MINIMUM SOLAR ZONE AREA WORKSHEET – NEW CONSTRUCTION

CALIFORNIA ENERGY COMMISSION

CEC-CF2R-SRA-02-E

SAMPLE FORM – NOT VALID FOR SUBMISSION TO BUILDING DEPARTMENTS

CERTIFICATE OF INSTALLATION

Note: This table completed by ECC Registry.

Project Name:	Enforcement Agency:
Dwelling Address:	Permit Number:
City and Zip Code:	Permit Application Date:

Solar Zone Area (requirements in §110.10 (b)1A Exception 1 or 6.
This worksheet applies to:

- Single family residences without PV that wish to show compliance with the Solar Readiness requirements (Section 110.10(b) by providing a solar zone on the roof of the residence. Note that Exceptions 1 and 6 to Section 110.10(b)1A exempt a residence from the solar Readiness requirements and are documented on the Certificate of Installation document CF2R-SRA-01-E. Check the exception being used and fill in the relevant details.

A. Minimum Required Solar Zone Area for Single Family Residence

01	Does the residence have three stories or more, and a total floor area less than or equal to 2,000 ft^2?	
02	Is the residence located in Climate zones 8-14, in a Wildland-Urban Interface Fire Area as defined in Title 24, Part 2, and have a whole house fan?	
03	What is the total area of low-sloped roofs where the annual solar access is 70% or greater (ft^2)?	
04	What is the total area of steep-sloped roofs oriented between 90 and 300 degrees relative to true north, where the annual solar access is 70% or greater (ft^2)?	
05	Solar Zone Area – Solar Access Method (ft^2)	
06	Are all the thermostats Occupant Controlled Smart Thermostats (OCSTs), certified to the Energy Commission and listed on the Commission's appliances database? Alternatively, a networked system of devices may be installed that provides functionality equivalent to an OCST.	
07	Minimum Required Solar Zone Area (ft^2):	

B. Schedule of Solar Zone Sub-Areas

Notes:

A. "A roof is either low-sloped or steep-sloped. Low-sloped" means a rise-to-run of 2:12 or less (9.5 degrees from horizontal). "Steep-sloped" means a rise-to-run greater than 2:12 (9.5 degrees from horizontal)
B. The solar zone shall comply with access, pathway, smoke ventilation, and spacing requirements as specified in Title 24, Part 9 or other Parts of Title 24 or in any requirements adopted by a local jurisdiction.
C. No obstructions, including but not limited to, vents, chimneys, architectural features, and roof mounted equipment, shall be located in the solar zone.
D. If there are any obstructions located south of the most northerly point of the solar zone, then the nearest point of the solar zone must be located no closer than twice the distance, measured in the

horizontal plane, of the height difference between the highest point of the obstruction and the nearest point of the solar zone, measured in the vertical plane.

01	02	03	04	05	06	07	08	09	10	11
Subarea ID	Building Plan Reference	Slope of Roof or Overhang (Note A)	Is Steep Slope, roof or overhang is oriented between 90 and 300 degrees relative to true north?	Subarea Complies with Part 9 of Title 24 (Note B)	Plane Containing the Solar Zone is Free of Obstructions (Note C)	Subarea is Located the Appropriate Distance from Obstructions (Note D)	Smallest Dimension is 5 feet or Greater	Subarea is at least 80 ft^2 (160 ft^2 for a Building with Roof Area >10,000ft^2)	Subarea Qualifies	Area (ft^2)
12	Total Proposed Solar Zone Area (ft^2)									
13	Compliance Statement:									

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Installation documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/AEA/ECC Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Installation is true and correct.
2. I am either: a) a responsible person eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation, and attest to the declarations in this statement, or b) I am an authorized representative of the responsible person and attest to the declarations in this statement on the responsible person's behalf.
3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations and the installation conforms to the requirements given on the Certificate of Compliance, plans, and specifications approved by the enforcement agency.
4. I understand that a registered copy of this Certificate of Installation shall be posted or made available with the building permit(s) issued for the building and shall be made available to the enforcement agency for all applicable inspections. I will take the necessary steps to fulfill this requirement.
5. I understand that a registered copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy. I will take the necessary steps to fulfill this requirement.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

CF2R-SRA-02-E User Instructions

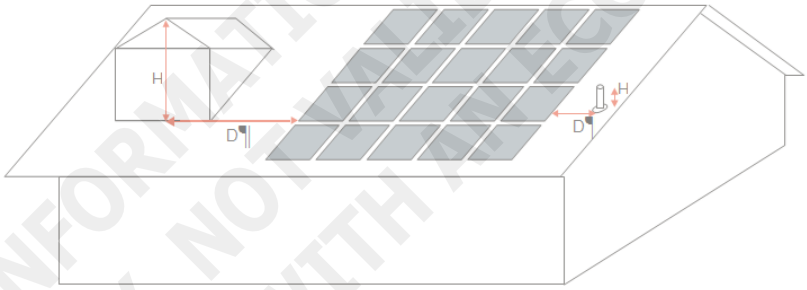
A. Minimum Required Solar Zone Area for Single Family Residence (Complete this section only if 'Single Family' is selected in A01)

1. User chooses whether the building has three or more stories and a total floor area less than or equal to 2,000 ft^2.
2. User chooses whether the residence is located in climate zones 8-14, is in a Wildland-Urban Interface Fire Area as defined in Title 24, Part 2 and has a whole house fan.
3. User enters the total area in units of ft^2 of low-sloped roof where the annual solar access is 70% or greater. Note that a Low Sloped Roof is defined as having a rise to run less than or equal to 2:12 or 9.5 degrees from horizontal. If this value is not known, then the user would enter 'N/A'. To determine the annual solar access during the design phase, designers will first evaluate whether there are any objects external to the building project that will shade the rooftop (or other prospective solar zone areas such as overhangs or parking shade structures). If an existing object is located to the north of all potential solar zones, the object will not shade the solar zone. Similarly, if the horizontal distance ("D") from the object to the solar zone is at least two times the height difference ("H") between the highest point of the object and the horizontal projection of the nearest point of the solar zone then the object will not shade the solar zone (see Figure 9.2). If objects external to the building project could shade the solar zone, annual solar access can be quantitatively determined using several computer-aided design (CAD) software packages which can import a CAD file of the building and perform a shading analysis or several online solar quoting tools which make use of both overhead and orthogonal aerial imagery. Annual solar access can be qualitatively determined using several three-dimensional modeling programs.
4. User enters the total area in units of ft^2 of steep-sloped roof oriented between 90 and 300 degrees relative to true north, where the annual solar access is 70% or greater. Note that a Steep Sloped Roof is defined as having a rise to run of greater than 2:12 or 9.5 degrees from horizontal. If this value is not known, then the user would enter 'N/A'. To determine the annual solar access during the design phase, designers will first evaluate whether there are any objects external to the building project that will shade the rooftop (or other prospective solar zone areas such as overhangs or parking shade structures). If an existing object is located to the north of all potential solar zones, the object will not shade the solar zone. Similarly, if the horizontal distance ("D") from the object to the solar zone is at least two times the height difference ("H") between the highest point of the object and the horizontal projection of the nearest point of the solar zone then the object will not shade the solar zone (see Figure 9.2). If objects external to the building project could shade the solar zone, annual solar access can be quantitatively determined using several computer-aided design (CAD) software packages which can import a CAD file of the building and perform a shading analysis or several online solar quoting tools which make use of both overhead and orthogonal aerial imagery. Annual solar access can be qualitatively determined using several three-dimensional modeling programs.
5. The Designated Solar Zone Area is auto calculated using the equation (B03+B04)*0.5. Note if either B03 or B04 equals N/A, then this field will be marked N/A.
6. User chooses whether or not all thermostats are Occupant Controlled Smart Thermostats (OCSTs) which have been certified to the Energy Commission.
7. The Minimum Required Solar Zone Area is auto calculated and based on the numbers and answers previously entered in this table.

B. Schedule of Solar Zone Sub-Areas

1. User enters Solar Zone Area identification information which matches the callouts shown on the building plans e.g., solar-1.
2. User enters the building plan reference number which includes a drawing of the solar zone subarea.
3. User selects whether the solar zone subarea is located on a low-sloped or steep-sloped section of the roof.
4. If user selects steep slope in B03, then the user must select whether the roof or overhang is oriented between 110 and 270 degrees relative to true north. If user selects low slope in D03, then this question will be answered with N/A.
5. User selects whether the subarea complies with all requirements of Title 24, Part 9.
6. User selects whether the plane(s) containing the solar zone are free of obstructions such as vents or chimneys.
7. User selects whether the solar zone subarea is located an appropriate distance from any on-roof obstructions. If user selects yes in D06, then this question will be answered with N/A. For single family residences buildings, any obstruction, located on the roof or any other part of the building that projects above the solar zone shall be located at a sufficient horizontal distance away from the solar zone, in order to reduce the resulting shading of the solar zone. For each obstruction, the horizontal distance ("D") from the obstruction to the solar zone shall be at least two times the height difference ("H") between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone (D ≥ 2 x H).

Figure 7.1 Artistic Depiction of "H" and "D"



Source: California Energy Commission

8. User selects whether the smallest dimension of the solar zone subarea is five feet or greater.
9. User selects whether the solar zone subarea covers at least 80 ft2 of roof space for a roof with a roof area of 10,000 ft2 or less. If the roof area is greater than 10,000 ft2, the solar zone subarea must be no smaller than 160 ft2.
10. The Sub-area qualification is auto calculated and is based on the information entered in this table.
11. User enters the square footage of the solar zone subarea.
12. The Total Solar Zone Area (ft2) is calculated by summing the areas of all qualifying solar zone subareas.
13. The building complies if the solar zone area (ft2) is greater than the minimum required solar zone area (ft2) found in A07.

Documentation Declaration Statements

1. The person who prepared the CF2R will sign and complete the fields for their name, company (if applicable), address, phone number, certification information (if applicable), date and signature.

2. The person who is assuming responsibility for the project being built to comply with Title 24, Part 6, will complete the fields for their name, company (if applicable), address, phone number, license number (if applicable), date and signature.