



**DEPARTMENT OF PUBLIC WORKS
Building and Safety Division**

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Plan Requirements for Solar (Photovoltaic) Systems

The following information is provided to assist permit applicants in preparing the plans and submittals for solar (photovoltaic) electric generating systems. Missing or incomplete information may cause delays in issuing your permit. If you are uncertain about these requirements or you do not know where to obtain the required information, please contact the Building and Safety Division at (209) 385-7477 for assistance.

All electrical installations must comply with the current edition of the National Electrical Code (NEC). In addition to the general requirements contained in Chapters 1 through 4, special requirements may also apply. See Article 690 for solar (photovoltaic) systems, Article 445 for generators, Article 480 for storage batteries and Article 705 for interconnected electrical power production sources. Other articles may also apply depending on the system configuration. Photovoltaic generating systems shall be designed and installed by a qualified, licensed electrician or for systems in single-family dwellings, no license is required, but the person designing and/or installing the system must be competent to do so.

Please submit three complete sets of plans. They must include all specifications, engineering calculations, diagrams and/or other pertinent information needed to describe the proposed P.V. system. Plans and submittals shall be drawn on appropriately sized paper, they shall clearly indicate the proposed work and shall include the following information:

A Site Plan, drawn to scale, showing:

- Property location and boundaries
- Footprint of all existing buildings and other structures
- Proposed location of solar panel arrays, inverters, and if used, generators battery banks and battery charge controllers
- Location of existing service
- Location of any existing easements

A detailed description of the system and of its components.

- Show the number of arrays, modules, inverters etc.
- Indicate if the system is a stand-alone or an interactive (grid tie) system. (It may be helpful to include the manufacturer's product data or specification sheets).
- Be sure to identify the make and model of the equipment you intend to use.

- Show the maximum system open-circuit voltage and the maximum short circuit current.
- Please note that stand-alone PV systems must be sized to meet or exceed the actual ac demand on the system.
- Load calculations in accordance with NEC Article 220 to justify the system size must be included with the submittals.

A single line diagram of the entire system including:

- Conductor sizes and types (consideration must be given to conductor temperature ratings, ampacity, environment and sunlight exposure. All conductors and cables must be listed and installed in accordance with their listing. Battery cables and welding cables are not recognized in the NEC as an approved wiring method).
- Conduit sizes and types.
- Fuses and/or circuit breakers, show rating in amperes (fuses and/or circuit breakers used for direct current circuits must be listed for direct current).
- Solar panels/modules (show parallel or series connected).
- Inverters (show whether single pole 120 volt or two pole 240 volt connected).
- Transfer switches.
- Batteries (show number, voltage, amp-hours, series and/or parallel connected).
- Generators (show size in volt-amps or watts and voltage output) battery charge controllers.
- Ground fault protection (indicate if included in the inverter or separate).
- Show the grounding system including the conductor sizes, connection points and grounding electrodes (ground rods).
- Indicate the location of all warning signs required per NEC 690-17. Lettering must be permanent and not less than one quarter inch high **-WARNING-ELECTRICAL SHOCK HAZARD-- DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.**

Note: All electrical equipment and conductors must be listed by a nationally recognized testing laboratory such as Underwriters Laboratory.

Provide a detailed design for:

- The solar collector support racks. Include engineering documentation for seismic and wind loading.
- For roof-mounted arrays, show the method of attachment to the roof, flashing details and provide documentation that the existing roof structure is capable of supporting the additional loads.

Note: You are required to notify your electrical service provider, P.G.&E. or T.I.D., of your intent to install a solar system and you must receive their written permission prior to connecting to any system that is capable of energizing lines or components owned or maintained by your local electrical provider.