



## ICC ORANGE EMPIRE CHAPTER CODE INTERPRETATION COMMITTEE

**DATE: 5/9/2008**

### **QUESTION AND CODE SECTION:**

Can the local jurisdiction streamline issuing permits for the installation of Solar Photo Voltaic Systems over the roof of a single-family dwelling?

### **BACKGROUND:**

Building Departments have experienced a big increase in permit applications to install Solar PV systems. The increase in demand is due to rising energy cost, concerns about the environment; green building movement and State rebate incentives. Because requirements for issuing a permit for a PV system vary among jurisdictions, the code committee drafted requirements for submittal and approval of a PV installation for member jurisdiction consideration and uniformity. The goal of the committee is to minimize the requirements for the most common installation of 3 – 4 Kilowatts.

### **DISCUSSION:**

The code committee determined from a survey received from the California Energy Commission and Solar PV system installers that the typical system is 3-4 kilowatts, covers approximately 200 sq. ft. of the roof, and weighs approximately 700 lbs. Some jurisdictions have received requests to install systems of larger capabilities of 5-7 kilowatts. Some installations require more than 700 sq. ft. of solar cells which weigh approximately 2,400 lbs. Most homes more than 25 years old, originally roofed with wood shake, wood or composition shingle, have been reroofed with heavier roofing materials.

In addition to compliance with the California Electrical Code, these systems trigger many code requirements including:

1. Ability of the roof framing to support the Solar PV system equipment.
2. Ability of the affected lateral system components to resist additional seismic loads generated by the Solar PV system equipment.
3. Flame spread of the solar panels compared with flame resistive requirement of roof covering.

The code committee drafted a list of minimum requirements to streamline the approval process of PV systems which cover less than 200 sq. ft. of roof surface and generate 3-4 kilowatts. Since this size installation will have minimum impact on the structure's vertical and lateral support systems, structural analysis will not be required. The roof flame spread requirement will not be applied to the PV cells since the PV arrays are installed over the roof which complies with the flame spread requirements.

**RECOMMENDATION:**

See attached recommended requirements.

## **SOLAR PHOTO-VOLTAIC SYSTEM OVER SINGLE FAMILY DWELLING SUBMITTAL REQUIREMENTS**

### **ADMINISTRATIVE**

1. Provide (\_\_\_) sets of plans minimum sheet size 18" x 24"
2. Attach all manufacturer specification sheets, installation instructions and U.L. listings to the plans
3. Plans are to be signed by State of California licensed contractor with any of the following classifications "A", "B", "C-46", "C-10", or licensed electrical engineer. Provide signature and contractor license number on each sheet

### **ROOF PLAN**

1. Provide a roof plan projected on a site plan. Show the location and dimensions of all solar voltaic equipment and PV arrays.
2. Provide a partial roof framing plan. Show new and existing supporting rafters, beams and headers include rafter size, span, and spacing. Identify roof sheathing and roofing materials  
ALTERNATE: Framing information is not required if arrays are supported at a maximum spacing of 4 ft.
3. Detail equipment support connections to roof. Provide a detail for flashing and water proofing at system supports
4. Provide calculations by a licensed professional engineer or architect to verify supporting members are adequate for existing and proposed loads  
ALTERNATE: Calculations not required if arrays are supported at a maximum spacing of 4 ft.
5. Provide lateral calculations by a licensed professional engineer or architect per 2007 C.B.C. showing that affected existing lateral resisting elements are no more than 10% overstressed according to the 2007 CBC.  
ALTERNATE: Lateral analysis is not required if total area of arrays is less than 200 sq. ft. over a second story roof or 300 sq. ft. over a first story roof

### **ELECTRICAL**

1. Provide Electrical drawings to show compliance with the applicable provisions of the 2007 California Electrical Code.

## **SOLAR PHOTO-VOLTAIC SYSTEM OVER SINGLE FAMILY DWELLING**

### **GUIDELINE TO ELECTRICAL SUBMITTAL REQUIREMENTS**

2. Show the location of the main electrical service, AC/DC disconnects, all solar voltaic equipment, and PV arrays on the roof plan
3. Single Line Diagram: show array configuration, conduit and conductors sizes with derating calculations
4. Inverter Information: show model number, specification cut sheets, and maximum D.C. input
5. PV Module Information: show open circuit voltage (VOC), short – circuit current (ISC) max series fuse
6. Array Information: show number of modules in series, number of parallel source circuits
7. Wiring and Over Current Protection: show conductor ampacities, adjusted with all derating factors show rating and location of all Over Current Devices (OCD)
8. System Labels and Warnings: show required signage on the plans per 2007 CEC- Article 690
9. Grounding Details: show equipment ground conductor, ground electrode conductor from inverter to ground rod or ufer ground
10. Disconnects: show AC/DC disconnects at inverter. DC disconnect required prior to DC array conductors penetrating the surface of the roof or entering the building
11. System Calculations: show (VOC) calculated 1.13 (temperature correction factor for City of Newport Beach) (ISC) calculated x 1.25% (NEC 690) x 1.25% (UL 1703)