar power is fed back into the utility grid. The installations must also be electrically safe for O&M staff, building occupants and emergency responders. The following requirements address these issues. There are other safety related concerns that aren’t addressed in these requirements including but not limited to roof and wind loading of PV arrays, fire rating of PV modules and racking, and roof penetrations.

Detailed specifications follow.

PART 1 - GENERAL

1.01 NEC REQUIREMENTS
   A. NEC 230.82(6) – Line side connections
   B. NEC 690 – Both line and load side connections
   C. NEC 710.10 – Labeling for stand-alone installations
   D. NEC 705.10 – Service equipment labeling

1.02 General Requirements
   A. PV systems to be installed on campus buildings shall be designed by professional engineers licensed to practice in the State of Texas.
   B. Construction documents signed and sealed by a Texas PE shall be submitted to UES for review for compliance with the items outlined below prior to the start of construction. These documents shall include an electrical one line of the system and a specification sheet on the inverter.
   C. UES shall be notified to do an inspection of the installation to ensure compliance with the items outlined below before the system is energized.

PART 2 - EQUIPMENT REQUIREMENTS

2.01 The inverter shall be UL 1741 listed and marked for use in a “utility interactive” application if grid tie-in is intended.

2.02 A UL 1741 listed rapid shutdown module per NEC 690.12 shall be included.
2.03 A manual load break AC disconnect switch that provides visual indication of the switch position shall provide a separation point between the PV system and the UES system. The disconnect switch shall be readily accessible to UES personnel and shall be capable of being locked in the open position with a UES padlock. The switch will be referred to as the “Solar AC Disconnect”.

2.04 UES will provide the metering equipment necessary to measure forward and reverse power and energy. The final determination of meter type and configuration shall be made by the UES Utility Metering Group. All costs associated with the metering equipment required shall be borne by the PV project.

PART 3 - LABELING REQUIREMENTS

3.01 The PV system shall display all relevant labeling as required per NEC. All labeling shall be on permanent, rigid plaques. Lettering shall have a minimum height of 3/8”. Permanent stick on labels and hand written labeling are not allowed.

3.02 There shall be a label at the service disconnect indicating that a solar installation is present and a label indicating the location of the Solar AC Disconnect.

3.03 The Solar AC Disconnect shall be identified with a label. If additional solar disconnects are present and not within sight of the Solar AC Disconnect, a label indicating each disconnect location shall be installed at each disconnect.

3.04 There shall be a label on the front of the main breaker panel indicating a solar installation is present. For a load-side tap, there shall be a label next to the branch circuit breaker stating it is the connection point for the solar installation. For a line-side tap, a label on the front of the main breaker panel stating the connection point for the solar installation is ahead of the main breaker shall be installed.