National Simplified Residential Roof Photovoltaic Array Permit Guidelines

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The information in this guideline is intended to provide a format whereby local jurisdictions and contractors can permit simple photovoltaic (PV) system installations where only a basic review is necessary. It is likely that most residential PV systems will comply with these simple criteria, which address the requirements for PV systems in the International Building, Residential, and Electrical codes, published by the International Code Council (ICC) The Structural and Electrical Commentaries provide background explanations for these guidelines.

Required Information for Permit:

1. Permit application required by the local jurisdiction: Permit applications normally include information about the project scope, project location, and the installer.
2. Site plan showing location of major components on the property: This drawing need not be exactly to scale, but it should represent relative location of components at site (see supplied example site plan). PV arrays in compliance with IRC fire setback requirements need no separate fire service review (with Fire Service MOU).
3. Electrical worksheets showing PV array configuration, wiring system, overcurrent protection, inverter, disconnects, required signs, and ac connection to building (see supplied standard electrical diagram).
4. Specification sheets and installation manuals (if available) for all major PV system components such as, PV modules, dc-to-dc converters, inverters, and mounting systems.
Step 2: Electrical PV System Requirements Checklist

☐ 1. Major electrical components including PV modules, dc-to-dc converters, and inverters, are identified for use in PV systems.

☐ 2. Array mounting system UL2703 certified for bonding and grounding. Alternatively, the array mounting system may incorporate UL2703 grounding devices to bond separate exposed metal parts together or to the equipment grounding conductor.

☐ 3. The PV array consists of no more than 2 series strings per inverter input and no more than 4 series strings in total per inverter.

☐ 4. Field Installed PV array wiring meets the following requirements (all boxes must be checked):
   a. All exposed PV source circuit wiring is no smaller than 12 AWG PV Wire or MFG Cable.
   b. All PV source circuit wiring in raceway is no smaller than 12 AWG THWN-2, XHHW-2, or RHW-2.
   c. Any field-installed PV output circuit wiring is 6 AWG THWN-2, XHHW-2, or RHW-2.
   d. PV system circuits on buildings meet requirements for controlled conductors in 690.12.

☐ 5. The total inverter capacity has a continuous ac power output 15,360 Watts or less and meets the requirements of 705.12(B) where installed on the load side of the service disconnecting means (complies with Table 705.12 in the Electrical Commentary). (choose one below)
   - Load-side connection complying with Table 705.12(B)
   - Supply-side connection complying with 705.12(A)

☐ 6. Equipment is rated for the maximum dc voltage applied to the equipment (put N/A in all blanks that do not apply to the specific installation):
   a. ASHRAE Extreme Annual Mean Minimum Design Dry Bulb Temperature (one source is www.solarabcs.org/permitting) =_________; Table 690.7 (NEC) value_________
   b. Max (temp adjusted) module Voc:Rated Voc ________V x Table 690.7 value_________ =_________ V
   c. Dc-to-dc converter(s) or microinverter rated maximum input voltage: _________V (must be greater than Max module Voc in (b.))
   d. Maximum number of dc-to-dc converters allowed in series (up to 600Vdc): __________
   e. Maximum voltage of dc-to-dc converter circuit with maximum number in (C.): _________ V
   f. Inverter(s) rated maximum input voltage:_______V (must be greater than i to iv below)
      a) Inverter 1 input 1: Max module Voc (b.) ________V x # in series______= _________V
      b) Inverter 1 input 2: Max module Voc (b.) ________V x # in series______= _________V
      c) Inverter 1 input 3: Max module Voc (b.) ________V x # in series______= _________V
      d) Inverter 2 input 1: Max module Voc (b.) ________V x # in series______= _________V
      e) Inverter 2 input 2: Max module Voc (b.) ________V x # in series______= _________V
      f) Inverter 2 input 3: Max module Voc (b.) ________V x # in series______= _________V

☐ 7. One of the standard electrical diagrams (E1.1a, E1.1b, E1.1c, or E1.1d) can be used to accurately represent the PV system. Diagrams can be found in the electrical commentary document.

Fill out the standard electrical diagram completely. If the electrical system is more complex than the standard electrical diagram can effectively communicate, the project does not meet the requirements for a simplified permit application and additional information may be necessary for the jurisdiction to process the permit application.