City of Needles
817 Third Street, Needles, California 92363
(760) 326-2113 • FAX (760) 326-6765
www.cityofneedles.com

RE: Streamlined Solar Process

To Whom it May Concern,

Thank you for your request regarding installing solar within the City of Needles.

Enclosed is the Needles Ordinance relevant to residential solar, and the streamlined process that provides a small window for project approval. The maximum PV system for a residential streamlined application process is 10KW. Please note that the attached documentation needs to be submitted with the application, including Exhibits A thru D provided at the end of the attached document. Otherwise, the project application is considered incomplete and will be returned to the applicant for further completion. Full stamped engineered plans must also be provided.

If your system **is over 10KW** please go through planning department as additional permits are needed. Please contact Patrick Martinez at pmartinez@cityofneedles.com. The attached documents are still required.

The Building Department will require a construction permit the enclosed application needs to be completed with the valuation of the project listed. A building permit fee and review fee will be required for this project. A licensed contractor must pull the permits. For Building Department questions please contact Elena Galindo at egalindo@cityofneedles.com.

Enclosed are two forms (Interconnection of Distributed Generation and Interconnect agreement) which must be completed and signed by the owner of the parcel. A solar guide has been developed for the homeowner to review and requires signatures of acknowledgment.

Once the entire packet is submitted with a complete set of engineered stamped plans, the City has five (5) days to review/approve your project. If any piece is missing, the project is returned.

Respectfully,

Rainie Torrance

Rainie Torrance
Assistant Utility Manager
rtorrance@cityofneedles.com
(760)326-5700 X140

ORDINANCE 572-AC

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF NEEDLES AMENDING THE NEEDLES MUNICIPAL CODE (NMC) SECTION 96.00 "USES PERMITTED", 96.01 "TABLE OF PERMISSIBLE USES, ADDING SECTION 99.09.04 "RENEWABLE ENERGY FACILITIES (REF)

WHEREAS, Assembly Bill 2188 (Chapter 521, Statutes 2014) requires California cities to adopt an ordinance creating a streamlined permitting process for small residential rooftop solar energy systems; and

WHEREAS, the City of Needles wishes to advance the use of solar energy by all of its citizens, businesses and industries; and

WHEREAS, the City of Needles recognizes that rooftop solar energy provides reliable energy and pricing for its residents; large scale solar projects create local jobs and economic opportunity; and

WHEREAS, a public hearing notice for the Needles Planning Commission meeting was published in the Needles Desert Star on September 16, 2015; and

WHEREAS, on October 7, 2015, the Needles Planning Commission held a duly noticed and advertised public hearing to receive oral and written testimony relative to the amendment of the Needles Municipal Code (NMC), and following the conclusion adopted its Resolution No. 10-07-2015-1 PC, recommending that the City Council of the City of Needles make such amendment to the Needles Municipal Code (NMC); and

WHEREAS, a public hearing notice for the Needles City Council meeting was published in the Needles Desert Star on September 9, 2015; 10 days prior to said meeting; and

WHEREAS, on October 27, 2015, the Needles City Council held a duly noticed and advertised public hearing to receive oral and written testimony relative to the amendment to the Needles Municipal Code (NMC); and

WHEREAS, the Needles City Council has sufficiently considered all testimony and any documentary evidence presented to them in order to make the following determination:

SECTION 1. The City Council HEREBY FINDS AND DETERMINES that this activity is not subject to the California Environmental Quality Act ("CEQA") pursuant to CEQA Section §§ 15060 (c)(2), the activity will not result in a direct or reasonable foreseeable indirect physical change in the environment

SECTION 2. The City Council HEREBY FINDS AND DETERMINES that facts do exist to approve an amendment to the Needles Municipal Code (NMC).

CITY OF NEEDLES

817 Third Street • Needles, California 92363
(760) 326-2113 • FAX (760) 326-6765
www.cityofneedles.com

October 26, 2015

Re: Correction to Proposed Permissible Use Table as Reflected in Ordinance #572, page 2

The Permissible Use Table Section 24.20 "utility scale" REP utilizing any technology requiring a PPA should be Subsection "24.30", not "24.20".

(a) Energy Project (REP) as follows:

24.00	RENEWABLE ENERGY PROJECT (REP)	R1	R1	R2	R3	CR	C1	C2	C3	M1	M2	P
24.10	residential rooftop or ground mounted on-site use only less than 10 kw photovoltaic or 30 kw thermal	BP	BP	BP	BP	BP/Z	Z	Z	Z	Z	Z	Z
24.20	REP on-site only utilizing any technology no PPA required	S	S	S	S	S	S	S	S	S	S	S
24.20	utility scale REP utilizing any technology requiring a PPA					C*	C*	C*	C*	C*	C*	C*
30												
*	See Section "9(A)" Public Benefit Program											

Dan Williams
Bldg. Official

SECTION 3. The City Council HEREBY APPROVES Ordinance 572-AC for an amendment to the Needles Municipal Code (NMC) as follows:

(a) Amend Section 96.00 Uses Permitted, adding under the section "Symbol Meaning", as follows:

"BP = Permitted Use with building permit for residential rooftop or ground mounted solar projects less than 10 kw solar voltaic or 30 kw thermal

(b) Amend Section 96.01 Table of Permissible Uses, adding Subsection 24.00 "Renewable Energy Project (REP) as follows:

24.00	RENEWABLE ENERGY PROJECT (REP)	R1	R1	R2	R3	CR	C1	C2	C3	M1	M2	P
24.10	residential rooftop or ground mounted on-site use only less than 10 kw photovoltaic or 30 kw thermal	BP	BP	BP	BP	BP/Z	Z	Z	Z	Z	Z	Z
24.20	REP on-site only utilizing any technology no PPA required	S	S	S	S	S	S	S	S	S	S	S
24.20	utility scale REP utilizing any technology requiring a PPA					C*	C*	C*	C*	C*	C*	C*
30												
*	See Section "9(A)" Public Benefit Program											

(c) Add Section 99.09.04 "Renewable Energy Projects (REP)

(1) Permitted Uses

a) Renewable Energy Projects (REP) shall be allowed in accordance with the City Code Section 96.01 "Permissible Use Table", unless otherwise exempted by state or federal law.

b) Other hybrid or emerging renewable energy technologies, which in the opinion of the review authority are of a similar and compatible nature to those uses described in this section.

(2) Definitions

a) "Electronic submittal" means the utilization of one or more of the following:
1) e-mail,
2) the internet,
3) Facsimile.

b) "Small residential rooftop solar energy system" means all of the following:

1) A solar energy system that is no larger than 10 kilowatts alternating current nameplate rating or 30 kilowatts thermal.

2) A solar energy system that conforms to all applicable state fire, structural, electrical, and other building codes as adopted or

amended by the City and paragraph (iii) of subdivision (c) of Section 714 of the Civil Code, as such section or subdivision may be amended, renumbered, or redesignated from time to time.

3) A solar energy system that is installed on a single or duplex family dwelling.

4) A solar panel or module array that does not exceed the maximum legal building height as defined by the authority having jurisdiction.

c) "Applicant" is the Landowner, developer, facility owner, and/or operator with legal control of the project, including heirs, successors and assigns, who have filed an application for development of a Solar Energy Facility under this Ordinance.

d) "Parcel" means all land within a legally established parcel.

e) "Practicable" means it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

f) "Landowner" means the persons or entities possessing legal title to the Parcel(s) upon which a REP is located.

g) "Protected Lands" means, for the purpose of this chapter only, lands containing resources that are protected or regulated by established regulatory standards of local, state, and federal agencies, conservation easements or other contractual instruments in such a way that prohibits or limits development of those lands.

h) "Review Authority" means applicable-city land use decision-making body as determined by local ordinance and appeal procedures.

i) "Solar Energy Project (SEP)" means a Solar Electric System that satisfies the parameters identified in the Ordinance...

j) "Solar Electric System (SES)" means the components and subsystems that, in combination, convert solar energy into electric or thermal energy suitable for use, and may include other appurtenant structures and facilities. The term includes, but is not limited to, photovoltaic power systems, solar thermal systems, and solar hot water systems.

k) "Uses Allowed" means one of the following:

(1) A REP designed primarily for serving on-site needs or a use that is related to the Primary Use of the property.

(2) A REP designed and installed to provide on-site energy demand for any legally established use of the property.

(3) A REP that uses over 50% of the Parcel(s) and is devoted to solar electric power generation primarily for use off-site.

(4) A REP that provides up to 125% of on-site electricity (or hot water) demand and generally less than 50% of the building site area, or 15-25% of the Parcel land area.

(5) A REP that is not the Primary Use of the property and uses less than 50% of the Parcel(s).

(6) Other hybrid or emerging renewable energy technologies, which in the opinion of the review authority are of a similar and compatible nature to those uses described in this section.

(3) Permit Requirements

(a) Small residential rooftop energy system

1) Application package includes:

a) Exhibit "A" - Checklist for Expedited Solar Residential Rooftop Project
b) Exhibit "B-1" - Standard Plan-Simplified Central/String Inverter System
c) Exhibit "B-2" – Standard Plan-Simplified Micro inverter and ACM System
d) Exhibit "C" – Structural Criteria for Rooftop Solar Structural Requirements
e) Exhibit "D" – building permit application with interconnection agreement application (Photovoltaic guidelines/ Needles Rebate Program)

2) Application Submittal for permit

Will be accepted by the City via email, internet, or facsimile

3) Review Process and permit issuance

a) Building official to review and confirm application is complete and administratively approve the application and issue all required permits or authorizations. Incomplete applications will be returned with written notification from building official identifying application deficiencies.

Such approval does not authorize an applicant to connect the small residential rooftop energy system to the local utility provider's electricity grid. The applicant is responsible for obtaining such approval or permission from the local utility provider.

4) Inspection

Only one inspection shall be required, which shall be done in a timely manner. If a small residential rooftop solar energy system fails inspection, a subsequent inspection is authorized; however the subsequent inspection need not conform to the requirements of this subsection.

(b) All other REP Projects

1) Permits required

The type of land use permit required for REFs are shown in the Permissible Use Table under Section 24.00

2) Application Package includes:

a) Conditional Use Permit Application
b) CEQA Checklist
c) Interconnection Agreement Application

3) Permits

a) Nothing in this chapter modifies the minimum building standards required to construct a REP, consistent with applicable building and fire codes. The REP components and all accessory equipment shall comply with the most recently adopted Building Code as determined by the Building Official and Fire Code as determined by the Fire Official.

b) The Permits shall include review by local permitting departments including, but not limited to, the local Fire Authority, for Health and Safety Requirements.

(4) **General Requirements**

(a) Setbacks.

The following setbacks from the Parcel line to the closest part of the REP shall be established as shown in the Table below. Fencing, roads and landscaping may occur within the setback.

Parcel Line Setback Table

Zoning District	Front	Rear	Side
Commercial	30'	30'	30'
Industrial	30'	30'	30'
Residential*	Per Zoning for that District		

* Complies with required front yard setbacks, or otherwise does not impair sight distance for safe access to or from the property or other properties in the vicinity as determined by ministerial zoning clearance.

(b) Grading, Access and Parking

(1) Renewable energy projects shall be sited to maintain natural grades and use existing roads for access to the extent practical. Construction of new roads shall be avoided as much as possible. Natural grades shall be restored and re-vegetated for temporary access roads, construction staging areas, or field office sites used during construction. The operator shall maintain an all-weather access road for maintenance and emergency vehicles.

(c) Soil Stabilization, Erosion Control and Ground Water Management –

(1) To the extent feasible and compatible with the climate and pre-project landscaping of the property the site shall be restored with native vegetation. The re-vegetation plans shall be reviewed and approved by the City. All areas occupied by the facility that are not utilized for access to operate and maintain the installation shall be covered with gravel or other soil stabilization or other methods approved by the City. Use of chemical soil stabilization will require ongoing maintenance as required by the City.

(2) The renewable energy facility must have a storm water management plan/permit showing existing and proposed grading and drainage demonstrating no net increase in runoff.

(3) Erosion and Sediment Control Plan, if applicable, approved prior to beginning grading or construction The plan must include best management practices for erosion control during and after construction, and permanent drainage and erosion control measures to prevent damage to local roads or adjacent areas, and to minimize sediment and storm water run-off into waterways, agricultural lands and habitat areas.

(4) Prior to issuing a final Building Permit, an as-built grading and drainage plan, prepared by a licensed professional surveyor or other approved qualified professional shall be submitted to the reviewing agency's engineer for review and approval. The plan shall show that the as-built conditions are substantially the same as those shown on the approved grading and drainage plan.

(5) A maintenance plan shall be submitted for the continuing maintenance of the REP, which may include, but not be limited to, planned maintenance of soil stabilization, equipment maintenance, and plans for cleaning of solar panels if required.

(d) Aesthetics

The operator of the renewable energy facility shall maintain the facility including all required landscaping in compliance with the approved design plans, and shall keep the facility free from weeds, dust, trash and debris.

(e) Air Quality

During site preparation, grading and construction, the renewable energy facility operator must implement best management practices to minimize dust and wind erosion, including regularly watering roads and construction staging areas as necessary, and minimizing vehicle idling and number of vehicle trips. Paved roads shall be swept as needed to remove any soil that has been carried onto them from the facility site.

(f) Air Safety

Renewable energy facilities shall be sited and operated to avoid hazards to air navigation. The renewable energy facility shall comply with any conditions

imposed by Federal, State, County, and City agencies.

(g) Biological Resources

The protection of high value biological resources is an important consideration. REP projects shall not be located on lands which support listed, candidate or other fully protected species, species of special concern, or species protected under the Native Plant Protection Act; Environmentally Sensitive Habitat Areas without CEQA. Applicant shall be responsible for all costs associated with the preparation of all documentation, studies, etc., as well as the costs associated with the City's use of a third party reviewer to ensure application completeness. Applicants are encouraged to coordinate with permitting agencies such as Dept. of Fish and Game and U.S. Fish and Wildlife Service during design stages.

(h) Cultural Resources

Renewable energy facilities shall be sited to avoid or mitigate impacts to significant cultural and historic resources, as well as sacred landscapes.-Facilities requiring a use permit that result in ground disturbance shall require a cultural resources records search and, if necessary, a cultural resources field survey at the time of facility application. Consultation with Native American tribes shall be conducted as part of the environmental review process.

Grading plans for all renewable energy facilities shall include notes that require the contractor to halt work within the vicinity of any archeological, historical or cultural resources or artifacts that may be discovered during construction or operation. If cultural resources are discovered during construction, the operator shall notify the local agency and a qualified professional shall be retained at the applicant's expense to evaluate the find and determine any measures to mitigate impacts including avoidance, removal, preservation or recordation in accordance with California law. The operator shall implement any feasible mitigation measures as determined by the local agency. If human remains are discovered, the County Coroner must also be notified and consultation with the Native American Heritage Commission may be required to determine the most likely descendants.

(i) Fire Protection

The renewable energy facility shall be subject to Fire Safety Standards. The operator must implement a Fire Prevention Plan for construction and ongoing operations approved by the County Fire Marshall and local fire protection district. The plan shall include, but not be limited to: emergency vehicle access and turn-around at the facility site(s), addressing, vegetation management and fire break maintenance around structures.

(j) Proximity to Transmission Lines and Utility Notification

Upgrades to distribution or transmission facilities shall be identified and addressed as part of the CEQA review process. No building permit for a renewable energy facility shall be issued until evidence has been provided that the proposed interconnection is acceptable to the affected utility.

If new distribution, transmission, or substation facilities are required and the utility is an investor-owned utility, the California Public Utilities Commission (CPUC) may need to approve a Permit to construct or a Certificate of Public Convenience and Necessity. Coordination with the CPUC is essential prior to renewable energy facility approval.

(k) Security and Fencing

The site area for a renewable energy facility must be fenced or other appropriate measures to prevent unauthorized access and provide adequate signage. Wildlife friendly fencing shall be used **where required**. If needed, security lighting shall be operated by motion sensors. Access gates and equipment cabinets must be locked at all times.

(l) Signs

Temporary signs describing the facility, and providing contact information for the contractor and operator shall be placed during construction and must be removed prior to final inspection and operation. Signs for public or employee safety are required. No more than two signs relating the address and name of the operator/facility may be placed on-site, subject to design review. Outdoor displays, billboards or advertising signs of any kind either on- or off-site are prohibited.

(m) Off-Site Facilities

When the REP is located on more than one Parcel, there shall be proper easement agreements or other approved methods for the notification of all impacted parties.

(n) Septic System Avoidance – The REP shall not be located over a septic system, leach field area or identified reserve area unless approved by the Department of Environmental Health;

(o) Floodplain Avoidance – If located in a floodplain as designated by FEMA, or an area of known localized flooding, all panels, electrical wiring, automatic transfer switches, inverters, etc. shall be located above the base flood elevation; and, shall not otherwise create a fire or other safety hazard as determined by the Building Official.

(p) Visibility

1) If lighting is required, it shall be activated by motion sensors, fully shielded and downcast type where the light does not spill onto the adjacent Parcel or the night sky;

2) No display of advertising, except for reasonable identification of the panel, inverter or other equipment manufacturer, and the facility owner;

(q) Decommissioning and Restoration

1) A Decommissioning Plan shall be required and shall include the following:

An estimate prepared by a registered engineer describing the activities required to decommission the site and return it to its natural condition that existed before the installation along with an estimate to conduct the decommissioning activities.

The Owner/Applicant shall provide sufficient financial assurance to decommission the site. Allowable financial assurances include cash deposit, Letter of Credit or Performance Bond from an institution satisfactory to the City Manager.

a) Removal of all aboveground and underground equipment, structures, fencing and foundations to a depth of three feet below grade. Underground equipment, structures and foundations located at least three feet below grade that do not constitute a hazard or interfere with the use of the land do not need to be removed.

b) If applicable, removal of substations, overhead poles, above ground electricity transmission lines located on-site or within the public right of way if determined not to be usable to any other public or private utility.

c) Removal of graveled areas and access roads.

d) Regarding and placement of like-kind topsoil after removal of all structures and equipment.

e) An Erosion Control Plan.

f) Revegetation of disturbed areas with native seed mixes and plant species suitable to the area.

g) The timeframe for completion of removal and decommissioning activities.

h) An engineer's cost estimate for all aspects of the decommissioning plan, including use of prevailing wage rates, and credit for the salvage value of the panels and system materials.

i) A statement signed by the owner or operator that they take full responsibility for reclaiming the site in accordance with the Decommissioning Plan and Use Permit approval upon cessation of use. See above. We want a financial assurance instrument.

The renewable energy facility operator is required to notify the City immediately upon termination or cessation of use or abandonment of the operation. The operator shall remove components of the facility when it becomes functionally obsolete or is no longer in use. The operator shall begin decommissioning and removal of all equipment, structures, footings/foundations, signs, fencing, and access roads within 90 days from the date the facility ceases operation, and shall return the site to an appropriate end-use within the timeframe specified in the Decommissioning Plan.

(r) Financial Assurance

At the time of issuance of the permit for the construction of the facility, the operator shall provide financial assurance in a form and amount acceptable to the local agency to secure the expense of decommissioning and removing all equipment, structures, fencing, and reclaiming the site and associated access or distribution lines in compliance with the approved reclamation plan.

(s) Workforce Development

The operator shall be encouraged to participate in the a regional occupational training program, or a similar program approved by the city, providing job training in renewable energy, and restoration and land stewardship, by providing an annual contribution to fund the program and providing access to the facility by teachers and students, for the term of the lease or facility use.

Submittal of a Local Hiring Plan is required prior to applying for a building permit for new construction valued at above $TBD. The Plan shall set voluntary targets for local hiring, along with a protocol for sequencing local job recruitment activities prior to advertising outside the City as determined by the City. The Plan shall also include annual monitoring and reporting requirements during construction

(t) Abandonment – A REP that ceases to produce electricity on a continuous basis for twenty four (24) months shall be considered abandoned unless the Applicant or Landowner demonstrates by substantial evidence satisfactory to the City that there is no intent to abandon the facility. Applicants and/or Landowners are required to remove all equipment and facilities and restore the site to original condition upon abandonment.

1) Facilities deemed by the City to be unsafe and facilities erected in violation of this section shall also be subject to this Section. The code enforcement officer or any other employee of the City shall have the right to request documentation and/or affidavits from the Applicant regarding the system's usage, and shall make a determination as to the date of abandonment or the date on which other violation(s) occurred.

2) Upon a determination of abandonment or other violation(s), the City shall send a notice hereof to the Applicant and/or Landowner, indicating that the responsible party shall remove the REP and all associated facilities, and remediate the site to its approximate original condition within ninety (90) days of notice by the City, unless the City determines that the facilities must be removed in a shorter period to protect public safety. Alternatively, if the violation(s) can be addressed by means short of removing the REP and restoration of the site, the City may advise the Applicant and/or Landowner of such alternative means of resolving the violation(s).

3) If the Applicant and/or Landowner do not comply, the City may remove the REP and restore the site and may thereafter (a) draw funds from any bond, security or financial assurance that may have been provided or (b) initiate judicial proceedings or take other steps authorized by law against the responsible parties to recover only those costs associated with the removal of structures deemed a public hazard.

(5) Misc.

Public Benefit Program

A streamlined permitting process utilizing a Special Use Permit in lieu of a Conditional Use Permit shall be used for any REF utility-scale sized project participating in the Public Benefit Program.

SECTION 4. This action shall become final and effective thirty (30) days after this decision by the City Council as provided by the Needles City Code.

SECTION 5. The City Clerk shall certify to the adoption of this Ordinance and shall transmit copies of the same to the applicant.

NOW, THEREFORE, BE IT ORDAINED that the City Council of the City of Needles, California, approve an amendment to the City Code.

INTRODUCED AND READ for the first time and ordered posted at a regular meeting of the City Council of the City of Needles, California, held on the 27th day of October, 2015, by the following roll call vote:

AYES: Councilmembers Gudmundson, Evans, Frazier, Williams, Darcy and Richardson
NOES None
ABSENT None
ABSTAIN None

Mayor

Attest: Dale Jones
City Clerk

PASSED, APPROVED AND ADOPTED at a regular meeting of the City Council of the City of Needles, California, held on the 10th day of November, 2015.

AYES: Councilmembers Gudmundson, Evans, Frazier, Williams, Darcy and Richardson
NOES: None
ABSENT: None
ABSTAIN: None

Mayor

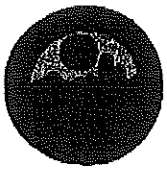
(Seal)

Attest: Dale Jones
City Clerk

Approved as to form:

City Attorney

EXHIBIT "A"



Eligibility Checklist for Expedited Solar Photovoltaic Permitting for One- and Two-Family Dwellings

GENERAL REQUIREMENTS

A. System size is 10 kW AC CEC rating or less	☐ Y	☐ N
B. The solar array is roof-mounted on one- or two-family dwelling or accessory structure	☐ Y	☐ N
C. The solar panel/module arrays will not exceed the maximum legal building height	☐ Y	☐ N
D. Solar system is utility interactive and without battery storage	☐ Y	☐ N
E. Permit application is completed and attached	☐ Y	☐ N

ELECTRICAL REQUIREMENTS

A. No more than four photovoltaic module strings are connected to each Maximum Power Point Tracking (MPPT) input where source circuit fusing is included in the inverter	☐ Y	☐ N
1) No more than two strings per MPPT input where source circuit fusing is not included	☐ Y	☐ N
2) Fuses (if needed) are rated to the series fuse rating of the PV module	☐ Y	☐ N
3) No more than one noninverter-integrated DC combiner is utilized per inverter	☐ Y	☐ N
B. For central inverter systems: No more than two inverters are utilized	☐ Y	☐ N
C. The PV system is interconnected to a single-phase AC service panel of nominal 120/220 Vac with a bus bar rating of 225 A or less	☐ Y	☐ N
D. The PV system is connected to the load side of the utility distribution equipment	☐ Y	☐ N
E. A Solar PV Standard Plan and supporting documentation is completed and attached	☐ Y	☐ N

STRUCTURAL REQUIREMENTS

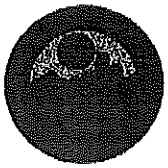
A. A completed Structural Criteria and supporting documentation is attached (if required)	☐ Y	☐ N

FIRE SAFETY REQUIREMENTS

A. Clear access pathways provided	☐ Y	☐ N
B. Fire classification solar system is provided	☐ Y	☐ N
C. All required markings and labels are provided	☐ Y	☐ N
D. A diagram of the roof layout of all panels, modules, clear access pathways and approximate locations of electrical disconnecting means and roof access points is completed and attached	☐ Y	☐ N

Notes:

1. *These criteria are intended for expedited solar permitting process.*
2. *If any items are checked NO, revise design to fit within Eligibility Checklist, otherwise permit application may go through standard process.*



Solar PV Standard Plan — Simplified Central/String Inverter Systems for One- and Two-Family Dwellings

SCOPE: Use this plan ONLY for utility-interactive central/string inverter systems not exceeding a system AC inverter output rating of 10kW on the roof of a one- or two-family dwelling or accessory structure. The photovoltaic system must interconnect to the load side of a single-phase AC service panel of nominal 120/240Vac with a bus bar rating of 225A or less. This plan is not intended for bipolar systems, hybrid systems or systems that utilize storage batteries, charge controllers, trackers, more than two inverters or more than one DC combiner (noninverter-integrated) per inverter. Systems must be in compliance with current California Building Standards Codes and local amendments of the authority having jurisdiction (AHJ). Other Articles of the California Electrical Code (CEC) shall apply as specified in 690.3.

MANUFACTURER'S SPECIFICATION SHEETS MUST BE PROVIDED for proposed inverter, modules, combiner/junction boxes and racking systems. Installation instructions for bonding and grounding equipment shall be provided, and local AHJs may require additional details. Listed and labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling (CEC 110.3). Equipment intended for use with PV system shall be identified and listed for the application (CEC 690.4[D]).

Job Address: _____ Permit #: _____

Contractor/ Engineer Name: _____ License # and Class: _____

Signature: _____ Date: _____ Phone Number: _____

Total # of Inverters installed: _____ (If more than one inverter, complete and attach the "Supplemental Calculation Sheets" and the "Load Center Calculations" if a new load center is to be used.)

Inverter 1 AC Output Power Rating: _____ Watts

Inverter 2 AC Output Power Rating (if applicable): _____ Watts

Combined Inverter Output Power Rating: _____ ≤ 10,000 Watts

Location Ambient Temperatures (Check box next to which lowest expected temperature is used):

1) ☐ Lowest expected ambient temperature for the location (T_L) = **Between -1 to -5 °C**

☐ Lowest expected ambient temperature for the location (T_L) = **Between -6 to -10 °C**

Average ambient high temperature (T_H) = 47 °C

Note: For a lower T_L or a higher T_H, use the Comprehensive Standard Plan

DC Information:

Module Manufacturer: _____ Model: _____	
2) Module V_{oc} (from module nameplate): _____ Volts	3) Module I_{sc} (from module nameplate): _____ Amps
4) Module DC output power under standard test conditions (STC) = _____ Watts (STC)	

5) DC Module Layout

Identify each source circuit (string) for inverter 1 shown on the roof plan with a Tag (e.g. A,B,C,...)	Number of modules per source circuit for inverter 1	Identify, by tag, which source circuits on the roof are to be paralleled (if none, put N/A)
		Combiner 1:
		Combiner 2:
Total number of source circuits for inverter 1:		

6) Are DC/DC Converters used? ☐ Yes ☐ No If No, skip to Step 7. If Yes enter info below.

DC/DC Converter Model #: _____

Max DC Output Current: _____ Amps

Max # of DC/DC Converters in an Input Circuit: _____

DC/DC Converter Max DC Input Voltage: _____ Volts

Max DC Output Current: _____ Volts

DC/DC Converter Max DC Input Power: _____ Watts

7) Maximum System DC Voltage — Use A1 or A2 for systems without DC/DC converters, and B1 or B2 with DC/DC Converters.

☐ A1. Module V_{oc} (STEP 2) = _____ x # in series (STEP 5) _____ x 1.12 (If $-1 \le T_L \le -5°C$, STEP 1) = _____ V

☐ A2. Module V_{oc} (STEP 2) = _____ x # in series (STEP 5) _____ x 1.14 (If $-6 \le T_L \le -10°C$, STEP 1) = _____ V

Table 1: Maximum Number of PV Modules in Series based on Module Rating V_{oc} for 600 Vdc Rated Equipment (CEC 690.7)

Max. Rated Module V_{oc} (*1.12) (Volts)	29.76	31.51	33.48	35.71	38.27	41.21	44.64	48.70	53.57	59.52	66.96	76.53	89.29
Max. Rated Module V_{oc} (*1.14) (Volts)	29.24	30.96	32.89	35.09	37.59	40.49	43.86	47.85	52.63	58.48	65.79	75.19	87.72
Max # of Modules for 600 Vdc	18	17	16	15	14	13	12	11	10	9	8	7	6

Use for DC/DC converters. The value calculated below must be less than DC/DC converter max DC input voltage (STEP 6).

☐ B1. Module V_{oc} (STEP 2) = _____ x # of modules per converter (STEP 6) _____ x 1.12 (If $-1 \le T_L \le -5°C$, STEP 1) = _____ V

☐ B2. Module V_{oc} (STEP 2) = _____ x # of modules per converter (STEP 6) _____ x 1.14 (If $-6 \le T_L \le -10°C$, STEP 1) = _____ V

Table 2: Largest Module V_{oc} for Single Module DC/DC Converter Configurations with 80V Max Input (CEC 690.7) and 600 Vdc

Max. Rated Module V_{oc} (*1.12) (Volts)	30.4	33.0	35.7	38.4	41.1	43.8	46.4	49.1	51.8	54.5	57.1	59.8	62.5	65.2	67.9	70.5
Max. Rated Module V_{oc} (*1.14) (Volts)	29.8	32.5	35.1	37.7	40.4	43.0	45.6	48.2	50.9	53.5	56.1	58.8	61.4	64.0	66.7	69.3
DC/DC Converter Max DC Input (Step #6) (Volts)	34	37	40	43	46	49	52	55	58	61	64	67	70	73	76	79

8) Maximum System DC Voltage from DC/DC Converters to Inverter — Only required if Yes in Step 6

Maximum System DC Voltage = _____ Volts

9) Maximum Source Circuit Current

Is Module I_{sc} below 9.6 Amps (Step 3)? ☐ Yes ☐ No (If No, use Comprehensive Standard Plan)

10) Sizing Source Circuit Conductors
Source Circuit Conductor Size = Min. #10 AWG copper conductor, 90°C wet (USE-2, PV Wire, XHHW-2, THWN-2, RHW-2)
For up to 8 conductors in roof-mounted conduit exposed to sunlight at least ½" from the roof covering (CEC 310)
Note: For over 8 conductors in the conduit or mounting height of lower than ½" from the roof, use Comprehensive Plan.

11) Are PV source circuits combined prior to the inverter? ☐ Yes ☐ No
If No, use Single Line Diagram 1 and proceed to Step 13.
If Yes, use Single Line Diagram 2 with Single Line Diagram 4 and proceed to Step 12.
Is source circuit OCPD required? ☐ Yes ☐ No
Source circuit OCPD size (if needed): 15 Amps

12) Sizing PV Output Circuit Conductors — If a combiner box will NOT be used (Step 11),
Output Circuit Conductor Size = Min. #6 AWG copper conductor

13) Inverter DC Disconnect
Does the inverter have an integrated DC disconnect? ☐ Yes ☐ No If Yes, proceed to step 14.
If No, the external DC disconnect to be installed is rated for _____ Amps (DC) and _____ Volts (DC)

14) Inverter Information
Manufacturer: _____ Model: _____
Max. Continuous AC Output Current Rating: _____ Amps
Integrated DC Arc-Fault Circuit Protection? ☐ Yes ☐ No (If No is selected, Comprehensive Standard Plan)
Grounded or Ungrounded System? ☐ Grounded ☐ Ungrounded

AC Information:

15) Sizing Inverter Output Circuit Conductors and OCPD
Inverter Output OCPD rating = _____ Amps (Table 3)
Inverter Output Circuit Conductor Size = _____ AWG (Table 3)

Table 3 Minimum Inverter Output OCPD and Circuit Conductor Size

Inverter Continuous Output Current Rating (Amps) (Step 14)	12	16	20	24	28	32	36	40	48
Minimum OCPD Size (Amps)	15	20	25	30	35	40	45	50	60
Minimum Conductor Size (AWG, 75°C, Copper)	14	12	10	10	8	8	6	6	6

Integrated DC Arc-Fault Circuit Protection? ☐ Yes ☐ No (If No is selected, Comprehensive Standard Plan)
Grounded or Ungrounded System? ☐ Grounded ☐ Ungrounded

16) Point of Connection to Utility

Only load side connections are permitted with this plan. Otherwise, use Comprehensive Standard Plan.

Is the PV OCPD positioned at the opposite end from input feeder location or main OCPD location? ☐ Yes ☐ No

If Yes, circle the Max Combined PV System OCPD(s) at 120% value as determined from Step 15 (or Step S20), bus bar Rating, and Main OCPD as shown in Table 4.

If No, circle the Max Combined PV System OCPD(s) at 100% value as determined from Step 15 (or Step S20), bus bar Rating, and Main OCPD as shown in Table 4.

Per 705.12(D)(2): [Inverter output OCPD size [Step #15 or S20] + Main OCPD Size] ≤ [bus size x (100% or 120%)]

Table 4 Maximum Combined Solar PV OCPD Size per Bus Bar Rating (Amps) per CEC/CRC 705.12(D)(2)

Bus Bar Rating	100	125	125	200	200	200	225	225	225
Main OCPD	100	100	125	150	175	200	175	200	225
Max Combined PV System OCPD(s) at 120% of Bus Bar Rating	20	50	25	60*	60*	40	60*	60*	45
Max Combined PV System OCPD(s) at 100% Bus Bar Rating	0	25	0	50	25	0	50	25	0

*This value has been lowered to 60 A from the calculated value to reflect 10 kW AC size maximum.

Reduction of the main breaker is not permitted with this plan. Otherwise, use Comprehensive Standard Plan.

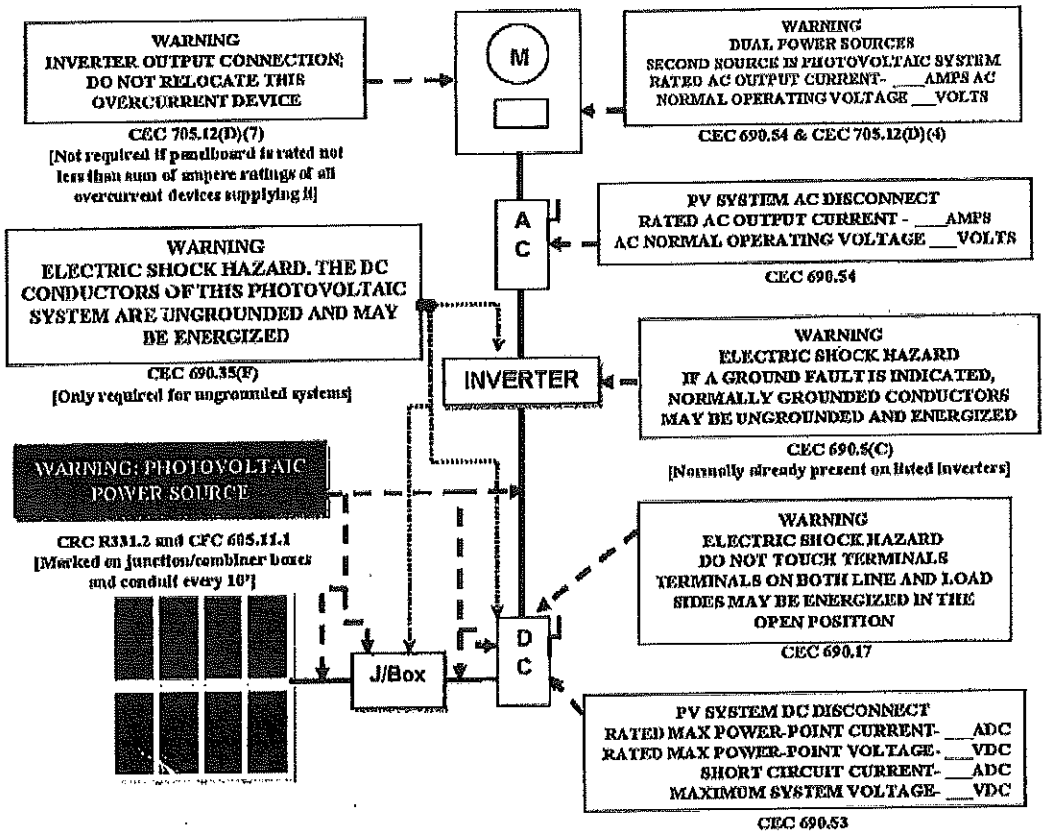
17 & 18 & 19) Labels and Grounding and Bonding

This content is covered by the labels on the next page and the Single Line Diagram(s). For background information, refer to the Comprehensive Standard Plan.

Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

Markings

CEC Articles 690 and 705 and CRC Section R331 require the following labels or markings be installed at these components of the photovoltaic system:



Code Abbreviations:
California Electrical Code (CEC)
California Residential Code (CRC)
California Fire Code (CFC)

Informational note: ANSI Z535.4 provides guidelines for the design of safety signs and labels for application to products. A phenolic plaque with contrasting colors between the text and background would meet the intent of the code for permanency. No type size is specified, but 20 point (3/8") should be considered the minimum.

CEC 705.12 requires a permanent plaque or directory denoting all electric power sources on or in the premises.

Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

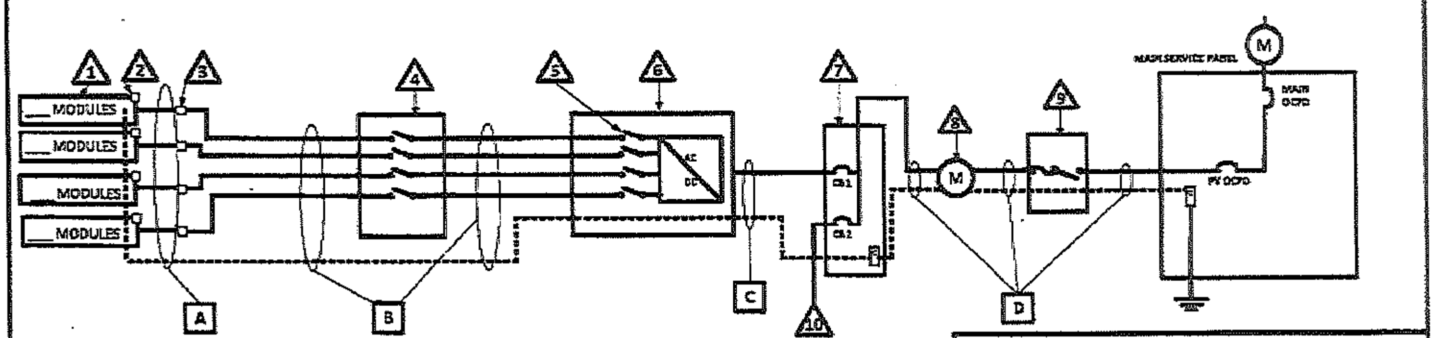
TAG	DESCRIPTION
1	SOLAR PV MODULE / STRING
2	DC/DC CONVERTERS INSTALLED? YES / NO (IF YES, STEPS 5 & 6 REQUIRED)
3	SOURCE CIRCUIT JUNCTION BOX INSTALLED?: YES / NO
4	SEPARATE DC DISCONNECT INSTALLED?: YES / NO
5	INTERNAL INVERTER DC DISCONNECT: YES / NO
6	CENTRAL INVERTER
7	LOAD CENTER INSTALLED?: YES / NO
8	PV PRODUCTION METER INSTALLED?: YES / NO
9	*SEPARATE AC DISCONNECT INSTALLED?: YES / NO
10	CONNECT TO INVERTER #2 (USE LINE DIAGRAM 2)

* Consult with your local AHJ and /or Utility

SINGLE-LINE DIAGRAM #1 – NO STRINGS COMBINED PRIOR TO INVERTER

CHECK A BOX FOR WHETHER SYSTEM IS GROUNDED OR UNGROUNDED: ☐ GROUNDED (INCLUDE GEC) ☐ UNGROUNDED

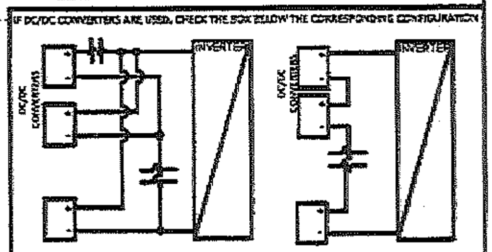
FOR UNGROUNDED SYSTEMS:
- DC OCPD MUST DISCONNECT BOTH CONDUCTORS OF EACH SOURCE CIRCUIT
- UNGROUNDED CONDUCTORS MUST BE IDENTIFIED PER 210.5(C). WHITE-FINISHED CONDUCTORS ARE NOT PERMITTED.



CONDUCTOR/CONDUIT SCHEDULE					
☐ TAG	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
A	USE-2 OR PV-WIRE				
	EGC/GEC:				
B					
	EGC/GEC:				
C					
	EGC/GEC:				
D					
	EGC/GEC:				

ENTER "N/A" WHERE SUITABLE FOR WHEN NOT USING CONDUIT OR CABLE AS PERMITTED BY CODE

IF DC/DC CONVERTERS ARE USED, CHECK THE BOX BELOW THE CORRESPONDING CONFIGURATION



☐ PARALLEL DC/DC CONVERTERS ON ONE SOURCE CIRCUIT (FIXED UNIT VOLTAGE DC/DC CONVERTERS)

☐ DC/DC CONVERTERS ARE ALL RUN IN SERIES (FIXED SOURCE CIRCUIT VOLTAGE DC/DC CONVERTERS)

Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

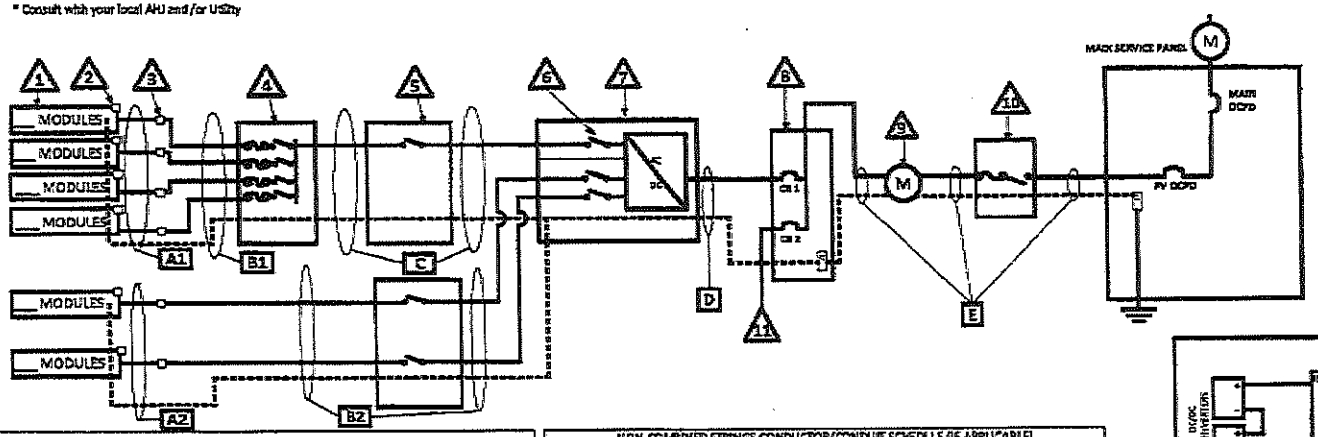
TAG	DESCRIPTION
1	SOLAR PV MODULE / STRING
2	DC/DC CONVERTERS INSTALLED? YES / NO (IF YES, STEPS 8 & 9 REQUIRED)
3	SOURCE CIRCUIT JUNCTION BOX INSTALLED?: YES / NO
4	COMBINER BOX (STEPS 11 & 12 REQUIRED)
5	SEPARATE DC DISCONNECT INSTALLED?: YES / NO
6	INTERNAL INVERTER DC DISCONNECT: YES / NO
7	CENTRAL INVERTER
8	LOAD CENTER INSTALLED?: YES / NO
9	PV PRODUCTION METER INSTALLED?: YES / NO
10	*SEPARATE AC DISCONNECT INSTALLED?: YES / NO
11	CONNECT TO INVERTER #2 (USE LINE DIAGRAM 4)

* Consult with your local AHJ and / or Utility

SINGLE-LINE DIAGRAM #2 – COMBINING STRINGS PRIOR TO INVERTER

CHECK A BOX FOR WHETHER SYSTEM IS GROUNDED OR UNGROUNDED: ☐ GROUNDED (INCLUDE GEC) ☐ UNGROUNDED

FOR UNGROUNDED SYSTEMS:
- DC OCPD MUST DISCONNECT BOTH CONDUCTORS OF EACH SOURCE CIRCUIT
- UNGROUNDED CONDUCTORS MUST BE IDENTIFIED PER 210.5(C). WHITE-FINISHED CONDUCTORS ARE NOT PERMITTED.

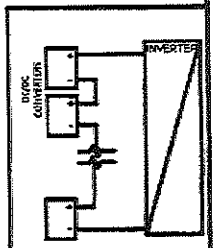


☐ LINE	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
Y1	USE-2 or PV WIRE				
	REQUIRED				
W					
	EGC/GEC				
C					
	REQUIRED				
D					
	EGC/GEC				
X					
	EGC/GEC				

NON-COMBINED STRINGS CONDUCTOR/CONDUIT SCHEDULE (IF APPLICABLE)

☐ TAG	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
A2	USE-2 or PV WIRE				
	EGC/GEC				
B2					
	EGC/GEC				

ENTER "N/A" WHERE SUITABLE FOR WHEN NOT USING CONDUIT OR CABLE AS PERMITTED BY CODE



IF DC/DC CONVERTERS ARE USED, THEY ARE PUT IN SERIES (FIXED SOURCE CIRCUIT VOLTAGE DC/DC CONVERTERS)

Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

Supplemental Calculation Sheets for Inverter #2
(Only include if second inverter is used)

DC Information:

Module Manufacturer: _____ Model: _____	
S2) Module V_{oc} (from module nameplate): _____ Volts	S3) Module I_{sc} (from module nameplate): _____ Amps
S4) Module DC output power under standard test conditions (STC) = _____ Watts (STC)	

S5) DC Module Layout

Identify each source circuit (string) for inverter 1 shown on the roof plan with a Tag (e.g. A,B,C,...)	Number of modules per source circuit for inverter 1	Identify, by tag, which source circuits on the roof are to be paralleled (if none, put N/A)
		Combiner 1:
		Combiner 2:
Total number of source circuits for inverter 1:		

S6) Are DC/DC Converters used? ☐ Yes ☐ No If No, skip to Step S7. If Yes, enter info below.

DC/DC Converter Model #: _____	DC/DC Converter Max DC Input Voltage: _____ Volts
Max DC Output Current: _____ Amps	Max DC Output Current: _____ Volts
Max # of DC/DC Converters in an Input Circuit: _____	DC/DC Converter Max DC Input Power: _____ Watts

S7) Maximum System DC Voltage — Use A1 or A2 for systems without DC/DC converters, and B1 or B2 with DC/DC Converters.

☐ A1. Module V_{oc} (STEP S2) = _____ x # in series (STEP S5) _____ x 1.12 (if $-1 \le T_L \le -5°C$, STEP S1) = _____ V

☐ A2. Module V_{oc} (STEP S2) = _____ x # in series (STEP S5) _____ x 1.14 (if $-6 \le T_L \le -10°C$, STEP S1) = _____ V

Table: Maximum Number of PV Modules in Series Rated for Module Rated Voltage and 600 Vdc Rated Equipment (CEC 690.7)

Max. Rated Module V_{oc} (*1.12) (Volts)	29.76	31.51	33.48	35.71	38.27	41.21	44.64	48.70	53.57	59.52	66.96	76.53	89.29
Max. Rated Module V_{oc} (*1.14) (Volts)	29.24	30.96	32.89	35.09	37.59	40.49	43.86	47.85	52.63	58.48	65.79	75.19	87.72
Max # of Modules for 600 Vdc	18	17	16	15	14	13	12	11	10	9	8	7	6

Use for DC/DC converters. The value calculated below must be less than DC/DC converter max DC input voltage (STEP S6).

☐ B1. Module V_{oc} (STEP S2) = _____ x # of modules per converter (STEP S6) _____ x 1.12 (if $-1 \le T_L \le -5°C$, STEP S1) = _____ V

☐ B2. Module V_{oc} (STEP S2) = _____ x # of modules per converter (STEP S6) _____ x 1.14 (if $-6 \le T_L \le -10°C$, STEP S1) = _____ V

Table: Maximum Module V_{oc} for Single Module per DC Converter Configuration with 80 V Absolute Max DC Input (CEC 690.7 and 690.8)

Max. Rated Module V_{oc} (*1.12) (Volts)	30.4	33.0	35.7	38.4	41.1	43.8	46.4	49.1	51.8	54.5	57.1	59.8	62.5	65.2	67.9	70.5
Max. Rated Module V_{oc} (*1.14) (Volts)	29.8	32.5	35.1	37.7	40.4	43.0	45.6	48.2	50.9	53.5	56.1	58.8	61.4	64.0	66.7	69.3
DC/DC Converter Max DC Input (Step 6) (Volts)	34	37	40	43	46	49	52	55	58	61	64	67	70	73	76	79

S8) Maximum System DC Voltage from DC/DC Converters to Inverter — Only required if Yes in Step S6

Maximum System DC Voltage = _____ Volts

S9) Maximum Source Circuit Current

Is Module ISC below 9.6 Amps (Step S3)? ☐ Yes ☐ No (If No, use Comprehensive Standard Plan)

S10) Sizing Source Circuit Conductors

Source Circuit Conductor Size = Min. #10 AWG copper conductor, 90°C wet (USE-2, PV Wire, XHHW-2, THWN-2, RHW-2)

For up to 8 conductors in roof-mounted conduit exposed to sunlight at least ½" from the roof covering (CEC 310)

Note: For over 8 conductors in the conduit or mounting height of lower than ½" from the roof, use Comprehensive Plan.

S11) Are PV source circuits combined prior to the inverter? ☐ Yes ☐ No

If No, use Single Line Diagram 1 and proceed to Step S13.

If Yes, use Single Line Diagram 2 with Single Line Diagram 4 and proceed to Step S12.

Is source circuit OCPD required? ☐ Yes ☐ No

Source circuit OCPD size (if needed): 15 Amps

S12) Sizing PV Output Circuit Conductors — If a combiner box will NOT be used (Step S11),

Output Circuit Conductor Size = Min. #6 AWG copper conductor

S13) Inverter DC Disconnect

Does the inverter have an integrated DC disconnect? ☐ Yes ☐ No If Yes, proceed to Step S14.

If No, the external DC disconnect to be installed is rated for _____ Amps (DC) and _____ Volts (DC)

S14) Inverter Information

Manufacturer: _____ Model: _____

Max. Continuous AC Output Current Rating: _____ Amps

Integrated DC Arc-Fault Circuit Protection? ☐ Yes ☐ No (If No is selected, Comprehensive Standard Plan)

Grounded or Ungrounded System? ☐ Grounded ☐ Ungrounded

AC Information:

S15) Sizing Inverter Output Circuit Conductors and OCPD

Inverter Output OCPD rating = _____ Amps (Table 3)

Inverter Output Circuit Conductor Size = _____ AWG (Table 3)

Table: Minimum Inverter Output OCPD and Circuit Conductor Size

Inverter Continuous Output Current Rating (Amps) (Step 14)	12	16	20	24	28	32	36	40	48
Minimum OCPD Size (Amps)	15	20	25	30	35	40	45	50	60
Minimum Conductor Size (AWG, 75°C, Copper)	14	12	10	10	8	8	6	6	6

Load Center Calculations
(Omit if a load center will not be installed for PV OCPDs)

S20) Load Center Output:

Calculate the sum of the maximum AC outputs from each inverter.

Inverter #1 Max Continuous AC Output Current Rating [STEP S14] _____ x 1.25 = _____ Amps

Inverter #2 Max Continuous AC Output Current Rating [STEP S14] _____ x 1.25 = _____ Amps

Total inverter currents connected to load center (sum of above) = _____ Amps

Conductor Size: _____ AWG

Overcurrent Protection Device: _____ Amps

Load center bus bar rating: _____ Amps

The sum of the ampere ratings of overcurrent devices in circuits supplying power to a bus bar or conductor shall not exceed 120 percent of the rating of the bus bar or conductor.

Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

TAG	DESCRIPTION
1	SOLAR PV MODULE / STRING
2	DC/DC CONVERTERS INSTALLED? YES / NO (IF YES, STEPS 6 & 8 REQUIRED)
3	SOURCE CIRCUIT JUNCTION BOX INSTALLED?: YES / NO
4	SEPARATE DC DISCONNECT INSTALLED?* YES / NO
5	INTERNAL INVERTER DC DISCONNECT: YES / NO
6	CENTRAL INVERTER
7	*SEPARATE AC DISCONNECT INSTALLED?: YES / NO
8	TO LOAD CENTER ON LINE DIAGRAM 1

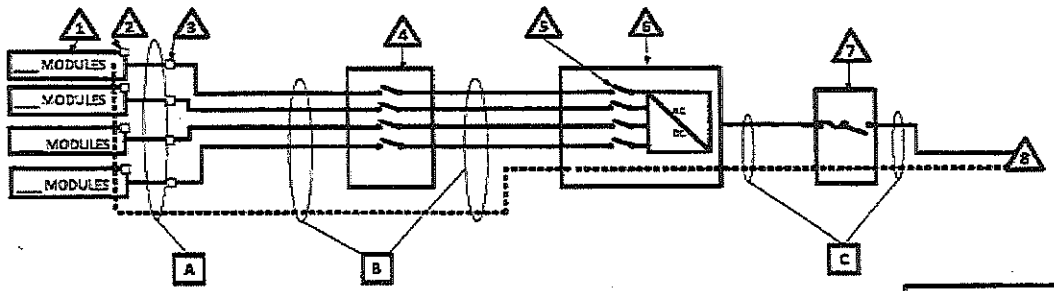
* Consult with your local AHJ and /or Utility

SINGLE-LINE DIAGRAM #3 – ADDITIONAL INVERTER FOR DIAGRAM #1

INVERTER # 2

CHECK A BOX FOR WHETHER SYSTEM IS GROUNDED OR UNGROUNDED: ☐ GROUNDED (INCLUDE GEC) ☐ UNGROUNDED

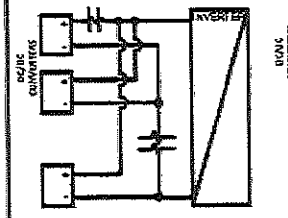
FOR UNGROUNDED SYSTEMS:
- DC OCPD MUST DISCONNECT BOTH CONDUCTORS OF EACH SOURCE CIRCUIT
- UNGROUNDED CONDUCTORS MUST BE IDENTIFIED PER 210.5(C). WHITE-FINISHED CONDUCTORS ARE NOT PERMITTED.



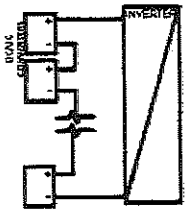
TAG	DESCRIPTION AND CONDUCTOR TYPE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TYPE	CONDUIT SIZE
A					
	EGC/GEC:				
B					
	EGC/GEC:				
C					
	EGC/GEC:				

ENTER "N/A" WHERE SUITABLE FOR WHEN NOT USING CONDUIT OR CABLE AS PERMITTED BY CODE

IF DC/DC CONVERTERS ARE USED, CHECK THE BOX BELOW THE CORRESPONDING CONFIGURATION



☐ PARALLEL DC/DC CONVERTERS ON ONE SOURCE CIRCUIT (FIXED UNIT VOLTAGE DC/DC CONVERTERS)



☐ DC/DC CONVERTERS ARE ALL RUN IN SERIES (FIXED SOURCE CIRCUIT VOLTAGE DC/DC CONVERTERS)

Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

TAG	DESCRIPTION
1	SOLAR PV MODULE / STRING
2	DC/DC CONVERTERS INSTALLED?: YES / NO (IF YES, STEPS 9 & 8 REQUIRED)
3	SOURCE CIRCUIT JUNCTION BOX INSTALLED?: YES / NO
4	COMBINER BOX (STEPS 11 & 12 REQUIRED)
5	SEPARATE DC DISCONNECT INSTALLED?: YES / NO
6	INTERNAL INVERTER DC DISCONNECT: YES / NO
7	CENTRAL INVERTER
8	*SEPARATE AC DISCONNECT INSTALLED?: YES / NO
9	TO LOAD CENTER ON LINE DIAGRAM 3

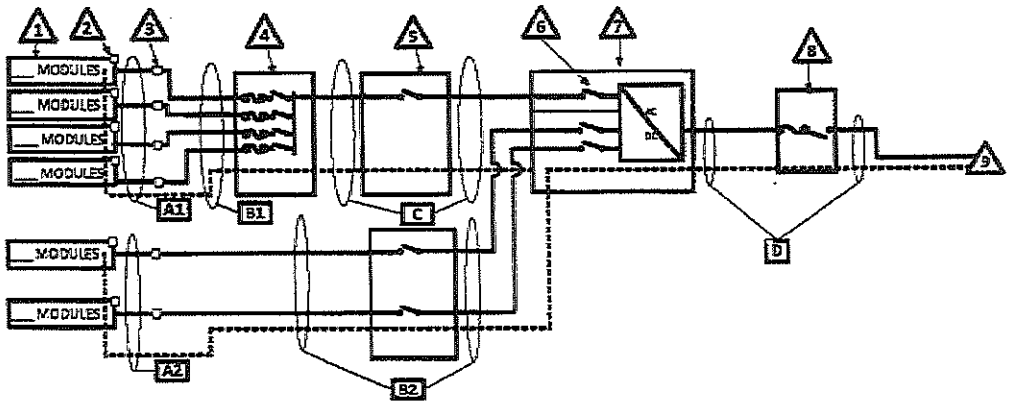
* Consult with your local AHJ and /or Utility

SINGLE-LINE DIAGRAM #4 – ADDITIONAL INVERTER FOR DIAGRAM #2

INVERTER # 2

CHECK A BOX FOR WHETHER SYSTEM IS GROUNDED OR UNGROUNDED: ☐ GROUNDED (INCLUDE GEC) ☐ UNGROUNDED

FOR UNGROUNDED SYSTEMS:
- DC OCPD MUST DISCONNECT BOTH CONDUCTORS OF EACH SOURCE CIRCUIT
- UNGROUNDED CONDUCTORS MUST BE IDENTIFIED PER 210.5(C). WHITE-FINISHED CONDUCTORS ARE NOT PERMITTED.



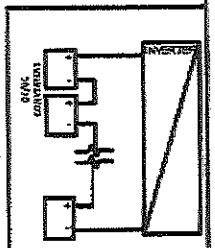
COMBINER CONDUCTOR/CONDUIT SCHEDULE

TYPE	DESCRIPTION AND CONDUCTOR TABLE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TABLE	CONDUIT SIZE
A1	SOURCE:				
B1	SOURCE:				
C	SOURCE:				
D	SOURCE:				

NON-COMBINED STRING CONDUCTOR/CONDUIT SCHEDULE OR CABLE/CABLE

TYPE	DESCRIPTION AND CONDUCTOR TABLE	CONDUCTOR SIZE	NUMBER OF CONDUCTORS	CONDUIT/CABLE TABLE	CONDUIT SIZE
A1	SOURCE:				
B1	SOURCE:				

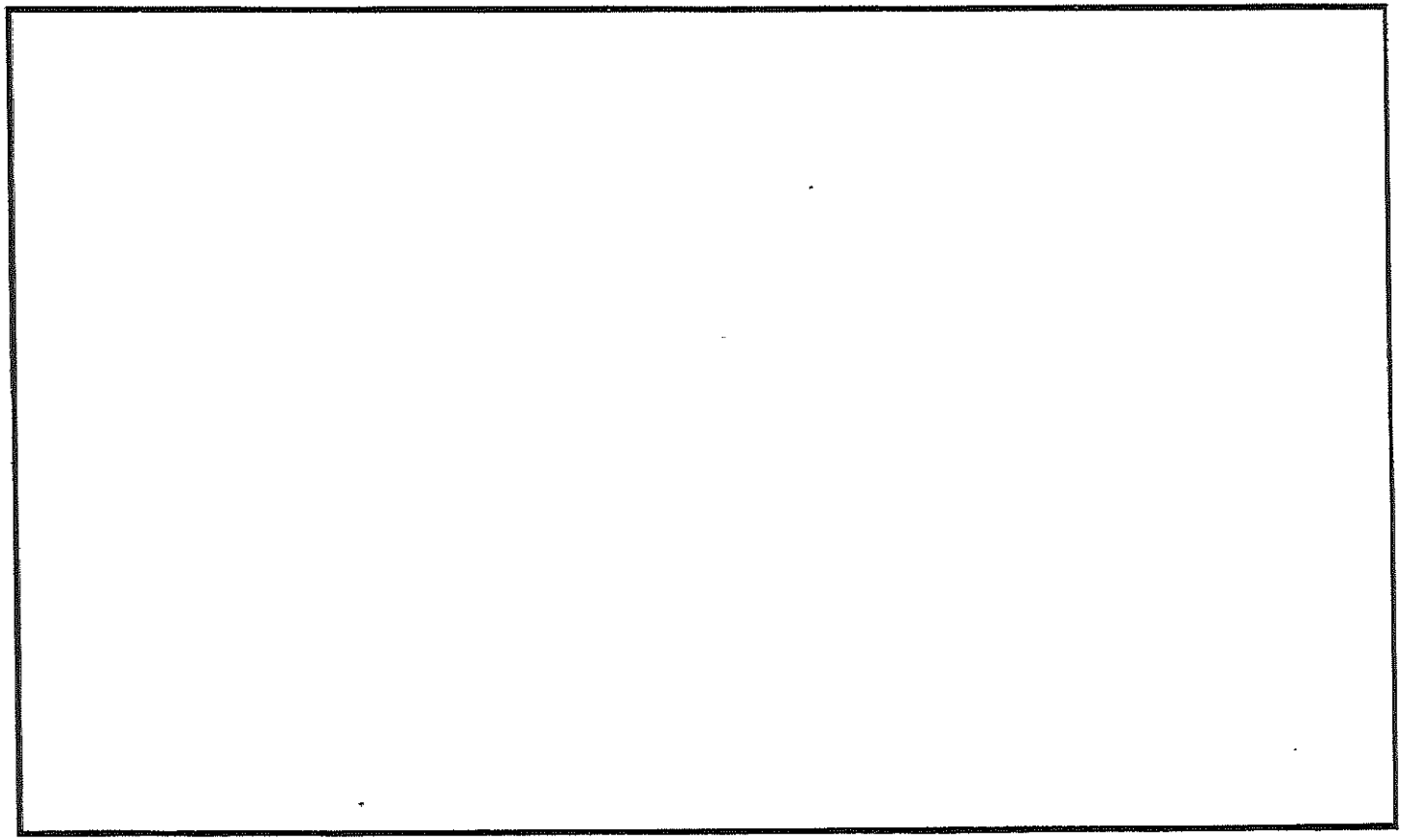
ENTER "N/A" WHERE SUITABLE FOR WHEN NOT USING CONDUIT OR CABLE AS PERMITTED BY CODE



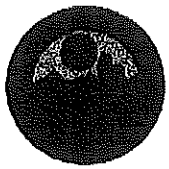
IF DC/DC CONVERTERS ARE USED, THEY ARE RUN IN SERIES (FIXED SOURCE CIRCUIT VOLTAGE DC/DC CONVERTERS)

SOLAR PV STANDARD PLAN

Roof Layout Diagram for One- and Two-Family Dwellings



Items required: roof layout of all panels, modules, clear access pathways and approximate locations of electrical disconnecting means and roof access points.



Solar PV Standard Plan — Simplified Microinverter and ACM Systems for One- and Two-Family Dwellings

SCOPE: Use this plan ONLY for systems using utility-interactive Microinverters or AC Modules (ACM) not exceeding a combined system AC inverter output rating of 10 kW, with a maximum of 3 branch circuits, one PV module per inverter and with PV module ISC maximum of 10-A DC, installed on a roof of a one- or two-family dwelling or accessory structure. The photovoltaic system must interconnect to a single-phase AC service panel of 120/240 Vac with service panel bus bar rating of 225 A or less. This plan is not intended for bipolar systems, hybrid systems or systems that utilize storage batteries, charge controllers or trackers. Systems must be in compliance with current California Building Standards Codes and local amendments of the authority having jurisdiction (AHJ). Other articles of the California Electrical Code (CEC) shall apply as specified in section 690.3.

MANUFACTURER'S SPECIFICATION SHEETS MUST BE PROVIDED for proposed inverters, modules, combiner/junction boxes and racking systems. Installation instructions for bonding and grounding equipment shall be provided and local AHJs may require additional details. Listed and labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling (CEC 110.3). Equipment intended for use with PV system shall be identified and listed for the application CEC 690.4(D).

Applicant and Site Information

Job Address: _____ Permit #: _____

Contractor/ Engineer Name: _____ License # and Class: _____

Signature: _____ Date: _____ Phone Number: _____

General Requirements and System Information

☐ Microinverter
Number of PV modules installed: _____
Number of Microinverters installed: _____

☐ AC Module (ACM)
Number of ACMs installed: _____
Note: Listed Alternating-Current Module (ACM) is defined in CEC 690.2 and installed per CEC 690.6

Number of Branch Circuits, 1, 2 or 3: _____

Actual number of Microinverters or ACMs per branch circuit: 1 _____ 2. _____ 3. _____

Total AC system power rating = (Total Number of Microinverters or ACMs) * (AC inverter power output) = _____ Watts

Lowest expected ambient temperature for this plan in Table 1: For -1 to -5°C use 1.12 or for -6 to -10°C use 1.14 correction factors.

Average ambient high temperature for this plan: = +47 OC
Note: For lower expected ambient or higher average ambient high temperatures, use Comprehensive Standard Plan.

Microinverter or ACM Information and Ratings

Microinverters with ungrounded DC inputs shall be installed in accordance with CEC 690.35.

Microinverter or ACM Manufacturer: _____

Model: _____

Rated (continuous) AC output power: _____ Watts

Nominal AC voltage rating: __________ Volts

Rated (continuous) AC output current: __________ Amps

If installing ACMs, skip [STEPS 0]

Maximum DC input voltage rating: __________ Volts (limited to 79 V, otherwise use the Comprehensive Standard Plan)

Maximum AC output overcurrent protection device (OCPD) __________ Amps

Maximum number of Microinverters or ACMs per branch circuit: __________

PV Module Information

(If installing ACMs, skip to [STEP 4])

PV Module Manufacturer: ______________________________

Model: ______________________________

Module DC output power under standard test conditions (STC) = __________ Watts

Module V_{oc} at STC (from module nameplate): __________ Volts

Module I_{sc} at STC (from module nameplate): __________ Amps

Adjusted PV Module DC voltage at minimum temperature = [Table 1] __________ [cannot exceed Step 0]

Table 1: Module V_{oc} at STC Based on Inverter Maximum DC Input Voltage Derived from CEC 690.7

Microinverter Max. DC Input [STEP 0] (Volts)	34	37	40	43	46	49	52	55	58	61	64	67	70	73	76	79
Max. Module VOC @ STC, 1.12 (-1 to -5°C) Correction Factor (Volts)	30.4	33.0	35.7	38.4	41.1	43.8	46.4	49.1	51.8	54.5	57.1	59.8	62.5	65.2	67.9	70.5
Max. Module VOC @ STC, 1.14 (-6 to -10°C) Correction Factor (Volts)	29.8	32.5	35.1	37.7	40.4	43.0	45.6	48.2	50.9	53.5	56.1	58.8	61.4	64.0	66.7	69.3

Branch Circuit Output Information

Fill in [Table 3] to describe the branch circuit inverter output conductor and OCPD size. Use [Table 2] for determining the OCPD and Minimum Conductor size.

Table 2: Branch Circuit OCPD and Minimum Conductor Size*

Circuit Current (Amps)	Circuit Power (Watts)	OCPD (Amps)	Minimum Conductor Size (AWG)	Minimum Metal Conduit Size for 6 Current Carrying Conductors
12	2880	15	12	¾"
16	3840	20	10	¾"
20	4800	25	8	1"
24	5760	30	8	1"

*CEC 690.8 and 210.19 (A)(1) Factored in Table 2, Conductors are copper, insulation must be 90°C wet-rated. Table 2 values are based on maximum ambient temperature of 69OC, which includes 22 OC adder, exposed to direct sunlight, mounted > 0.5 inches above rooftop, ≤ 6 current carrying conductors (3 circuits) in a circular raceway. Otherwise use Comprehensive Standard Plan.

Table 3: PV Array Configuration			
	Branch 1	Branch 2	Branch 3
Number of Microinverters or ACMs [Step 0]			
Selected Conductor Size [Table 2] (AWG)			
Selected Branch and Inverter Output OCPD [Table 2]			

Solar Load Center (if used)

Solar Load Center is to have a bus bar rating not less than 100 Amps. Otherwise use Comprehensive Standard Plan.

Circuit Power see [STEP 0] =_____ Watts

Circuit Current = (Circuit Power) / (AC voltage) = _____ Amps

Table 4: Step 1: Inverter Output OCPD and Conductor Size**				
Circuit Current (Amps)	Circuit Power (Watts)	OCPD (Amps)	Minimum Conductor Size (AWG)	Minimum Metal Conduit Size
24	5760	30	10	½"
28	6720	35	8	¾"
32	7680	40	8	¾"
36	8640	45	8	¾"
40	9600	50	8	¾"
41.6	≤ 10000	60	6	¾"

**CEC 690.8 and 210.19 (A)(1) Factored in Table 4, Conductors are copper, insulation must be 90°C wet-rated. Table 4 values are based on maximum ambient temperature of 47OC (no rooftop temperature adder in this calculation), ≤ 3 current carrying conductors in a circular raceway. Otherwise use Comprehensive Standard Plan.

Point of Connection to Utility:

Load Side Connection only! Otherwise use the Comprehensive Standard Plan.
Is the PV OCPD positioned at the opposite end from input feeder location or main OCPD location?
☐ Yes ☐ No (If No, then use 100% row in Table 5)
Per 705.12(D)(2): (Combined inverter output OCPD size + Main OCPD size) ≤ [bus bar size × (100% or 120%)]

Table 5: Maximum Combined Inverter Output Circuit OCPD									
Bus Bar Size (Amps)	100	125	125	200	200	200	225	225	225
Main OCPD (Amps)	100	100	125	150	175	200	175	200	225
Maximum Combined Inverter OCPD with 120% of bus bar rating (Amps)	20	50	25	60†	60†	40	60†	60†	45
Maximum Combined Inverter OCPD with 100% of bus bar rating (Amps)	0	25	0	50	25	0	50	25	0

†This plan limits the maximum system size to less than 10 kW, therefore the OCPD size is limited to 60 A. Reduction of Main Breaker is not permitted with this plan.

Grounding and Bonding

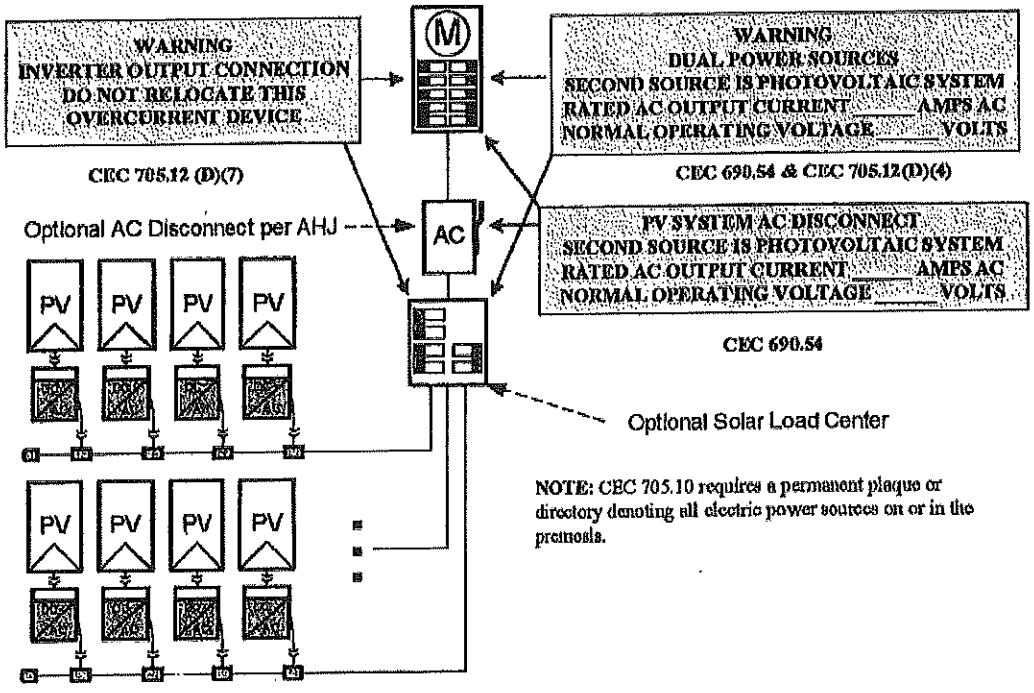
Check one of the boxes for whether system is grounded or ungrounded: ☐ Grounded ☐ Ungrounded

For Microinverters with a grounded DC input, systems must follow the requirements of GEC (CEC 690.47) and EGC (CEC 690.43).

For ACM systems and Microinverters with ungrounded a DC input follow the EGC requirements of (CEC 690.43).

Markings

Informational note: ANSI Z535.4 provides guidelines for the design of safety signs and labels for application to products. A phenolic plaque with contrasting colors between the text and background would meet the intent of the code for permanency. No type size is specified, but 20 point (3/8") should be considered the minimum.



Solar PV Standard Plan — Simplified
Central/String Inverter Systems for One- and Two-Family Dwellings

Single-Inverter Line Diagram

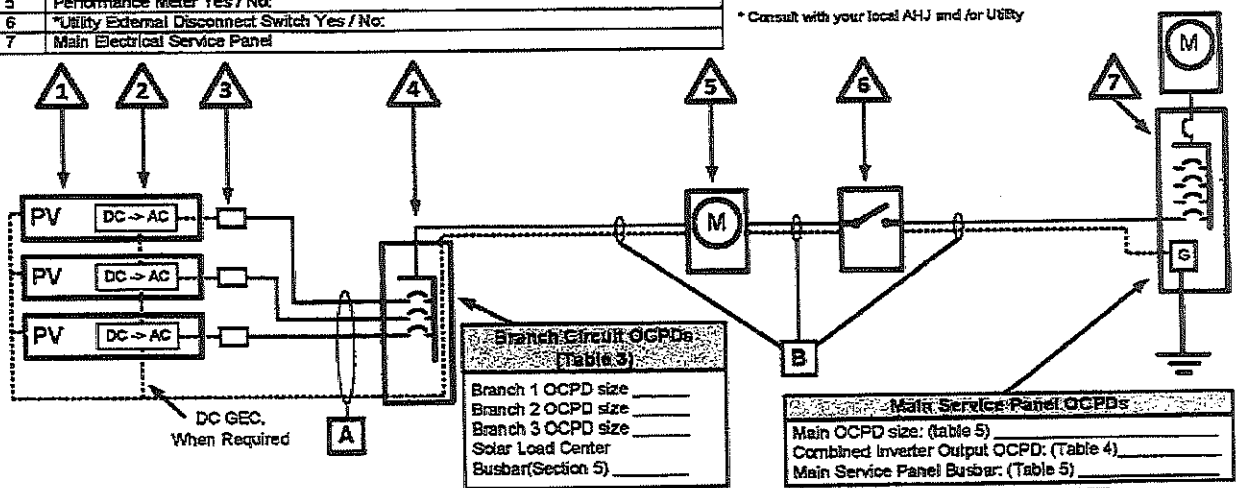
Equipment Schedule

TAG	DESCRIPTION: (Provide model # if provided)
1	Solar PV Module or ACM:
2	Microinverter (if not ACM):
3	Junction Box (es):
4	Solar Load Center, Yes / No:
5	Performance Meter Yes / No:
6	*Utility External Disconnect Switch Yes / No:
7	Main Electrical Service Panel

Single-Line Diagram for Microinverters or ACMs

Check a box for dc system grounding: ☐ Grounded, ☐ Ungrounded
For ungrounded dc power systems, EGC is required
For grounded dc power systems, GEC & EGC are required
Refer to CEC 250.120 for EGC installation & Table 250.122 for sizing

* Consult with your local AHJ and /or Utility



Branch Circuit OCPDs (Table 3)

Branch 1 OCPD size _____
Branch 2 OCPD size _____
Branch 3 OCPD size _____
Solar Load Center
Busbar(Section 5) _____

Main Service Panel OCPDs

Main OCPD size: (table 5) _____
Combined Inverter Output OCPD: (Table 4)_____
Main Service Panel Busbar: (Table 5) _____

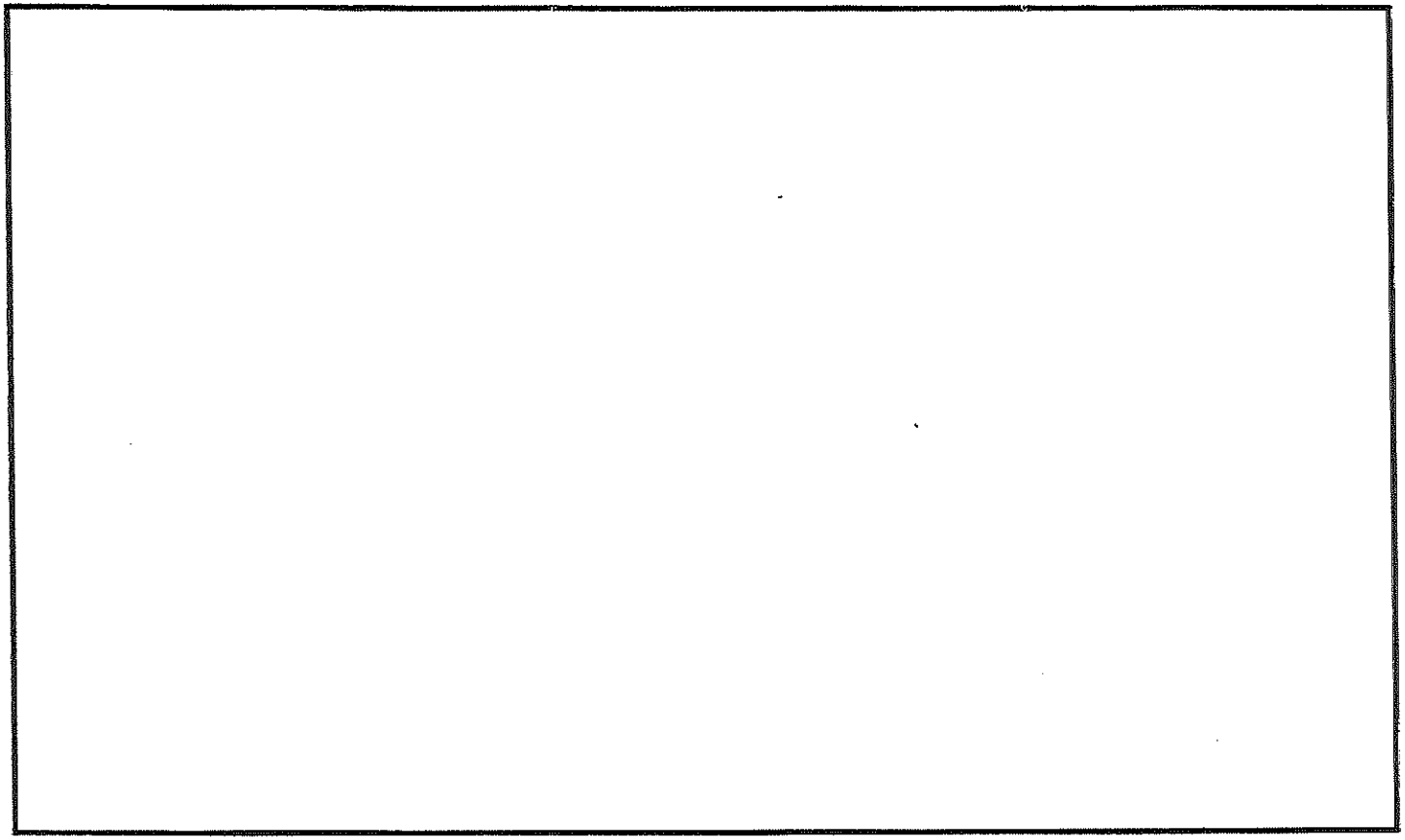
Conductor, Cable and Conduit Schedule

☐ TAG	Description and Conductor Type: (Table 3)	Conductor Size	Number of Conductors	Conduit/ Conductor/ Cable Type	Conduit Size
A	Current-Carrying Conductors: (for each branch circuit)				
	EGC:				
	GEC (when required):				
B	Current-Carrying Conductors:				
	EGC:				
	GEC (when required):				

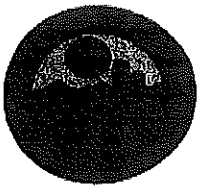
SOLAR PV STANDARD PLAN — SIMPLIFIED

Microinverter and ACM Systems for One- and Two-Family Dwellings

ROOF LAYOUT PLAN



Items required: roof layout of all panels, modules, clear access pathways and approximate locations of electrical disconnecting means and roof access points.



Structural Criteria for Residential Rooftop Solar Energy Installations

Use of this document

This toolkit document includes a one-page list of structural criteria for over-the-counter or online approval, as well as attached tables and figures that supplement the criteria and explain their use.

This document applies to flush-mounted solar arrays installed on the roofs of wood-framed one- and two-family dwellings. "Flush-mounted" means the modules are installed parallel to, and relatively close to, the roof surface (see the "Solar Array Check" section of the Structural Criteria for specific qualifying requirements). This list is intended to be a simple pre-installation check to gain reasonable assurance that the design of the solar array complies with the structural provisions of the 2013 California Building Code (CBC) and 2013 California Residential Code (CRC). It is not intended to provide post-installation inspection criteria.

Currently Used Expedited Solar Permitting Approaches

This document is intended for jurisdictions without an expedited process for residential solar structural permitting, and is not intended to replace or supplant procedures for jurisdictions with an expedited process already in place. Good examples from jurisdictions with provisions for expedited structural permitting include the City of Los Angeles, which exempts residential solar installations from structural permitting if five simple requirements are met, and the East Bay Green Corridor's streamlined solar permitting process, which uses structural criteria tailored to typical conditions for that consortium of nine cities.

Regional and Site Assumptions

This document is based on the following regional and site assumptions:

- The dwelling is located in a ZERO snow load area (see Map 1).
- The dwelling is not in Wind Exposure D (within 200 yards of the ocean or a large coastal bay).
- If in Wind Exposure B (urban, suburban or wooded areas), the dwelling may be located:
  - in a Special Wind Region (see Map 2) with design wind speeds between 110 and 130 mph, or
  - on a tall hill, provided average slope is no steeper than 15%.
- If in Wind Exposure C (within 500 yards of large open fields or grasslands), the dwelling is:
  - in a standard 110 mph design wind speed region, and
  - not on a hill with a grade steeper than 5%.

Additional Options

The Chief Building Official (CBO) may consider adding rows to the structural criteria, based on personal judgment and their jurisdiction's conditions and history. Possible additional questions include:

- Regional and Site Checks
  - If the jurisdiction is in a mixed snow load area, with zero snow load only at lower elevations, consider asking "is the dwelling lower than elevation ____ feet?"

(Introductory text provided for jurisdiction's reference only. Do not attach to Criteria that follow.)

- If the jurisdiction is in a coastal region, consider asking "is the dwelling farther than 200 yards from the ocean or a large coastal bay?" to verify the dwelling is not in Wind Exposure D.
- If the jurisdiction is in a Special Wind Region with design wind speeds between 115 and 130 mph, consider verifying that the dwelling is in Wind Exposure B by asking "is the dwelling in an urban, suburban or wooded area, and *not* within 500 yards of open fields and grasslands?"
- If the jurisdiction is in a Special Wind Region with design wind speeds between 115 and 130 mph, consider verifying that there are no significant topographic wind speed-up effects by asking "is the dwelling in a relatively flat area (grade less than 5%) and not within 500 yards of the crest of a tall hill?"

- Roof Check
  - Based on the jurisdiction's one- and two-family housing stock and code compliance history, many CBOs will find it reasonable to assume that most dwellings' roof structures were designed to the building code in effect at the time the houses were built. If so, the roof structure code compliance check consists of the Contractor's visual roof audit, checking for unusual sagging or deterioration, without requiring additional measurements of existing rafters to check against span tables.
  - For CBOs of jurisdictions with evidence of structurally deficient one- and two-family housing stock or poor structural code compliance history, the CBO may elect to add the rafter span check option described in the criteria.

The Structural Toolkit and CRC Wind Speeds

The 2013 CRC contains an inconsistency related to wind speeds. Despite referencing ASCE 7-10 as its standard, the 2013 CRC's text and tables use outdated ASCE 7-05 wind speeds. Under the old ASCE 7-05 / CBC 2010, the basic design wind speed in most regions of the state was 85 mph (max. 3 second gust in 50 years). Under ASCE 7-10 / CBC 2013, the design wind speed has increased to 110 mph (max. 3 second gust in 700 years). Despite the different definitions of wind speed, design wind pressures remain essentially unchanged.

Because the Toolkit's structural document is intended to be forward looking, all wind speeds in the Toolkit document are based on the ASCE 7-10. This is clearly stated in the caption to the state wind speed map, and the Table 1 footnotes. This anticipates an obvious and expected correction to the CRC; otherwise the Toolkit would become immediately outdated when the CRC is amended to change the base design wind speed from mph to 110 mph.

2013 CRC text (ASCE 7-05) wind speeds equivalent to the 2013 CRC and CBC Reference Standard (ASCE 7-10) are shown below. See ASCE 7-10 Table C26.5-6 for additional information.

2013 CRC text ASCE 7-05	2013 CRC and CBC Referenced Standard ASCE 7-10
85 mph	110 mph
90 mph	115 mph
95 mph	120 mph
100 mph	126 mph
105 mph	133 mph

(Introductory text provided for jurisdiction's reference only. Do not attach to Criteria that follow.)

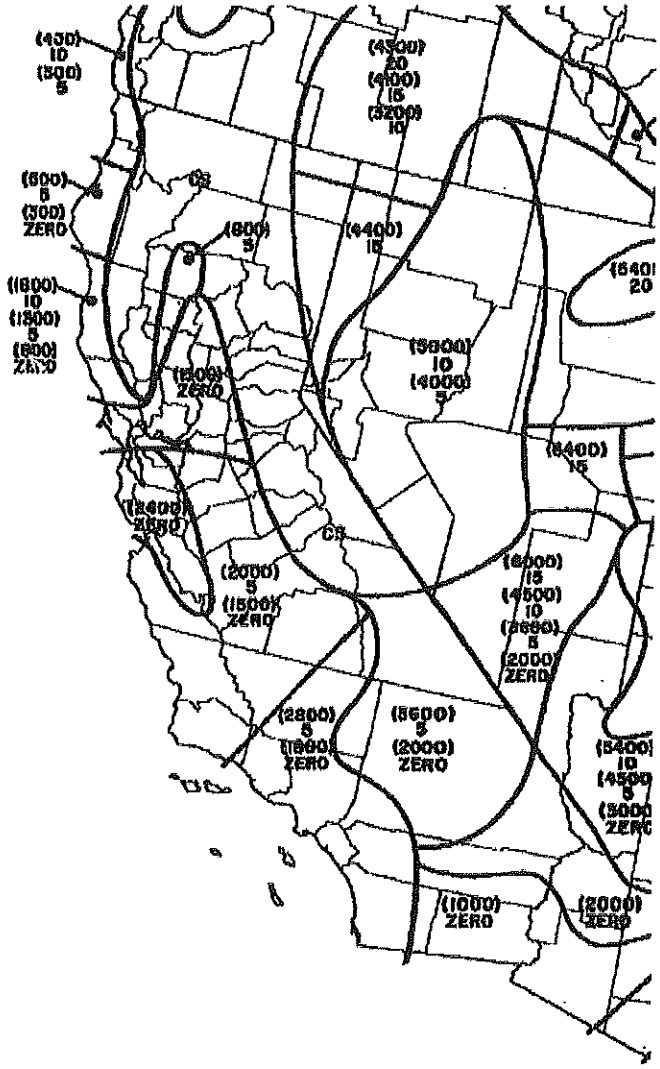
Structural Technical Appendix

This toolkit document is supported by a Structural Technical Appendix that describes the technical analysis behind these criteria, which are based on structural engineering principles and the California Building and Residential Codes. The Technical Appendix also provides some additional guidance to address non-conforming items, such as when an anchor layout is not based on a solar support component manufacturer's guidelines, or when a coastal site is located within 200 yards of the ocean (Exposure D). This document can be found online.

Probability of Code Compliance

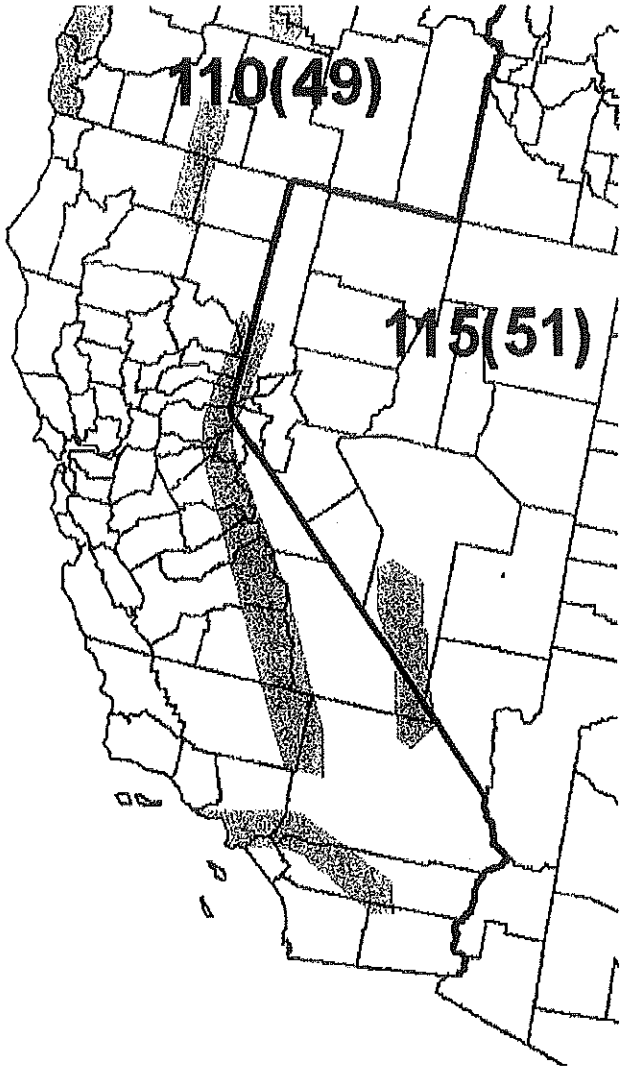
The Structural Technical Appendix includes a section that examines the probabilities associated with the assumptions behind Table 1 that allows six feet cross-slope anchor spacing in some circumstances. That statistical analysis estimates that the probability of code noncompliance for six feet anchor spacing is only 2 in a thousand installations (0.2%). Note that probability of structural failure is orders of magnitude lower than the probability of code *noncompliance.*

(Introductory text provided for jurisdiction's reference only. Do not attach to Criteria that follow.)



Map 1. California Ground Snow Load Map (Ref: ASCE 7-10).
The numbers in parentheses represent the upper elevation limits in feet for the ground snow load in psf listed below the elevation. Example: (2400) ZERO in the South San Francisco bay area indicates that zero ground snow loads occur from sea level up to an elevation of 2400 feet. CS indicates "Case Studies" where extreme local variations in ground snow loads occur. Non-zero snow load areas and Case Study (CS) areas are excluded from the use of this structural toolkit document. See the Technical Appendix for additional information.

(Map provided for jurisdiction's reference only. Do not attach to Criteria that follow.)



Map 2. California Design Wind Speed Map (Ref: ASCE 7-10).

The number outside the parentheses represents the design wind speed in mph. Typical design wind speed is 110 mph. The grey shaded areas on the map indicate "special wind regions" where higher wind speeds may apply. When the project is in a grey shaded area, contact the local building department for the design wind speed.

(Map provided for jurisdiction's reference only. Do not attach to Criteria that follow.)

STRUCTURAL CRITERIA FOR RESIDENTIAL FLUSH-MOUNTED SOLAR ARRAYS

1. ROOF CHECKS

A. Visual Review/Contractor's Site Audit of Existing Conditions:
- 1) Is the roof a single roof without a reroof overlay? ☐ Y ☐ N
- 2) Does the roof structure appear structurally sound, without signs of alterations or significant structural deterioration or sagging, as illustrated in Figure 1? ☐ Y ☐ N

B. Roof Structure Data:
- 1) Measured roof slope (e.g. 6:12): _____:12
- 2) Measured rafter spacing (center-to-center): _____ inch
- 3) Type of roof framing (rafter or manufactured truss): ☐ Rafter ☐ Truss

2. SOLAR ARRAY CHECKS

A. Flush-mounted Solar Array:
- 1) Is the plane of the modules (panels) parallel to the plane of the roof? ☐ Y ☐ N
- 2) Is there a 2" to 10" gap between underside of module and the roof surface? ☐ Y ☐ N
- 3) Modules do not overhang any roof edges (ridges, hops, gable ends, eaves)? ☐ Y ☐ N

B. Do the modules plus support componenets weigh no more than:
4 psf for photovoltaic arrays or 5 psf for solar thermal arrays? ☐ Y ☐ N

C. Does the array cover no more than half of the toal roof area (all roof planes)? ☐ Y ☐ N

D. Are solar support component manufacturer's project-specific completed worksheets, tables with relevant cells circled, or web-based calculator results attached? ☐ Y ☐ N

E. Is a roof plan of the module and anchor layout attached? (see Figure 2) ☐ Y ☐ N

F. Downward Load Check (Anchor Layout Check):
- 1) Proposed anchor horizontal spacing (see Figure 2): ___' - ___"ft-in
- 2) Horizontal anchor spacing per Table 1: ___' - ___"ft-in
- 3) Is proposed anchor horizontal spacing less than Table 1 spacing? ☐ Y ☐ N

G. Wind Uplift Check (Anchor Fastener Check):
- 1) Anchor fastener data (see Figure 3):
  - a. Diameter of lag screw, hanger bolt or self-drilling screw: _____ inch
  - b. Embedment depth of rafter: _____ inch
  - c. Number of screws per anchor (typically one): _____
  - d. Are 5/16" diameter lag screws with 2.5" embedment into the rafter used, OR does the anchor fastener meet the manufacturer's guidelines? ☐ Y ☐ N

3. SUMMARY

☐ A. All items above are checked YES. No additional calculations are required.

☐ B. One or more items are checked NO. Attach project-specific drawings and calculations stamped and signed by a California-licensed Civil or Structural Engineer.

Job Address: _____ Permit #: _____

Contractor/Installer: _____ License # & Class: _____

Signature: _____ Date: _____ Phone #: _____

Optional Additional Rafter Span Check Criteria

[At option of CBO, insert rows (4) to (7) below into table above after row 1.B.(3)]

1. ROOF CHECKS

B. Roof Structure Data:
- 4) Measured rafter size (e.g. 13/4 x 33/4, not 2x4): ____ x ____ inch
- 5) Measured rafter horizontal span (see Figure 4): ___' - ___"ft-in
- 6) Horizontal rafter span per Table 2: ___' - ___"ft-in
- 7) Is measured horizontal rafter span less than Table 2 span? ☐ Y ☐ N ☐ Truss

(Jurisdictions may delete "Optional Additional Rafter Span Check" at bottom of this page, or incorporate into main list of Structural Criteria above)

Roof Slope		Rafter Spacing		
		16" o.c.	24" o.c.	32" o.c.
Photovoltaic Arrays (4 psf max)				
Flat to 6:12	0° to 26°	5'-4"	6'-0"	5'-4"
7:12 to 12:12	27° to 45°	1'-4"	2'-0"	2'-8"
13:12 to 24:12	46° to 63°	1'-4"	2'-0"	2'-8"
Solar Thermal Arrays (5 psf max)				
Flat to 6:12	0° to 26°	4'-0"	4'-0"	5'-4"
7:12 to 12:12	27° to 45°	1'-4"	2'-0"	2'-8"
13:12 to 24:12	46° to 63°	Calc. Req'd	Calc. Req'd	Calc. Req'd

Solar support component manufacturer's guidelines may be relied upon to ensure the array above the roof is properly designed, but manufacturer's guidelines typically do NOT check to ensure that the roof itself can support the concentrated loads from the solar array. Table 1 assumes that the roof complied with the building code in effect at the time of construction, and places limits on anchor horizontal spacing to ensure that a roof structure is not overloaded under either downward loads or wind uplift loads. Note 4 below lists the basic assumptions upon which this table is based.

Table 1 Notes:

1. Anchors are also known as "stand-offs", "feet", "mounts" or "points of attachment". Horizontal anchor spacing is also known as "cross-slope" or "east-west" anchor spacing (see Figure 2).
2. If anchors are staggered from row-to-row going up the roof, the anchor spacing may be twice that shown above, but no greater than 6'-0".
3. For manufactured plated wood trusses at slopes of flat to 6:12, the horizontal anchor spacing shall not exceed 4'-0" and anchors in adjacent rows shall be staggered.
4. This table is based on the following assumptions:
   - The roof structure conformed to building code requirements at the time it was built.
   - The attached list of criteria are met.
   - Mean roof height is not greater than 40 feet.
   - Roof sheathing is at least 7/16" thick oriented strand board or plywood. 1x skip sheathing is acceptable.
   - If the dwelling is in Wind Exposure B (typical urban, suburban or wooded areas farther than 500 yards from large open fields), no more than one of the following conditions apply:
     - The dwelling is located in a special wind region with design wind speed between 115 and 130 mph per ASCE 7-10, or
     - The dwelling is located on the top half of a tall hill, provided average slope steeper is less than 15%.
   - If the dwelling is in Wind Exposure C (within 500 yards of large open fields or grasslands), all of the following conditions apply:
     - Design wind speed is 110 mph or less (not in a Special Wind Region), and
     - The dwelling is not located on the top half of a tall hill.
   - The solar array displaces roof live loads (temporary construction loads) that the roof was originally designed to carry.
   - The Structural Technical Appendix provides additional information about analysis assumptions.

Assumed Vintage	Nominal Size	Actual Size	Non-Tile Roof[2]			Tile Roof[3]		
			Rafter Spacing					
			16" o.c.	24" o.c.	32" o.c.	16" o.c.	24" o.c.	32" o.c.
Post-1960	2x4	1½"x3½"	9'-10"	8'-0"	6'-6"	8'-6"	6'-11"	5'-6"
	2x6	1½"x5½"	14'-4"	11'-9"	9'-6"	12'-5"	10'-2"	8'-0"
	2x8	1½"x7¼"	18'-2"	14'-10"	12'-0"	15'-9"	12'-10"	10'-3"
Pre-1960	2x4	1¾"x3¾"	11'-3"	9'-9"	7'-9"	10'-3"	8'-6"	6'-9"
	2x6	1¾"x5¾"	17'-0"	14'-0"	11'-3"	14'-9"	12'-0"	9'-9"
	2x8	1¾"x7¾"	22'-3"	18'-0"	14'-6"	19'-0"	15'-6"	12'-6"

Beyond a visual review by the Contractor checking for unusual sagging or deterioration, some CBOs may want additional assurance that the roof structure complies with structural building code requirements. Table 2 is an optional table some CBOs may elect to use to provide additional assurance by requiring a check of existing roof rafter spans, and supports optional criteria 1.B.5 and 1.B.6. For post-1960 construction, these span tables match the rafter span tables found in the 2013 California Building and Residential codes. For pre-1960 construction, the rafter span tables are based on structural calculations with lumber sizes and wood species & grade appropriate for older construction. Note 5 below lists the basic assumptions upon which this table is based.

Table 2 Notes:

1. See Figure 4 for definition of roof rafter maximum horizontal span.
2. "Non-tile Roof" = asphalt shingle, wood shingle & wood shake, with an assumed roof assembly weight of 10 psf.
3. "Tile Roof" = clay tile or cement tile, with an assumed roof assembly weight of 20psf
4. Unaltered manufactured plated-wood trusses may be assumed to be code compliant and meet intent of Table 2.
5. This table is based on the following assumptions:
   - Span/deflection ratio is equal to or greater than 180.
   - For post-1960 construction, wood species and grade is Douglas Fir-Larch No. 2.
   - For pre-1960 construction, wood species and grade is Douglas Fir-Larch No. 1.
   - Other wood species and/or grade are also acceptable if allowable bending stress is equal or greater to that listed above.

(Attach Table 2 ONLY if the Optional Additional Rafter Span Check is added to the list of Structural Criteria)

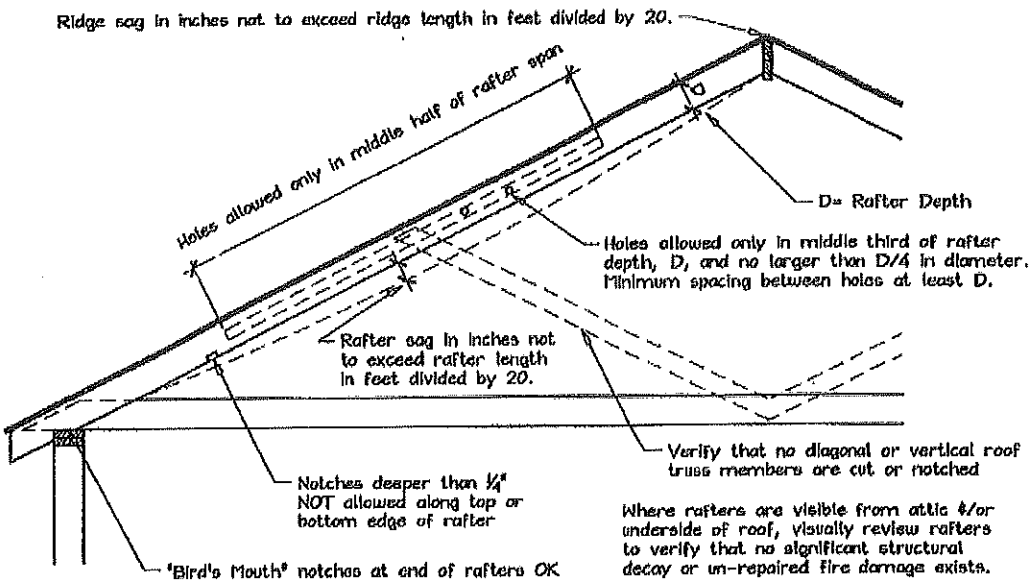


Figure 1. Roof Visual Structural Review (Contractor's Site Audit) of Existing Conditions.

The site auditor should verify the following:

1. No visually apparent disallowed rafter holes, notches and truss modifications as shown above.
2. No visually apparent structural decay or un-repaired fire damage.
3. Roof sag, measured in inches, is not more than the rafter or ridge beam length in feet divided by 20.

Rafters that fail the above criteria should not be used to support solar arrays unless they are first strengthened.

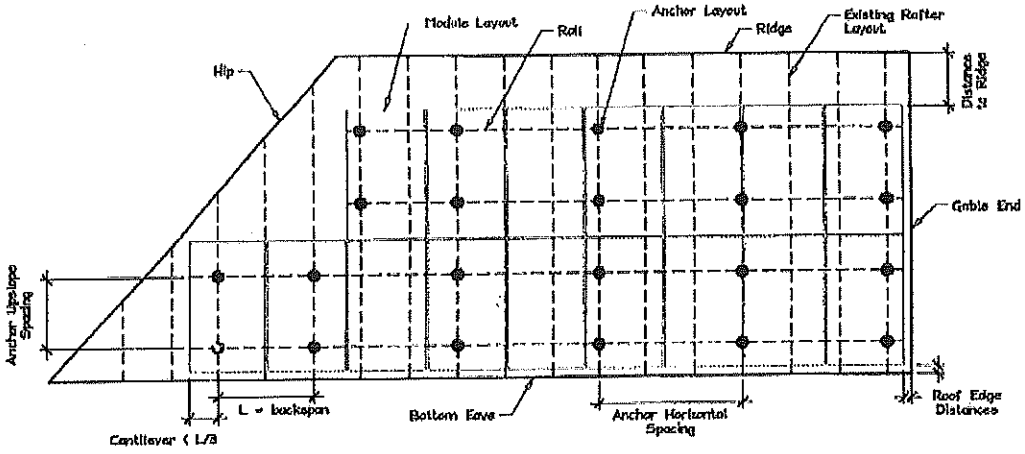


Figure 2. Sample Solar Panel Array and Anchor Layout Diagram (Roof Plan).

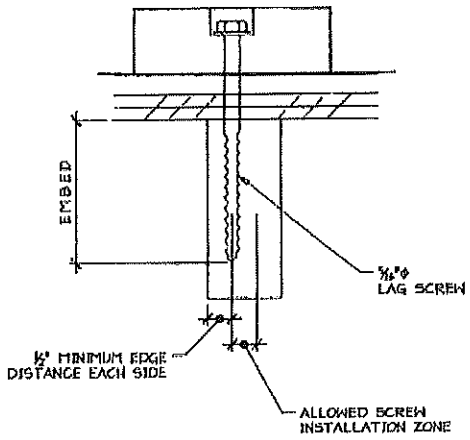


Figure 3. Typical Anchor with Lag Screw Attachment.

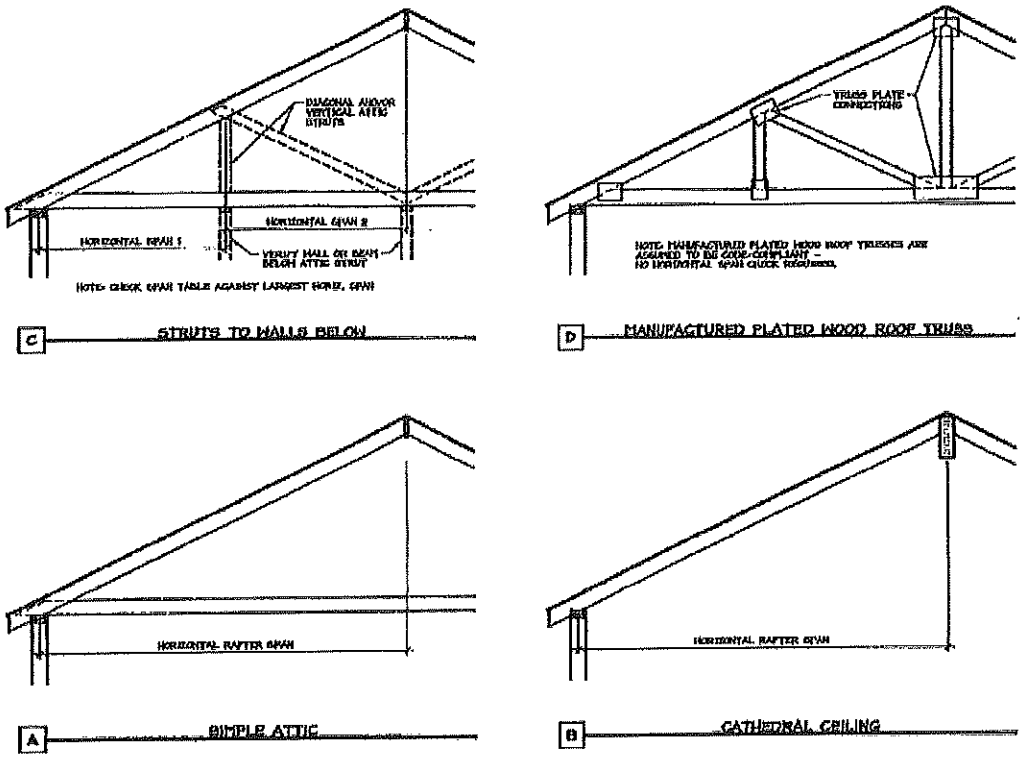


Figure 4. Definition of Rafter Horizontal Span.

(Attach Figure 4 ONLY if the Optional Additional Rafter Span Check is added to the list of Structural Criteria)

CITY OF NEEDLES

817 Third Street • Needles, California 92363
(760) 326-2113 • FAX (760) 326-6765

CERTIFICATION

I, Dale Jones, City Clerk of the City of Needles, California, do hereby certify that the foregoing is a true and correct copy of Ordinance Number 572-AC

Dale Jones, CMC, City Clerk
(SEAL)

Date: November 19, 2015

Print Form

PERMIT NO: _____

City of Needles

817 Third Street • Needles, CA 92363
Phone (760) 326-5740 option 5 • Fax (760) 326-5008

CONSTRUCTION PERMIT APPLICATION

TYPE OF PERMIT ☐ Combination ☐ Building ☐ Remodel ☐ Electrical ☐ Plumbing ☐ Mechanical ☐ Solar ☐ Grading
☐ Retaining Wall ☐ Parking Lot ☐ Demolition ☐ Other _____

PROJECT ADDRESS: _____ **APN #** _____

OWNER INFORMATION

Name _____ Phone _____ Cell _____
Address _____ City _____ State _____ Zip _____
Email _____ **ZONE** _____

ENGINEER / CONTRACTOR INFORMATION

Company Name _____ Preparer _____ Phone _____
Address _____ City _____ State _____ Zip _____
Email _____ Lic # _____

Occupancy & Group _____
Type of Construction: _____

EXISTING CONDITION

Foundation: ☐ Wood ☐ Concrete ☐ Slab ☐ Piers / Caissons
Frame: ☐ Wood Stud ☐ Metal ☐ Timber ☐ Masonry
Exterior Wall: ☐ Wood Siding ☐ Stucco ☐ Masonry Veneer ☐ Masonry ☐ Brick ☐ Concrete Block ☐ Metal
Roof: ☐ Built-up ☐ Metal ☐ Comp Shingle ☐ Tile ☐ Wood Shingle / Shake
Heating ☐ Electric ☐ Gas Furnace ☐ Gas Wall ☐ Solar
State Requirements: ☐ Energy ☐ Sound ☐ Handicapped

SPECIAL CONDITIONS / NOTES:

VALIDATION

APPLICATION SIGNATURE

Print Name	Date	No of Plans

☐ Water Fees to be Paid ☐ City Business License
☐ Fire Hydrants for Const. ☐ Encroachment Permit
☐ Sewer Fees to be Paid ☐ State Contractor's License
☐ _____ ☐ _____

PROJECT INFORMATION

Type of Project: _____
Proposed Use: _____

Structure: Setbacks: Front _____ Side _____ Rear _____
Floor Area _____ Garage _____ Barn _____ Storage _____
Carport _____ Covered Porch _____ Deck _____
No. Bedrooms _____ No. Bathrooms _____ No. Stories _____
Building Height _____

Retaining Wall Information: Length: _____ Height: _____
Material: _____

Mobile / Modular Home Information: Manufacturer
Year _____ Serial No. _____ D.O.H. No. _____
D.M.V. Lic No. _____ State _____ No. Bedrooms _____

Grading Information: Tot. Cut _____ Cu. Yd.
Total Fill _____ Cu. Yd. Area of Disturbance _____

TOTAL VALUATION ..... $ _____

Plan Check Fee ..... $ _____
Combination Permit ..... $ _____
Building Permit ..... $ _____
Electrical Permit ..... $ _____
Plumbing Permit ..... $ _____
Mechanical Permit ..... $ _____
Grading Permit ..... $ _____
Other: _____ $ _____
Other: _____ $ _____

TOTAL PERMIT FEES $ _____
DEPOSIT COLLECTED $ _____

TOTAL FEES or DUE before ISSUANCE $ _____

NEEDLES PUBLIC UTILITY AUTHORITY
APPLICATION FOR INTERCONNECTION
OF DISTRIBUTED GENERATION

Customer Information	
Customer/Business Name	
Customer ID	Location ID
Address where generator is to be located	
Contact Person/Title	
Contact's Address (if different than above)	
Telephone	Fax
Emergency Contact Name	
Emergency Contact Phone	
Description of Project Site	

Generator Information		
Category of Generator	◔ Induction ◔ Synchronous ◔ Inverter	
Type of Generator	◔ Solar Photovoltaic ◔ Reciprocating Engine	◔ Microturbine ◔ Fuel Cell
◔ Other: _____		
Fuel Source		
Rated Unit Capacity (in kW)		
Number of Units		
Estimated Annual Energy Output (in kWh)		
Interconnection Voltage	◔ 1-phase ◔ 3-phase, 3-wire ◔ 3-phase, 4-wire Voltage: _____	
Main Panel	◔ 1-phase ◔ 3-phase Amps: _____	

Project Information
Proposed Construction Start Date
Generator On-Line Date
Generator Operating Schedule (Days, Hours per week)
Annual Operating Hours

_____ _____
Customer Signature Date

Electrical Engineering Review: _____ _____
Date

SECTION 2 AMENDED BY NEEDLES CITY COUNCIL AND NEEDLES PUBLIC UTILITIES AUTHORITY DECEMBER 8, 2015 AMENDED MAY 7, 2019

PHOTOVOLTAIC INTERCONNECTION AGREEMENT FOR NET ENERGY METERING FROM RESIDENTIAL AND SMALL COMMERCIAL SOLAR ELECTRIC GENERATING FACILITIES OF 10 KILOWATTS OR LESS

_____("Customer-Generator"), and
Needles Public Utility Authority **("NPUA")** referred to collectively as "Parties" and individually as "Party", agree
as follows:

1. SOLAR-ELECTRIC GENERATING FACILITY:

1.1 PVID Number: _____

1.2 PV Array Rating: _____kW.

1.3 Address: _____

1.4 Facility will be ready for operation on or about_____
(date)

1.5 Location of NPUA Substation and Circuit:

_____

1.6 Operating Option

Customer-Generator has elected to operate its solar-electric generating facility in parallel with NPUA's facilities. The solar-electric generating facility is intended primarily to offset part or all of the Customer-Generator's own electrical requirements.

2. PAYMENT FOR NET ENERGY

2.1 For eligible residential and small commercial customer-generators, the net energy metering calculation shall be made by measuring the difference between the electricity supplied to the eligible customer-generator and the electricity generated by the eligible customer-generator and fed back to the electric grid over a monthly and 12-month period. The following rule shall apply to the annualized net metering calculation:

2.2 Customer will be billed on a monthly basis, regardless of Customer's previous billing cycle. The monthly Net Energy Metering calculation shall be made by measuring the difference between the electricity supplied to the Customer and the electricity generated by the Customer and fed back to the grid over a normal one-month billing period.

2.3 At the end of each one-month billing period following the date of first interconnection, NPUA shall determine if Customer was a net consumer or a net producer of electricity during the one-month time period.

2.4 In the event the electricity supplied by NPUA during the one-month period exceeds the electricity generated and fed back to the grid by Customer during the same period, Customer is a net energy consumer. If Customer is a net energy consumer, NPUA shall bill Customer for the net energy consumption during such billing period based on the Customer's Rate Schedule and Customer shall pay for such net energy consumption monthly in accordance with Customer's monthly billing statement.

2.5 In the event the electricity supplied by NPUA during the one-month period is less than the electricity generated and fed back to the grid by Customer during the same period, Customer is a net energy producer. If Customer is a net energy producer, any excess kilowatt-hours generated during the billing cycle shall be carried over to the following billing period on a monetary basis until the end of the 12-month period.

2.6 Any net monthly consumption of electricity shall be calculated according to the terms of the rate schedule. If Customer is a net generator over a billing period, the net kilowatt-hours generated shall be valued at the same price per kilowatt-hour as NPUA would charge for the baseline quantity of electricity during that billing period, and if the number of kilowatt-hours generated exceeds the baseline quantity, the excess shall be valued at the same price per kilowatt-hour as NPUA would charge electricity over the baseline quantity during the billing period.

2.7 The eligible customer –generator account shall, at the end of the 12-month period following the date of final interconnection of the customer-generator's system with the NPUA distribution system, and at each anniversary month thereafter, be evaluated and reconciled for electricity used or generated during the period.

2.8 NPUA shall retain any Net Surplus Energy generated by Customer, including any associated environmental attributes or renewable energy credits ("RECs"), and Customer's credits shall be reset to zero for the subsequent 12-month period. No payment will be made to Customer for the excess energy delivered to NPUA's grid, unless Customer elects a compensation option in Subsection 2.11.

2.9 NPUA will determine if the customer-generator was a net consumer or a net producer of electricity during that period.

2.10 Customer may be eligible for Net Surplus Energy Compensation. The Customer's Net Surplus Energy Compensation shall be calculated over a 12-month period. If Customer is eligible for Net Surplus Compensation, customer shall be compensated pursuant to the method selected by Customer in Subsection 2.11. Such Net Surplus Compensation Rate shall provide just and reasonable compensation for the value of the Net Surplus Energy, and shall be adopted by the Board of Public Utilities and the Needles Public Utility Authority. Such Net Surplus Compensation Rate shall be reviewed and subject to change on an annual basis.

2.11 At the end of the 12-month period, upon certification by the Customer that they have sole ownership of the environmental attributes and RECs associated with the energy generated from the Generating Facility in accordance with Subsection 2.12 Customer may receive Net Surplus Energy Compensation for Net Surplus Energy by affirmatively electing one of the following methods (Please initial just one): The Customer will be required to complete this form annually prior to the end of a 12-month period. If an annual form is not returned by the requested due date the response below will automatically be the default response.

(a). ___ Receive monetary compensation for Net Surplus Generation exported to NPUA during the prior 12-month period at the Net Surplus Energy Compensation Rate

(b).____ Receive the Net Surplus Energy Compensation as a kilowatt-hour credit calculated using the Net Surplus Energy Compensation rate and applied against future billing periods.

___ (Please initial) By making this election, I also agree that all environmental attributes and RECs associated with the kilowatt-hours generated shall be the property of NPUA.

2.12 Customer hereby certifies that they have sole ownership of the environmental attributes and RECs associated with the energy generated from the Generating Facility. For Customers who elect to receive Net Surplus Energy Compensation based on a per kilowatt-hour rate in accordance with Subsection 2.11, the environmental attributes and RECs associated with the kilowatt-hours in which the Customer received Net Surplus Energy Compensation at the per kilowatt-hour rate shall be the property of the NPUA. Customer hereby transfers to the NPUA all rights, title, and interest Customer has to such environmental attributes and RECs. Customers who elect to receive Net Surplus Energy Compensation based on a per kilowatt-hour credit calculated using the net surplus energy compensation rate and applied in accordance with Subsection 2.11 may elect to transfer to City all rights, title, and interest Customer has to such environmental attributes and RECs.

2.13 All net consumption over 12 months will be charged the Utility Users Tax, not to exceed the rate of two and a half percent (2.5%) as

established by Ordinance No. 545-AC and the Mandated Conservation fee (adopted every October) as established by Resolution No. 7-24-07.

3. INTERRUPTION OR REDUCTION OF DELIVERIES

3.1 NPUA shall not be obligated to accept or pay for, and may require Customer-Generator to interrupt or reduce, deliveries of as-available energy:

(a) When necessary in order to construct, install, maintain, repair, replace, remove,
Investigate, or inspect any of its equipment or any part of its system; or

(b) If NPUA determines that curtailment, interruption, or reduction is necessary because of emergencies, forced outages, force majeure, or compliance with prudent electrical practices.

3.2 Whenever possible, NPUA shall give Customer-Generator reasonable notice of the possibility that interruption or reduction of deliveries may be required.

3.3 Notwithstanding any other provisions of this Agreement, if at any time NPUA determines that either:

(a) the facility may endanger NPUA personnel, or

(b) the continued operation of Customer-Generator's facility may endanger the integrity of NPUA's 's electric system, NPUA shall have the right to disconnect Customer-Generator's facility from NPUA 's electric system. Customer-Generator's facility shall remain disconnected until such time as NPUA is satisfied that the conditions(s) referenced in (a) or (b) of this Section 3.3 have been corrected.

4. INTERCONNECTION

4.1 Customer-Generator shall deliver the as-available energy to NPUA at the utility's meter.

4.2 Customer-Generator shall pay for designing, installing, operating, and maintaining the solar-electric generating facility in accordance with all applicable laws and regulations and shall comply with NPUA's Appendix A, which is attached hereto.

4.3 Customer-Generator shall not commence parallel operation of the generator facility until written approval of the interconnection facilities has been given by NPUA. Such approval shall not be unreasonably withheld. NPUA shall have the right to have representatives present at the initial testing of Customer-Generator's protective apparatus.

5. METER REQUIREMENTS

5.1 NPUA shall own, operate and maintain on Customer's premises a single meter capable of registering the flow of electricity in two directions ("Required Meter"). In addition, the meter shall be capable of recording time-of-use information for all customers. NPUA may waive metering requirements of this Section; provided such waiver shall be applied in a non-discriminatory manner.

5.2 If the existing electrical meter of Customer is not capable of measuring the flow of electricity in two directions or supplying time-of-use information, Customer shall be responsible for all expenses involved in NPUA purchase and installation of a Required Meter. NPUA may waive metering expenses of this Section; provided such a waiver shall be applied in a non-discriminatory manner.

6. OWNERSHIP OF ENVIRONMENTAL ATTRIBUTES

Customer shall assign NPUA any and all environmental attributes, renewable energy credits ("RECs"), green tags, energy or carbon credits/allowances with respect to the PV solar systems, and agree that NPUA shall have sole discretion and full benefits of any and all environmental attributes from distributed solar generation within NPUA service territory.

5. MAINTENANCE AND PERMITS

Customer-Generator shall obtain any governmental authorizations and permits required for the construction and operation of the solar-electric generating facility and interconnection facilities and shall maintain all facilities in a safe and prudent manner and in conformance with all applicable laws and regulations including, but not limited to, NPUA's Appendix A.

Customer-Generator shall reimburse NPUA for any and all losses, damages, claims, penalties, or liability it incurs as a result of Customer-Generator's failure to obtain or maintain any governmental authorizations and permits required for construction and operation of Customer-Generator's generating facility.

6. ACCESS TO PREMISES

NPUA may enter Customer-Generator's premises:

(a) to inspect, at all reasonable hours, Customer-Generator's protective devices and read or test meter; and

(b) to disconnect, without notice the interconnection facilities if, in NPUA's opinion, a hazardous condition exists and such immediate action is necessary to protect persons, or NPUA's facilities, or

property of others from damage or interference caused by Customer-Generator's solar-electric facilities, or lack of properly operating protective devices.

7. INDEMNITY AND LIABILITY

7.1 Each party as indemnitor shall defend, hold harmless, and indemnify the other Party and the directors, officers, employees, and agents of such other Party against and from any and all loss, liability, damage, claim, cost, charge, demand, or expense (including any direct, indirect, or consequential loss, liability, damage, claim, cost, charge, demand, or expense, including attor4ney's fees) for injury or death to persons including employees of either Party and damage to property including property of either Party arising out of or in connection with (a) the engineering, design, construction, maintenance, repair, operation, supervision, inspection, testing, protection or ownership of, or (b) the making of replacements, additions, betterments to, or reconstruction of, the indemnitor's facilities; provided, however, Customer-Generator's duty to indemnify NPUA hereunder shall not extend to loss, liability, damage, claim, cost, charge, demand, or expense resulting from interruptions in electrical service to NPUA*'s* customers other than Customer-Generator. This indemnity shall apply notwithstanding the active or passive negligence of the indemnitee. However, neither Party shall be indemnified hereunder for its loss, liability, damage, claim, cost, charge, demand, or expense resulting from its sole negligence or willful misconduct.

7.2 Not withstanding the indemnity of Section 7.1, and except for a Party's willful misconduct or sole negligence, each Party shall be responsible for damage to its facilities resulting from electrical disturbances or faults.

7.3 The provisions of this Section 7 shall not be construed to relieve any insurer of its obligations to pay any insurance claims in accordance with provisions of any valid insurance policy.

7.4 Except as otherwise provided in Section 7.1, neither Party shall be liable to the other Party for consequential damages incurred by that Party.

7.5 If Customer-Generator fails to comply with the insurance provisions of this Agreement, if any, Customer-Generator shall, at its own cost, defend, hold harmless and indemnify NPUA, its directors, officers, employees, agents, assignees, and successors in interest from and against any and all loss, liability, damage, claim, cost, charge, demand, or expense of any kind or nature (including attorneys' fee and other costs of litigation) resulting from the death or injury to any person or damage to any property, including the personnel and property of NPUA, to the extent that NPUA would have been protected had Customer-Generator complied with all such insurance provisions. The inclusion of this Section 7.5 is not intended to create any express or implied right in Customer-Generator to elect not to provide any such required insurance.

8. INSURANCE *(Optional)*

8.1 Customer-Generator shall maintain, during the term of this Agreement Comprehensive Personal Liability Insurance with a combined single limit of not less than one hundred thousand dollars ($100,000) for each occurrence.

8.2 Such insurance required in Section 8.1 shall, by endorsement to the policy or policies, provide for thirty (30) calendar days written notice to NPUA prior to cancellation, termination, alterations, or material change of such insurance.

8.3 NPUA shall have the right to inspect or obtain a copy of the original policy or policies of insurance.

8.4 Customer-Generator shall furnish the required certificates and endorsements to NPUA prior to commencing operation.

8.5 All insurance certificates, endorsements, cancellations, terminations, alterations, and material changes of such insurance shall be issued and submitted to the following:

NPUA - 817 Third Street
Needles, California 92363

9. GOVERNING LAW

This Agreement shall be interpreted, governed, and construed under the laws of the State of California as if executed and to be performed wholly within the State of California.

10. AMENDMENT MODIFICATION OR WAIVER

Any amendments or modifications to this Agreement shall be in writing and agreed to by both Parties, The failure of any Party at any time or times to require performance of any provision hereof shall in no manner affect the right at a later time to enforce the same.

No waiver by any Party of the breach of any term of covenant contained in this Agreement, whether by conduct or otherwise, shall be deemed to be construed as a further or continuing waiver of any such breach or waiver of the breach of any other term or convent unless such waiver is in writing.

11. APPENDIX

The Agreement includes the following appendix, which is attached and incorporated by reference:

12. NOTICES

All written Notices shall be directed as follows:

NPUA- 817 Third Street
Needles, California 92363

CUSTOMER-GENERATOR:

Name
Address
City

Customer-Generator's notices to NPUA pursuant to this Section 12 shall reference the PVID Number set forth in Section 1.1

12.1 In the event of an emergency, Customer shall immediately notify NPUA at its 24-hour emergencies number,760-326-5700, of any emergency situation related to the Generating Facility.

13. TERM OF AGREEMENT

This Agreement shall be in effect when signed by the Customer-Generator and NPUA and shall remain in effect thereafter month-to-month unless terminated by either Party on thirty (30) days' prior written notice in accordance with Section 12.

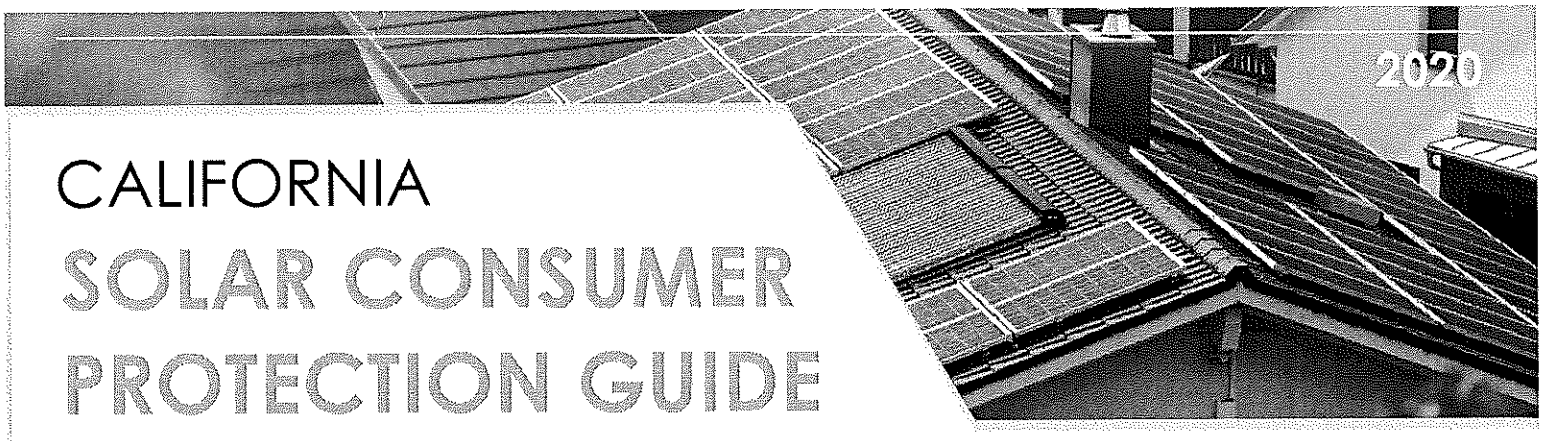
14. ASSIGNMENT PROHIBITED

Customer-Generator understands and agrees that this Agreement is personal to Customer and that Customer-Generator shall not assign or transfer in any way all or any portion of this Agreement to any other person or entity of any kind. Any attempt by Customer-Generator to assign or transfer in any way all or any portion of this Agreement shall be void ab initio.

15. SIGNATURES

IN WITNESS WHEREOF, the Parties hereto have caused two originals of this Agreement to be executed by their duly authorized representatives.

(CUSTOMER-GENERATOR)	NPUA
By: _____ Name: Title:	By: _____ Name Title:
Date: _____	Date:_____



CALIFORNIA
SOLAR CONSUMER PROTECTION GUIDE

PUTTING SOLAR ON YOUR HOME IS AN IMPORTANT FINANCIAL DECISION.
DON'T SIGN A CONTRACT UNTIL YOU READ THIS DOCUMENT!

In many areas of California, you cannot connect a residential solar system to the electric grid until you read, initial, and sign this document. (*The requirement to sign this document does not apply to solar systems that are part of new home construction or multi-family buildings, and it does not apply to solar thermal systems.*)

*Customer Initial Here*_____*(1/4)*

MAKE SURE TO READ AT LEAST THE NEXT 3 PAGES

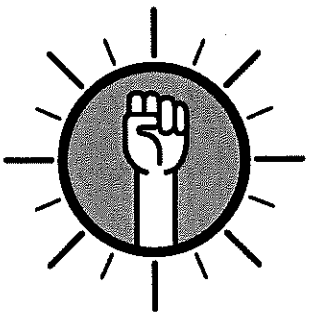
If you are considering signing a contract for a residential solar system.

Most solar providers are honest and fair. However, there are still some false claims you need to watch out for. Do not do business with a salesperson that makes one of these false claims.

False claims to watch out for	The Truth
FALSE — You can get free solar energy at no cost to you.	**TRUE** — **Solar energy is rarely free. An honest company will be upfront about all the costs you will pay over time.** • There is one exception: a few government-funded solar programs offer free or low-cost solar to low-income households. Go directly to page 6 to see what government-approved organizations run these programs.
FALSE — You will never pay an electricity bill ever again after a solar system is installed.	**TRUE** — **After going solar, you will typically pay a small electricity bill every month and a larger electricity bill at the end of the 12-month cycle, depending on the utility billing rate. See page 17 for an example.** • Customers who take out a solar loan or sign a lease or power purchase agreement will also receive a monthly bill from a loan company or solar provider. • If you use PACE (Property Assessed Clean Energy) financing, you will also make a payment once or twice a year with your property taxes or monthly with your mortgage payment.
FALSE — Time is running out and you must quickly sign an electronic tablet to get solar.	**TRUE** — **An honest salesperson would never rush you to sign anything without giving you time to review what you are signing.** • California law requires that a salesperson show you the contract terms before you sign.

**If you think you have been a victim of solar fraud, report the incident to the Contractors State License Board (CSLB) at 800-321-CSLB (2752) or www.cslb.ca.gov/consumers*

Customer Initial Here_____(2/4)



Know Your Rights

YOU HAVE THE RIGHT...

to a copy of a solar contract and financing agreement in the language in which the salesperson spoke to you.

If a solar provider comes to your home to sell you solar panels and speaks to you in a language other than English (such as Spanish), you have the right to a copy of the contract in that language.

YOU HAVE THE RIGHT...

to read this entire 23-page guide before signing a contract.

Do not feel pressured to read this guide while the salesperson waits. Ask them to come back at a later date to allow you time to read it.

If you are a public utility customer, a solar provider must give you the time to read and sign this guide before you sign a contract for solar. If they do not allow you to read this document, they should not be allowed to interconnect your solar system to the electric grid.

YOU HAVE THE RIGHT...

to a Solar Disclosure Document from your solar provider.

By law, a solar provider must provide you with a completed Solar Energy System Disclosure Document created by the Contractors State License Board (CSLB). This one page document shows you the total costs for the solar energy system. A blank version of this document is available at www.cslb.ca.gov/contractors/SolarSheet.aspx.

YOU HAVE THE RIGHT...

to a 3-day cancellation period after signing a contract.

You have at least three business days to cancel your contract for any reason. You may cancel the contract by emailing, mailing, faxing, or delivering a notice to your solar provider by midnight of the third business day after you received a signed, dated copy of the contract. Note that different rules may apply for contracts negotiated by a company's place of business.

If your solar provider refuses to cancel the contract, report them to the Contractors State License Board at 800-321-CSLB(2751) or www.cslb.ca.gov/consumers.

Customer Initial Here_____(3/4)

Ask a Solar Provider These Initial Questions
Before You Sign a Contract

? What is your Contractors State License Board (CSLB) license number?

Ask for a proof of the license. Then check the license to make sure it is valid by going to www.cslb.ca.gov/consumers or calling 800-321-CSLB (2752).

- The license must be active and in classification A (General Engineering Contractor), c-46 (Solar Contractor), C-10 (Electrical Contractor), or B (General Building Contractor) in order to be valid.
- CSLB License Number is: _____

If your solar provider does not have a valid contractor license, do not sign a contract with them and report them to the CSLB.

? What is the total cost of the solar energy system?

If you are considering a solar loan, lease, or power purchase agreement, also ask:

- Is there a down payment?
- How much will I pay per month? When will these payments increase and by how much?

If you are considering PACE financing, also ask:

- How much will I pay once or twice a year with my property taxes or monthly with my mortgage?

? If I sell my home, what are my options and what do I need to do?

Ask your solar provider, lender, or PACE administrator to show you where in the contract it describes what happens when you sell your home.

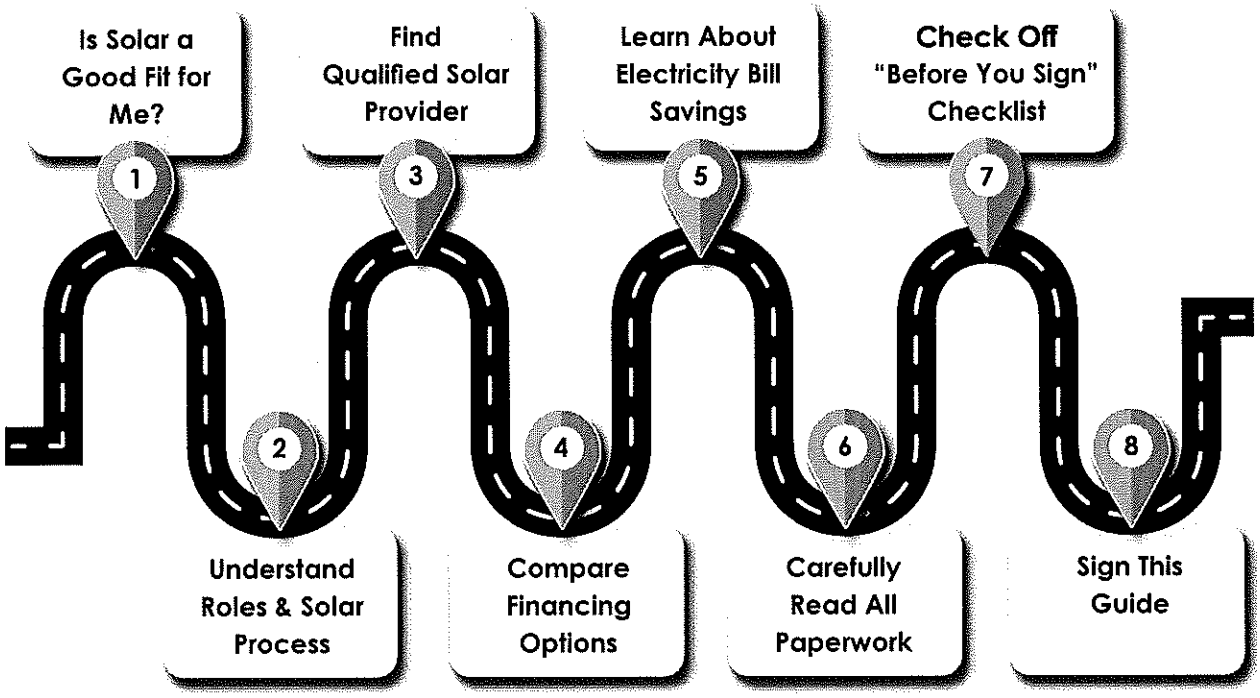
For other important questions to ask a solar provider before you sign a contract, go to page 10 of this guide.

Make sure to get **3 bids** from different solar providers before you sign a contract. See page 9 of this guide for more details.

Ok, I read these 3 pages. Now What?

- For a step-by-step guide for how to go solar, proceed to the next page. This is recommended, even if you've already started the solar process!
- If you are getting ready to sign a contract, skip to the "Before You Sign" checklist, on page 22 of this guide.

Customer Initial Here_____(4/4)



STEP 1: Is Solar a Good Fit for Me?

Solar photo-voltaic panels can capture sunlight on your roof or property and convert it into electricity. This electricity powers the needs of your home, such as lights, electric vehicles, and appliances.

Before you consider getting solar at your home, ask yourself:

Do I qualify for low-income solar programs?

If you think you might qualify for a low-income solar program, go directly to the next page (page 6).

Am I a good candidate for rooftop solar?

- Does my roof receive a good amount of sunlight or is it mostly shaded? What direction does the roof face? Roofs that are mostly shaded or face due north are not good candidates for solar. If you plan to replace your roof soon, you should replace it before installing a rooftop solar system.
- If your roof is heavily shaded or isn't in great condition, or if you are a renter, community solar programs could be a good fit for your. With community solar, you receive 50-100 percent of your electricity from solar projects located across California. Community solar programs vary and may increase your electricity bill or provide an electricity bill savings. Contact your electricity provider for more information.

Have I made my home energy efficient first?

Making your home energy efficient before going solar can decrease your overall energy use and reduce the size of the solar system you need, potentially saving you thousands of dollars. Call your electricity provider or check their website for energy efficiency tips and advice on how to get an in-person home energy assessment.

Low-Income Solar Programs

Connect With Your Local Utility...

GRID ALTERNATIVES AND DAC PROGRAM

GRID Alternatives, a non-profit organization, offers assistance for certain income-qualified solar programs in some local jurisdictions and Disadvantaged Communities.

Contact GRID Alternatives by visiting www.gridalternatives.org/qualify or by calling 1-866-921-4696.

**A DAC is a neighborhood vulnerable to multiple sources of pollution. To find out if you live in a qualified DAC, check out the map at: https://oehha.ca.gov/calenviroscreen/sb535.*

COMMUNITY SOLAR PROGRAMS

Community Solar Programs allow qualifying households to subscribe to a utility-owned solar project. These programs vary with each public utility so check with your electric provider to get more information regarding a community solar program.

If you are a public utility customer, call your electricity provider or check their website to see if any low-income solar options are available to you.

2 STEP 2: Understand Roles and Solar Process

Solar Providers

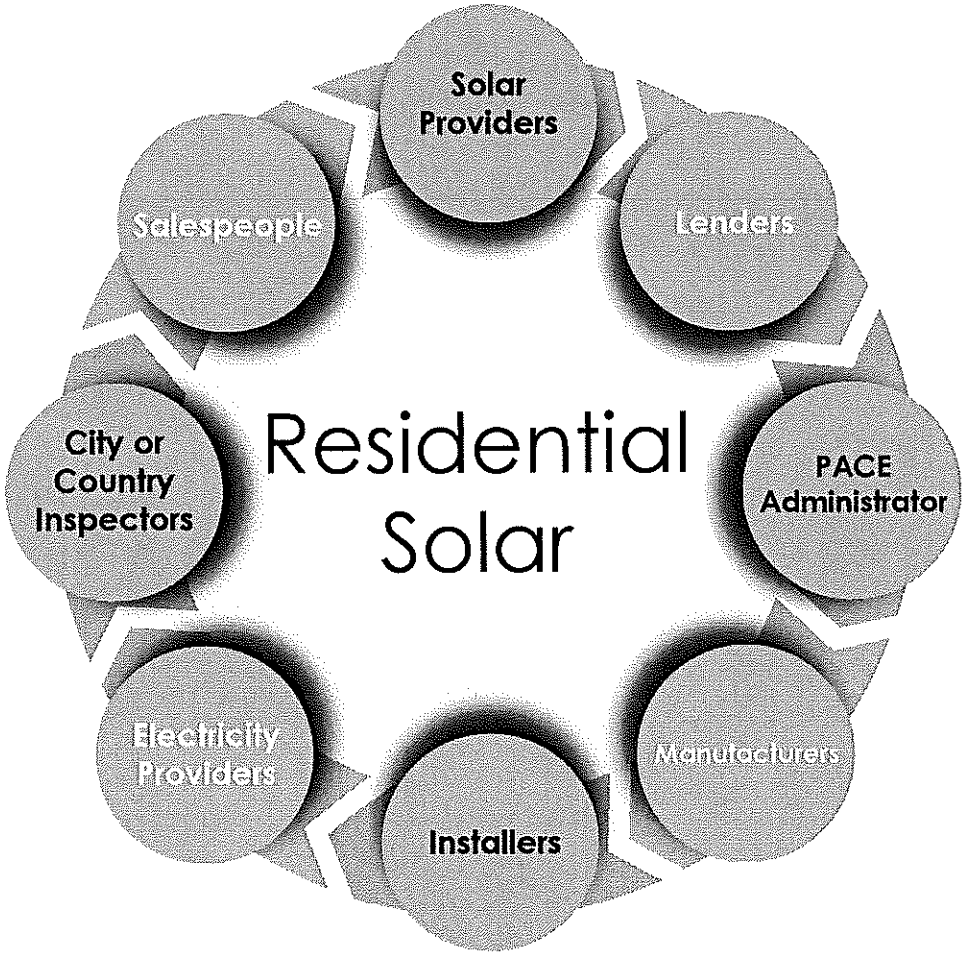
Solar providers are the companies that sell you solar and send installers to your home. Sometimes they provide financing. They must be licensed. See page 4.

Installers

Installers are sent by Solar Providers to your home to check roof, ground and electric conditions and to install the solar system. They must be licensed like a Solar Provider. See page 4.

Salespeople

Salespeople work for Solar Providers and may call you or knock on your door. They must be registered, with some limited exceptions. Ask for their "Home Improvement Salesperson (HIS) registration" and check it at 800-321-CSLB (2752) or www.cslb.ca.gov.



Lenders

Lenders provide you with financing if you have a solar loan or PACE financing.

PACE Administrators

PACE administrators manage PACE financing programs. They must be licensed. Check their license at https://docqnet.dbo.ca.gov/licensesearch.

Electricity Providers

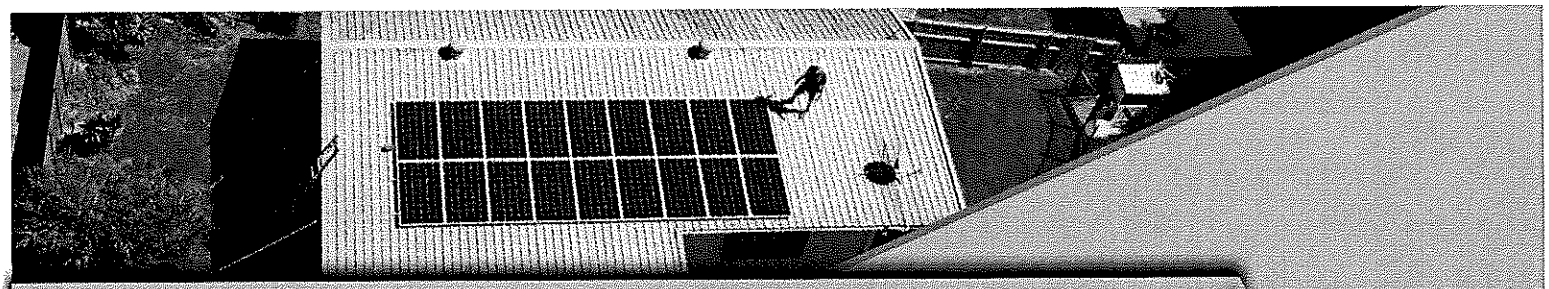
Electricity providers interconnect your solar system to the electric grid and send you electricity bills that may include solar bill credits.

Manufacturers

Manufacturers are the companies who make solar equipment. They provide most solar warranties for purchased systems.

City/Utility Inspectors

City/utility inspectors come to your home to make sure the system is up to code to ensure your health and safety.



Overview of a Typical Rooftop Solar Process

BEFORE YOU SIGN A CONTRACT

You	decide if rooftop solar is a good fit for you (see page 5)
You	get a home energy assessment to make your home more energy efficient (see page 5)
You	look at low-income solar programs to see if you qualify (see page 6)
You	research Solar Providers and compare at least 3 bids(see page 9)
Solar Provider...	provides you with solar contract, Solar Disclosure Document, and this Solar Consumer Guide
You	qualify for financing (if needed)
Lender.....	writes up financing agreement (if needed)
You	review solar contract, Solar Disclosure Document, and any financing agreement (see page 19)
You	go through checklist on page 22 of this Solar Consumer Guide
You	sign this Solar Consumer Guide, solar contract, and financing agreement

AFTER YOU SIGN A CONTRACT

Installer	performs a home site visit to confirm assumptions and check roof, ground, and electric conditions
Solar Provider	finalizes system design and applies for building permit with city or country agency
Installer	installs the solar system (only after receiving city/county permit)
City/Utility Inspector	inspects system for building permit compliance
Solar Provider	submits application to electricity provider to interconnect solar system to grid
Solar Provider	submits city/county inspection approval to electricity provider
You	turn on system *after* receiving written approval from electricity provider
Electricity Provider	sends you your first electricity bill with solar/net energy metering credits (see page 17)
Lender/Solar Provider ...	sends you first bill for solar system or solar energy*

*IF YOU USE PACE FINANCING,

you will not receive a bill from a Lender or Solar Provider (the last step above). Instead your payments will be due once or twice a year with your property taxes or monthly with your mortgage payment.

It typically takes 1 to 3 months after you sign a contract for the solar system to be installed at your home.

After the solar system is installed, it typically takes 2-3 weeks to receive approval from your electricity provider to turn your system on. It could take longer depending on your circumstances.

STEP 3: Find a Qualified Solar Provider

**For Low-Income Solar Programs and Providers, go directly to page 6.*

Find Solar Providers that Serve Your Neighborhood

FIND PROVIDER

Go to **www.cslb.ca.gov**, a government website, and click on the "Find My Licensed Contractor" search on the right-hand side of the page. Enter your city and one of the following license classifications: C-46 (Solar Contractor), C-10 (Electrical Contractor), or B (General Building Contractor).

Go to **www.CaliforniaDGStats.ca.gov**, a government-funded website, to enter your zip code and see a list of Solar Providers and recent installation costs. Note that these costs are not verified by the government.

Go to www.energysage.com to research and shop for solar, financing, and energy efficiency options.

Ask friends and neighbors who had solar installed at least a year ago if they recommended a Solar Provider and why.

Narrow Down the List to Qualified Solar Providers

NARROW DOWN

First, make sure Solar Providers you consider have a valid license from the CSLB. It is illegal for Solar Providers and their Installers to conduct business without a license.

- Go to the Contractors State License Board (CSLB) website at www.cslb.ca.gov/consumers or call 800-321-CLSB (2752) to see if the Solar Provider and Installer licenses are active and valid. The licenses must be in the classifications: C-46 (Solar Contractor), C-10 (Electrical Contractor), B (General Building Contractor), or A (General Engineering Contractor).

Find out how long the company has been in business and how many installations they have done.

Check out trusted customer review websites online. Since some websites may not be neutral, check a few different websites to make sure reviews are consistent.

It's a good sign if companies employ installers certified by the North American Board of Certified Energy Practitioners (NABCEP), a high standard in the industry.

Get Bids From At Least 3 Qualified Solar Providers and Ask Questions

GET BIDS

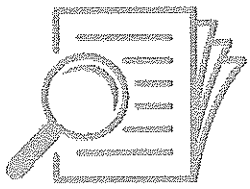
After you narrow down the list of Solar Providers, separately ask each of them for a bid or price quote.

- Note that the best option for you is not necessarily the cheapest bid. A very low bid may indicate that a Solar Provider is trying to cut corners.

Don't hesitate to ask Solar Providers a lot of questions up front. A qualified company will be happy to answer all of them. A sample list of questions in on the next page.

Questions to Ask a Solar Provider Before You Sign a Contract

COMPANY BACKGROUND



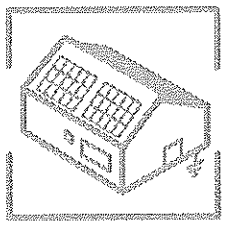
What is your company's contractor license number from the Contractors State License Board (CSLB)? What is your Installer's contractor license number?

Will you subcontract with another company to install the solar system? If so, what is their CSLB contractor license number?

How long have you been in business and how many systems have you installed?

Can you provide me with three customer references to call or visit? These customers should have solar installed for at least a year.

DESIGN & ROOF



Is my roof a good candidate for solar? Why?

Does my roof need to be replaced before installing solar panels?

- If yes, how much will that cost, who will do it, what is their license number, and is there a roof warranty?

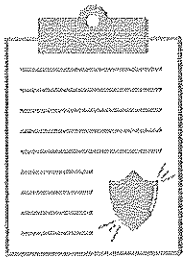
Why did you choose this specific design and size for the solar system you are recommending to me?

- Note that a system sized to cover all of your electricity needs isn't necessarily the best investment. Typically, a system is sized to around 80-85 percent of your electricity use from the previous year.

What steps will you take to ensure my roof won't leak?

Roughly how much will it cost to remove and re-install the panels if I need to replace my roof in the future, including inspection fees?

WARRANTIES & PERFORMANCE OF SOLAR SYSTEM



Are there warranties for the panels and inverters?

- If yes, how long do they last and who do I contact to replace these components?
- If equipment such as the inverter fails after the warranty period, how much will it cost to replace?

Are there warranties for labor/construction?

Are repairs and maintenance included in the contract? If yes, who should I contact for repairs?

Will I be able to monitor the performance of the system once it's installed? If so, how?

Does the solar provider offer a minimum energy guarantee (common with leases and power purchase agreements)?

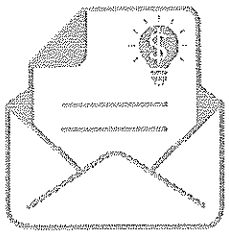
- If yes, how will I be paid if the system does not produce as much energy as promised in the contract?

Is there an insurance policy that comes with the solar system, or do I need to take out additional homeowner's insurance? Note that this is especially important if you live in fire-prone areas.

What are my obligations in the contract if my solar system stops working due to a disaster like an earthquake or a fire?

Who has the right to claim the environmental benefits of the power generated by my system? (See "Getting Environmental Credit for Going Green" on page 18).

ELECTRICITY BILL SAVINGS ESTIMATE (see page 17)



Please beware of a solar provider who tells you solar is free - it is not. See page 2 for more information on false claims.

Explain to me why an electricity bill savings estimate is not a guarantee.

Even though I will continue to pay electricity bills after going solar, I can receive solar bill credits on my electricity bill. How does that work?

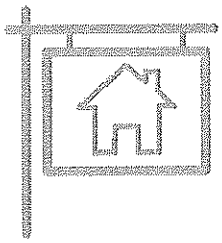
Is there an option to pay my electricity bills monthly instead of annually, so the costs are more even throughout the year? How do I sign up?

What electricity rate do you recommend I switch to for solar, and why?

How long will I be on that rate, and how can I compare or change rates on my electricity provider's website?

Does my electricity provider offer special rates for solar customers?

IMPACTS ON FUTURE SALE OF YOUR HOME



Will a solar system make it more difficult for me to sell my home or refinance?

For leases, power purchase agreements (PPAs), and PACE financed systems:

- What happens if the home buyer doesn't want the solar system or doesn't qualify to take on my lease, PPA, or PACE financed system?
- Are there fees if I need to terminate the contract early to sell my house?
- Are there fees for transferring the lease PPA, or PACE financing to a new homeowner?

TIMELINE (see page 8)

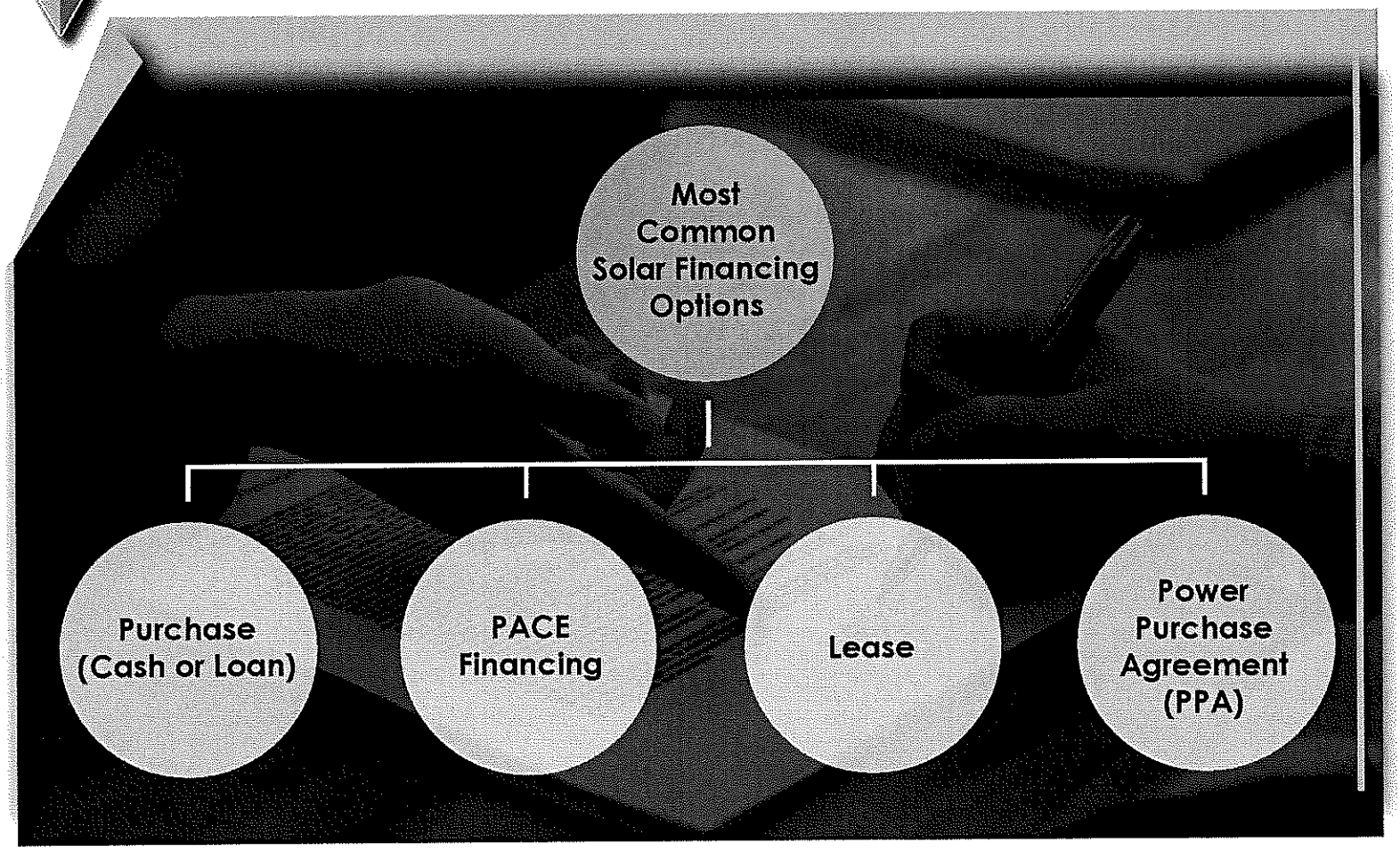
When do you propose to start and finish installing solar on my roof?

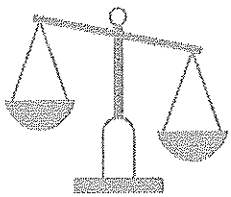
After installation is complete, roughly how long will it take for my electricity provider to send me written approval to turn my system on?

What situations would allow me to be released from a contract?

Do you want to know questions to ask about loans or financing?
Keep reading because those are in the next sections!

4 STEP 4: Compare Your Financing Options

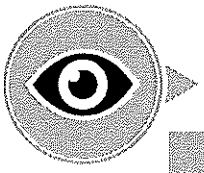




Side-By-Side Quick Financial Comparison

	+ PROS	− CONS
Purchase with Cash or Loan	• Typically greater return on investment. • If you use a loan, little or no upfront costs. • May increase value of home. • You can directly receive tax credits and deductions. Consult tax professional to see if you qualify.	• You are typically responsible for repairs and maintenance. This may involve contacting different manufacturers, who could go out of business during the 10-20 year component life cycles. • Some solar loans place a lien on your property. In those cases, if you do not make your payments, this could result in foreclosure or make it more difficult to sell your home or refinance your mortgage.

	PROS	CONS
PACE Financing	• Little or no upfront costs. • May have a longer repayment period than typical home improvement loan, which may be preferable. • You may be able to receive tax credits and deductions. Consult tax professional to see if you qualify.	• PACE financing results in first-priority lien on your property. Your bank may require you to pay off the PACE assessment prior to refinancing. • If you do not make your PACE payments, this could result in foreclosure or make it more difficult to sell your home or refinance your mortgage. • You are typically responsible for repairs and maintenance. This may involve contacting different manufacturers, who could go out of business during the 10-20 year component life cycles.
Lease and PPA	• Little or no upfront costs. • Solar Provider is responsible for all monitoring, maintenance, and repairs. • Minimum energy production often guaranteed.	• Selling home may be more complicated than with a purchase system. Options typically are: the new owner must agree to take on the lease/agreement, you continue making payments, or you buy out the lease/agreement, which could be thousands of dollars. • Solar Provider could go out of business during the contract period.



A Closer Look at Purchase (with cash or loan)

PURCHASE

You can purchase a solar system from a Solar Provider or Manufacturer with a solar loan or cash. In this approach, you own the installed system. Types of loans include:

- **Secured loans:** these require an asset that will serve as collateral for the loan - often that asset is your solar system.
- **Unsecured loans:** these do not require any collateral, similar to a credit card.

A secured loan is often preferred because it typically has lower interest rates.

Many Solar Providers work with lenders that offer solar loans, but you should check with banks and credit unions as well. Compare offers to make sure you are being offered a reasonable interest rate.

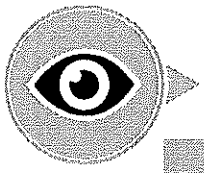
PURCHASE

If you install and own a solar system by the end of 2020, there is supposed to be a 26 percent federal tax credit available (also referred to as the "ITC"). The federal tax credit is expected to drop to 22 percent for systems installed in 2021, and then drop to 0 percent for systems installed after 2021. If you have questions about the ITC please contact the Internal Revenue Service at https://www.irs.gov/ or any other questions, including whether a loan is tax deductible, please speak to a Certified Public Accountant (CPA) for personal tax advice.

Unless you purchase a maintenance plan or your system comes with one, you will be responsible for any maintenance and repairs. Make sure you save the equipment warranties, particularly for the inverter, which may need to be replaced sooner than other equipment. If you sell your home, look for real estate agents and appraisers with experience selling homes with solar. You may include the system in the house sale just like any other major home component.

Questions to Ask a Lender About the Purchase of a Solar System with a Loan:

- What is the total cost of the loan over the entire course of the contract?
- How much will I pay up front, how much over time, and for how long?
- What is my interest rate? What is my annual percentage rate ("APR")?
- Who do I contact if I have questions about my loan payments?
- Will a solar loan make it more difficult for me to sell or refinance my home? Will I need to buyout my loan? Who do I contact?



A Closer Look at PACE (Property Assessed Clean Energy)

PACE (Property Assessed Clean Energy)

PACE is a financing option that is available in some areas of California. In a PACE financing arrangement, a PACE Program Administrator finances the upfront costs of a solar system, which you then pay through an assessment on your property tax bill. With PACE financing, you own the solar system.

PACE financing lasts for a fixed term, typically around 10-30 years, and it is attached to your house. If you sell your house before you have fully paid the PACE assessment, a buyer may require you to pay off the assessment, which will be what is remaining in the balance, which could be thousands of dollars. Some mortgage lenders will not loan money to buyers to purchase properties with PACE liens unless the full assessment is paid.

Unlike Leases and Power Purchase Agreements that require monthly payments, PACE assessments are typically due once or twice a year, in larger lump sums, with your property taxes. Given this unique arrangement, it's important to understand how much you will owe and when, so that you can set aside enough money throughout the year to cover the amount.

If your house is mortgaged and you typically pay your taxes with an escrow or impound account, your mortgage company may increase the amount you pay monthly to *(continued on next page)*

cover the anticipated increase to your property tax bill. Discuss how PACE will affect your monthly mortgage payment before you sign an agreement.

Be aware that if you fail to make your PACE payments included with your property taxes or mortgage, your home could be put in foreclosure.

Questions to Ask a PACE Program Administrator About a PACE Financed System:

- ? What is the total cost of the financing over the entire course of the contract?
- ? How much will I owe for PACE financing when I pay my mortgage or property taxes?
- ? How many times a year will I owe this PACE payment?
- ? What happens if I want to sell or refinance my home? Will selling or refinancing be more difficult with PACE? Is there anything I have to do with the mortgage company?
- ? What are the penalties for failing to pay the assessment on time?
- ? Who do I contact if I have problems making my PACE payments?

A Closer Look at Lease and PPA (Power Purchase Agreement)

With a **Lease**, the Solar Provider owns the system on your property and "rents" it to you for a set period of time. A Solar Provider will install the solar system on your home, and you will make scheduled monthly payments in exchange for all the electricity the system produces. A typical Lease contract period is 20-25 years.

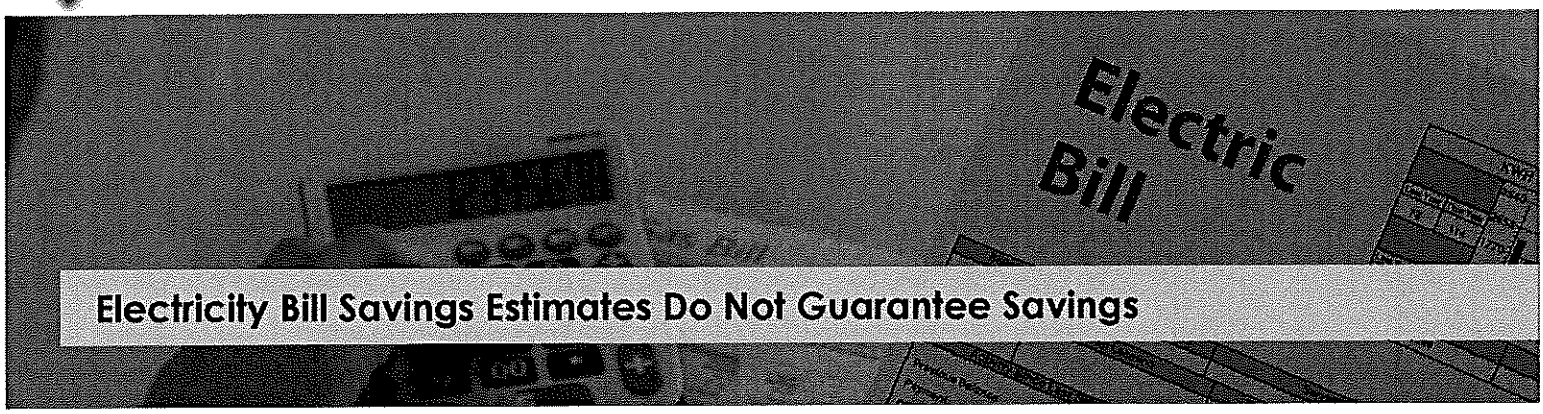
In a **Power Purchase Agreement (PPA)**, the Solar Provider owns the system on your property and sells you the electricity it generates. PPAs are similar to Leases, except that instead of making a fixed monthly payment for the system, you typically pay for all the power the solar system generates (a fixed per-kilowatt-hour rate). The contract will specify the kilowatt-hour rate you pay in the first year and every year after that. This rate should generally be lower than your current electricity rate. A typical PPA contract period is 20-25 years.

- If you sell your house before the Lease or PPA contract is over, you will have to pay the Solar Provider the remainder of the value of the Lease or PPA or transfer the contract to the new property owner. Make sure you understand the specific contract terms, since buying out a Lease or PPA can cost thousands of dollars.
- Payments for Leases or PPAs will typically increase by a specified amount every year based on an "escalation clause" or "escalator." Escalators are typically in the range of a 1 percent to 3 percent increase above the rate you paid in the previous year. Be cautious of entering into a contract with an escalator higher than that.
- There may be different ways to arrange Leases and PPAs, such as paying more up front to reduce your monthly payments.

Questions to Ask a Lender or Solar Provider About a Lease or PPA

- ? What is the total cost of the solar system or solar energy over the entire course of the contract?
- ? How much will I pay up front, how much over time, and for how long?
- ? Will my payments increase over time? How much will they increase, and how frequently?
- ? Is there an option to make a down payment to reduce my monthly payments (for a Lease) or kilowatt-hour rate (for a PPA)?
- ? What happens if I wish to end the Lease or PPA early?
- ? If I end my agreement early, will I owe a balloon payment and/or an early termination fee? If so, how much will I owe?
- ? Will a Lease or PPA make it more difficult for me to sell or refinance my home?

STEP 5: Learn About Electricity Bill Savings



An electricity bill savings estimate is an educated guess about how much you could save with rooftop solar. Here are some reasons why it's possible that your savings could be lower than the estimate:

Electricity bill savings estimates are based on several uncertain factors, such as your future energy use. For example, if your family grows, you buy an electric vehicle, or you decide to turn up your air conditioning in the summer, your energy use will go up along with your electricity bill.

Electricity prices and rates can change over time. Your electricity provider may require you to switch to a different rate in the future, which could change how much you save.

If you sell your home, you could incur additional costs. For example, if a buyer doesn't want to take on a Lease or Power Purchase Agreement, you might have to buy out the contract, which could be thousands of dollars.

Before you sign a contract, ask yourself: if the savings end up being lower than the estimated monthly or yearly savings, does getting rooftop solar still make sense to me?

HOW ELECTRICITY BILL SAVINGS WORK

There is a special arrangement with your electricity provider that is called Net Energy Metering (NEM). NEM allows you to get a financial credit on your electricity bill when your solar system sends electricity back to the grid after first powering the electricity needs at your house. This credit is sometimes equal to the retail rate of energy and sometimes equal to the wholesale rate, depending upon the utility.

NEM and Your Electricity Bill

Since the sun isn't always shining, solar customers also rely on electricity from their electricity provider. After your solar system is interconnected to the grid, your monthly electricity bill will summarize how much electricity you took in or "consumed," from your electricity provider, and how much electricity your solar system sent to the grid or "exported."

If you took in more than you sent out to the grid in any given month, you will see an overall charge on your bill. If you sent out more than you took in, you will see an overall credit. Typically, you will be able to carry forward credits to the next month's bill, and electricity usage charges will not be due until the end of a 12-month period. Some utilities have a monthly 'true-up' and do not allow credits to be carried to the next month. Note that many electricity providers require solar customers to pay a monthly minimum bill each month just like other customers. This minimum bill may change over time.

Some utility solar customers are required to go on a time-of-use (TOU) rate. A TOU rate will change different prices for electricity depending up on the time of day. Prices are typically higher between 4p.m. and 9p.m., called "peak" hours, and lower the rest of the day and at night during "off peak" hours.

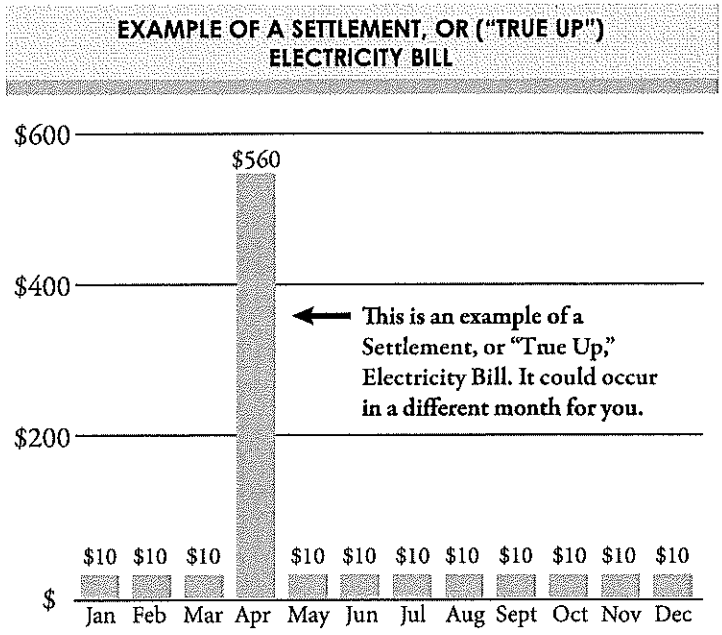
12 Month Settlement Bill

Typically, at the end of a 12-month period, you will receive a Settlement bill, also called a "True Up" bill, that settles all the credits and charges. Even though going solar can reduce your electricity costs, most customers still owe some money to their electricity provider at the end of the 12 months. See graphic below that shows an example of an electricity bill over a 12-month cycle for a solar customer.

Some electricity providers give you the option to pay your bills monthly instead of annually. If you choose the monthly option, your payments will be more evenly distributed over the course of the 12 months, and you will not have to worry about paying a potentially large bill once a year. Be clear with your Solar Provider if you want the monthly option, and double-check with your electricity provider that the correct option was chosen.

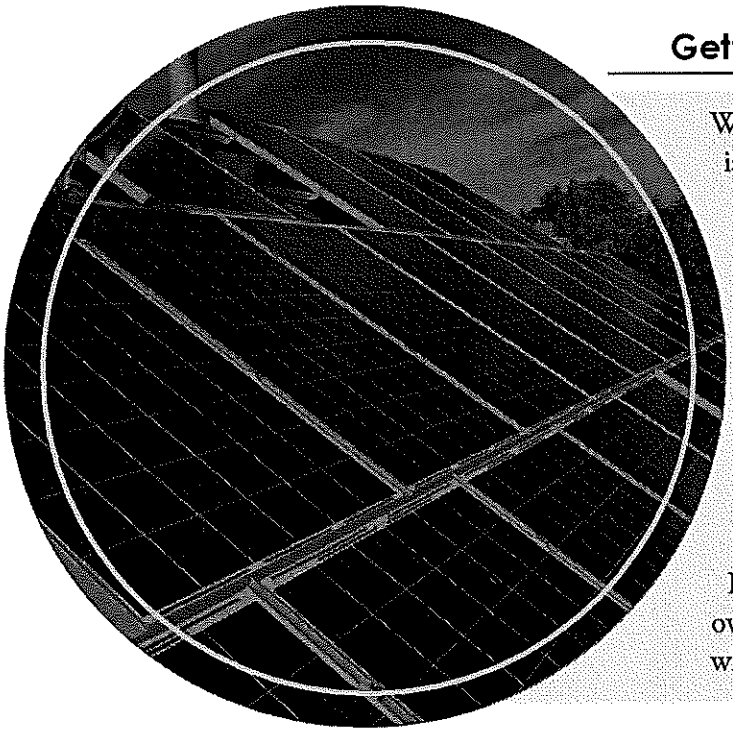
Though it's rare, if you sent out more electricity than you took in over the course of the 12-month period, you are typically eligible to be paid "net surplus compensation," which is around 2 to 3 cents per kilowatt-hour. Because the compensation rate is

(continued on next page)



lower than the retail rate, it is generally not in your financial interest to install a solar system that produces more energy than you would use over the course of a year.

Currently, public utility customers are guaranteed NEM for up to 20 years from the time their solar system starts operating. Your electricity rate, however, is subject to change. Contact your local utility for more information.



Getting Environmental Credit for Going Green

When a residential solar system produces electricity, the system is eligible to receive Renewable Energy Certificates, or "RECs," which are certificates that represent the renewable energy that is generated. If you purchase a solar system, you own the rights to these RECs and can make the claim that you're producing clean energy and avoiding emissions of greenhouse gases by going solar. However, if you enter a Lease or PPA, the contract may state that the Solar Provider or someone else owns the RECs. If you do not own the RECs, they can be sold without your knowledge to other customers who use them to make environmental claims or comply with clean energy requirements. And with PACE financing, a local jurisdiction may own the RECs. If owning the RECs is important to you, ask your solar provider who will own the RECs, and check the contract fine print.

Combining Solar with Storage

When you install battery storage with your solar system, you can store excess solar electricity produced by your panels for use in the evening when the sun goes down. The software that comes with battery storage automatically determines whether to store the extra energy or export it to the grid to maximize cost savings. Battery storage can also provide limited back-up power.

The state-funded Self-Generation Incentive Program (SGIP) provides financial incentive to install storage. See www.cpuc.ca.gov/sgip for details on the SGIP program.

STEP6: Carefully Read All Paperwork

THE SOLAR ENERGY SYSTEM DISCLOSURE DOCUMENT

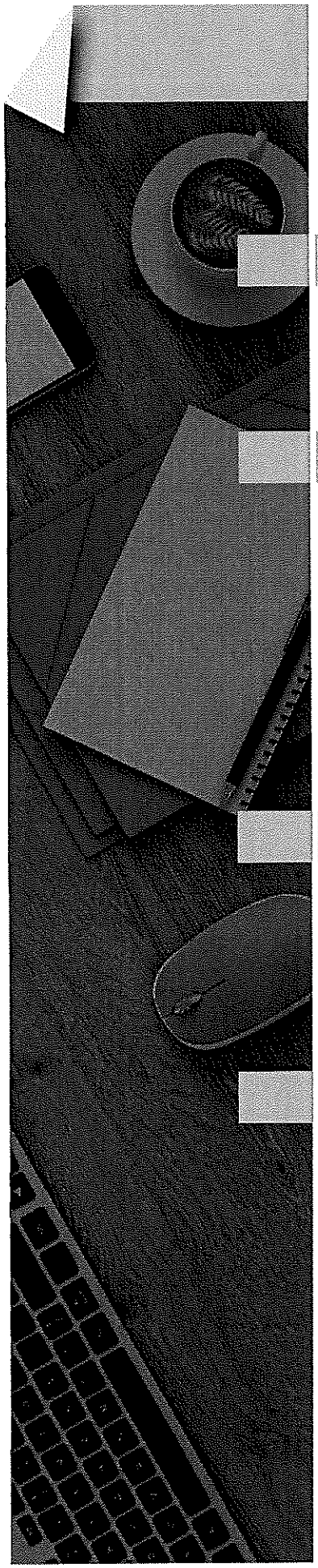
This one-page document from the Contractors State License Board shows you the total costs for the proposed solar energy system. It also has information about your three-day right to cancel a contract. A Solar Provider is required to fill out this document. It may be placed as the cover page to the contract. See a blank version at www.cslb.ca.gov/contractors/SolarSheet.aspx.

CONTRACT

- The solar contract is the legally binding document between you and the Solar Provider. Make sure to read it carefully.
- Make sure everything you were promised is written in the contract. For example, many answers to the questions on pages 10 and 11 of this guide should be referenced in the contract.
- By law any contract for solar installation must include:
  - Contractor information, including business address and license numbers
  - Description of the project, including equipment installed and materials used
  - Contract price, plus finance charge and/or down payment if applicable
  - Approximate start and end date of the contract term
  - Notice of a 3-day right to cancel the contract (with limited exceptions)
- Ask the Solar Provider what situations would allow you to be released from the contract. For example, if your Solar Provider discovers a site visit that your roof is shaded in a way that wasn't expected, that could cancel the contract.

FINANCIAL PAPERWORK

- If you are purchasing a system with a solar loan, you will be asked to sign a separate financing agreement. The Lender will provide you with this separate agreement.
- If you are purchasing a system with PACE financing, you must sign: (1) a Financing Application and, (2) a Financing Agreement.
  - Before you sign the Financing Application, read it carefully to make sure all the information is correct, including your contact information, your income, and the cost of the solar energy system.
  - The separate Financing Agreement may be provided by the Solar Provider, the PACE administrator, or a financing institution.
- Make sure everything you were promised is written into any financial agreements. For example, many answers to the questions on pages 14-16 of this guide should be referenced in the contract.



ADDITIONAL RESOURCES

Low-Income Solar Programs

- **Grid Alternatives and DAC Program:**
  866-921-4696 and www.gridalternatives.org/qualify

Contractors State License Board (CSLB)

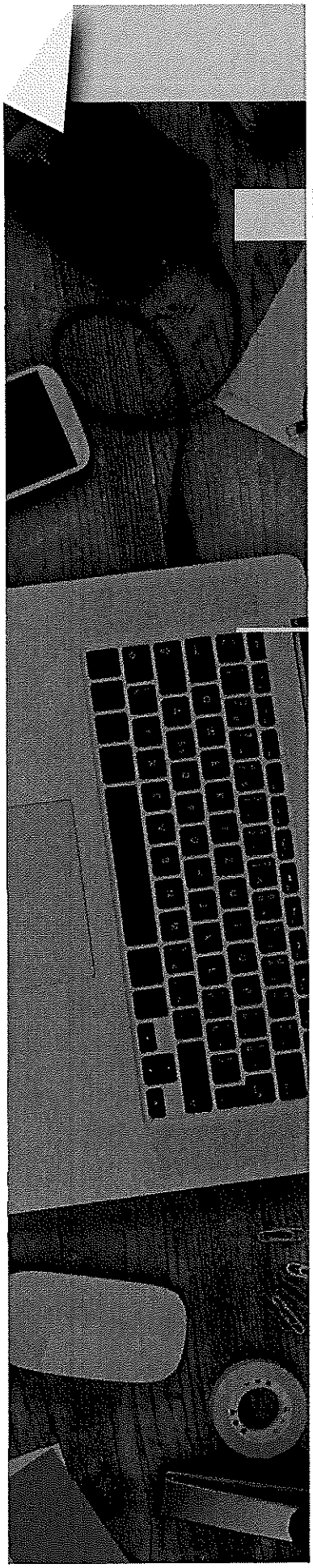
- **CSLB 24-Hour Licensing and Consumer Information:**
  800-321-CSLB (2752)
- **Check a Contractor License or Home Improvement Salesperson Registration:**
  http://www.cslb.ca.gov/OnlineServices/CheckLicenseII/CheckLicense.aspx
- **CSLB Solar Smart:**
  www.cslb.ca.gov/Consumers/Solar_Smart
- **CSLB Solar Energy System Disclosure Document:**
  www.cslb.ca.gov/contractors/SolarSheet.aspx

Department of Business of Oversight (DBO)

- **PACE Administrator License Check:**
  https://docqnet.dbo.ca.gov/
- **Filing a Complaint against PACE provider:**
  www.dbo.ca.gov

Solar Financing Guides

- **CESA Homeowner's Guide to Solar Financing: search here:**
  http://cesa.org/resource-library
- **CESA/George Washington University Rooftop Solar Financing 101:**
  http://cesa.org/projects/sustainable-solar/videos



ADDITIONAL RESOURCES (cont.)

Other Solar Guides

- **Solar Energy Industries Association (SEIA) Residential Consumer Guide to Solar Power:**
  http://www.seia.org/research-resources/residential-consumer-guide-solar-power
- **Interstate Renewable Energy Council (IREC) Be Solar Smart Consumer Checklist:**
  https://irecusa.org/consumer-protection/consumer-checklist/
- **CESA/George Washington University Choosing a Solar Installer:**
  http://cesa.org/projects/sustainable-solar/videos
- **EnergySage Solar 101:**
  http://www.energysage.com/solar/101

- **City of Needles Electric Department:**
  http://cityofneedles.com/services/electric-department/

STEP 7: "Before You Sign" Checklist

Before you sign any documents, make sure you have completed these items!

Remember, take your time and don't feel pressured to sign a contract. If you feel you need more time to think about your decision or to do more research, do not sign anything until you do.

- ☐ Check to see if you qualify for a low-income solar program, which has strong protections for consumers. **See page 6.**
- ☐ Consider making your home more energy efficient before getting solar. This could save you money. **See page 5.**
- ☐ Get at least 3 bids for solar at your home. **See page 9.**
- ☐ Check to make sure the Solar Provider's license is current and valid with the Contractors State License Board. **See page 4.**
- ☐ Ask the Solar Provider for 3 customer references and call or visit them.
- ☐ Ask the Solar Provider the contract questions on **page 4, 10, and 11** so you understand the terms of the solar contract.
- ☐ If you are financing your system, ask the lender, Solar Provider, or PACE Program Administrator the finance questions on **page 14, 15, and 16,** so you understand the terms of your financing arrangement.
- ☐ Read the critical information about electricity bill savings estimate on **page 16 and 17.**
- ☐ Carefully read all the documents that the Solar Provider is asking you to sign. These usually include: 1) Solar Energy System Disclosure Document, 2) Contract, and 3) Financial Paperwork. **See page 19.**
- ☐ Understand what happens after you sign a contract for solar. **See page 8.**
- ☐ Save copies of all the documents you sign. The information will be useful if you sell your home, need to replace your roof, or have any repair or maintenance issues.

STEP 8: Sign This Guide

Have you read at least the first 4 pages of this guide?

The first 4 pages of the California Solar Consumer Protection Program contain important information on false claims to watch out for and your rights.

It recommends that you take 48 hours to read and understand this entire guide before you sign.

****Do not feel pressured to read the complete document while the salesperson waits. Ask them to come back at a later date to allow you time to read it.****

CUSTOMER

☐ I read and initialed the first 4 pages of California's Solar Consumer Protection Guide. The Solar Provider gave me the time to read the entire 23-page guide.

☐ I have not yet entered into a contract for solar with the Solar Provider signing below.

Customer Printed Name	Customer Signature	Date

SOLAR PROVIDER*

☐ The customer initialed the first 4 pages of the guide.

☐ The customer signed above before entering into a contract for the purchase, lease, power purchase agreement, or PACE financing of a solar system or solar energy with the company named below.

Company Representative Name/Title	Company Representative Signature	Date

Company Name	Company Email	Company Phone

ELECTRIC RATES EFFECTIVE OCTOBER 1, 2021 (RATES WERE CALCULATED USING 5% CPI)

WINTER RATES (OCT 1ST – FEB 28TH)

Basic Service Charge	$32.39
Hydro Allotment 395 KWH	0.0660
Over Hydro	.1285
CA Conservation Charge	0.0030
Utility Users Tax	2.5%

SUMMER RATES (MARCH 1ST – SEPTEMBER 30TH)

Basic Service Charge	$32.39
Hydro Allotment 730 KWH	0.0619
Over Hydro	.1285
CA Conservation Charge	0.0030
Utility Users Tax	2.5%