



Building and Safety Permit Service Center

All plans must be submitted as an unsecured, flattened PDF with embedded fonts. Minimum 11"x17" sheet size.

For small solar PV rooftop systems (up to 10kW AC). The equipment, system, associated wiring and connections shall be installed by a qualified person.

All solar PV installations require an electrical permit. Permit application submittal documents can be submitted electronically using [Permits Online](#) (login and select "Create an Application"), by email to solar@cityofberkeley.info or in person at the [Permit Service Center](#). For standardized solar permitting guidelines, visit <https://www.cityofberkeley.info/solarpvpermitguide/>.

Numbers in parenthesis refer to code sections of the 2016 edition of the California Residential Code (CRC), California Electrical Code (CEC), California Mechanical Code (CMC), California Plumbing Code (CPC), California Energy Code (CEnc) and California Green Building Standards Code (CGBSC).

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Code Compliance Checklist SOLAR PHOTOVOLTAIC

Project Information

Project Address:

Permit Number:

Permit Submittal Requirements

Schematic Site Plan showing: (a) building footprint with distances to property lines; (b) location of the solar PV system(s); (c) location of the main electrical service panel; (d) subpanel(s) (if any); (e) exterior and interior locations of all equipment and disconnects with working space clearances; (f) clear access pathways from roof eaves to ridges as indicates in the Code Requirements below. The site plan shall also contain project information (i.e., project address, owner's information, scope of work statement) and legend of symbols used on the drawings. See Code Requirements below for any additional guidance.

Structural Plan showing: (a) types, sizes, spacing and span of the existing roof framing members; (b) number and location of the solar panel supports; (c) construction details for the attachment of the solar arrays to the supporting roof framing; (d) type, size and length of fastener to be used. Panels that are not flush mounted (10 inches or more) require a licensed engineer to provide a structural analysis and details of connection adequate to resist wind uplift.

Electrical Plan showing: (a) complete single line diagram of the PV and utility interconnect; (b) existing service size and number of meters; (c) size, type, and insulation ratings (voltage, temperature, etc.) of all conductors and associated wiring components on the direct current (DC) and alternating (AC) side of the PV system; (d) type, size and material of raceway(s); (e) markings and labeling. Manufacturer's specifications sheets shall be provided for all proposed components. See Code Requirements below for any additional guidance.

Electrical Code Requirements

Qualifications of Installer: The equipment, system, associated wiring and interconnections shall be installed by a qualified person trained per NFPA 70E 2012. [CEC §690.4(C)]

Listing of Existing Equipment: The installer shall ensure that any alterations or additions to the existing system(s) shall not cause existing equipment or components to lose their listings. [CEC §110.3]

Grounding: Interconnected electric power production sources shall be grounded in accordance with Article 250. [CEC §705.50]

Ground-Fault Protection: Ground-Fault Protection for DC PV arrays shall meet the requirements of CEC §690.5 to reduce fire hazards. Ungrounded DC PV arrays shall comply with §690.35. Provide grounding instructions for module and mounting rails at time of inspection.

Arc-Fault Circuit Protection: PV systems operating at a maximum system voltage of 80 volts or greater, shall be protected as specified in CEC §690.11.

Disconnecting Means: The PV disconnecting means for ungrounded PV conductors shall consist of a manually operable switch(es), or circuit breaker(s) and installed at a readily accessible location either on the outside of a building or structure or inside

nearest the point of entrance of the system conductors. The disconnecting means shall be permitted to be power operable with provisions for manual operation in the event of a power-supply failure. [CEC §690.13(A) and §690.17]

AC Disconnect: An alternating-current means of disconnecting shall be mounted within sight of or in each inverter. [CEC §690.15(A)(2)]

DC Disconnect: A direct-current PV disconnecting means shall be mounted within sight of or in each inverter. [CEC §690.15 and 690.15(A)(1)]

DC Disconnect Markings: A permanent label for the DC PV power source shall be provided at the PV disconnecting means indicating the following: (1) Rated maximum power-point current, (2) Rated maximum power-point voltage, (3) Maximum system voltage, (4) Maximum circuit current., and (5) Maximum rated output current of the charge controller (if installed). [CEC §690.53]

DC PV Source & Output Circuits Inside a Building: Where DC PV source or output circuits from a building-integrated or other PV system are run in-side a building they shall be contained in metal race-ways, type MC metal-clad cable that complies with CEC §250.118(10), or metal enclosures from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means. The wiring methods shall comply with the additional installation requirements listed in CEC §690.31(G).

Rapid Shutdown: PV system circuits installed on or in buildings shall include a rapid shutdown function that controls specific conductors as follows: [CEC §690.12]

- Requirements for controlled conductors shall apply only to PV system conductors of more than 5 feet in length inside a building, or more than 10 feet from a PV array.
- Controlled conductors shall be limited to not more than 30 volts and 240 volt-amperes within 10 seconds of rapid shutdown initiation.
- Voltage and power shall be measured between any two conductors and between any conductor and ground.
- The rapid shutdown initiation methods shall be labeled in accordance with CEC §690.56(C).
- Equipment that performs the rapid shutdown shall be listed and identified.

Identification of Power Sources: Buildings or structures with both utility service and a PV system, complying with CEC §690.12, shall have a permanent plaque or directory including the following wording: "PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN" The plaque or directory shall be reflective, with all letters capitalized and having a minimum height of 3/8 inch, in white on red background. [CEC §690.56(C)]

Point of Connection Rating: The output of an interconnected electric power source shall be connected as specified in CEC §705. Note that the sum of the ratings of all overcurrent devices connected to power production sources shall not exceed the rating of the service.

Supply Side Connection: Pursuant to CEC §230.82(6), an electric power production source shall be permitted to be connected to the supply side of the service disconnecting means. The sum of the ratings of all overcurrent devices connected to power production sources shall not exceed the rating of the service. Unless the existing panel is designed for a supply side connection, the installer must demonstrate that the installed supply side connection will not void or violate the panel manufacture's listing. [CEC §705.12 (A)]

Load Side Connection: The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises. The interconnecting provisions for the utility-interactive inverter(s) shall comply with CEC §705.12(D).

Bus or Conductor Ampere Rating: 125 percent of the inverter output circuit current shall be used in ampacity calculations for the following: (1) Feeders, (2) Taps, and (3) Busbars. [CEC §705.12(D)(2)]

Identification & Grouping: PV system conductors shall be identified and grouped as required by CEC §690.31(B).

Point of Interconnection Markings: All interactive system(s) points of interconnection with other sources shall be marked at an accessible location at the disconnecting means as a power source and with the rated AC output current and the nominal operating AC voltage. (CEC §690.54)

Marking and Labeling Required: The following wiring methods and enclosures that contain PV power source

conductors shall be marked with the wording "WARNING: PHOTOVOLTAIC POWER SOURCE" by means of permanently affixed labels or other approved permanent marking: [CEC §690.31(G)(3)]

- Exposed raceways, cable trays and other wiring methods;
- Covers or enclosures of pull boxes and junction boxes; and
- Conduit bodies in which any of the available conduit openings are unused.

Marking Locations: The labels or marking shall be visible after installation. The labels shall be reflective, and all letters shall be capitalized and shall be a minimum height of 3/8 inch in white on a red background. PV power circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceiling or floors. Spacing between labels or markings, or between a label and a marking, shall not be more than 10 feet. Labels required by this section shall be suitable for the environment where they are installed. [CEC §690.31(G)(4)]

Structural Code Requirements

Rafter Span: The rafter's spans shall be measured horizontally from ridge board to supporting wall top plates. Installation of purlins and braces to reduce the span of rafters is limited to a slope not less than 45 degrees from the horizontal. [CRC §R802.5]

Roof Framing: In lieu of providing a project specific engineered design, the roof rafter framing supporting the added PV system shall meet the conventional framing standards of CRC §R802.5 and Tables R802.5.1(1) through (8).

Module Attachment: Module attachments shall be in accordance with the manufacturer's specifications.

Fire Department Requirements

Fire Classification: Rooftop mounted PV panels and modules shall have a combined fire classification listing in accordance with UL1703 and comply with CBC Table 1505.1. Installations within Fire Zones 2 or 3 shall have a listed Class A fire classification; for additional information, reference the State Fire Marshall guidelines. [CRC §R902.4]

Clear Access Paths: Not less than two minimum 36-inchwide pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. At least one pathway shall be provided on the street or driveway side of the roof. [CRC R324.6.1]

- For photovoltaic arrays occupying not more than 33 percent of the plan view total roof area, not less than an 18-inch clear set back is required on both sides of a horizontal ridge. [CRC R324.6.2]
- For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, not less than a 36-inch clear set back is required on both sides of a horizontal ridge. [CRC R324.6.2]

Emergency Escape and Rescue Options: Panels and modules installed on dwellings shall not be placed on a portion of a roof that is below an emergency escape and rescue opening. A 36-inch wide pathway shall be provided to the emergency escape and rescue opening. [CRC R324.6.4]

I certify that I have read and acknowledged all of the Code Requirements noted above. I accept full responsibility for complying with all of the above requirements, as applicable to my project. I further agree that if I fail to comply with the code requirements, due to error or omission, I will correct all deficiencies prior to final inspection.

Name

Signature

Date

Check One:

Contractor

Owner

Owner's Agent