



Public Works Services Department
Building Safety Division
1088 East Kamm Avenue
Dinuba, Ca. 93618

This is a General Guide for Photovoltaic Plans Submittal Information Requirements.

Residential Roof or Ground Mount Solar Photovoltaic Systems shall comply with the 2016 California Electrical Code, California Residential Code Section 324, California Building Code, California Solar permitting Handbook and manufactures' installation/specifications instructions.

The following information must be provided on the plans at the time of a Photovoltaic Permit Application. An incomplete permit application and/or plans will cause the permit and/or plans to be returned for corrections.

This is a general guide only; other information may be required as needed.

Complete the Building Permit Application and submit a minimum of two complete sets of plans at submittal.

The plans are to be submitted on 11x17 size paper.

COVER SHEET

- General Electrical Construction notes Per the 2016 California Electrical Code.
- General Photovoltaic Notes per the 2016 California Electrical Code.
- Property Owner, address, and contact phone number.
- Sheet Index
- Note that the Photovoltaic system shall comply with 2016 California Building Codes, California Electrical Code, California Residential Code, Ca Energy Code, Ca Plumbing Code, CA Mechanical Code and Green Build Standards Code.
- Vicinity and Site Plan.
- Indicate on application if a service upgrade will be included
- The north arrow shall be placed on the cover, site and roof layout sheets.
- Scope of work.
- Plans sheets index.
- Note if single or 2-story.
- Name and contact information for the contractor/installer.

SITE PLAN

- Property lines and fences.
- Streets and alley
- Buildings, swimming pool
- PV module layout
- Main electrical panel, inverter,
- Trees
- Equipment, vents, skylights etc. location
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ROOF PLAN

- Array layout
- Conduit location and size.
- PV string identification and number.
- PV array orientation and pitch.
- Junction boxes.
- Main electrical panel, inverter, DC/AC disconnects.
- HVAC unit, attic roof vents, plumbing vents or other items attached to the roof.
- Identify any existing mechanical equipment on the roof plan and provide a minimum working clearance of 36 inches around the entire unit as well as a minimum 36 inch wide clear accessway from the roof scuttle or roof access point.
- Identify all exterior conduits, fittings, and boxes and note that they shall be rated for rain-tight and approved for use in wet locations.
- Provide the Fire Department set-backs/roof access pathway and point of access; access points cannot over a window or door. Typical access pathways are 18" from valleys, 3' from the ridge and 3' from roof edge. Fire Department access Pathways show no access points over exiting windows or doors, one 3' wide pathway adjacent to panels on hip roofs, two 3' wide pathways adjacent to panels on single ridge roofs, and panels no higher than 3' below the ridge for all roofs and 18" from any valleys.
- PV modules shall not be installed over a plumbing vent, attic vent or HVAC venting; 3' clearance around HVAC equipment and attic vents.
- PV modules shall not cover or block plumbing vent terminations.
- Roof loading and point load calculations.

ATTACHMENT LAYOUT

- Roof Load calculations
- Attachment details/drawings of modules support system.
- Rails and point support layout.
- Roofing type, i.e. asphalt shingles, tile, wood shake or shingles etc.
- Attachment notes and information.
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- Fire Department Access Pathways and access points; one access point shall be from the street side.

Calculations

- System Calculations: Show open circuit voltage (Voc) module connected in series. The ampacity of module inter-connections cables, after corrections for conditions of use, must not be less than 1.56 times module short circuit current (Isc) marked on the back of the module.

- Main Service Panel 120% Rule calculations showing that the main electrical disconnect is sized correctly, including the buss bar rating, main disconnect, de-rating if derated.
- Provide all PV wire sizes and PV wire size calculations.
- Provide the DC and AC system disconnect ratings; DC: max power point current and voltage, Max system voltage, Short Current Voltage.
- Inverter in and out put calcs.
- PV system out-put.
- Roof loading and point load calculations.
- Center fed panels, back fed on load side shall not exceed 100% of buss rating.

Construction/Code Notes

- 2016, Ca Electrical Code photovoltaic installation, and electrical notes per Article 690 & 705.
- General Electrical Construction notes construction
- Marking and label notes on the label sheet; label location notes.
- Racking and attachment notes on the attachment layout sheet.
- Smoke detectors and Carbon Monoxide Alarms notes.

Single Line Diagram:

- Show the entire PV system including modules, junction, combiner boxes, wires and conduits and sizes, conductors-type and sizes, inverters, AC/DC disconnects and type, and main electrical panel. Main panel size, BUS rating, main disconnect size and if de-rated, PV breaker and size.
- Array Modules (panels) & number count and info.
- Existing electrical size, buss rating and disconnect. If service is up-graded, size buss rating and disconnect; if derated what is the derated disconnect size.
- Rapid shut-down devices.
- Conduit sizes and conductor sizes and grounding with calculations.
- Module locations, grounding specs/details and if two ground rods are required. Array, inverter, modules, J-box type and size, specifications.
 - Rapid shut-down note.
 - Note if micro-inverters are used.
- Provide number and size of PV wire in conduits.
- Provide a conduit and PV conductor schedule.
- If the conduits or PV conductors are in the attic, show the locations and sizes and requirement for installation.
- PV Array system Information.
- PV Modules Ratings-STC

- Inverter, inverter size ratings, including micro-inverters.
- PV panels and inverter Information: show model number, specification cut sheets, and maximum D.C. input.
- PV Module Information: show open circuit voltage Voc, short circuit current (Isc) maximum series fuse.
- Array Information: show number of modules in each series, number of parallel source circuits.
- Grounding Details: show equipment grounding conductor, grounding electrode conductor from the inverter to ground rod or UFER ground.

CODE REQUIRED SIGNAGE/LABELS

- System Labels and Warnings sheet: Show required signage on the plans in accordance with Article 690 and 705 of the 2013 California Electrical Code and Section R331.2 of the 2016 California Residential Code. Provide a location index of the labels. The AC and DC system disconnect labels must be filled out /completed at final inspection.
- The correct labels shall be placed on the junction box, inverter, DC and AC disconnects, sub-panel and main electrical panel.
- A permanent plaque or directory is required if the main disconnect and DC and/or AC disconnect are not in the same location.
- The DC and AC Disconnect Photovoltaic Power Source labels shall be completely filled out.

GENERAL REQUIREMENTS

1. Systems shall not to be energized until the final inspection has been approved by the Building Inspector.
2. Attach manufacturer's equipment list, specification, installation sheets for roof mounts, inverters, panels, wiring and installation instructions and U.L. listing on the plans.
3. Plans are to be signed by a State of California licensed contractor with any of the following classifications "A", "B", "C-46", "C-10", or a licensed electrical engineer. Provide signature and contractor license number on each sheet.
4. Provide a photo of the existing electrical meter panel showing the breakers and "dead-front" labeling and one picture of the electrical service with the "dead-front" removed.
5. All smoke alarms and carbon monoxide alarms are to be operational at the final inspection. Newly installed smoke detector alarms shall have a 10year battery life. Smoke alarms that are hard wired and interconnected are required to operate in that manner. *Battery smoke alarms shall not take the place of hard wired/interconnected alarms.*
6. Supply side taps will require relisting of panel unless provided by an approved and listed manufacturer. Provide information and specifications for the supply side tap to the electrical service. Supply side tape shall be approved in writing by PG&E and the MSP shall be re-certified by UL.

7. Over current protection for both alternating and direct current must be installed in the inverter or field installed at the time of installation.
8. Main service panel must have a plaque/label indicating a second power source is installed, and a disconnecting means must be field installed in all ungrounded conductors at the main service panel.
9. Ground mounted solar photovoltaic systems placed on a support system will require to be designed by an Engineer.
10. PV panel, standoff, rapid shut-down devices, inverters specifications and connection details.
11. Elevation views of the panel connection to the trusses/rafters.
12. PG&E and Gas Co. clearance requirements for a new service; PG&E will not approve a new electrical service to be attached to a bedroom wall.
13. PV modules shall not cover or block plumbing vent termination.
14. Note: Adequate spacing must be maintained between any plumbing sewer vents (6") extending through the roof or extend vent 6" minimum above panels.
15. Provide PV panels/frame support maximum distributed point load.

Plans resubmitted for Changes/Revisions/Addendums

- All plans that are re-submitted for an addendum or revisions- The changes shall be identified with a circling cloud and an explanation for the change.

For additional information, please review the California Solar Permitting Guidebook, the 2016 California Electrical and Ca Residential Code.

- One inspection is required for roof mount systems. If a new Main Electrical Service Panel has been installed; that is a separate inspection.
- Approved plans and permit on site for inspection.
- The owner of the property/house needs to be present so smoke detectors and carbon monoxide alarms can be tested.

ROOF

1. Layout and number of the PV modules shall match the plans.
2. The PV wires under the Modules are required to be tied to the modules and not hanging/touching the roofing; 1' minimum clearance.
3. PV modules shall not be installed over a plumbing vent, attic vent or HVAC venting; 3' clearance around HVAC equipment and attic vents
4. Supporting footers and rails are to be secured to the roof; excess rails are to be cut no more than 2" beyond the module.
5. Conduit runs are to be fastened to the roof, There is to be a minimum of 1" between the roofing and bottom of the conduits. PV CIRCUIT labels at 10' intervals max.
6. Fire Department access pathways and access points.
7. Open any exposed junction boxes, check for grounding lugs, ground wire and secure wire connections.
8. Check modules grounding to supporting rails.
9. Modules grounding wires and conduit grounding lugs will be checked; positive conduit grounding is required from the modules to the main service panel ground bar.
10. A ladder must be on-site to access the roof.

ELECTRIC PANEL, INVERTER AND DC/AC DISCONNECTS

11. All equipment, disconnects, taps, connections, etc., are to be open and accessible at time of inspection. If installer needs to be onsite to accomplish access to the equipment, provide a contact number and instructions at the time of the inspection request.
12. Supply side taps: inspection with UL representative and PG&E if the supply conductors are tapped, the electrical panel will have to be re-certified by Underwriters Laboratories (UL) prior to PV power start-up.
13. Grounding lugs on conduit ends in the panels/boxes. Ground Wire connected to the conduit grounding lugs?
14. The covers are to be removed from the breaker side of the main service panel, the inverter and disconnect covers and any exposed junction boxes covers are to be removed for inspection.
15. Main breaker and PV breaker amp size and shall match the plans.
 - i. Has main breaker been de-rated?

16. All labels applied in the correct locations. See attached label sheet

- Warning labels on main panel, inverter and disconnect boxes.
- Shock Hazard Warning Labels on inverter, main panel and disconnect boxes.
- Rapid Shut-Down Label.
- Main panel, inverter and sub-panel-Panel Fed By Multiple Sources.

17. The DC and AC Disconnect Photovoltaic Power Source labels shall be completed with the correct information and match the plans.

Smoke Detectors and Carbon Monoxide Alarms

1. Test all Smoke alarms and carbon monoxide alarms. If the alarms are interconnected then all alarms will sound when test button; test each one to be sure they are all sounding.
2. Battery powered alarms shall not be substituted for the hard-wired type.
3. If the alarm sounds too weak to hear clearly then the alarm is to be replaced.