CALIFORNIA
ENERGY
COMMISSION

NEW SOLAR HOMES PARTNERSHIP
~~REVISED SECOND~~THIRD EDITION

COMMITTEE GUIDEBOOK

~~AUGUST 2008~~
JANUARY 2010
CEC-300-2010~~08-006~~001-CMD

Arnold Schwarzenegger, *Governor*

Attachment 1

ERRATA TO THE NEW SOLAR HOMES PARTNERSHIP COMMITTEE DRAFT GUIDEBOOK

The following list of Errata was adopted as part of the proposed revisions to the *New Solar Homes Partnership Guidebook* (Guidebook) at the Energy Commission's January 27, 2010, Business Meeting. The Errata provide staff clarifications and conforming changes to the text of the *Guidebook* based on party comments received during the comment period. The Errata below are edits to the Committee Draft Guidebook.

Errata to the Guidebook are presented in gray highlight to make it easier to identify the changes.

I. INTRODUCTION

C. Summary of New Solar Homes Partnership Guidebook Requirements

Page 6, "Program Element – Energy efficiency requirements," is revised as follows:

Energy efficiency requirements	At least Tier I defined as 15% greater efficiency than the base level of the Building Energy Efficiency Standards (Title 24) in effect at the time of building permit on the date the building permit was applied for. Tier II, higher levels of energy efficiency are strongly encouraged. ~~'Tier I - Title 24 + 15% or higher. Tier II – Title 24 + 35% or higher and 40% or higher for cooling energy.~~ *Energy Star* for builder installed appliances. ~~Solar water heating can be used to help meet Tiers.~~

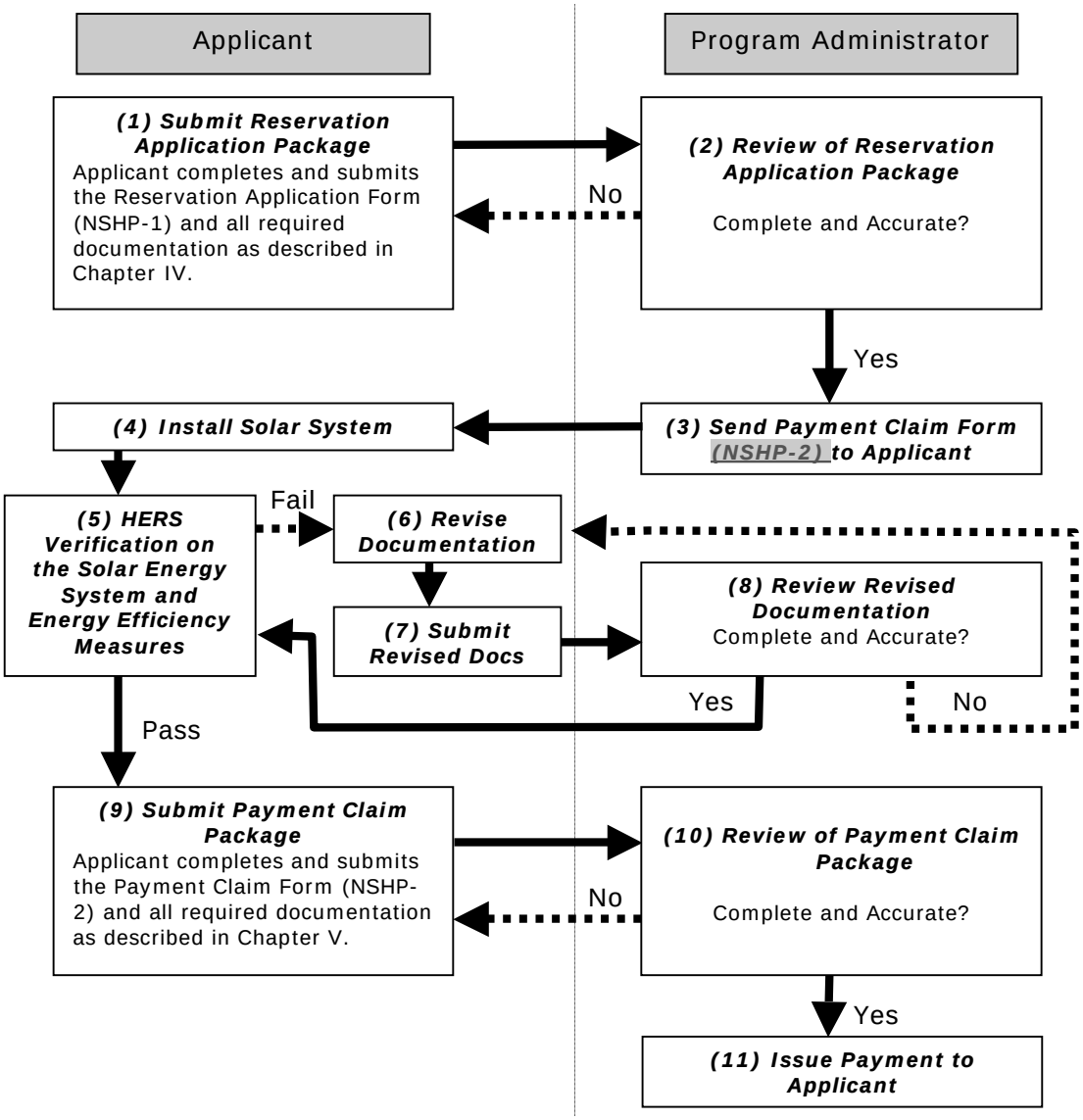
Page 6, "Program Element – Field Verification," is revised as follows:

Field Verification	Solar energy system installation, equipment and performance~~s~~ shall be verified by the installing contractor and a qualified HERS Rater. ~~and ALL~~ All energy efficiency measures used to meet the above Title 24 requirements ~~code level required~~ for program participation ~~are~~ shall be verified by a qualified HERS ~~r~~Rater. Verification of some energy efficiency measures may be required to be completed as early in the construction process as foundation or rough-in.

D. Flow Charts of the NSHP Application and Payment Process

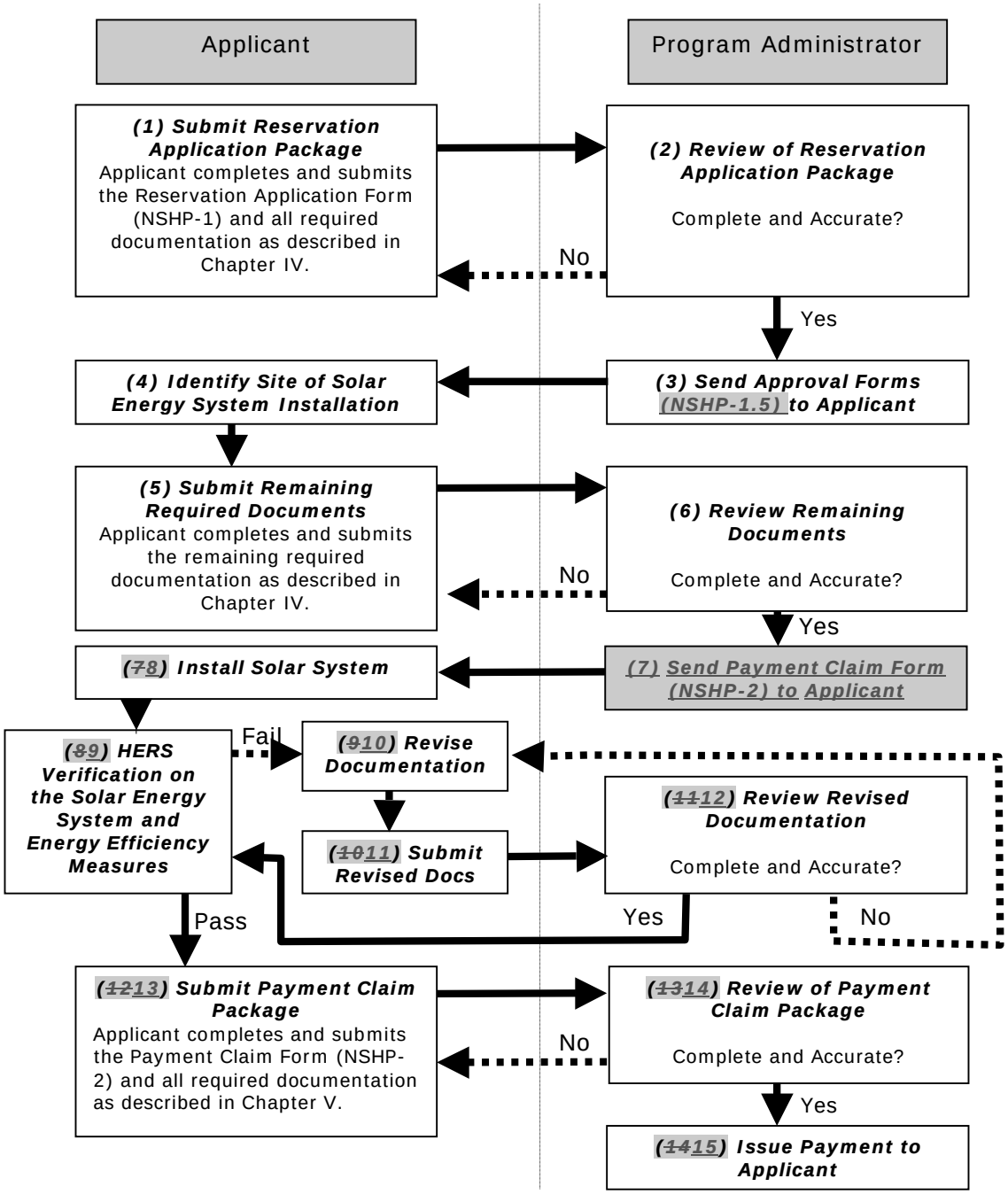
Page 7, Figure 1, is revised as follows:

Figure 1
Application Process Flow Chart for All Projects, Except Solar as an Option



Page 8, Figure 2, is revised as follows:

Figure 2
Application Process Flow Chart for Solar as an Option Projects



F. Applicability of Guidebook Changes to Existing Applications

Page 9 is revised as follows:

1. The rules below explain the applicability of this third edition of the NSHP Guidebook to existing applications. For purposes of this section, "adoption date" means the date the Energy Commission adopts this edition of the Guidebook, and an "approved application" means one that the Commission approved prior to the adoption date. An approved application that has not received an approved payment claim will continue to be governed by the previous Guidebook versions except as follows:
    a) Applicants are permitted to enter into leasing/PPA agreements as long as they comply with the requirements in Chapter II, Section L.
    b) Applicants may increase the size of their systems but payment will be capped based on 7.5 kW AC per system.
    c) Applicants do not have to submit the final building permit signoff or final invoice, and may follow the third edition in regards to utility interconnection, EPBI and Energy Efficiency Documentation.

II. PROGRAM ELIGIBILITY REQUIREMENTS

B. Residential Building Energy Efficiency

Page 13 is revised as follows:

Field verification of *all* energy efficiency measures used to meet the above Title 24 requirements will be required and reported on the CF-4R-NSHP form and be consistent with current Title 24 Standards field verification procedures and protocols. In addition, ~~for either Tier I or II,~~ each appliance provided by the builder must be Energy Star labeled if *Energy Star* is applicable to that appliance. Solar water heating may be used to assist in meeting the energy efficiency requirements of either Tier I or Tier II.

E. System Performance Meter

Page 15 is revised as follows:

All solar energy systems must be installed with a standalone performance meter or an inverter with a built-in performance meter so that the customer can determine the amount of energy produced by the system.

K. Equipment Sellers/Installers

Page 17 is revised as follows:

To participate in the NSHP, companies that~~who~~ sell and/or install solar energy system equipment must be self-registered ~~registered with~~on the Energy Commission's Contractors, Installers, and Sellers Database (Database). Equipment sellers/installers should have the following information available prior to self-registration: ~~with the following information on the Retailer Registration form, NSHP-4:~~

1. Business name, address, phone, fax, and e-mail address
2. Owner or principal contact
3. Business license number
4. Contractor license number (if applicable)
5. Proof of good standing on record with the California Secretary of State, as required for corporate and limited liability entities
6. Reseller's license number

~~Self-registration can be done on-line at: [http://gosolarcalifornia.ca.gov/retailers/search-new.php].~~

This information must be submitted to the Energy Commission through the self-registration process before a company can become eligible to participate in the NSHP. ~~To remain eligible, this information must be resubmitted annually by March 31.~~ ~~Annual submittal is required even if the information identified in the company's prior submittal has not changed. In addition, a company must submit an updated NSHP-4 form within 30 days of the date any of its reported information has changed.~~

Self-registration can be done on-line at: http://www.gosolarcalifornia.ca.gov/database/addcompany.php.

Sellers, contractors, or installers that are listed in the online Database should maintain their information on a regular basis. This can be done using the log-on account name and password provided when the company has registered. Updates can be done online at:

http://www.gosolarcalifornia.ca.gov/database/update.php

The Energy Commission will send out emails periodically to remind companies to update their online information, contacts, and other data.

It is the responsibility of each company to maintain its online information. If the Energy Commission's e-mails are returned as undeliverable, and the Energy Commission cannot reach that company by phone or by regular U.S. mail, the Energy Commission

reserves the right to remove the company from the online Database after a three-month period.

L. Leases and Power Purchase Agreements

Page 18 is revised as follows:

Solar energy systems that are leased by an end-use customer or provide electricity to an end-use customer under a power purchase agreement (PPA) are eligible for NSHP funding if the lease agreement or PPA is executed and has a start date on or after July 1, 2009. Lease agreements and PPAs that are executed or have a start date prior to July 1, 2009, are not eligible for funding even though the system may have been installed after this date. Lease agreements and PPAs must have ~~a~~an initial term of no less than 10 years and must provide the lessee or customer the option to renew the agreement, purchase the system, or remove the system at the end of the initial ~~agreement~~term of the agreement. In addition, lease agreements and PPAs must demonstrate that the NSHP funding benefits the end-use customer by directly and exclusively reducing the lease payments for the system or the cost of electricity produced by the system.

IV. RESERVATION PROCESS

A. Types of Reservations

3. Affordable Housing

b. Individual Meter Requirement

Page 28, first paragraph, is revised as follows:

EXCEPTION: Affordable housing projects that qualify for virtual net metering (VNM) as adopted by the California Public Utilities Commission (CPUC) in Decision 08-10-036 are not required to separately net-meter~~The solar energy system for~~ each residential dwelling unit that will be ~~provided~~allocated electricity from the solar system.

B. Forms and Documentation

2. Proof of Residential New Construction

a. For Solar as Standard Projects

Page 29 is revised as follows:

A copy of the ~~tentative (or~~ final~~, if available)~~ subdivision map, or "tract map" must be submitted. Each ~~residential building included~~site in the reservation must be indicated as pre-plotted locations on the map for the reservation. If the ~~residential buildings~~sites are not pre-plotted, the~~n~~ applic~~ants~~tion does not qualify for the Ssolar as Sstandard incentive reservation and must use the criteria outlined ~~in Section B of this chapter~~ under Base Incentive.

4. Energy Efficiency Documentation

Page 31, second**,** fourth and fifth paragraphs, are revised as follows:

~~Only~~ Residential energy efficiency documentation (CF-1R) must be completed by a Certified Energy Plans Examiner (CEPE) approved for residential compliance by the California Association of Building Energy Consultants (CABEC) ~~will be accepted~~. Nonresidential energy efficiency documentation (PERF-1) must be completed by a CEPE approved for nonresidential compliance by CABEC. For a list of CEPEs, visit the CABEC website at: [http://www.cabec.org/ceperosterall.php].

Applicants must submit the CF-1R (or PERF-1 when ~~relevant~~applicable) and other required energy efficiency documentation forms and the associated digital input files (e.g. *.bld or *.mp7, *.mp8), generated directly by one of the Energy Commission-approved Title 24 compliance software programs, showing all of the measures used to meet the energy savings requirements. The CF-1R (or PERF-1 when ~~relevant~~applicable) and other energy efficiency documentation forms must be consistent with the construction plan-set.

~~Applicants must submit the CF-1R form and the~~ The associated digital input files (e.g. *.bld or *.mp7, *.mp8) ~~in digital format which may~~ will be used for uploading into the data registry of one of the Energy Commission approved HERS Providers.

5. Equipment Purchase Agreement and Installation Contract

a. For Solar as Standard Projects

Page 34 is revised as follows:

~~Additional information is required for contracts to be properly executed.~~ For more information on CSLB guidelines, please refer to their website at: [~~www.cslb.ca.gov~~http://www.cslb.ca.gov/]
~~The Energy Commission requires all contracted installations to be done by entities with a valid A, B, C-10 or C-46 contractor license. When systems are installed by the builder's employees, those employees are not required to be licensed. However, the Energy Commission strongly encourages installation by qualified installers since the~~

~~expected performance and incentive amount depend in part on the quality of system installation.~~

For systems that are leased or provide electricity under a power purchase agreement, instead of providing both an equipment purchase agreement and installation contract, applicants must provide an installation contract that lists the proposed equipment to be installed.

V. PAYMENT PROCESS

A. Forms and Documentation

2. Expected Performance Based Incentive Documentation

Page 43 is revised as follows:

Applicants must submit signed copies of a Certificate of Field Verification and Diagnostic Testing (CF-4R-PV) for each solar energy system ~~for each residential building~~ consistent with the procedures found in Appendix ~~4~~2. When the Program Administrator has online access to a HERS Provider Registry for verification purposes, ~~Electronic~~ electronic copies of a CF-4R-PV that are registered in a HERS ~~p~~Provider data registry are acceptable in lieu of a signed CF-4R-PV~~and shall be verified by the Program Administrator~~.

3. Energy Efficiency Documentation

Page 44, third and fourth paragraphs, is revised as follows:

Applicants must submit a signed copy of the Certificate of Field Verification and Diagnostic Testing (CF-4R) for ~~all~~ any ~~energy efficiency~~HERS verification measures installed to meet either Tier I or Tier II. When the Program Administrator has online access to a HERS Provider Registry for verification purposes, ~~Electronic~~ electronic copies of a CF-4R that are registered in a HERS ~~p~~Provider data registry are acceptable in lieu of a signed CF-4R ~~and shall be verified by the Program Administrators~~. A CF-4R is required when indicated by the statement “HERS Verification Required” on the CF-1R (or PERF-1).

~~When the field verification and diagnostic testing is performed using the sampling approach, builders must submit only a CF-4R form for each residential building that is sample tested for a group of up to seven units for which compliance was verified based on the results of the sample. Builders may be required to provide copies of Certificates of Field Verification and Diagnostic Testing for other residential buildings in the group upon request.~~

Applicants must submit a signed copy of the Above Code Energy Efficiency Measures Verification Checklist (CF-4R-NSHP) for all energy efficiency measures used to meet

the above Title 24 requirements ~~installed to meet either Tier I or Tier II~~. When the Program Administrator has online access to a HERS Provider Registry for verification purposes, ~~Electronic~~ electronic copies of a CF-4R-NSHP that are registered in a HERS ~~p~~Provider data registry are acceptable in lieu of a signed CF-4R-NSHP~~and shall be verified by the Program Administrators~~. The CF-4R-NSHP is generated from the CF-1R (or PERF-1) and will be unique to the energy efficiency measures proposed for a specific design. The CF-4R-NSHP is always required regardless of the use of any HERS verification measures.

APPENDIX 1 – FREQUENTLY ASKED QUESTIONS

C. Time Extensions

Page 50 is revised as follows:

~~No time extensions will be granted to existing reservations under any circumstances.~~Projects with valid, unexpired reservations as of January 1, 2010, ~~with an expiration date prior to December 31, 2011,~~ are automatically granted a one-time time extension as follows:~~.~~ Solar as Standard and affordable housing projects have an additional 12 months from ~~after~~ the expiration date of their reservations as stated on the NSHP-2 to submit a payment claim package~~s~~. Base incentive projects have an additional six months from ~~after~~ the expiration date of their reservation as stated on the NSHP-2 to submit payment claim packages.

No other time extensions will be granted to any other projects under any circumstances.

APPENDIX 2. FIELD VERIFICATION AND DIAGNOSTIC TESTING OF SYSTEMS

E. Field Verification Visual Inspection

1. PV Modules

Page 62 is revised as follows:

The PV installer and the HERS rater ~~must~~ shall verify that the ~~same number~~ make, model, and quantity ~~of each make and model number~~ of PV modules ~~used in the expected performance calculations~~specified on the CF-1R-PV are installed in the field. The PV installer and HERS rater ~~must also~~ shall verify the module mounting type (flush mounted BIPV or rack mounted) and in the case of rack mounted modules, the standoff distance of the modules above the mounting surface. The PV installer and the HERS rater ~~also must observe and~~shall verify the mounting height of the modules above the ground (either one story, two story or ~~measured minimum~~applicant specified ~~distance~~ height~~above the ground~~).

G. Verification of System Performance

4. Multiple Orientation Arrays

Page 80 is revised as follows:

Multiple orientation arrays are those with parallel strings, each with an equal number of modules, in different orientations (azimuth and tilt) and ~~For larger systems, PV modules~~ connected to the same inverter. ~~may be installed with strings of equal numbers of modules connected in parallel in more than one orientation, each with its own tilt and azimuth (note that it is bad practice to install such strings in series or with a different number of modules in each string; either of these installations will lead to substantial reductions in performance). When strings are installed in multiple orientation arrays~~When parallel strings in different orientations are connected to the same inverter, separate CF-1R-PV forms must be prepared for each orientation and solar irradiance must be measured separately in a plane parallel to each ~~string that has a different azimuth and tilt.~~orientation. Field verification will require separate CF-6R-PV and CF-4R-PV forms for each orientation. The expected ~~output~~ AC power output is determined separately for each ~~condition~~ orientation and the sum is used for verification purposes.

NSHP-1

RESERVATION APPLICATION FORM
NEW SOLAR HOMES PARTNERSHIP

1. Applicant Name and Contact Information

Homeowner or Builder/Developer Name	Phone Number	Email Address

Please check one of the following:

I am the: o Homeowner o Builder/Developer

Mailing Address	City:	State:	Zip Code:

Contact Name (if different from above) & Company	Address	Phone, Fax and Email Address

2. Project Description

Please give a general project description including the site address of development.

Name of project: _____

Address to where the system will be installed (if this is a housing development, only the city or location to nearest city needs to be specified): _____

Please check all that apply to your project:

Occupancy type: o Single Family o Multifamily/Mixed ~~Use~~ Occupancy

Reservation type: o Solar as Standard (More than 50 percent of the residential dwelling units in a large project (minimum of 6 residential dwelling units) will have solar energy systems installed)

o Base Incentive
- Custom home
- Small housing developments with less than 6 residential units
- Projects where solar will be installed on less than 50 percent of the residential dwelling units
- Common area systems in residential developments
- Solar as an Option (Please note, if solar is offered as an option, your reservation can only be for up to 50 percent of the residential dwelling units in the project) Total number of residential dwelling units in the project: _____

Total number of residential dwelling units with solar energy systems installed: _____

o Affordable Housing
- o Total number of common areas systems installed: _____
- o Total number of residential dwelling units with solar energy systems installed: _____

Please note that only Solar as Standard, affordable housing, and solar as an option projects will receive a 36-month reservation. All others will receive an 18-month reservation.

For custom home applicants to complete

Anticipated new construction permit issue date(s): _____

Anticipated solar permit issue date(s):_____ Anticipated occupancy permit issue date(s):_____

Please note that the building permit for the solar energy system should be approved by the building code enforcement agency prior to the original occupancy of the newly constructed building, but no later than 60 days after the issuance of the occupancy permit.

3. Electric Utility, Participation in Utility's Energy Efficiency Program

Please select the utility providing electricity to the project: o PG&E o SCE o SDG&E o BVE

Is your project participating in the electric utility's residential new construction program? o Yes o No

Please note that projects participating in the electric utility's residential new construction program can waive the submission of the energy efficiency documentation.

4. Home Energy Rating System (HERS) Information[1] (if available)

	HERS Rater Company	HERS Rater	Phone number	HERS Provider
Energy efficiency measures verification				
Solar energy system field verification				

5. Required Supporting Documentation

Solar as Standard Projects:
- o Final Subdivision Map
- o EPBI Documentation
  - □ CF-1R-PV form
  - □ Electronic input files (.emf, .her)
- o Equipment Purchase Agreement**
- o Labor Contract (if separate from the equipment purchase agreement)
- o Energy Efficiency Documentation*
  - □ CF-1R form
  - □ Electronic input file (.bld/.mp7, .mp8)
  - □ Construction plan set

Base Incentive Projects, except Solar as an Option:
- o Final Subdivision Map/Building Permit
- o EPBI Documentation
  - □ CF-1R-PV form
  - □ Electronic input files (.emf, .her)
- o Equipment Purchase Agreement**
- o Labor Contract (if separate from the equipment purchase agreement)
- o Energy Efficiency Documentation*
  - □ CF-1R form
  - □ Electronic input file (.bld/.mp7, .mp8)
  - □ Construction plan set

Solar as an Option Projects:
- o Final Subdivision Map
- o Equipment Purchase Agreement**
- o Labor Contract (if separate from the equipment purchase agreement)
- o Build-Out Schedule

To be submitted later when installation details are specified:
- o EPBI Documentation
  - □ CF-1R-PV form
  - □ Electronic input files (.emf, .her)
- o Energy Efficiency Documentation*
  - □ CF-1R form
  - □ Electronic input file (.bld/.mp7, .mp8)
  - □ Construction plan set

Affordable Housing Projects: in addition to a copy of the regulatory agreement, submit all required supporting documentation pertaining to the project's housing type. TCAC projects have up to 60 days after funding approval to submit the Energy Efficiency Documentation.

***Waived if ~~proof of~~ participating~~on~~ in a utility residential new construction program ~~is provided~~*

***In the case of lease or PPA projects, an installation contract with equipment listed shall replace the equipment purchase agreement.*

6. Declaration

The undersigned party declares under penalty of perjury that the information in this form and the supporting documentation submitted herewith is true and correct to the best of his or her knowledge and acknowledges the following program requirements to reserve funding:

- o Incentives are based on the expected performance of the systems installed.
- o Buildings must achieve at a ~~the~~ minimum Tier I Energy Efficiency to be eligible for the program.
- o Systems that are leased or provide electricity under a power purchase agreement are subject to special reporting requirements. Applicant may be required to repay some or all of the NSHP funding he or she receives if the system is leased or provides electricity through a power purchase agreement, and the lease agreement or power purchase agreement is terminated within five years of the system's installation or the start date of the agreement, whichever is later.

The undersigned party further acknowledges that he or she is aware of the requirements and conditions of receiving funding under the New Solar Homes Partnership (NSHP) and agrees to comply with all such requirements and conditions as provided in the Energy Commission's NSHP Guidebook, Third Edition, and Overall Program Guidebook as a condition to receiving funding under the NSHP. The undersigned party authorizes the Energy Commission, during the term of the NSHP, to exchange information on this form with applicable electric utility servicing the project to verify compliance with NSHP requirements.

Signature, Assignment of Administrative Rights and Incentive Recipient Information

Homeowner or Builder/Developer Name: _____ Date: _____

Signature: _____ Title: _____

(Optional)

o I, the applicant, am designating _____ as my authorized representative for the New Solar Homes Partnership program. This party is permitted to sign the NSHP-2(s) and any revised EPBI Documentation on this project on my behalf.

Designated Payee of NSHP Incentive ~~Recipient~~: _____

Payee's ~~Recipient's~~ Address: _____

[1] It will be the responsibility of the applicant to provide this information to the program administrators at the earliest opportunity, if not available at this time. This information is used to upload the project information to the HERS registry and has to occur in a timely manner at least 6 months prior to the field verification process.

NSHP-1.5

SOLAR AS AN OPTION APPROVAL FORM
NEW SOLAR HOMES PARTNERSHIP

1. Confirmation of Reservation Amount

This is to confirm that financial incentives have been reserved for _____ through the NSHP. The amount of funding reserved for your project is $_____.

The reserved funding is based on the following formula:

Total number of homes in a development or build-out phase x 50% x 2 kW per home x base incentive

Your reservation period begins _____ and will expire on _____. The payment will be made to _____ (designated payee).

The exact incentive amount for each site will not be confirmed until the applicant identifies a specific site to which a solar energy system will be installed. At that point, the applicant shall provide a copy of this form and the remaining required supporting documentation pertaining to the site to the Program Administrator. The Program Administrator will review and approve the information submitted. Once approved, the exact incentive amount will be confirmed, and the applicant will be provided a Payment Claim Form (NSHP-2) for the specified site.

2. Site Address

Address to where the system will be installed: _____

3. Home Energy Rating System (HERS) Information[2] (if previously not provided)

	HERS Rater Company	HERS Rater	Phone number	HERS Provider
Energy efficiency measures verification				
PV installation field verification				

4. Signatures

The undersigned parties declare under penalty of perjury that the information in this form and the supporting documentation submitted herewith is true and correct to the best of their knowledge.

Applicant/ Authorized Representative	*Required Supporting Documentation*
Name: _____ Title: _____ Signature: _____ Date: _____	o EPBI Documentation • CF-1R-PV form • Electronic input files (.emf, .her) o Energy Efficiency Documentation* • CF-1R form • Electronic input file (.bld/.mp7, .mp8) • Construction plan set **Waived if ~~proof of~~ participation ~~in~~ in a utility residential new construction program ~~is provided~~*

For the latest mailing address information, visit [http://www.gosolarcalifornia.ca.gov/contactus.html]. Alternatively, you may submit your application via the NSHP application tool at [https://www.newsolarhomes.org]. Please visit the Go Solar California website for tutorials on how to use the application tool.

[2] It will be the responsibility of the applicant to provide this information to the program administrators at the earliest opportunity, if not available at this time. This information is used to upload the project information to the HERS database and has to occur in a timely manner at least 6 months prior to the field verification process.

NSHP-2

PAYMENT CLAIM FORM
NEW SOLAR HOMES PARTNERSHIP

[CEC use only]

Incentive @ _____ = $_____

Payment Approval Date:_____

Reservation ID _____

Project Name _____

Address or _____

Site ID _____

1. Confirmation of Reservation Amount

_____ has been granted a reservation of $ _____ for a _____ kW solar energy system. This reservation is for a _____ project and will expire on _____. The system is being installed at _____. The payment will be made to _____ (designated payee).

The solar energy system must be completed and the claim submitted with the appropriate documentation by the deadline. Claims must be postmarked by the expiration date or the reservation will expire. This reservation is non-transferable. System must be installed at the installation address.

2. Major System Equipment of Record (Modules, Inverters, Meters)

Quantity	Manufacturer	Model	Cost

3. System Details

Total System Price: _____ Total HERS Cost: _____ Lot Number: _____

Equipment Cost (before rebate): _____ PV HERS Cost: _____ Final Address: _____

Installation Cost: _____ EE HERS Cost: _____ Interconnection Date: _____

Sales Arrangement: o Purchased oLeased oPPA Annual kWh: New Construction Building Permit Issue Date:

Final Equipment Seller Name:	Final PV HERS Rater Name and Provider:
Final System Installer Name:	Final EE HERS Rater Name and Provider:

4. Modifications

Has any of the equipment or installation specifications changed since the reservation was approved? O Yes O No
If yes note the changes before claiming payment.

_____

_____

_____

_____

5. Payment Assignment

Is payment assigned to another party?

☐ **Yes (Please fill out all the sections below.)**

☐ **No (Please skip Section 5 and complete all others.)**

Assignment Request

I, _____, the ~~designated payee~~ applicant or authorized representative of the ~~payee~~applicant as specified on the NSHP-1 form, hereby assign the right to receive payment for the above noted reservation under the NSHP to the following individual or entity and request that payment be forwarded to this individual or entity at the address below. An STD-204 should be submitted for the person/entity receiving the payment, if not already on record with the Energy Commission.

Name: _____

Address: _____

_____

Phone Number: _____

As the ~~designated payee~~ applicant or authorized representative of the applicant as specified on the NSHP-1 form, I understand that I remain responsible for complying with the requirements of the NSHP and will remain liable for any tax consequences associated with the reservation payment, despite the payment's assignment. I further understand that I may revoke this payment assignment at any time prior to the Energy Commission's processing of the payment by providing written notice to the Energy Commission's Renewable Energy Office.

Signature: _____ Date: _____

Name: _____ Title: _____

6. Signatures

The undersigned party~~ies~~ declare~~s~~ under penalty of perjury that the information in this form and the supporting documentation submitted herewith is true and correct to the best of his or her ~~their~~ knowledge. The party~~ies~~ further declare~~s~~ under penalty of perjury that the following statements are true and correct to the best of his or her~~their~~ knowledge:

(1) The electrical generating system described above and in any attached documents meets the terms and conditions of the Energy Commission's NSHP and has been installed and is operating satisfactorily as of the date stated below.

(2) The electrical generating system described above and in any attached documents is properly interconnected to the utility distribution grid and has been issued utility approval to operate the system as interconnected to the distribution grid.

(3) The rated electrical output of the generating system, the physical location of the system, and the equipment identified were installed as stated above.

(4) Except as noted above, there were no changes in the information previously submitted for this system.

The undersigned party~~ies~~ further acknowledge~~s~~ that he or she ~~they~~ are aware of the requirements and conditions of receiving funding under the NSHP, including the special reporting and repayment requirements for leased systems and systems providing electricity under a power purchase agreement, and agree to comply with all such requirements and conditions as provided in the Energy Commission's NSHP Guidebook, Third Edition, and Overall Program Guidebook as a condition to receiving funding under the NSHP. As specified in the NSHP Guidebook, the undersigned applicant ~~Purchaser~~ authorizes the Energy Commission during the term of the NSHP to exchange information on this form with the electric utility servicing the system in order to verify compliance with the NSHP requirements.

Applicant/ Authorized Representative	***Required Supporting Documentation***	***Documents to be Verified by Program Administrator***
Name: _____ Title: _____ Signature: _____ Date: _____	• Ten-Year Warranty Form (NSHP-3) • Payee Data Record (STD-204) and IRS W-9 if requested • Lease or Power Purchase Agreement, if applicable	• Final EPBI Documentation (CF-4R-PV) • Final Energy Efficiency Documentation (CF-4R and/or CF-4R-NSHP) • Utility Approval of Interconnection

For the latest mailing address information, visit [http://www.gosolarcalifornia.ca.gov/contactus.html].

CALIFORNIA ENERGY COMMISSION

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Valerie Hall
Deputy Director
EFFICIENCY & RENEWABLE ~~Energy~~ ENERGY DIVISION

These guidelines were formally adopted by the California Energy Commission on December 13, 2006, pursuant to Public Resources Code Section 25744 and 25747 Public Resources Code Section 25780 et seq., as enacted by Senate Bill 1 (Chapter 132, Statute of 2006), and subsequently revised pursuant to this authority on July 11, 2007, ~~and~~ August 21, 2008 and~~-~~ January XX, [2010 .

Table of Contents

What's New in This Guidebook? ..... **i**
Chapter I. Introduction **1**
A. Purpose 1
B. Program Overview 1
C. Summary of New Solar Homes Partnership Guidebook Requirements 5
D. Flow Charts of the NSHP Application and Payment Process 7
E. Renewable Energy Credits/Certificates 8
F. Applicability of Guidebook Changes to Existing Applications 9
Chapter II. Program Eligibility Requirements **11**
A. Technology and System Ownership 12
B. Residential Building Energy Efficiency 12
C. Grid Interconnection 13
D. System Components 14
E. System Performance Meter 15
F. System Sized to Offset On-site Electricity Load 15
G. System Performance 15
H. System Installation 16
I. Field Verification 16
J. Warranty Requirements 17
K. Equipment Sellers/Installers 17
L. Leases and Power Purchase Agreements 18
Chapter III. Incentive Levels and Structure **20**
A. Incentive Levels and Decline Schedule 20
1. Incentive Levels for Market-Rate Housing 20
2. Incentive Levels for Affordable Housing Projects 22
B. Expected Performance-Based Incentive Calculation 23
C. Other Incentives May Affect the NSHP Incentive Amount 24
Chapter IV. Reservation Process **26**
A. Types of Reservations 26
1. Solar as Standard 26
2. Base Incentive 26
3. Affordable Housing *(Moved from Sect. D)* 27
B. Forms and Documentation 28
1. Reservation Application Form (all reservations) 28
2. Proof of Residential New Construction 29
3. Expected Performance Based Incentive (EPBI) Documentation 30
(all reservations) 30
4. Energy Efficiency Documentation (all reservations) 31
5. Equipment Purchase Agreement and Installation Contract 33
C. Projects Where Solar is Offered as an Option to Homebuyers 36
(*AH Moved up to Sect. A)* 37
D. Additional Information for All Reservation Applications 39
E. Where to Send Reservations 40
Chapter V. Payment Process **41**
A. Forms and Documentation 41

1. Payment Claim Form (NSHP-2) 41
2. Expected Performance Based Incentive (EPBI) Documentation 43
3. Energy Efficiency Documentation 44
4. Ten-Year Warranty (NSHP-3) 45
5. System Interconnection with Utility Grid 45
6. Payee Data Record (STD-204) / IRS W-9 Form 46
7. Lease Agreement or Power Purchase Agreement 46
B. Additional Information on Payment Claims 47
C. Claiming an Incentive Payment Without a Prior Reservation 48
Appendix 1 – Frequently Asked Questions 49
A. Can My Installed System Be Different Than My Reservation? 49
B. Can Applicants Add to Their Existing Systems? 50
C. Time Extensions 50
Appendix 2 – Field Verification and Diagnostic Testing of Systems 58
A. Background 58
B. Responsibilities 59
C. Field Verification and Diagnostic Testing Process 59
D. Relationship to Other Codes, Standards and Verification 62
E. Field Verification Visual Inspection 62
1. PV Modules 62
2. Inverters 63
3. System Performance Meters 63
4. Tilt and Azimuth 63
F. Shading Verification 67
1. Minimal Shading Criterion 68
2. Accounting for Actual Shading 70
3. Measuring Heights and Distances or Altitude Angles 71
4. Mature Tree Height 76
G. Verification of System Performance 77
1. Measuring Solar Irradiance 80
2. Measuring Ambient Air Temperature 80
3. Observing AC Power Output at the System Performance Meter 80
4. Multiple Orientation Arrays 80
Appendix 3 – NSHP Forms 82

What's New in This Guidebook?

Below are the major changes in this edition of the New Solar Homes Partnership Guidebook as compared with the August 2008 edition of the NSHP guidebook:

Market Rate Housing

- ~~Permits ten-year~~ Provides explicit language and requirements to clarify the eligibility of leased systems and systems furnishing electricity under power purchase agreements to participate in the NSHP program. Requirements include~~,~~ annual report and confirmation from lessor or system owner (for the first five years of the lease or PPA,) on the operational status of the solar PV system; payback of NSHP incentives within the first 5 years if a lease agreement is terminated and the system is removed from the building.

- Modifies the Solar As An O~~o~~ption program by increasing from 10 to 50 percent the maximum percentage level of a project's residential dwelling units that can be reserved, and extending the solar-as-option reservation period from 18 to 36 months.

- Allows builders/developers to submit applications for phases of six or more residential dwelling units to qualify for the solar-as-standard reservation.

Affordable Housing

- Affordable housing with occupancy permits less than two years old may apply for incentives.

- The restriction that affordable housing is required to remain as affordable housing is reduced from 45 years to 10 years.

- Explicitly recognizes virtual net metering for affordable housing as acceptable to apply for NSHP incentives.

- Projects requesting funding from the California Tax Credit Allocation Committee (TCAC) are given up to 60 days after the approval from TCAC to provide finalized energy efficiency documentation.

General Program Changes

- Allows system sizes that are increased after initial NSHP reservation approval time to receive the same original incentive level that the NSHP reservation was initially approved.

- Removes the system size justification requirement.

- Limits ~~l~~incentives to the first 7.5 kW AC of a solar energy system installed for individual residential dwelling units. Incentives for common area systems or virtual net metered systems are not similarly capped.

- Updates the California Flexible Installation criteria tilt range to include flat installations.

- Updates the energy efficiency Tier levels under the new 2008 Building Energy Efficiency Standards.

- Eliminates the NSHP-1.6 application process.

- Eliminates the need for annual retailer registration and completion of the NSHP-4 retailer form. This process is now being replaced by the online self-registration process at: http://www.gosolarcalifornia.ca.gov

- Revises and simplifies NSHP application forms.

- Removes requirement to provide build-out schedule.

Chapter I. Introduction

The New Solar Homes Partnership (NSHP) provides financial incentives and other support for installing eligible solar ~~photovoltaic (PV)~~energy systems on new residential buildings[1] ~~-~~ that receive electricity from specified investor-owned utilities.[2] The Energy Commission implements the New Solar Homes Partnership (NSHP) in coordination with the California Public Utilities Commission (CPUC) as part of the overall California Solar Initiative. This Guidebook describes the requirements to receive incentives for constructing energy efficient, solar homes under the NSHP.

A. Purpose

The goal of the NSHP is to create a self-sustaining market for solar homes where builders incorporate high levels of energy efficiency and high performing solar energy systems. The NSHP provides financial incentives and non-financial assistance in the form of builder and market support to accomplish this goal.

B. Program Overview

The NSHP is part of a comprehensive statewide solar program known as the California Solar Initiative (CSI). ~~The NSHP builds on the success of the Energy Commission's Emerging Renewables Program (ERP), which began providing incentives for renewable energy systems in 1998.~~ Senate Bill 1 (SB 1)[3] establishes three goals of the CSI: 1) to install 3,000 megawatts (MW) of distributed solar ~~PV~~ electric capacity in California by the end of 2016; 2) to establish a self-sufficient solar industry in which solar energy systems are a viable mainstream option in 10 years, and 3) to place solar energy systems on 50 percent of new homes in 13 years. The NSHP seeks to achieve 400 MW of installed solar electric capacity in California by the end of 2016.

The Energy Commission and the CPUC ~~California Public Utilities Commission will~~ each administer separate, but coordinated elements of the CSI.

The NSHP ~~Program~~ is administered ~~ration by for the NSHP has been transferred to~~ Pacific Gas and Electric Company (PG&E) ~~(effective June 2008)~~, Southern California Edison Company (SCE) ~~(effective April 2008)~~, and San Diego Gas & Electric Company (SDG&E) ~~(effective March 2008)~~, for their respective service areas. These entities

[1] ~~Please S~~see ~~Section~~ Chapter II, Program Eligibility Requirements, for the definition of new residential buildings.
[2] Eligible electric utilities are Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, and Golden State Water Company (doing business as Bear Valley Electric Service).
[3] SB 1 (Murray), Chapter 132, Statutes of 2006, § 4, as codified in Public Resources Code sections 25780 – 25784.

administer the NSHP on the Energy Commission's behalf in accordance with their respective agreements with the Energy Commission. The Energy Commission provides ~~O~~oversight of the program and program administration for eligible customers of Bear Valley Electric Service (BVES). ~~will continue to be handled by the Energy Commission~~.

The NSHP program provides two incentive structures, one for conventional or market-rate housing and another for qualified affordable housing projects. For market-rate housing, the incentive is determined by the level of an applicant's commitment to solar. For affordable housing projects, the incentive depends on the type of structure the solar energy system is servicing. The NSHP offers a higher ~~-~~incentive to affordable housing projects, because the affordable housing industry often faces more difficulties in the financing and incorporation of solar energy systems in its developments than do conventional housing developments.[4] ~~For both incentive structures, energy efficiency, the expected performance of the system (anticipated electrical generation over the life of the system), which depends on specific key factors regarding equipment efficiency and the design and installation of the system, will also determine the incentive amount. The incentive is paid once the system is installed, operational, and has met all program requirements.~~

To qualify for an incentive, both the residential building and the installed ~~PV~~ solar energy system must meet specific program requirements included in this Guidebook. ~~The residential buildings must receive electricity distribution service at the site of installation from one of four investor-owned utilities (IOUs) in California that collect funds to support the program: Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, and Southern California Water Company – doing business as Bear Valley Electric Service (BVES). The solar electric system must be 1 kW AC or larger, interconnected to the utility distribution grid and generate electricity to offset the end-use consumer's on-site electrical load. The solar electric system must be located on the same premises of the end-use consumer where the consumer's own electrical demand is located. The solar electric system must use new certified components that have not been previously placed in service and are on the Energy Commission's list of eligible equipment. The solar electric system must come with a 10-year warranty to protect against defects and undue degradation of electrical output. The solar electric system must be installed and field-verified by a third-party as specified in this Guidebook.~~

The residential buildings must achieve energy efficiency levels substantially greater than the requirements of the current Building Energy Efficiency Standards, Title 24, Part 6, also known as "Title 24." Energy efficiency requirements may be satisfied through either Tier I or Tier II level energy efficiency measures. ~~The builder can choose to comply with either of two tiers of energy efficiency measures:~~

[4] These higher incentives are provided consistent with Public Resources Code section 25401.6.~~,~~

~~1) Tier I – 15 percent reduction in the residential building's combined space heating, cooling and water heating energy compared to the current *Title 24 Standards*;~~

~~2) Tier II – 35 percent reduction in the residential building's combined space heating, cooling and water heating energy and 40 percent in the residential building's space cooling (air conditioning) energy compared to the current *Title 24 Standards*.~~

~~In addition, for either Tier I or II, each appliance provided by the builder must be *Energy Star* if an *Energy Star* designation is applicable for that appliance[4]. Solar water heating may be used to assist in meeting the energy efficiency requirements of either Tier I or Tier II.~~

The Energy Commission places great importance on ensuring that residential buildings, which qualify for an incentive under the NSHP~~New Solar Homes Partnership~~, are as energy efficient as possible. The Tier I level is a minimum condition of participation in the NSHP, and consistent with the energy efficiency savings needed to qualify for incentives from current residential new construction programs operated by the IOUs. The Tier II level is expected to achieve an immediate positive cash flow for homeowners and encourages builders to move toward constructing zero energy residential buildings,[5] reflecting what is regularly being accomplished in California by builders that are participating in the national *Building America* program. For both tiers, incentives to builders for delivering the required energy efficiency levels are expected to be made available through coordinated utility energy efficiency programs overseen by the CPUC, such as the residential new construction programs. ~~**Applicants are strongly encouraged to directly contact the residential new construction energy efficiency programs of their investor-owned utility to inquire about program requirements and incentives for each energy efficiency tier.**~~

Applicants are strongly encouraged to participate in their utility's residential and multifamily new construction energy efficiency programs to obtain the financial incentives that they can earn for meeting either Tier I or Tier II requirements, and to streamline the process for demonstrating that the energy efficiency requirements for NSHP are met. Energy efficiency documentation submitted and approved by utility new construction programs will not need to be submitted for NSHP, but will be verified before payment claims are approved by program administrators.

~~[4] These Standards are specified in the California Code of Regulations, Title 24, Part 6, commencing with Section 100.~~

[5] The U.S. Department of Energy (DOE) Building Technologies Program defines a net zero energy building as "a residential or commercial building with greatly reduced needs for energy through efficiency gains, with the balance of energy needs supplied by renewable technologies." Source: NREL – NAHB Research Center, February 2006.

~~The Energy Commission understands that the affordable housing industry often faces more difficulties in the financing and incorporation of PV systems in its developments than do conventional housing developments. To address this concern, the NSHP offers an additional amount, above the solar as standard incentive level, when specific eligibility requirements are satisfied (See Chapter IV, Section C, for details).~~
The expected performance of the solar energy system (anticipated annual electrical generation), which depends on specific key factors regarding equipment efficiency and the design and installation of the system, will determine the incentive amount. The incentive is paid once the system is installed, operational, and has met all program requirements.

Along with the financial incentive, the NSHP will provide non-financial support services, offering marketing and technical assistance to builders, as well as training to building officials and salespeople. The Energy Commission may provide greater assistance for builders choosing to build to Tier II energy efficiency levels. The Energy Commission's goal is to assist the industry to the maximum extent feasible to construct and sell new energy efficient, solar residential buildings.

By participating in the NSHP program, applicants authorize the Energy Commission and/or the Program Administrators[6] during the term of the NSHP to obtain information from the utility serving the project to verify compliance with program requirements, including requirements for system interconnection to the utility grid. In addition, the applicant must provide to the Energy Commission new homeowner contact information when requested by the Energy Commission and/or the Program Administrators.

The NSHP may be periodically evaluated and modified to ensure progress towards program goals. The evaluation may include: comparing the expected energy ~~performance~~ generation of systems to the actual output over time; determining the cost-benefit profile of systems; and/or, assessing overall program progress towards meeting installed capacity targets. In addition, an evaluation could include investigating risks to long-term achievement of expected performance levels, such as the effects of unforeseen shading or poor system maintenance, and identifying potential actions that would reduce those risks. Lastly, the NSHP may be modified in the future to address the eligibility of solar thermal electric systems, which are potentially eligible for funding under the CSI (SB 1) pursuant to Senate Bill 107[7] and Senate Bill 1250.[8]

Funding for the NSHP is provided through the Energy Commission's Renewables Resources Trust Fund pursuant to Senate Bill 107, which authorizes the allocation and use of funding available for emerging renewable technologies pursuant to Public Resources Code sections 25744 and 25751 to fund ~~PV~~ photovoltaic and solar thermal

[6] The term "Program Administrators" refers to PG&E, SCE, and SGD&E, for their respective service territories.
[7] SB 107 (Simitian), Chapter 464, Statutes of 2006, § 7, as codified in Public Resources Code section 25744.5.
[8] SB 1250 (Perata), Chapter 512, Statutes of 2006, § 11, as codified in Public Resources Code section 25744, subd. (d).

electric systems in accordance with the eligibility requirements established under SB 1. Because of this, the NSHP is considered an element within the Energy Commission's Renewable Energy Program umbrella and is subject to the general administrative requirements in the Energy Commission's *Overall Program Guidebook* for the Renewable Energy Program *(Overall Program Guidebook)*.

The *Overall Program Guidebook* describes how the Renewable Energy Program is administered. It includes information and requirements that apply overall to the Renewable Energy Program and the program elements, including information dealing with appeals, record retention, audits, and enforcement actions. To qualify for funding under the NSHP, applicants must satisfy the requirements specified in this NSHP Guidebook and the *Overall Program Guidebook.* **Applicants are strongly encouraged to read and understand their responsibilities under both guidebooks.**

~~The following table provides a basic summary of the NSHP program elements.~~

C. Summary of New Solar Homes Partnership Guidebook Requirements

The following table is a brief summary of program eligibility requirements. The applicant should refer to Chapter II for more detailed descriptions of the requirements.

Program Element	NSHP ~~– 2007~~
Eligible technologies	Solar electric generation~~PV electric~~ only
Eligible electric service territories	PG&E, SCE, SDG&E, and BVES
Eligible ~~customers~~housing types	New residential construction,~~only~~ including ~~,~~ total building renovations, ~~(permitted as new construction)~~ [, common areas of housing developments, ~~residential portions of mixed-use developments,~~ and ~~common areas.~~ qualifying mixed occupancy projects. ~~Includes affordable housingserved by PG&E, SCE, SDG&E, and BVES.~~
Eligible equipment	New and not previously placed in service, and listed on the Energy Commission's eligible equipment list. ~~Certified by the Energy Commission.~~
Reservation period	~~18 months for base incentive.~~ 36 months for qualifying Solar as Standard and Solar as an Option developments and affordable housing~~qualifying developments and affordable housing~~ projects. 18 months for all other projects. ~~Extensions are not allowed.~~
Initial Incentive level	Expected Performance-Based Incentive (EPBI)~~,~~ based on the reference system receiving ~~$2.60/watt for production homes with solar as a standard feature,~~ $3.50/watt for affordable housing dwelling units, $3.30/watt for affordable housing common areas, $2.60/watt for production homes with Solar as Standard, or $2.50/watt for all other ~~homes~~projects. Additional funding is available from the utilities for meeting Tier ~~1~~ I and Tier II energy efficiency requirements. ~~EPBI for affordable housing is $3.50/watt for individual units and $3.30/watt for common areas.~~
Incentive level adjustment	Volumetric trigger. ~~-~~Declines ~~approximately~~ 10~~%~~ percent based on original incentive level, ~~when~~ as pre-specified target installed MW volumes are reached.
Incentive adjustments	Depends on geographic location, orientation, tilt, shading, and equipment efficiency.
Energy efficiency requirements	At least Tier I defined as 15% greater efficiency than the base level of the Building Energy Efficiency Standards (Title 24) in effect ~~at the time of build'ing permit~~on the date the building permit was applied for. Tier II, higher levels of energy efficiency are strongly encouraged. ~~Tier I - Title 24 + 15% or higher, Tier II – Title 24 + 35% or higher and 40% or higher for cooling energy.*Energy Star* for builder installed appliances. Solar water heating can be used to help meet Tiers.~~
Field Verification	Solar energy system installation, equipment and performances and ALL energy efficiency measures used to meet the above Title 24 requirements ~~code level required~~ for program participation ~~are~~ shall be verified by a qualified HERS rater.
Checkpoints	~~Required for 36 month reservations only.~~ Solar as an Option projects only.
Interconnection	Grid connected with eligible utility required.

~~C.~~D. Flow Charts of the NSHP Application and Payment Process

The following flow charts provide a summary of the application and payment processing of the NSHP program. Figure 1 shows the process for ~~Solar as a Standard Feature Incentive~~all projects except Solar as an Option and Figure 2 shows the process for ~~a Base Incentive~~Solar as an Option projects.

Figure 1
Application Process Flow Chart for All Projects, Except Solar as an Option

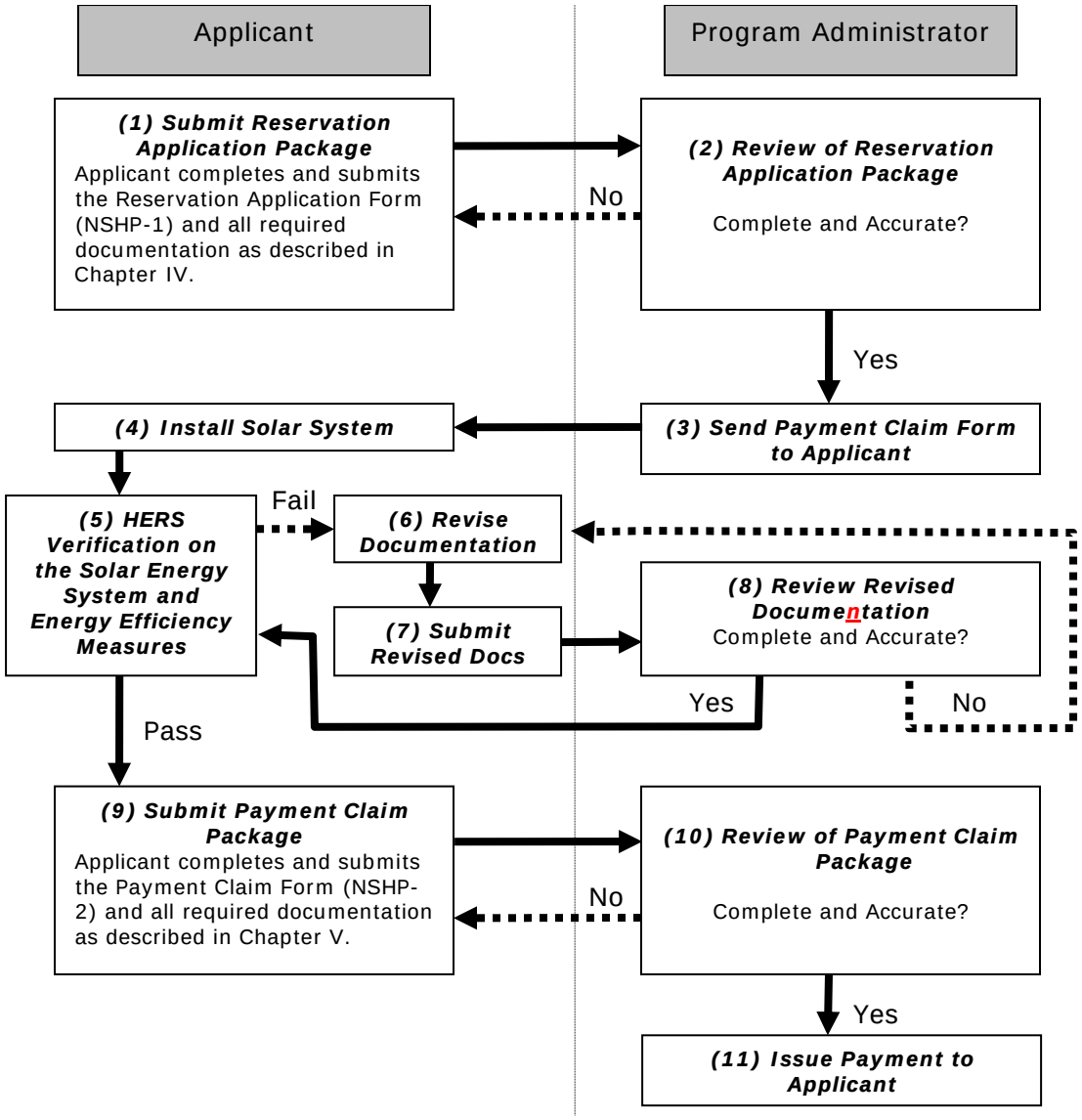
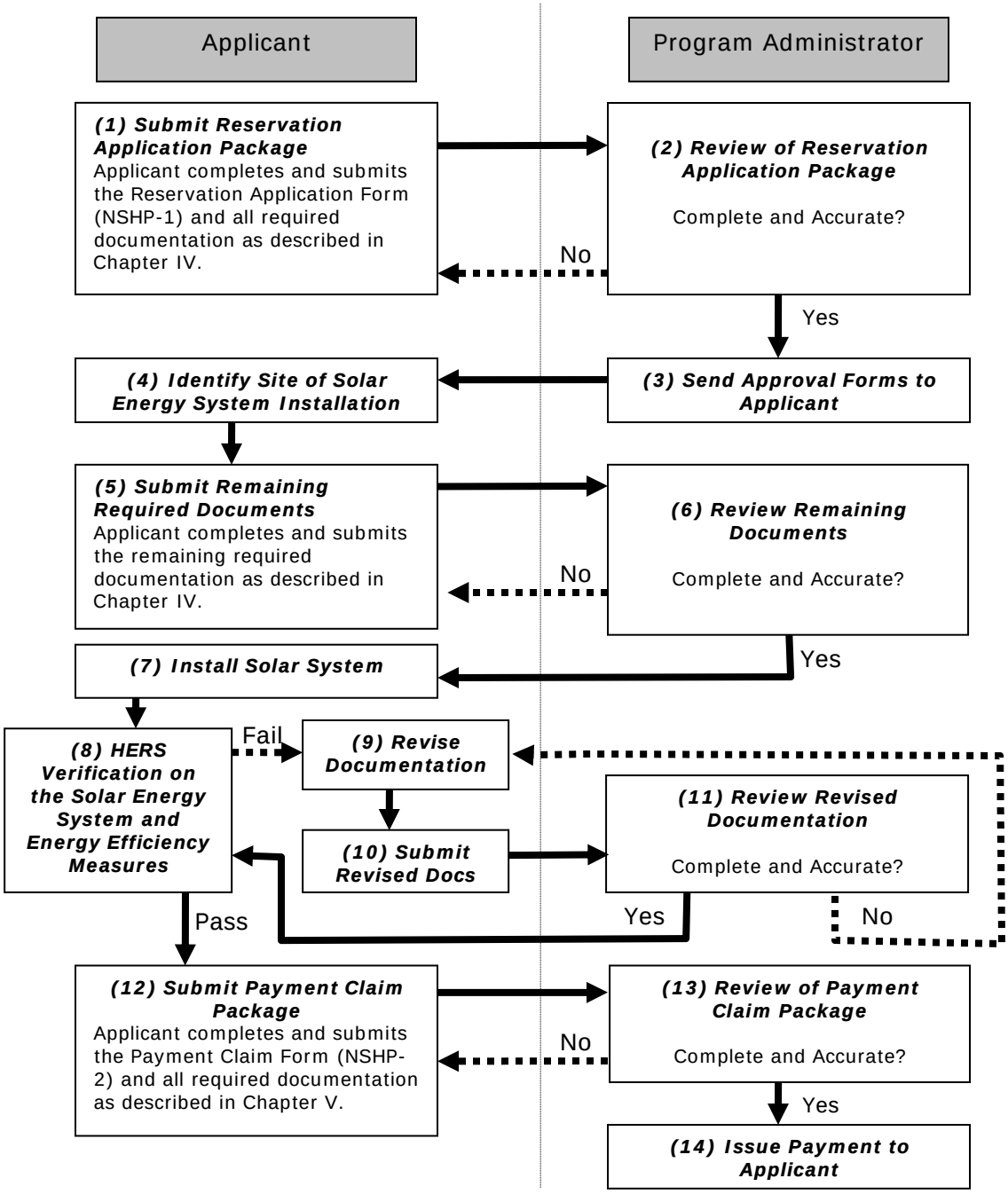


Figure 2
Application Process Flow Chart for Solar as an Option Projects



~~D.~~E. Renewable Energy Credits/Certificates

When ~~renewable~~ electricity is generated using an eligible renewable energy resource, two commodities are created. The first commodity is the electricity, and the second is the renewable energy credits (also referred to as renewable energy certificates, or

RECs) representing the non-energy, environmental attributes associated with the electricity. For purposes of the state's Renewables Portfolio Standard, a renewable energy credit is defined to include "…all renewable and environmental attributes associated with the production of electricity from the eligible renewable energy resource..."[9]

The Energy Commission recognizes that owners of ~~PV~~ solar energy systems, including those participating in the NSHP, may assert claims concerning renewable energy credits attributed to their ~~PV~~ solar energy systems. However, the Energy Commission has established no rules or policies governing the creation, ownership or disposition of any such renewable energy credits. The Energy Commission does not require participants of the NSHP to relinquish their claims of renewable energy credits, or to transfer ownership of any such credits to the Energy Commission or any other entity, as a condition of receiving NSHP funding.

F. Applicability of Guidebook Changes to Existing Applications

1. The rules below explain the applicability of this third edition of the NSHP Guidebook to existing applications. For purposes of this section, "adoption date" means the date the Energy Commission adopts this edition of the Guidebook, and an "approved application" means one that the Commission approved prior to the adoption date. An approved application that has not received an approved payment claim will continue to be governed by the previous Guidebook versions except as follows:
    a) Applicants are permitted to enter into leasing/PPA agreements as long as they comply with the requirements in Chapter II, Section L.
    b) Applicants may increase the size of their systems but payment will be capped based on 7.5 kW AC per system.

2. Approved applications that have been paid or that have approved payment claims are not eligible for additional compensation or to reapply for additional compensation.

3. An applicant who submitted an application prior to the adoption date and did not receive approval of the application by the adoption date may opt to follow either the previous Guidebook version or this third edition. The applicant must provide written or email notice to be subject to this third edition. If no notice is received by the Program Administrators or the Commission, the application will be governed by the previous edition.

[9] Refer to definition in the *Overall Program Guidebook, January 2008 ~~March 2007~~ edition*, page 22.

4. All applications submitted after the adoption date will be governed by this third edition of the Guidebook.

Chapter II. Program Eligibility Requirements

This chapter~~section~~ covers the eligibility requirements necessary to receive incentives. Applicants can be either building owners or builders/developers. Eligible solar energy systems are limited to ~~solar system~~solar electric generators~~s~~ installed on new residential buildings that have achieved an Energy Commission-specified level of energy efficiency beyond that required by the current *Title 24 Standards*.

To be eligible for NSHP incentives, a ~~PV~~ solar energy system must be installed in conjunction with the construction of a new residential building that is permanently fixed to its foundation. In addition, the building permit for the solar energy system ~~must~~ should be approved by the building code enforcement agency prior to the original occupancy of the newly constructed building, but no later than 60 days after the issuance of the occupancy permit, with original occupancy occurring on or after January 1, 2007.

Multifamily affordable housing projects with occupancy permits less than two years old are eligible to apply to the NSHP. This exception is designed to bridge the eligibility gap between the NSHP and the CPUC's MASH (Multi-Family Affordable Solar Housing) program. If future CPUC proceedings resolve this ~~-~~eligibility gap, this exception should no longer be necessary and shall be eliminated~~-~~.

Solar energy systems installed on additions or alterations to existing buildings do not qualify for NSHP incentives nor do transient residences (e.g., motels, hotels). Solar energy systems installed on total rehabilitations where the entire structure is to be rebuilt to comply with current building requirements, are also eligible, as long as the entire structure meets the energy efficiency requirements.[10] ~~-~~ No incentive from the NSHP will be provided to any ~~PV~~ solar energy system servicing nonresidential portions of a development, except in cases of mixed~~-used~~ occupancy[11] buildings or the common areas of developments as described below.[12]

Qualifying solar energy systems must service newly-constructed residential buildings that are single family homes, duplexes, triplexes, condominiums, other multifamily buildings, including both "market rate" and affordable housing projects. Mixed~~-use~~ occupancy buildings with both residential and non~~-~~residential occupancies may also

[10] A residential building is considered "new" if the entire building structure is subject to current Title 24 building efficiency standards and does not yet have a Permit of Occupancy from the relevant Building Department."

[11] When a building is designed and constructed for more than one type of occupancy (residential and non-residential), the space for each occupancy shall meet the provisions of Title 24, Part 6, applicable to that occupancy. Exception: If one occupancy constitutes at least 80 percent of the conditioned floor area of the building, the entire building envelope, HVAC, and water heating may comply with the provisions of Title 24, Part 6 applicable to that occupancy, provided that the applicable lighting requirements in Sections 146 through 148 or 150(k) are met for each occupancy and space and mandatory measures in Sections 110 through 139, and 150 are met for each occupancy and space.

[12] Common areas are defined as those non-dwelling portions of a building that are intended for the primary benefit of the residential occupants of the building. Examples include, but are not limited to: hallways, laundry rooms, recreation rooms, manager unit, and tenant parking.

qualify for funding. The residential portion of mixed-use occupancy buildings is eligible for funding. If the nonresidential portion is equal to or less than 10 percent of the total building space, the entire solar energy system will be eligible for funding under the NSHP.

Solar energy systems serving the common areas of new residential and mixed-use occupancy developments are also eligible for incentives.

A. Technology and System Ownership

A PV solar energy system that achieves the direct conversion of sunlight to electricity is the only technology eligible to receive financial incentives. Eligible PV solar energy systems must be 1.00 kW AC (alternating current) or larger. It is the intent of the program that eligible systems remain interconnected to the utility distribution grid and be operated at the original location for their expected economic lifeat least the 10-year warranty period. The solar energy system must be located on the same site where the end-use customer's own electricity demand is located.

Solar energy systems that are leased by the end-use customer or that supply electricity to the end-use customer through a power purchase agreement (PPA) may qualify for NSHP funding, provided the applicant and system satisfy the additional requirements in Section L.

B. Residential Building Energy Efficiency

Eligible solar energy systems must be installed on new residential buildings (typically residential) that have achieved an Energy Commission specified level of energy efficiency beyond Title 24 Standards. Participating residential buildings are required to meet one of the tiers of energy efficiency shown below.:

- Tier I – 15 percent reduction in the residential building's combined space heating, space cooling, and water heating energy compared to the current Title 24 Standards under which the building was permittedin effect on the date the building permit was applied for.

For buildings permittedwhich applied for building permits under the *2005* Building Energy Efficiency Standards (Title 24):

- Tier II – 35 percent reduction in the residential building's combined space heating, space cooling and water heating energy and 40 percent reduction in the residential building's space cooling (air conditioning) energy compared to the current 2005 Title 24 Standards.

For buildings ~~permitted~~which applied for building permits under the *2008* Building Energy Efficiency Standards (Title 24):

- Tier II – 30 percent reduction in the residential building's combined space heating, space cooling and water heating energy and 30 percent reduction in the residential building's space cooling (air conditioning) energy compared to the 2008 Title 24 Standards.

Solar energy systems on common areas of high rise[13] and low rise[14] multifamily developments that are intended for the primary benefit of the residential occupants of the development are eligible to receive NSHP incentives. Both conditioned[15] and unconditioned common areas being served by the solar energy system must also be highly energy efficient. Examples of common area spaces may include, but are not limited to lobbies, hallways, corridors, pool rooms, game rooms, common area kitchens, manager offices and tenant parking. Documentation showing energy savings of at least 15 percent of the combined space heating, space cooling, water heating and lighting energy, compared to the ~~relevant~~ Title 24 S~~s~~tandards (residential or nonresidential) in effect on the date the building permit was applied for~~that the building was permitted under~~, is required for Tier I. In case of unconditioned common areas, the documentation needs to show 15 percent less energy use in lighting under the applicable Title 24 standards for the space, as evidence of reducing electric use. This can be demonstrated through the use of relevant lighting forms associated with the space.

Field verification of *all* energy efficiency measures will be required and reported on the CF-4R-NSHP form and be consistent with current Title 24 Standards field verification procedures and protocols. In addition, ~~for either Tier I or II,~~ each appliance provided by the builder must be Energy Star labeled if *Energy Star* is applicable to that appliance. Solar water heating may be used to assist in meeting the energy efficiency requirements of either Tier I or Tier II.

C. Grid Interconnection

[13] A building, other than a hotel/motel, of Occupancy Group R, Division 1 with four or more habitable stories. High-rise residential buildings are subject to the Building Energy Efficiency Standards for non-residential buildings. Refer to the California Code of Regulations, Title 24, Part 6.

[14] A building, other than a hotel/motel that is of Occupancy Group R, Division 1, and is multi-family with three stories or less, or a single family residence of Occupancy Group R, Division 3, or an Occupancy Group U building located on a residential site.

[15] Directly conditioned space is an enclosed space that is provided with wood heating, is provided with mechanical heating that has a capacity exceeding 10 Btu/hr-ft²), or is provided with mechanical cooling that has a capacity exceeding 5 Btu/hr-ft², unless the space-conditioning system is designed for a process space. Indirectly conditioned space is enclosed space, including, but not limited to, unconditioned volume in atria, that (1) is not directly conditioned space; and (2) either (a) has a thermal transmittance area product (UA) to directly conditioned space exceeding that to the outdoors or to unconditioned space and does not have fixed vents or openings to the outdoors or to unconditioned space, or (b) is a space through which air from directly conditioned spaces is transferred at a rate exceeding three air changes per hour.

Eligible ~~PV~~ solar energy systems must be permanently interconnected to the electrical distribution grid of the utility serving the customer's electrical load. The site where the system is installed must receive electrical distribution service from an existing in-state electrical corporation collecting funds to support the program as stated in Chapter I~~, Section B~~. These in-state electrical corporations are PG&E, SCE, SDG&E, and BVES. The system interconnection to the utility distribution grid must also comply with applicable electrical codes, utility interconnection requirements, and metering requirements. The solar energy system shall not be interconnected to the utility distribution grid until the applicant has received a formal approval letter from the interconnection department of applicant's ~~his/her~~ electric utility.~~'s interconnection department.~~

D. System Components

Major solar energy system components are defined as ~~PV modules~~solar electric generators (typically photovoltaic modules), inverters and meters.

All major system components must be new and must not have been previously placed in service in any other location or for any other application. **Equipment purchased or installed more than 24 months before applying for a reservation is not eligible.** ~~The equipment must be properly certified to have been tested by an appropriate nationally recognized laboratory and met specific performance criteria, as described in Appendix 3.~~System components must satisfy the eligibility requirements specified ~~Eligibility requirements for system components are identical to those~~ in the most recent approved edition of Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1) [http://www.energy.ca.gov/sb1/meetings/index.html]. ~~Performance information for approved~~ Approved major components will be posted on the Energy Commission's lists of eligible equipment available at: [http://gosolarcalifornia.ca.gov/equipment/index.html].

The applicant must confirm that the components purchased for a system are eligible when applying for NSHP funding. The Energy Commission or its agents will confirm that the equipment identified in a reservation package meets eligibility requirements prior to a reservation being granted.

Because equipment is added and removed from the eligible equipment list on a regular basis, the Energy Commission recommends the applicant wait for an approved reservation before installation commences. If the applicant begins or completes the installation before the Energy Commission has approved the reservation, changes to the equipment lists may create a situation where significant and costly system modifications are required to comply with program guidelines.

E. System Performance Meter

All solar energy systems must be installed with a stand-alone performance meter or an inverter with a built-in performance meter so that the customer can determine the amount of energy produced by the system. ~~The meter must be on the Energy Commission's eligible equipment list and measure the total energy produced by the system in kilowatt-hours (or watt-hours) and have a manufacturer's accuracy specification of ±5 percent. The meter must retain the kilowatt-hour production data in the event of a power outage and must provide a display of system output that the customer can easily view and understand. A system need not include a separate meter, if the system is installed with an inverter that contains internal metering and display equipment that meets the meter requirements above. A list of eligible performance meters and inverters that have built-in meters is available at: [www.consumerenergycenter.org/erprebate/equipment.html].~~

F. System Sized to Offset On-site Electricity Load

Eligible solar energy systems must be sized so that the amount of electricity that is produced offsets part or all of the end-use customer's electrical needs at the site of installation. Systems 7.5 kW AC or less are considered to be sized to serve the on-site electric load of the end-use customer. The maximum incentive paid for a system on single family residential units is limited to the first 7.5 kW AC of the system. ~~Systems 5 kW or less are assumed in compliance with being sized to serve on-site electric load.~~ For systems greater than 7.5 kW, ~~only the expected performance of the system that is no more than 100 percent of the expected electrical generation needs at the site of installation is eligible for incentives.~~ See Appendix 2 for further details on how to determine the maximum system size eligible for incentives. ~~.~~ The minimum size of an eligible system is 1.00 kW AC, measured after the inverter.

G. System Performance

The incentive amount will be based on the estimated performance of the solar energy system, calculated using the California Energy Commission's PV Calculator (CECPV Calculator).[16] The estimated performance of the system will be the basis for qualifying for a reservation, and for the final incentive amount. System installation should be consistent with the characteristics used to determine estimated performance to receive the reserved amount. The final incentive amount is subject to available funds. The

[16] Currently the CECPV Calculator can only be used to determine incentives for solar energy systems using photovoltaic modules. Applicants using any other solar electric generating technology should contact the California Energy Commission.

characteristics that are addressed by the CECPV Calculator include shading by any obstruction of the modules.

The ~~Energy Commission~~CEC ~~-~~PV Calculator will include “California Flexible Installation” criteria (as detailed in Chapter III Section B) to allow estimated performance to be based on an estimate of performance for a range of module orientations and tilts. The California Flexible Installation is intended for use only by new residential developments and is not allowable for applications consisting of only one single family dwelling or only the common area of a multifamily development. Systems installed within the range of these orientations and tilts and meeting the “minimal shading criteria” can use the California Flexible Installation criteria as the basis for the reservation application and incentive request without having to know more specific orientations~~,~~ and tilts. ~~and shading conditions.~~ Third-party field verification will be conducted to assess whether systems have been installed consistent with the characteristics used to determine estimated performance.

H. System Installation

Solar energy ~~S~~systems must be installed in conformance with the manufacturer’s specifications and with all applicable electrical and building codes and standards.

If installed under contract, systems must be installed by an appropriately licensed contractor, in accordance with rules and regulations adopted by the California Contractors State License Board. Installation contractors must have an active A, B, C-10, or a C-46 license. Contractors with roofing specific licenses may place ~~PV~~ photovoltaic modules~~panels~~ in accordance with limitations of their specific licenses; however, electrical connections must be made by an above-mentioned contractor. Owner-builders are allowed under the NSHP to install their own systems.[17]

The Energy Commission encourages installation contractors to become certified by the North American Board of Certified Energy Practitioners (NABCEP). See [~~www.nabcep.org~~http://www.nabcep.org] for additional information.

I. Field Verification

Installed solar energy systems must be third-party field-verified as described in Appendix ~~4~~ 2 to ensure that installations are consistent with the information used to determine the estimated performance, reservations, and ultimately the final incentive amount. Field verification is completed consistent with the procedures found in the current Building Energy Efficiency Standards [http://www.energy.ca.gov/title24]. Field verification for new housing developments may employ the sampling approach as ~~described in Sections 7.5, including subsections 7.5.1, 7.5.2, and 7.5.3, of the~~

[17] For information on restrictions placed on owner-builders, contact the Contractors State License Board at (800) 321-CSLB to obtain a current edition of the Contractor's License Law and Handbook.

~~Residential Alternative Calculation Methods Approval Manual for the *2005 Building Energy Efficiency Standards*. This information is posted on the Energy Commission's website at: [www.energy.ca.gov/title24/2005standards/residential_manual.html]~~allowed in the current Building Energy Efficiency Standards.[18]

Field verification will check the consistency either for residential buildings that have relied upon the "California Flexible Installation" criteria and the minimal shading criteria, or for residential buildings that have uniquely specified orientation, tilt and shading characteristics. Field verification will also be required for any eligible mixed-~~use~~ occupancy buildings, nonresidential buildings or common areas. When field verification indicates that the installation will not achieve the estimated performance used for reservations, the deficiencies must be corrected or the estimated performance must be recalculated based on the actual installation and the application must be resubmitted for approval at the incentive level in effect at the time of the original reservation. When field verification indicates that the installation will achieve an estimated performance greater than that used for the reservation, the estimated performance may be re-calculated at the builder's option to reflect the higher performance, and the application may be resubmitted for the incremental performance at the incentive level in effect at the time of the original reservation.

J. Warranty Requirements

All solar energy systems must have a minimum ten-year warranty provided in combination by the manufacturer and installer to protect against defective workmanship, system or component breakdown or degradation in electrical output of more than 15 percent from the originally rated electrical output during the ten-year period. The warranty must cover the solar generating system only, including the solar electric generators (typically photovoltaic modules)~~PV modules (panels)~~, inverters, and meters, and provide for no-cost repair or replacement of the system or system components, including any associated labor during the warranty period.

K. Equipment Sellers/Installers

To participate in the NSHP, companies that~~who~~ sell and/or install solar energy system equipment must be registered with the Energy Commission. Equipment sellers/installers should have the following information available prior to self-registration:
~~with the following information on the Retailer Registration form, NSHP-4:~~

1. Business name, address, phone, fax, and e-mail address
2. Owner or principal contact

[18] For the 2005 Building Energy Efficiency Standards see Chapter 7 of the Residential Alternative Calculation Method (ACM) Approval Manual. For the 2008 Building Efficiency Standards see Appendix RA2 of the 2008 Reference Appendices.

3. Business license number
4. Contractor license number (if applicable)
5. Proof of good standing on record with the California Secretary of State, as required for corporate and limited liability entities
6. Reseller's license number

Self-registration can be done on-line at: [http://gosolarcalifornia.ca.gov/retailers/search-new.php].

This information must be submitted before a company can become eligible to participate in the NSHP. ~~**To remain eligible, this information must be resubmitted annually by March 31.** Annual submittal is required even if the information identified in the company's prior submittal has not changed. In addition, a company must submit an updated NSHP-4 form within 30 days of the date any of its reported information has changed.~~

L. Leases and Power Purchase Agreements

Solar energy systems that are leased by an end-use customer or provide electricity to an end-use customer under a power purchase agreement (PPA) are eligible for NSHP funding if the lease agreement or PPA is executed and has a start date on or after July 1, 2009. Lease agreements and PPAs that are executed or have a start date prior to July 1, 2009, are not eligible for funding even though the system may have been installed after this date. Lease agreements and PPAs must have a term of no less than 10 years and must provide the lessee or customer the option to renew the agreement, purchase the system, or remove the system at the end of the agreement term. In addition, lease agreements and PPAs must demonstrate that the NSHP funding benefits the end-use customer by directly and exclusively reducing the lease payments for the system or the cost of electricity produced by the system.

For the first five years of the lease or PPA, the lessor or owner of the solar energy system, in the case of a PPA, shall provide an annual status report to the Program Administrator on the operation of the NSHP-funded solar energy system. The annual status report shall address agreements executed through December 31 of each year, be submitted to the Program Administrator no later than January 31 of each year, and shall include the following information for each system:

1) Date that the agreement was fully executed and the start date of the agreement;
2) Operational status of the system; and~~,~~
3) Status of the agreement, and if status has changed, date of change and reason for the change. (Status changes would primarily include, change in lessee or customer, system purchase, termination of agreement, and system removal.)

The annual status report shall be submitted to the Energy Commission if the NSHP is not administered by a Program Administrator.

If any lease agreement or PPA for a system that received funding from the NSHP is terminated and the system is removed from the building on which it was originally installed, the NSHP funding received by the applicant shall be repaid by the Lessor or system owner to the Energy Commission in the amounts specified below:

- If the agreement is terminated within one year of the system's installation or the start date of the agreement, whichever is later, 100 percent of the funding received shall be repaid;
- If the agreement is terminated within two years of the system's installation or the start date of the agreement, whichever is later, 80 percent of the funding received shall be repaid;
- If the agreement is terminated within three years of the system's installation or the start date of the agreement, whichever is later, 60 percent of the funding received shall be repaid;
- If the agreement is terminated within four years of the system's installation or the start date of the agreement, whichever is later, 40 percent of the funding received shall be repaid;
- If the agreement is terminated within five years of the system's installation or the start date of the agreement, whichever is later, 20 percent of the funding received shall be repaid;
- Repayment shall not be required if the agreement is terminated more than five years after the system's installation or the start date of the agreement, whichever is later.

Repayment will not be required if a system is destroyed by natural disaster or fire at no fault of the lessor/owner or lessee/customer.

Nothing in this section precludes an applicant from using an otherwise valid reservation to request a rebate for a system that is leased or provides electricity through a power purchase agreement.

Chapter III. Incentive Levels and Structure

This ~~section~~ chapter describes the incentives offered by the NSHP program. The NSHP provides an Expected Performance-Based Incentive (EPBI) using a specific dollars-per-watt amount applied to the Energy Commission-specified reference solar energy system. The incentive amount for each applicant solar energy system is determined by analysis using the CECPV Calculator, and is paid when the solar energy system has been installed, approved by the local building authority, and all program requirements have been met. Detailed information on how the incentive amount is determined can be found in Section B.

Incentives will decline over the life of the program, with the program's application process closing no later than the end of 2016. Incentive levels and reserved volume are subject to funding availability.

A. Incentive Levels~~Amounts~~ and Decline Schedule

1. Incentive Levels for Market-Rate Housing

There are two available incentive levels:

- **Base incentive:** Beginning in January 2007, the EPBI amount is based on the reference solar energy system receiving $2.50/watt at the initial ~~step~~MW volume. The base incentive applies to custom homes, small developments, reservations where solar is identified as an option, production housing where solar will not be installed as a S~~s~~olar as S~~s~~tandard feature, as defined below, and common areas of residential developments. Projects qualifying for the base incentive will receive an 18-month reservation period.

  EXCEPTION: Projects qualifying for Solar as an Option will receive a 36-month reservation period.

- ~~**Production housing with s**~~**Solar as ~~a s~~Standard ~~feature~~ incentive:** Beginning in January 2007, the EPBI amount is based on the reference solar energy system receiving $2.60/watt at the initial MW volume~~step~~. To qualify, the builder must commit at the reservation stage that a minimum of 50 percent of the homes/dwelling units in the subdivision or multifamily housing phase~~development~~ with 6 or more homes/dwelling units will have solar energy systems that meet or exceed the California Flexible Installation criteria. Projects qualifying for this incentive will receive a 36-month reservation period.

The actual incentive amount for a particular solar energy system and installation depends on the EPBI calculation of the system's expected performance compared to the reference solar energy system. Incentive levels will decline when a specific

cumulative MW volume of reservations, in terms of total-program capacity, has been reached, as reflected by the table below.

Funds reserved for solar energy systems not installed within the allowed reservation period will be reallocated to the incentive level in effect at the time those approved reservations expire or are cancelled, and the volume targets from that point forward will be adjusted to reflect the funds from the expired or cancelled reservations.

EPBI Incentive Levels and Related Reservation Volumes

Base Incentive (per watt, reference system)	**Qualifying Residential Units With Solar as a Standard Feature Incentive *** (per watt, reference system)	**Reserved Volume**** (MW-AC)
$2.50	$2.60	15
$2.25	$2.35	18
$2.00	$2.10	22
$1.75	$1.85	25
$1.50	$1.60	30
$1.25	$1.35	35
$1.00	$1.10	40
$0.75	$0.85	50
$0.50	$0.60	75
$0.25	$0.35	90
Total		400

*Residential developments of 6 or more dwelling units in which 50% of homes/dwelling units have solar energy systems ~~meeting at least~~that meet or exceed the California Flexible Installation Criteria.
**Reserved volume includes ~~volumes~~ reserved ~~by~~ affordable housing volumes, discussed later in this Guidebook.

2. Incentive Levels for Affordable Housing Projects

The following incentive levels apply to eligible affordable housing projects. Eligibility requirements for affordable housing can be found in Chapter IV, Section ~~C~~A. Projects qualifying for this incentive will receive a 36-month reservation period. The design of the incentive levels and decline structure for affordable housing is the same as the design for market-rate housing as discussed earlier.

Residential Dwelling Unit ~~System~~ Incentive (per watt, reference system)	**Common Area ~~System~~ Incentive** (per watt, reference system)	**Reserved Volume*** (MW-AC)
$3.50	$3.30	1.5
$3.15	$2.97	1.8
$2.80	$2.64	2.2
$2.45	$2.31	2.5
$2.10	$1.98	3.0
$1.75	$1.65	3.0
$1.40	$1.32	4.0
$1.05	$0.99	5.0
$0.70	$0.66	6.0
$0.35	$0.33	7.0
Total		36.0
*The 36 MW represents part of the total 400 MW goal for the entire NSHP program.		

Beginning July 1, 2009, multifamily affordable housing projects using virtual net metering[19] are eligible for the residential dwelling unit incentive for the portion of the solar energy system that is allocated to the tenants. If the residential dwelling unit incentive is requested, the residential dwelling units must meet the residential building energy efficiency requirements in Chapter II, Section B.

~~The table above reflects a declining incentive level as specific MW capacity has been reserved. For example, at the beginning of the program, incentives will be offered at $3.50/$3.30/watt for dwelling unit/common area systems respectively, until 1.5 MW of capacity has been reserved. At that point incentives offered will be lowered to $3.15/$2.97/watt until an additional 1.8 MW has been reserved. At the discretion of the Energy Commission, this process will continue until total realized volume has been reserved or until funding is no longer available.~~

[19] Virtual net metering allows the electricity produced by a single solar energy system installation to be credited to the benefit of multiple tenants in an affordable housing multifamily building without requiring the solar energy system to be physically connected to each tenant's meter. Virtual net metering was adopted in the California Public Utilities Commission Decision 08-10-036. [http://docs.cpuc.ca.gov/cyberdocs/webquickstart.asp?DOC_ID=356818&docType=LEGAL_PROCEED]

Change in Incentive Level

The Energy Commission will issue ~~provide~~ a public notice to inform program participants of ~~when there will be~~ a drop in the incentive levels as shown in the above tables. The new incentive levels will be effective 30 days after the public notice is issued. Applicants can qualify for the then current incentive level as long as a complete NSHP reservation application with consistent and accurate information is submitted within the 30 day noticing period. After the incentive level has been lowered, the corresponding reserved volume target for the new incentive level may also be adjusted in order to maintain the overall program megawatt goals.

For current incentive levels, please refer to [https://www.newsolarhomes.org/RebateLevels.aspx].

B. Expected Performance-Based Incentive Calculation

The NSHP provides an incentive based on the expected performance (i.e., expected annual electrical ~~generated~~ generation~~electricity~~), of a ~~PV~~ solar energy system installed in a specific location. The EPBI is determined by analysis using the CECPV Calculator ~~software tool~~. The analysis accounts for the tested and certified performance of the specific module and inverter, the mounting type and cell temperature, the orientation and tilt of the modules, and the extent to which the system is shaded. The CECPV ~~calculator~~ Calculator accounts for these parameters that are under the control of the builder/installer, as well as the solar and climatic conditions for the locale of the building to determine the hourly estimated performance over a year. This is then weighted to account for the time-of-use value of the ~~system~~ electric generation to the utility system (referred to as time dependent valuation (TDV)).

The weighted TDV annual kilowatt-hour (kWh) production of an applicant system is compared to the weighted TDV annual kWh production of a reference system. The CECPV Calculator converts the available $/watt AC incentive level into the equivalent incentive amount for the TDV-weighted kWh of annual production for the reference system. This equivalent incentive per TDV-weighted kWh rate is applied to the expected annual TDV performance determined by the CECPV Calculator for the applicant system to determine the incentive for the specific equipment and installation characteristics of that system.

The Energy Commission uses the reference system shown in the following table:

Reference ~~PV~~ Solar Energy System and Installation

Parameters	**Reference System and Installation**
Location	San Jose (latitude, longitude, Climate Zone 4, weather file, TDV values)
Azimuth	180 degrees (south orientation)
Tilt	22.6 degrees (5:12 pitch)
Mounting	Direct mounted Building Integrated Photovoltaics (BIPV)

~~PV~~ Photovoltaic Modules	Matches Systems Installed at Premier Gardens, Sacramento[20]
Number of Modules	
Strings (series and parallel)	
Inverter	
Shading	None
Default Losses	0.88 for dirt, dust and mismatched wiring

A minimum of 30 days public notice will be given when changes are made or will be made to the CECPV Calculator. The previous version of the CECPV Calculator will remain certified for use during this period.

California Flexible Installation

In lieu of site-specific EPBI analysis as described above, the NSHP program permits applicants to use the California Flexible Installation criteria as an alternative approach to estimate the EPBI. The California Flexible Installation is intended for use only by new residential developments and is not allowable for applications consisting of only one single family dwelling or only the common area of a residential development. The California Flexible Installation criteria offer a simplified approach to estimating the incentives for those solar energy systems in a development that are designed and installed to meet the criteria. One EPBI calculation can be made for all solar energy systems in a subdivision that ~~feet~~ meet all of the following: 1) ~~having~~ have an azimuth ranging from 150~~°~~ to 270 degrees, ~~°~~; 2) have a tilt corresponding to a roof pitch between ~~1~~0:12 and 7:12, 3) meet the "minimal shading criteria" ~~and~~, 4) use the same make, model, and quantity of major system components~~module models, number of modules, and inverter~~, and 5) fixed, non-tracking mounting. The minimal shading criteria implies no existing, planned or potential shading obstructions that are closer than a distance of twice the height that the obstruction extends above ~~any point on the modules~~the nearest point on the array. ~~For more information, please see Appendix 4, Section E.~~

California Flexible Installation incentives will be calculated using the following default parameters: azimuth of 170 degrees, tilt of 5:12, two story mounting height, fixed non-tracking mounting, and minimal shading. User input will be used for photovoltaic module and inverter make, model and quantity, array standoff height from roof, location, and incentive type.

C. Other Incentives May Affect the ~~Rebate~~NSHP Incentive Amount

Incentives received from sources other than the NSHP that lower the cost of the ~~PV~~ solar energy system may affect the incentive amount applicants receive from the Energy Commission. If incentives are from other utility incentive programs, a State of

[20] The modules and inverter performance characteristics for the reference system are those that are specific to the installation in the Premier Gardens subdivision in Sacramento and include 42 BIPV modules connected in a single series string to a 2.5 kW inverter.

California sponsored incentive program, or a federal government sponsored incentive program (other than tax credits), a minimum of five percent of the total incentives received or expected from other sources will be subtracted from the NSHP incentive amount. The percent reduction will be increased as necessary to ensure the sum of all incentives received or expected from all sources, including the NSHP, does not exceed the total cost of the system.

The NSHP will not issue a reservation or make a payment for any system or portion of a system that has received payment from, or is eligible for and participating in, the California Public Utilities Commission-approved California Solar Initiative program, ~~the Rebuild a Greener San Diego program,~~ or any other ~~rebate~~incentive program for ~~PV~~ solar energy systems using electric utility ratepayer funds.

Chapter IV. Reservation Process

This chapter ~~section~~ describes the ~~process~~ types of reservations and the documentation required to reserve funding from the NSHP. ~~A reservation provides assurance to builders that reserved funds will be available when a payment claim is made. Applicants eligible for the Solar as Standard Feature Incentive will be required to submit documentation as described in Section A below. Applicants eligible for the Base Incentive will be required to submit documentation as described in Section B below. Affordable housing applicants will be required to submit documentation described in Sections A and C.~~

Please read the following descriptions carefully to determine which reservation your project may ~~would~~ qualify for and the documentation you will need to provide. Once the required information has been submitted and confirmed to meet the ~~NSHP program's~~ requirements of the NSHP program, the reservation application will be approved, and funding will be reserved for your project.

A. Types of Reservations

1. ~~Reservation Process for Projects Where~~ Solar ~~as Will be a~~ Standard ~~Feature~~

~~Build-out phases~~~~This reservation process can only be used by developers Developments~~ of 6 or more residential dwelling units ~~who have~~ where the builder/developer has committed to installing solar energy systems on 50 percent or more ~~of the dwellings~~ units ~~in the subdivision or in a build-out phase of the or subdivision,, and that of all residential buildings in the development,~~ meet~~ing~~ at minimum, the California Flexible Installation criteria are eligible for a Solar as Standard reservation. [21] This includes single family and multifamily ~~developments~~ projects. Applicants meeting these criteria will receive a 36-month reservation period. Applicants not meeting the~~se~~ above criteria may qualify for the Base Incentive and should refer to ~~Chapter IV,~~ Section 2~~B~~ described below.

2. Base Incentive ~~Initial Reservation Application~~

The following projects are eligible for the base incentive and an 18-month reservation period:

- Custom homes
- Small developments/phases (under 6 residential dwelling units)
- Projects where solar will be installed on less than 50 percent of the residential dwelling units
- Common areas of residential developments

[21] A build-out phase is part or all of a development which an applicant plans to build within the reservation period.

Projects offering solar as an option to homebuyers are also eligible for the base incentive but will receive a 36-month reservation. See section C for more details on the reservation process for solar as an option projects.

3. Affordable Housing (Moved from Sect. D)

The NSHP offers higher incentives for qualifying systems installed on affordable housing projects. Affordable housing projects of all sizes are eligible for a 36-month reservation period.

Eligible projects include multifamily and single-family developments where at least 20 percent of the project units are reserved for extremely low, very low, lower, or moderate income households for a period of at least 10 years. Qualifying systems must be connected to and serving the energy needs of 1) residential units subject to affordability requirements, 2) the office and residential unit of the project manager, provided all other residential units in the project are subject to affordability requirements, or 3) the common areas of the project, where all of the project's units are reserved for extremely low, very low, lower or moderate income households, except for the manager's unit. Examples of common areas include, but are not limited to: hallways, recreation rooms, manager's unit, and tenant parking.

Below are additional requirements for affordable housing projects:

a) Regulatory Agreement

The affordable housing project must be undertaken pursuant to section 50052.5, 50053, or 50199.4 of the Health and Safety Code, or other affordable housing laws or regulations adopted by the California Department of Housing and Community Development. Applicants must demonstrate this by providing documentation that identifies the statutory basis under which the project was undertaken. In addition, the applicant must provide a copy of the regulatory agreement or approval for the project's development that identifies 1) the project, 2) the number of residential units in the project subject to the affordability requirements, and 3) the applicable affordability requirements for these residential units. The regulatory agreement or approval must expressly limit residency in the affordable residential units to persons with extremely low, very low, lower or moderate income persons as defined by the Health and Safety Code sections 50079.5, 50105, 50106, and 50093 et seq. or regulations adopted by the California Department of Housing and Community Development. The regulatory agreement shall reserve at least 20 percent of the project units for extremely low, very low, lower, or moderate income households for a period of at least 10 years.

b) Individual Meter Requirement

Each residential dwelling unit for which a solar energy system is being installed must have an individual electricity consumption meter capable of monitoring and reporting the utility electricity consumption of that unit. The solar energy system for each residential

dwelling unit shall be separately net-metered through that individual electricity consumption meter. If the meter is an electric utility meter, applicants must provide documentation from the electric utility confirming service and meter number at payment claim time. If the meter is supplied by an entity other than the utility, documentation must be provided explaining how the meter monitors and reports individual unit consumption. Meters supplied by an entity other than a utility must be utility-grade and have the same reporting accuracy levels of utility-supplied meters.

EXCEPTION: Affordable housing projects that qualify for virtual net metering (VNM) as adopted by the California Public Utilities Commission (CPUC) in Decision 08-10-036 are not required to separately net-meter~~The solar energy system for~~ each residential dwelling unit that will be provided electricity from the solar system. ~~is not required to be separately net-metered in the case of multifamily affordable housing projects that qualify for virtual net metering (VNM) as adopted by the California Public Utilities Commission (CPUC) in Decision 08-10-036.~~

c) Maintenance and Monitoring Plan

Affordable housing applicants shall develop ~~maintain a copy of~~ a maintenance and monitoring plan for NSHP-funded systems and shall retain a copy of such plan for inspection by the Energy Commission or the Program Administrator. This plan shall be provided to the system owner and the building or property manager and shall ~~should~~ identify specific maintenance, monitoring, and inspections the building or property manager will ~~would~~ need to undertake, or have contracted for, ~~in order~~ to ensure that the system produces maximum output over the system's expected life. The plan should include activities such as: a) cleaning schedule for the removal of any dirt and dust build up on the solar energy system; b) periodic checking of all electrical connections for corrosion and looseness; c) checking the inverter for instantaneous power and long term energy output and diagnose and taking corrective action needed if production is significantly lower than expected; and d) checking for any tree/plant growth or other obstructions that are causing shading on the array and take action to eliminate that shading. The Energy Commission or its Program Administrators reserve the right to request applicants to provide a copy of the maintenance and monitoring plan at anytime during the course of the NSHP program.

~~A.~~B. Forms and Documentation

1. Reservation Application Form (all reservations)

The Reservation Application Form (NSHP-1) ~~identifies~~ provides ~~the~~ general information ~~needed~~ about the proposed ~~development~~ project, the electric utility service area in which the project will be located ~~in~~, and must be signed by the homeowner or builder/developer. ~~and~~The form also identifies~~specifies~~ what information must be submitted with the application and requests applicants to share the contact information of the Home Energy Rating System (HERS) rater, if available. The NSHP-1 provides the homeowner or builder/developer an opportunity to assign his/her administrative rights.

~~Only residential buildings receiving electrical service from one of the four eligible IOUs contributing funds to support the NSHP may receive NSHP funding. Applicants must indicate on the NSHP-1 the electric utility that will provide electric service to the development. This form must be signed by the builder.~~

2. Proof of Residential New Construction

a) For Solar as Standard Projects

A copy of the ~~tentative (or~~ final~~, if available)~~ subdivision map, or "tract map" must be submitted. Each residential building included in the reservation must be indicated as pre-plotted locations on the map for the reservation. If the residential buildings are not pre-plotted, the~~n~~ applica~~nts~~tion does not qualify for the solar as standard incentive reservation and must use the criteria outlined ~~in Section B of this chapter~~under Base Incentive.

b) For Base Incentive and Affordable Housing Projects

Applicants must submit either building permits for new construction or a copy of the final subdivision map. Grading permits and expired permits are not acceptable and may not be submitted to support an application. Total rehabilitations of residential dwelling units must provide adequate proof that the entire unit(s) are to be renovated and will meet or exceed the energy efficiency requirements for the entire structure.

~~Construction Plan-Set~~

~~A copy of the construction plan-set that is used for building permit purposes must be submitted. The construction plan-set must include: a) architectural floor plans, elevations and sections (including information on windows and other measures used to the Title 24 energy calculations); b) site plan for custom homes indicating the north direction; c) electrical plans (as appropriate for Title 24 plan check); and d) mechanical plans (should include information relevant for Title 24 plan check). Additional information may be required upon request to review and complete the plan check. Applicants are encouraged to provide the construction plan-set in electronic format.~~ **~~The construction plan-set requirement will be waived for applicants who are participating in their electric utility's residential new construction energy efficiency program and submit proof thereof.~~**

~~a) Cost Estimate for Equipment~~

~~The reservation process requires the applicant to commit to the purchase of solar equipment. The Energy Commission recognizes that builders may not have committed financially to equipment or installation at the time of the initial reservation application. However, builders must at a minimum demonstrate their interest in PV installation to the~~

~~Energy Commission by providing a cost estimate from an equipment seller registered with the Energy Commission. The cost estimate must show the estimated cost per residential building where PV will be installed as well as the estimated cost for the development. Applicants are required to submit an equipment purchase agreement or invoice at the 6-month checkpoint described below.~~

~~Equipment sellers must be registered as described in Chapter 2. A listing of registered sellers may be found at the Energy Commission's website: [www.consumerenergycenter.org/erprebate]. Reservation requests that identify ineligible equipment sellers will not be approved until the required business information for the equipment seller is filed with the Energy Commission.~~

~~2.~~3. Expected Performance Based Incentive (EPBI) Documentation (all reservations)

The Expected Performance Based Incentive (EPBI) documentation specifies the expected performance of the ~~PV~~ solar energy system(s) to be installed ~~on the residential buildings~~ and the eligible funding amount ~~eligible~~ to the applicant. ~~To the extent that this varies among the residential buildings in the reservation, the information must be provided for specific residential buildings.~~ To complete this documentation, the applicant must use the CECPV Calculator for each unique ~~PV~~ solar energy system ~~(a system is defined as one or more strings of PV modules connected to one inverter)~~.[22] The CECPV ~~calculator~~ Calculator will produce ~~an~~ the CF-1R-PV output report~~, the CF-1R-PV~~. A development may use the California Flexible Installation criteria to calculate the incentives for all systems that meet the criteria.[23] In ~~some~~ cases~~, a development will have~~ where there is more than one ~~PV~~ solar energy system design that results in different levels of expected performance~~. In these cases,~~ a ~~single print out~~CF-1R-PV for each system design that results in a unique expected performance calculation must be submitted.

Applicants must submit each CF-1R-PV ~~form~~ and the associated .emf digital input file and .her digital output file ~~in digital format~~ for review by the ~~Energy Commission or its agents~~Program Administrator. The Program Administrator will ~~and~~ upload the .her digital output file ~~the input file~~ into the data registry of one of the Energy Commission approved ~~Home Energy Rating System Program (~~HERS~~)~~ Providers. Applicants are advised to identify the HERS rater and Provider early in the application process so that the payment claim process will not be unnecessarily delayed due to the unavailability of this information.

[22] For solar energy systems consisting of photovoltaic modules, NSHP defines a system as one or more strings of modules connected to one inverter.

[23] The California Flexible Installation criteria offer a simplified approach to estimating the incentives for those solar energy systems in a development that are designed and installed to meet the criteria, as outlined in Chapter III Section B. ~~For more information, please refer to Appendix 4, Section E.~~

4. Energy Efficiency Documentation (all reservations)

To participate in the NSHP, the residential buildings must also be highly energy efficient. Documentation showing energy savings for each single family home or multifamily building of at least 15 percent of the combined space heating, space cooling and water heating energy compared to the current Building Energy Efficiency Standards is required. ~~for Tier I, and at least 35 percent of the combined space heating, space cooling and water heating energy and 40 percent of the air conditioning energy is required for Tier II~~. Either of the two Tier levels described in Chapter II Section B can be used to meet this requirement. Documentation must also show that ~~for either Tier I or Tier II each~~ appliances provided by the builder are *Energy Star* labeled if *Energy Star* is applicable to that appliance. Solar water heating may be used to assist in meeting the requirements of either Tier I or Tier II.

Only energy efficiency documentation completed by Certified Energy Plans Examiners (CEPE) approved for residential compliance by the California Association of Building Energy Consultants (CABEC) will be accepted. For a list of CEPEs, visit the CABEC website at: [http://www.cabec.org/ceperosterall.php].

~~**Applicants are strongly encouraged to participate in their utility's residential new construction energy efficiency program to obtain the financial incentives that they can earn for meeting either Tier I or Tier II, and to streamline the process for demonstrating that the energy efficiency requirements are met. Energy efficiency documentation submitted and approved by utility new construction programs will not need to be submitted to the Energy Commission.**~~

Applicants must submit the CF-1R (or PERF-1 when relevant) and other required energy efficiency documentation forms and the associated digital input files (e.g. *.bld or *.mp7), generated directly by one of the Energy Commission-approved Title 24 compliance software programs, showing all of the measures used to meet the energy savings requirements. The CF-1R (or PERF-1 when relevant) and other energy efficiency documentation forms must be consistent with the construction plan-set.

~~Applicants must submit the CF-1R form and the~~ The associated digital input files (e.g. *.bld or *.mp7) ~~in digital format which may~~ will be used for uploading into the data registry of one of the Energy Commission approved HERS Providers. This step normally will be completed in conjunction with the utility new construction processes or by the Program Administrator. Applicants are advised to identify the specific HERS rater and Provider ~~early in the application process so that the payment claim will not be delayed due to the unavailability of this information~~as early in the design process as possible. Many energy efficiency measures, that can be used to meet the required tier levels of energy efficiency, must be included early in the building design and subsequently verified by a HERS rater during construction.

A copy of the construction plan-set that is used for building permit purposes must be submitted by the applicant. The construction plan-set is used to verify the energy

efficiency measures to be installed on the project. The construction plan-set must include: a) architectural floor plans, elevations and sections (including information on windows and other measures used for the Title 24 energy calculations); b) site plan for custom homes indicating the north direction; c) electrical plans (as appropriate for Title 24 plan check); and d) mechanical plans (should include information relevant for Title 24 plan check). Additional information may be required upon request to review and complete the plan check. Applicants are encouraged to provide the construction plan-set in electronic format, preferably portable document format (PDF).

Applicants are strongly encouraged to participate in their utility's residential and multifamily new construction energy efficiency programs to obtain the financial incentives that they can earn for meeting either Tier I or Tier II requirements, and to streamline the process for demonstrating that the energy efficiency requirements for NSHP are met. Energy efficiency documentation submitted and approved by utility new construction programs will not need to be submitted for NSHP, but will be verified before payment claims are approved by program administrators.

a) For Affordable Housing Projects

Projects requesting funding from the California Tax Credit Allocation Committee (TCAC) are given up to 60 days after the approval from TCAC to provide finalized energy efficiency documentation as described above.

~~3. System Size Justification~~

~~As stated in Chapter II, Section F, eligible systems must be sized so that the amount of electricity produced offsets part or all of the customer's electrical needs at the site of installation. Systems 5 kW or less are assumed in compliance with being sized to serve on-site electric load. If the PV systems are above 5 kW in size, applicants must provide documentation showing that the expected annual on-site electrical load justifies the system size. Please refer to Appendix 2 for details.~~

~~4. Six-Month Checkpoint~~

~~The six-month checkpoint is required only for applicants that qualify for Solar as Standard Feature Incentive and obtain a 36-month reservation, as described above. Applications for the "Base Incentive" and the 18-month reservation period do not need to submit the NSHP-1.6 form, and should refer to the application instructions in Section B below.~~

~~To ensure funding is encumbered for projects that will be completed within the reservation timeframe, applicant progress will be assessed at 6-month intervals. If the Energy Commission determines that it is not reasonable to expect the fully reserved~~

~~number of residential buildings will be completed by the end of the reservation period, it will reduce the reservation amount as it deems appropriate.~~

~~a) General Approval/Six-Month Reservation Update Form~~

~~To ensure that projects make progress on schedule and sufficient time remains to install the PV systems, the builder must complete the 6-Month Reservation Approval and Update Form (NSHP-1.6) and submit it to the NSHP Program, 6 months after the initial reservation has been approved, informing the Energy Commission of any changes (e.g., NSHP-1 changes and revised EPBI calculations) to the original reservation application.~~

5. Equipment Purchase Agreement and Installation Contract

a) For Solar as Standard Projects

The equipment purchase agreement and installation contract indicate the applicant's commitment to the purchase and installation of ~~PV~~ solar energy systems. The applicant must submit one master equipment purchase and installation agreement for all the ~~entire housing development~~residential dwelling units in the reservation or one agreement for the system equipment and a second agreement for the installation. ~~These agreements must cover all residential buildings in the reservation.~~ In cases where the installation is performed by the builder's employees, installation labor cost must be separately listed.

The master purchase agreement(s) for the equipment and installation labor must contain language indicating the builder's commitment to ~~buy~~ purchase eligible ~~PV~~ solar energy systems for all of the residential dwelling units ~~residential buildings~~ in the reservation and include the following information:

- List of the physical addresses for the system installations.
- Quantity, make and model of the ~~modules~~solar electric generators (typically photovoltaic modules), inverters, and meters to be installed at each address.
- Total ~~eligible~~ system cost of the eligible equipment and/or labor.

The master purchase agreement(s) must be signed by the applicant or the applicant's representative, the seller of the systems, and the installer (an installer's signature on the equipment purchase agreement is not required if the applicant is hiring a separate company for the installation of the equipment). The seller of the systems must be an Energy Commission registered retailer. ~~Purchase agreements that indicate a smaller number of residential buildings installing PV than stated in the NSHP-1 or NSHP-2 may lead to reduced incentive amounts.~~

In situations where the applicant is purchasing the system from one company and hiring a separate company for installation, the applicant must provide proof of his or her commitment to purchase and install the system~~s~~ in separate documents.

An installation contract must state the price charged for the installation of equipment ~~on a specified number of residential buildings in the housing development~~for all of the

residential dwelling units in the reservation. Installation contracts must comply with the California Contractors State License Board (CSLB) requirements. In general, proper contracts will contain the following information:

- Name, address and contractor's license number of the company performing the system installation.
- Site address for the system installation; description of the work to be performed;
- Total agreed price to install the system; payment terms (payment dates and dollar amounts).
- Printed names and signatures of the builder and the installation company's authorized representative.

~~Additional information is required for contracts to be properly executed.~~ For more information on CSLB guidelines, please refer to their website at: [~~www.cslb.ca.gov~~http://www.cslb.ca.gov/]
~~The Energy Commission requires all contracted installations to be done by entities with a valid A, B, C-10 or C-46 contractor license. When systems are installed by the builder's employees, those employees are not required to be licensed. However, the Energy Commission strongly encourages installation by qualified installers since the expected performance and incentive amount depend in part on the quality of system installation.~~

b) For Base Incentive and Affordable Housing Projects

Equipment purchase agreements and installation contracts should mirror those described above.

In cases where there is no signed purchase agreement, the applicant may provide invoices or receipts showing that at least 10 percent of the system equipment purchase price [~~PV modules~~solar electric generators (typically photovoltaic modules), inverters, and performance meter(s)] has been paid to the seller(s).

~~6. Build-Out Schedule~~

~~This schedule must include dates identifying when the PV systems have been/will be installed.~~

~~7. Payee Data Record (STD-204)~~

~~The Payee Data Record must be completed by the builder if payment is to be made to the builder, or, if payment is assigned to another party, by that party. If the builder or designated payee has submitted a complete STD-204 form with a prior application and has already received an incentive payment within the past year from the Energy Commission, a new STD-204 is not needed. In these cases the Energy Commission will use data from the previously submitted STD-204 form. If the data provided in a previously submitted STD-204 has changed, the builder or designated payee must~~

submit a new STD-204. Entities exempt from federal excise tax may not be required to provide a STD-204; applicants should check with their tax advisers.

In addition, when the payee is a corporation or limited liability entity, the payee must submit proof of good standing with the California Secretary of State.

8. Additional Reservation Status Checkpoints

To ensure projects progress on schedule and sufficient time remains to install the PV systems, the Energy Commission or its agents will conduct status checks every 6 months. In addition, the builder is required to inform the program of any changes to the above required information. The Energy Commission or its agents will reduce the amount of funding reserved as it deems appropriate, if it determines that it is not reasonable to expect the fully reserved number of residential buildings to be completed by the end of the reservation period.

The final subdivision map, if not submitted previously, must be provided within 24 months of the initial reservation. It must include the signoff page with all applicable approvals, including those from the county record's office. The map must also show all the residential buildings where PV systems are to be installed.

B. Reservation process for projects applying for the base incentive

The following projects are eligible for the Base Incentive and an 18-month reservation period. No NSHP-1.6 will be issued:

- Custom homes
- Small developments (under 6 residential dwelling units)
- Developments where solar is an option
- Developments where solar will be installed on less than 50 percent of the residential dwelling units
- Common areas of residential developments

The following documents as described in Section A must be submitted, except as provided below.

1. Reservation Application Form

2. Building Permit or Final Subdivision Map

~~Applicants must submit either building permits for new construction or a copy of the final subdivision map. Applications for individual houses in a development must also include a copy of the agreement between the builder and home purchaser to install a PV system. Grading permits, expired permits and permits over 3 years old are not acceptable and may not be submitted to support an application.~~

~~**3. Construction Plan-Set**~~

~~**4. Equipment Purchase Agreement and Installation Contract**~~

~~In cases where there is no signed purchase agreement, the builder may provide invoices or receipts showing that at least 10 percent of the system equipment purchase price [PV modules, inverters, and performance meter(s)] has been paid to the seller(s).~~

~~**5. Expected Performance Based Incentive (EPBI) Documentation**~~

~~**6. Energy Efficiency Documentation**~~

~~**7. System Size Justification**~~

~~**8. Build-Out Schedule**~~

~~**9. Payee Data Record (STD-204)**~~

C. ~~Reservation Applications~~Projects Where Solar is Offered as an Option to Homebuyers

For ~~applications~~ projects where ~~an applicant~~ the builder/developer ~~will be~~ offer~~sing~~ solar energy systems as an option to residential home buyers ~~rather than being offers as a Solar as Standard Feature~~, the NSHP ~~Program~~ will reserve funding ~~based on the solar equipment committed to be purchased for the development. If solar is an option, the reservation can only be~~ for up to ~~10~~ 50 percent of the residential dwelling units ~~buildings~~ in the ~~development~~project. Funding will be reserved assuming a 2 kW AC system size at the base incentive available at the time of reservation. The NSHP requires the following documents for reservation approval:

- Reservation Application Form (NSHP-1)
- Final Subdivision Map showing eligible lots
-
- Equipment Purchase Agreement and Installation Contract
- Build-out schedule for the project, including a projected timeline for completing the construction of dwelling units that will have solar energy systems.

The Program Administrator will issue Solar as an Option Approval Form~~s~~s (NSHP 1.5 forms), which represents initial approval for up to 50 percent of the residential dwelling units identified in the application. As each specific residential dwelling unit is identified to

have a solar energy system installed, the applicant shall provide the Program Administrator with a completed NSHP-1.5 form, the EPBI and energy efficiency documentation pertaining to the residential dwelling unit for plan review. The Program Administrator will conduct the plan review process to verify that the information is complete and meets eligibility requirements, and will notify the applicant by sending him a site specific NSHP-2 form. The applicant will then fill out, sign, and submit the NSHP-2 and supporting documentation for payment claim.

The applicant shall provide the Program Administrator an update on the project's construction and system installation progress 18~~2 and 24~~ months after the reservation has been approved. The update shall include an evaluation of the probability of how many of the remaining residential dwelling units will have solar energy systems installed, stating the projected timeline. Program Administrator will evaluate the progress on the project to determine if the reserved funding is deemed greater than the projected pay-out in the remaining months of the reservation. This evaluation will consider the build-out schedule the applicant included with its Reservation Application. If the Program Administrator, in consultation with Energy Commission staff, concludes that the project is not progressing as expected, the project's funding reservation may be reduced or completely disencumbered. ~~An initial NSHP-2 will be issued, informing the applicant that funding has been reserved. Once a specific residential building unit (or units) has been identified to have a solar system installed, the applicant shall submit the NSHP-2 back to the Energy Commission or its agents, with specific information about the location (address or lot number), solar equipment, and EPBI and energy efficiency documentation. Upon receipt of that information, the NSHP program will issue a NSHP-2 specifically for the location or locations identified by the applicant.~~

~~*D.* Affordable Housing~~ (*AH Moved up to Sect. A)*

~~The NSHP offers higher incentives for qualifying systems installed on affordable housing projects. Affordable housing projects of all sizes are eligible for a 36-month reservation period.~~

~~Eligible projects include multifamily and single-family developments where at least 20 percent of the project units are reserved for extremely low, very low, lower, or moderate income households for a period of at least 45 years. Qualifying systems must be connected to and serving the energy needs of 1) residential units subject to affordability requirements, 2) the office and residential unit of the project manager, provided all other residential units in the project are subject to affordability requirements, or 3) the common areas of the project, where all of the project's units are reserved for extremely low, very low, lower or moderate income households, except for the manager's unit. Examples of common areas include, but are not limited to: hallways, recreation rooms, manager's unit, and tenant parking.~~

~~Mixed Use Properties~~

Mixed use properties are those which are comprised of residential and nonresidential units. The NSHP will fund those solar systems serving common areas and/or residential units in mixed-use affordable housing projects. If the nonresidential portion is equal to less than 10 percent of the total building space, the entire solar system will be eligible for funding under the NSHP.

Eligible affordable housing applicants are subject to the reservation process described in Section A of this chapter. In addition, the following documentation must be submitted in order to receive the initial reservation approval.

1. Regulatory Agreement

The affordable housing project must be undertaken pursuant to section 50052.5, 50053, or 50199.4 of the Health and Safety Code, or other affordable housing laws or regulations adopted by the California Department of Housing and Community Development. Applicants must demonstrate this by providing documentation that identifies the statutory basis under which the project was undertaken. In addition, the applicant must provide a copy of the regulatory agreement or approval for the project's development that identifies 1) the project, 2) the number of residential units in the project subject to the affordability requirements, and 3) the applicable affordability requirements for these residential units. The regulatory agreement or approval must expressly limit residency in the affordable residential units to persons with extremely low, very low, lower or moderate income persons as defined by the Health and Safety Code sections 50079.5, 50105, 50106, and 50093 et seq. or regulations adopted by the California Department of Housing and Community Development.

2. Individual Meter Requirement

Each residential dwelling unit for which a system is being installed must have an individual meter capable of monitoring and reporting the electricity consumption of that unit. If this meter is an electric utility meter, applicants must provide documentation from the electric utility confirming service and meter number at payment claim time. If the meter is supplied by an entity other than the utility, documentation must be provided explaining how the meter monitors and reports individual unit consumption. Meters supplied by an entity other than a utility must be utility-grade and have the same reporting accuracy levels of utility-supplied meters.

3. Maintenance Agreement

Affordable housing applicants shall provide a maintenance and monitoring plan. The plan may be submitted as a part of the reservation application or at the time the Payment Claim Form (NSHP-2) is submitted. This plan shall also be provided to the building or property manager and should identify specific maintenance, monitoring, and inspections the building or property manger would need to undertake, or have

~~contracted for, in order to ensure that the system produces maximum output over the system's expected life. The plan should include activities such as: a) cleaning schedule for the module array of any dirt and dust build up; b) periodic checking of all electrical connections for corrosion and erosion; c) checking the inverter for instantaneous power and long term energy output and diagnose and taking corrective action needed if production is significantly lower than expected; and d) checking for any tree/plant growth or other obstructions that are causing shading on the array and take action to eliminate that shading.~~

~~E.~~D. Additional Information for All ~~on~~ Reservation~~s~~ Applications

Funding is available on a first-come, first-served basis for applicants who submit complete and accurate applications. Only one reservation and one incentive payment will be allowed for each residential dwelling unit during the reservation period.[24] Applicants will not be allowed to submit multiple reservation applications for the same residential dwelling unit.

Only applicants or designated payees who submit complete and accurate reservation applications and provide all supporting documentation will receive reservation approval. In applications with only minor omissions or discrepancies that do not affect eligibility or the amount reserved, the Energy Commission or its agents *may* request clarification of information. If the additional information is not supplied within the stated timeframe, the applicant may be notified to reapply.

No funding will be reserved if an application is incomplete or illegible, has conflicting information or does not otherwise comply with the program requirements. Incomplete applications will not be approved and may require reapplication. If an applicant re-applies, the complete reservation application and all supporting documentation must be submitted as one package and will be subject to the program requirements and funding availability in effect at the time of the new submission.

While information sent in after the initial application may be matched to the application, it is not guaranteed.

Information provided in the application and supporting documentation must be consistent throughout. Applicants should ~~check to~~ ensure all names, ~~and~~ addresses, and equipment are the same throughout all documentation or provide an explanation if they are different. Failure to do so may result in delays or application rejection.

[24] An applicant may only cancel their reservation and re-apply for a new reservation ~~one~~ within the original reservation period if the incentive has dropped at least one level from the ~~rebate granted~~incentive level in the original reservation. A letter explaining the request must be submitted with a new Reservation Application Form signed by the ~~builder~~applicant. This is designed to discourage applicants from applying too early in the construction process for a system to be installed within the reservation period.

An application will be approved for a reservation based on the date it is deemed complete, not the date it was first submitted. The incentive level and other program criteria applicable on the date the application is deemed complete will apply. **Applicants are strongly encouraged to keep copies of all applications and supporting documentation submitted to the Energy Commission or its agents.**

Because the available funding changes during the term of the program, the Energy Commission recommends that applicants not start construction on participating residential buildings and system installations until they receive a confirmation indicating the amount of funding that has been approved for their reservation.

~~F.~~ E. Where to Send Reservations

The complete reservation application must be delivered to the appropriate Program Administrator. For mailing address, fax and contact information, please visit [http://www.gosolarcalifornia.ca.gov/contactus.html].

Alternatively, applicants are strongly encouraged to electronically send applications through the NSHP application web tool [https://www.newsolarhomes.org]. Please visit the Go Solar California website for tutorials on how to use and navigate through the web tool before submitting applications electronically.

Chapter V. Payment Process

~~This section describes the process required to claim funding from the NSHP. Program administration for the NSHP has been transferred to Pacific Gas and Electric Company (effective June 2008), Southern California Edison Company (effective April 2008), and San Diego Gas & Electric Company (effective March 2008), for their respective service areas. Oversight of the program will continue to be handled by the Energy Commission.~~

This chapter identifies the information and steps necessary to receive the incentive payment. To be eligible ~~receive the~~all applications must first have followed the instructions outlined in Chapter IV, Reservation Process, in securing a reservation. In addition, ~~rebate payment,~~ the ~~PV~~ solar energy system must be completely installed, grid-connected, ~~and~~ operating satisfactorily, and the building must be in compliance with the energy efficiency specifications proposed in the applicant's reservation.~~.~~ ~~With the system operating,~~ The applicant~~s~~ must then complete the Payment Claim Form (NSHP-2), which the applicant should have received when the reservation was approved, and provide all supporting documentation below before the reservation expires.

~~; otherwise, i~~If the reservation expires on or before the payment claim and supporting documentation have been submitted to the NSHP Program Administrator, the applicant will be required to reapply under the program eligibility requirements and ~~would then be eligible for~~ incentive levels in effect at the time of the reapplication.

A. Forms and ~~Payment Claim~~ Documentation

1. Payment Claim Form (NSHP-2)

The applicant will receive a Payment Claim Form (NSHP-2) for each residential dwelling unit upon reservation approval. (An exception is for applications where solar is an option. See Chapter IV, Section C for discussion of this reservation process.) When the system has been installed, ~~and~~ the applicant may ~~is ready to~~ submit the completed NSHP-2 Payment C~~c~~laim F~~f~~orm to request payment. The completed Payment Claim Form must identify any ~~, he/she should record in the space provided. Upon reservation approval, the Program Administrator will send a copy of the Payment Claim Form (NSHP-2) for each PV system being installed to confirm the amount of funding reserved on the builder's behalf.~~

~~In most cases, the parties entering into the equipment purchase agreement and installation contract(s) (builder and equipment seller and/or installer) must read, sign, and date the Payment Claim Form. In cases where builders buy equipment from a PV manufacturer or wholesaler and install the equipment themselves, only the builder must sign the form.~~

~~Any~~ changes (e.g., changed equipment, installer or equipment seller)~~,~~ that have been made to the information submitted since the reservation was approved. ~~provided on the previously submitted Reservation Application Form (NSHP-1), such as the use of different equipment, a different installer or a different equipment seller, must be noted in the space provided on the Payment Claim Form (NSHP-2). If additional space is needed to note such changes, a~~Additional pages may be attached if needed. ~~to the Payment Claim Form.~~ Please see Appendix 1 for information on how reservation changes may affect application eligibility or the incentive amount.

The NSHP-2 requests applicants to submit information on solar energy equipment and installation costs. If the HERS rating cost can be broken down by unit, the HERS rating cost shall also be reported.

Assignment and re-assignment ~~Reassignment~~ of incentive payment. The applicant may use the NSHP-2 to ~~re-~~assign his or her right to receive the incentive payment to another party. If an applicant assigns his or her rights to receive the incentive payment to one party and then cancels that assignment, the applicant may subsequently re-assign his or her right to receive payment to another party. Applicants that assign their incentive payment to another party will still be reported as the recipients of the incentive payments for tax purposes.

The NSHP-2 with original signatures (copies are not accepted) ~~and all the documentation listed below~~ must be ~~returned~~ submitted to the Program Administrator by mail.~~, as original signatures are required to process a payment claim for an installed PV system.~~ The Energy Commission encourages applicants to sign with blue or other ink that is clearly distinguishable as original. ~~In some cases, applicants may be asked to return a new form with clearly original signatures.~~ Stamped signatures will not be accepted.

~~2. Documentation Confirming Payment~~

~~Applicants must submit final system cost documentation clearly identifying the final amount paid or legally incurred by the applicant for payment to the equipment seller and/or installer to purchase the system and the final amount paid to install the system. The final amount paid or legally incurred for payment to the equipment seller and/or the final amount paid or legally incurred for payment to the installer must match the cost information identified in the NSHP-2.~~

~~To meet this requirement, the applicant must submit final invoices or a copy of the final agreement. The actual amount paid or legally incurred for payment by the builder to the equipment seller and/or the actual amount paid or legally incurred for payment to the installer must be clearly indicated. In addition, the final invoices or agreements must clearly indicate the extent to which the Energy Commission's incentive lowered the cost of the system for the applicant. If the applicant has entered into an agreement to pay the equipment seller over time rather than in a lump sum, the final agreement must also~~

~~include the terms of payment and the amount of any deposits or payments paid by the applicant to the equipment seller to date.~~

~~The Energy Commission or its agents will conduct spot checks to verify that payments were made as identified in the final invoices or agreements provided by equipment sellers and/or installers. As part of these spot checks, the Energy Commission or its agents may require applicants to submit copies of cancelled checks, credit card statements, or equivalent documentation to substantiate payments made to the equipment seller and/or installer. (When submitting this documentation, applicants are encouraged to remove their personal account numbers or other sensitive information identified in the documentation.) Applicants must explain the difference if the final amount paid by the applicant is different from the amount of the purchase or installation shown in any agreement or invoice or in the previously submitted Reservation Application Form (NSHP-1).~~

~~3. Final Building Permit and Final Inspection Sign Off~~

~~Applicants must submit a copy of the building permit and the final inspection signoff for the system installation prior to the expiration date of the reservation. The builder name and address on the final building permit and final inspection signoff must match the name and address shown on the Payment Claim Form (NSHP-2) and the previously submitted Reservation Request Form (NSHP-1).~~

~~4.~~2. Expected Performance Based Incentive (EPBI) Documentation

Applicants must submit signed copies of a Certificate of Field Verification and Diagnostic Testing (CF-4R-PV) for each solar energy system ~~for each residential building~~ consistent with the procedures found in Appendix ~~4~~2.[25] Electronic copies of a CF-4R-PV that are registered in a HERS provider data registry are acceptable in lieu of a signed CF-4R-PV and shall be verified by the Program Administrator. ~~When the field verification and diagnostic testing is performed using the sampling approach, builders must submit only a CF-4R-PV for each system for each residential building that is sample tested for a group of up to seven units for which compliance was verified based on the results of the sample. Builders may be required to provide copies of Certificates of Field Verification and Diagnostic Testing for other residential buildings in the group upon request.~~ HERS raters must be certified and work under the oversight of one of the Energy Commission approved NSHP HERS providers – California Home Energy Efficiency Rating Services (CHEERS)~~,~~ or California Certified Energy Rating & Testing Services (CalCERTs) ~~or California Building Performance Contractors Association (CBPCA)~~. Web links to these providers can be found on the Energy Commission Website: [~~www.energy.ca.gov/HERS/~~http://www.energy.ca.gov/HERS~~-~~]. The CF-4R-PV form must be generated through the data registry system of an Energy Commission-approved NSHP HERS Provider. The CF-4R-PV shall not be generated unless it has

[25] The field verification procedures found in Appendix 2 are currently applicable only for solar energy systems using photovoltaic modules. Applicants using any other solar electric generating technology should contact the California Energy Commission.

been confirmed by the HERS Provider that the energy efficiency verification(s) have been completed. ~~To enable the HERS rater to make the field verifications, the builder must submit each CF-1R-PV form and the associated input file in digital format to the Energy Commission or its agents for uploading into the data registry of one of the Commission-approved HERS Providers, and the~~ The ~~builder~~ applicant must provide the HERS rater with ~~the CF-6R-PV (Installer Certification) form, the site plan, and~~ the solar energy system information specified in Section ~~C4-~~C2 of Appendix ~~4-~~2 for each ~~residential buildings~~solar energy system being tested. In cases where the CF-4R-PV shows that the installed solar energy system is not consistent with CF-1R-PV that has been previously submitted to the Energy Commission or its agents, a revised CF-1R-PV that reflects the actual installation shall be prepared and submitted ~~that reflects the actual installation~~. When such an inconsistency is found when the sampling approach is used, a revised CF-1R-PV shall be prepared for all systems in the group that was sampled, consistent with the Energy Commission's re-sampling and corrective action procedures. Applicants may be required to submit Installation Certificates (CF-6R-PVs) to the Energy Commission or its agents upon request.

~~5.~~3. Energy Efficiency Documentation

The requirements for energy efficiency documentation in conjunction with the payment claim are conceptually the same as for EPBI documentation. The energy efficiency documentation is specified below.

Applicants are strongly encouraged to participate in their utility's residential and multifamily new construction energy efficiency programs to obtain the financial incentives that they can earn for meeting either Tier I or Tier II requirements, and to streamline the process for demonstrating that the energy efficiency requirements ~~have been~~for NSHP are met. Energy efficiency documentation ~~that has been~~ submitted and approved by utility new construction programs ~~is~~ will not ~~required~~ need to be submitted for NSHP, but will be verified before payment claims are approved by program administrators. ~~to the Energy Commission.~~

Applicants must submit a signed copy of the Certificate of Field Verification and Diagnostic Testing (CF-4R) for ~~all~~ any ~~energy efficiency~~HERS verification measures installed to meet either Tier I or Tier II. Electronic copies of a CF-4R that are registered in a HERS provider data registry are acceptable in lieu of a signed CF-4R and shall be verified by the Pprogram Aadministrators.
~~When the field verification and diagnostic testing is performed using the sampling approach, builders must submit only a CF-4R form for each residential building that is sample tested for a group of up to seven units for which compliance was verified based on the results of the sample. Builders may be required to provide copies of Certificates of Field Verification and Diagnostic Testing for other residential buildings in the group upon request.~~

Applicants must submit a signed copy of the Above Code Energy Efficiency Measures Verification Checklist (CF-4R-NSHP) for all energy efficiency measures installed to meet either Tier I or Tier II. Electronic copies of a CF-4R-NSHP that are registered in a

HERS provider data registry are acceptable in lieu of a signed CF-4R-NSHP and shall be verified by the Pprogram Aadministrators. The CF-4R-NSHP is always required regardless of the use of any HERS verification measures.

It is the responsibility of the NSHP applicant to properly arrange, with the HERS rater, the inspections required for completing the CF-4R-NSHP. Please be aware that some of these inspections may need to take place as early in the construction process as foundation or rough-in.

HERS raters must be certified and work under the oversight of one of the Energy Commission approved NSHP HERS Providers – CHEERS, or CalCERTs or CBPCA. Web links to these providers can be found on the Energy Commission Website: [www.energy.ca.gov/HERS/http://www.energy.ca.gov/HERS]. The CF-4R and CF-4R-NSHP must be generated through the data registry system of an Energy Commission-approved HERS Provider. The HERS rater must verify the presence of all energy efficiency measures installed to meet either Tier I or Tier II. To enable the HERS rater to make these field verifications, the builder must submit each CF-1R form and the associated input file in digital format for uploading into the data registry of one of the Energy Commission-approved HERS Providers. The builder must provide the HERS rater with the CF-6R for each residential building.

6.4. Ten-Year Warranty (NSHP-3)

A Ten-Year Warranty Form (NSHP-3) must be completed and signed by the appropriate party(ies) and given to the builder to compile as part of the payment claim package.

For owner-builder installed systems, please submit copies of the manufacturers' 10-year warranties for the inverter(s) and solar electric generating equipment.

7.5. System Interconnection with Utility Grid

Program Administrators will verify that the system has been interconnected prior to issuing payment. Upon request of the Program Administrator, Tthe applicant must be able to provide proof from the electric utility demonstrate that the solar energy system is interconnected to the utility distribution grid and that the utility has approved the system's interconnection. Approval by the utility to interconnect reflects that the appropriate building inspectors have approved the installation of the solar system. to the utility grid from the site of installation. The applicant must demonstrate this by submitting a letter of authorization to interconnect the system from the utility. By providing the utility's letter of authorization to interconnect, applicants will not be required to submit proof of electrical connection.

By applying for program funding, builders authorize the Energy Commission and/or the Program Administrators during the term of the NSHP to obtain information from the

~~utility serving the project in order to verify compliance with program requirements, including requirements for system interconnection to the utility grid. In addition, the builder must forward new homeowner contact information when requested by the Energy Commission and/or the Program Administrators.~~

6. Payee Data Record (STD-204) / IRS W-9 Form

The Payee Data Record must be completed by the party identified as the designated payee in the NSHP-1 Reservation Application Form. If the designated payee has already submitted a complete STD-204 form with a prior application and has already received an incentive payment within the past year from the Program Administrator or the Energy Commission, a new STD-204 is not needed. In these cases the Program Administrators and Energy Commission will use data from the previously submitted STD-204 form. If the data provided in a previously submitted STD-204 has changed, the designated payee must submit a new STD-204.

In addition, payees for projects located in the territories of PG&E and SDG&E must provide a copy of the Request for Taxpayer Identification Number and Certification (IRS W-9 form) if requested by the Program Administrators.

When the payee is a corporation or limited liability entity, the payee must also submit proof of good standing with the California Secretary of State.

7. Lease Agreement or Power Purchase Agreement

For systems utilizing third-party ownership structures, the lease agreement or power purchase agreement shall be submitted to the Program Administrator. See Chapter II, Section A for requirements.

~~B. Assignment of Rebate Payment~~

~~The applicant may assign his or her right to receive the payment to another party by completing the Payment Claim Form (NSHP-2) and submitting it with the payment claim package. The Payment Claim Form may not be submitted by fax as original signatures are required to process the assignment. Applicants that assign their incentive payment to another party will still be reported as the recipients of said payments for tax purposes.~~

~~C.~~B. Additional Information on Payment Claims ~~Submission~~

Applicants must ensure that all program requirements as stated in Chapter 2 have been met prior to the submission of a payment claim package.

Applicants must ~~mail~~submit the complete payment claim package to the appropriate Program Administrator on or before the expiration date specified on the Payment Claim Form. A payment claim package is for one residential dwelling unit. ~~Payments will be provided for each payment claim package submitted.~~ Multiple ~~P~~payment claim~~s~~ packages ~~may be made~~ for multiple residential dwelling units may be submitted at the same time. ~~individual buildings or groups of buildings. Reservation holders~~Applicants who reserve more than one residential dwelling unit in the program are not required to have completely installed all systems in their reservations before submitting a payment claim package. **Applicants are strongly encouraged to keep copies of all documents submitted in the payment claim package to the Program Administrator.**

If the payment claim package is incomplete, the Program Administrator will request the applicant to provide all missing or unclear information. ~~; t~~The applicant will be responsible for obtaining missing or revised information from the equipment seller, ~~or~~ installer, or HERS rater to process the request. The Program Administrator will allow the applicant up to 60 days to respond with corrections to all the missing or unclear information to approve payment.

If the claim is made after the expiration date of the reservation or is otherwise ineligible, the applicant may reapply for an ~~rebate~~incentive reservation but will be subject to the program eligibility requirements, incentive levels, and funding available at the time of the re-application.

The complete payment claim package must be delivered to the appropriate Program Administrator. For mailing address, fax and contact information, please visit [http://www.gosolarcalifornia.ca.gov/contactus.html]. Alternatively, if the applicant had previously submitted the application via the NSHP application web tool, the applicant may choose to submit all of the documents in the payment claim package, except the NSHP-2, through the web tool as well. Applicants are strongly encouraged to use the web tool for submitting payment claim documents.

The Energy Commission and the Program Administrators intend to make payments within 6 to 8 weeks of receipt of a complete payment claim package. Payment will be made to the payee and mailed to the address ~~of the payee specified~~ on the ~~Reservation Application Form (NSHP-1)~~NSHP-2 and/or Payee Data Record (STD-204). ~~If the applicant has assigned the payment to another party, payment will be made to the assigned payee and mailed to the address of the payee specified on the Payment Claim Form.~~

~~D.~~C. Claiming an Incentive Payment Without a Prior Reservation

~~If an incentive payment is claimed for a system not previously approved for a reservation, the completed payment claim package must be accompanied by a completed reservation package.~~ If a solar energy system has been installed and the applicant subsequently wishes to receive an incentive from the program, the reservation process in Chapter IV must still be followed. However, ~~A~~applicants ~~without a prior reservation~~ should be aware that program eligibility requirements and incentive levels at the time of application/payment claim submission may have changed since the system installation, resulting in necessary system modifications, lower incentives, or ineligibility for incentives. ~~and may cause the applicant to make significant and costly changes to the system in order for it to qualify for an incentive.~~

Appendix 1 – Frequently Asked Questions

A. Can My Installed System Be Different Than My Reservation?

The Energy Commission expects a solar energy system to be installed as described in the ~~Reservation Application Form (NSHP-1)~~Expected Performance Based Incentive Documentation (CF-1R-PV), but recognizes that changes may occur during installation. Any change in the solar energy system specifications or the expected performance of the system as determined through field verification, must be documented by re-running the CECPV Calculator. ~~Changes do not require prior approval, but must be documented on the Payment Claim Form (NSHP-2) and are likely to change the incentive amount. Changes that result in a lowering of the expected performance of a system, and thereby lowering incentive amounts are not a problem. However, any change that increases the expected performance of a system, and thereby increasing the rebate amount is subject to availability of funding. The builder may receive the incremental increase in the eligible rebate at the time the claim is received.~~

~~Modifications to an approved reservation may be made prior to a payment claim or when the complete payment claim is submitted. When a modification increases the expected performance of the system, a new incentive amount will be calculated based on the time a modification request, with supporting documentation, is deemed complete. If reservations at that time exceed available funding, the incremental increase in expected performance will earn the incentive amount in effect at the time of the modification.~~

~~If any system change occurs or is determined by the field verification that decreases the expected performance below that used in the reservation, the rebate is based on the lower expected performance. If any system change occurs or is determined by the field verification that increases the expected performance above that used in the reservation, the applicant may complete the Payment Claim Form based on the higher performance (subject to the available funding stipulation above).~~

If the applicant uses the “California Flexible Installation” criteria and the minimal shading criteria, the ~~builder~~ applicant may complete the ~~the Payment Claim Form~~payment claim package using the expected performance used for the reservation as long as the orientation, tilt and minimal shading criteria are determined to be met by the field verification. The applicant also has the option of recalculating the incentive based on the actual orientation and tilt of the system as determined by the field verification. If the field verification determines that the “California Flexible Installation” criteria and the minimal shading criteria are not met, the expected performance will be re-calculated based on the actual orientation, tilt and shading.

The incentive level used to reserve funding when the application was approved will be used to calculate the incentive payment for the installed system. These changes must

be submitted to the Program Administrator prior to the submission of the payment claim package. Changes must also be documented in the Payment Claim Form (NSHP-2).

B. Can ~~Builders~~ Applicants Add to Their Existing Systems?

Once incentives are paid, changes to expand or otherwise improve the expected performance of a system(s) are not eligible for NSHP funding. Homeowners otherwise ineligible for the NSHP funding may apply to the California Solar Initiative Program administered by the California Public Utilities Commission. See [~~www.gosolarcalifornia.ca.gov~~http://www.gosolarcalifornia.ca.gov/csi/index.html] for additional information and requirements.

C. ~~Can I Get a~~ Time Extension~~s~~?

~~No time extensions will be granted to existing reservations under any circumstances.~~Projects with valid, unexpired reservations as of January 1, 2010, ~~with an expiration date prior to December 31, 2011,~~ are granted a one-time time extension as follows:~~.~~ Solar as Standard and affordable housing projects have an additional 12 months from ~~after~~ the expiration date of their reservations as stated on the NSHP-2 to submit a payment claim package~~s~~. Base incentive projects have an additional six months after the expiration date of their reservation as stated on the NSHP-2 to submit payment claim packages.

No other time extensions will be granted to any other projects under any circumstances.

~~Appendix 2 – System Size Justification~~

~~This Appendix describes the method used to determine the maximum system size eligible for incentives from the program. Because the average annual residential electricity consumption in California is about 7000 kWh/yr, systems that are 5 kW and under are automatically presumed in compliance with the maximum size limitation.~~

~~In cases where the proposed system size is greater than 5kW, the system must be sized such that the expected performance, defined as expected annual generation of the system is no greater than 100 percent of the residential building's on-site estimated annual electricity consumption. The applicant may submit either the estimated annual electricity consumption of the residential unit based on a detailed energy use calculation signed by a Certified Energy Plans Examiner (CEPE) or a letter from a qualified architect, engineer, or electrical contractor (C-10 licensed) licensed by the State of California detailing expected energy consumption.~~

~~The Energy Commission or its agents will use the expected system electricity production from the EPBI calculation and compare it to the expected energy consumption. In cases where the expected electricity production is greater than 100 percent of the estimated annual consumption, the incentive amount will be based on the estimated annual consumption.~~

Appendix 3 – Criteria for Testing, Certification and Listing of Eligible Components

This Appendix summarizes the criteria used for determining which components can be used to create a PV system that is eligible for a rebate from the New Solar Homes Partnership. Certified equipment (solar modules, inverters, and performance meters) is periodically added to and removed from the lists of eligible equipment.

The equipment must be certified to meet nationally or internationally recognized standards, information submittal requirements, and other criteria specified by the Energy Commission to be listed. Until the equipment is listed, it is not eligible and no funding can be reserved or payment made.

If a component becomes decertified as a result of failing to meet the testing requirements described below, and is removed from the Energy Commission's lists of eligible components, applicants may be required to modify their systems by replacing the decertified component with a certified component before payment is issued.

A. Photovoltaic Modules

All flat plate PV modules must be certified by a nationally recognized testing laboratory as meeting the requirements of and being listed to be in conformance to the Underwriters Laboratory (UL) Standard 1703 and any subsequent testing standard adopted by UL.

All flat plate photovoltaic modules must also be tested by a laboratory accredited by the International Laboratory Accreditation Cooperation according to the following sections of either the International Electrotechnical Commission Standard (IEC) 61215, *Crystalline Silicon Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type* Approval, *Second Edition 2005-04*, or the (IEC) Standard 61646, *Thin-film Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval, First Edition, 1996-11*, except as specified in Notes 3, 6 and 7 of Table 1 below.

IEC Standard 61215 Sections

- 10.2 Maximum Power Determination
- 10.4 Measurement of Temperature Coefficients
- 10.5 Measurement of Nominal Operating Cell Temperature (NOCT)
- 10.6 Performance at STC and NOCT
- 10.7 Performance at Low Irradiance

IEC Standard 61646 Sections

- 10.2 Performance at STC
- 10.4 Measurement of Temperature Coefficients

~~10.5 Measurement of NOCT~~
~~10.6 Performance at NOCT~~
~~10.7 Performance at Low Irradiance~~
~~10.18 Light Soaking~~

~~The following performance data and information must be provided and certified to the Energy Commission. Data for a module may be provided based on testing of a module that is a similar design and type with variations that do not significantly affect performance, if the manufacturer certifies that test results for all specified parameters in Table 1 for both modules would not be significantly different. Data submitted to the Energy Commission will be made public.~~

~~The factory measured maximum power of each production module, as specified in UL 1703, Section 44.1, and the lower bound of the manufacturer's stated tolerance range, pursuant to UL 1703, Section 48.2, must be no less than 95% of the Maximum Power reported to the Energy Commission.~~

Table 1. Module Performance Parameter Testing

Parameter	Symbol	Units	Notes
Maximum Power	P_{mp}	Watts	1, 7
Voltage at maximum power	V_{mp}	Volts	1, 7
Current at maximum power	I_{mp}	Amps	1, 7
Open Circuit Voltage	V_{oc}	Volts	1, 7
Short Circuit Current	I_{sc}	Amps	1, 7
Nominal Operating Cell Temperature	NOCT	°C	3, 7
Temperature Coefficients	β_{Voc} (at V_{oc}) β_{Vmp} (at V_{mp}) α_{Isc} (at I_{sc}) α_{Imp} (at I_{mp}) γ_{Pmp} (at P_{mp})	%/°C	2, 7
Voltage at maximum power and low irradiance	V_{low}	Volts	4, 6
Current at maximum power and low irradiance	I_{low}	Amps	4, 6
Voltage at NOCT	V_{NOCT}	Volts	5, 6
Current at NOCT	I_{NOCT}	Amps	5, 6

Notes:

1) Values shall be measured at Standard Test Conditions after Preconditioning according to IEC Standard 61215, Section 5, or after Light-soaking according to IEC Standard 61646, Section 10.18.

2) Values shall be measured and calculated according to IEC Standards 61215 and 61646, Section 10.4.

3) Value shall be measured according to IEC Standards 61215 and 61646, Section 10.5.2. For BIPV modules the measurements shall be made using the mounting specified below. Prior to January 1, 2008 manufacturers may provide NOCT values for BIPV modules that are not tested according to IEC Standards 61215 and 61646 with the mounting below; these values for performance calculations will be adjusted by adding 20 ^{o} C to be consistent with the Sandia National Laboratories Report, *A Simplified Thermal Model for Flat-Plate Photovoltaic Arrays* by Martin K. Fuentes, 1987, page 11, Table 4.

4) Values shall be measured at low irradiance according to IEC Standards 61215 and 61646, Section 10.7.

5) Values shall be measured at NOCT according to IEC Standards 61215 and 61646, Section 10.6.

6) Prior to January 1, 2008 provision of this data is optional.

7) Prior to January 1, 2008 manufacturers will provide this data based on IEC Standard 61215 or IEC Standard 61646 if available or based on test procedures specified in UL 1703, Section 18.1 (in-house laboratory and flash test data is permissible prior to January1, 2008), if testing for the module according to one of these IEC Standards has not been completed.

Mounting Specifications for NOCT testing for Building Integrated Photovoltaic (BIPV) Modules Intended for Roof Integrated Installations:

Tilt angle: the test modules shall be positioned so that they are tilted at 23 ^{o} ± 5 ^{o} (5:12 roof pitch) to the horizontal.

Configuration: the test modules shall be located in the middle of an array that is at least four feet high and four feet wide. The array shall be surrounded on all sides with a minimum of three feet of the building system for which the BIPV system is designed to be compatible, and the entire assembly shall be installed and sealed as specified by the manufacturer for a normal installation.

Substrate and Underlayment: the test modules shall be installed on a substrate of oriented strand board with a minimum thickness of 15/32 inch that is covered by #30 roofing felt with a minimum R-10 continuous insulation under and in contact with the oriented strand board and include any other manufacturer recommended underlayments.

B. Inverters

All inverters must be certified as meeting the requirements of UL 1741. Each model of inverter must be tested by a qualified Nationally Recognized Test Laboratory[26] to be eligible for this program. Performance ratings for each model will be determined according to sections of the test protocol entitled, *Performance Test Protocol for Evaluating Inverters Used in Grid-Connected Photovoltaic Systems*, prepared by Sandia National Laboratories, Endecon Engineering, BEW Engineering, and Institute for Sustainable Technology, October 14, 2004 version[27] and the "Guidelines for the Use of the Performance Test Protocol for Evaluating Inverters Used in Grid-Connected Photovoltaic Systems." This version of the test protocol and guidelines are available on the Energy Commission website at [http://energy.ca.gov/renewables/02-REN-1038/documents/2004-12-01_INVERTER_TEST.PDF]. The tests must be performed in accordance with sections 3, 4, 5.1 and 5.2 of the test protocol, as further clarified in the guidelines. The following tests are required:

- **Maximum Continuous Output Power.** Section 5.4 shall be performed in its entirety for test condition A of Table 5-2 with the following exceptions: 1) the test shall be performed at an ambient temperature of 40°C, rather than 45°C, and 2) the dc V_{nom} may be selected by the manufacturer at any point between V_{min}

[26] Nationally Recognized Testing Laboratories shall be those laboratories that have been recognized by the U.S. Department of Labor, Occupational Safety & Health Administration (OSHA), in accordance with Title 29 of the Code of Federal Regulations, section 1910.7, and are approved to conduct test UL 1741 under the scope of their OSHA recognition. A list of all current Nationally Recognized Testing Laboratories is available on OSHA's web page at [www.osha.gov/dts/otpca/nrtl/index.html]. Please note, not all of the Nationally Recognized Testing Laboratories identified on OSHA's list are approved to conduct test UL 1741.

[27] This version of the test protocol is identified by the file name "InvertrTestProto_041014.doc" as shown in the left-hand side of the footer on each page of the protocol.

~~+0.25* (V_{max} - V_{min}) and V_{min} +0.75* (V_{max} - V_{min}). It is not necessary to perform Section 5.4 for test conditions B through E of Table 5-2.~~

- ~~**Conversion Efficiency.** Section 5.5 shall be performed for test conditions A, B and C of Table 5.3, subject to the following: 1) the tests shall be performed with dc V_{nom} equaling the same voltage as selected above for the Maximum Continuous Power Output test, 2) steps 1 through 8 of the test procedure (Section 5.5.1) shall be performed at 25°C, and not at 45°C, and 3) to reduce time for each test condition, begin at the highest power level and go to the lower power levels. If done in this order it will only be necessary to wait for temperature stabilization at the 100 percent power level. In addition, the unit only needs to be operated at full output power for one hour, rather than 2.5 hours, and no preheating is necessary if the Conversion Efficiency test is performed within 1 hour of full operation under test 5.4 provided the unit has not been exposed to ambient temperature of less than 22 °C.~~

- ~~**Tare Losses.** Section 5.7.1 shall be performed in its entirety. It is not necessary to perform the tests under Section 5.7.2 or Section 5.7.3.~~

~~All of the above data will be used as inputs for the Commission's PV Calculator.~~

~~Please note that the tests for Power Foldback (Section 5.8) and Inverter Performance Factor/Inverter Yield (Section 5.9) are NOT required.~~

~~The data and reports resulting from the tests for Maximum Continuous Output Power (Section 5.4), Conversion Efficiency (Section 5.5) and Tare Losses (Section 5.7.1) must be provided to the Energy Commission and will be made public. The inverter tested must utilize the same hardware and software configuration evaluated during the UL 1741 certification test.~~

~~The methodology for rating inverters on the Energy Commission list is based on the weighted inverter efficiency measured at various load points. Weighting inverter efficiency will be determined with the following weighting factors:~~

~~DC Input Power Level~~	~~Weighting Factor~~
~~10%~~	~~0.04~~
~~20%~~	~~0.05~~
~~30%~~	~~0.12~~
~~50%~~	~~0.21~~
~~75%~~	~~0.53~~
~~100%~~	~~0.05~~

~~The Energy Commission also plans to consider if changes should include adjusting the ratings for inverters with battery-backup to account for losses inherent in battery back-up systems.~~

~~To qualify for the NSHP, PV systems must have an inverter that has a built in meter that measures and displays output AC power.~~

~~C. Metering Criteria~~

~~Performance meters or inverters with a built-in meter must be easy to read for the customer's benefit and be listed with the Energy Commission's eligible equipment list. The meter must measure the total energy produced by the system in kilowatt-hours (or watt hours) and have a manufacturer's uncertainty specification of plus or minus five percent. The meter must retain the kilowatt-hour production data in the event of a power outage.~~

Appendix ~~4~~ 2 – Field Verification and Diagnostic Testing of ~~Photovoltaic~~ Systems[28]

A. Background

The New Solar Homes Partnership (NSHP) provides incentives ~~to builders~~ for installing high performance ~~PV systems~~solar energy systems on energy efficient homes. The ~~NSHP bases the~~ incentive amount ~~on a~~is ~~determination~~ determined ~~of~~ by the expected performance of the ~~solar systems~~solar energy system~~,~~. The expected performance calculation ~~which~~ accounts for the tested and certified performance of the specific photovoltaic (PV) modules and inverter, ~~the~~ mounting type, ~~and~~ cell temperature, ~~the~~ orientation, ~~and~~ tilt of the modules, and the extent to which the system is shaded. The CECPV Calculator developed by the Energy Commission accounts for these parameters ~~that are under the control of the builder,~~ as well as the solar and climatic conditions for the ~~locale~~ location of the ~~building~~ system to determine hourly estimated performance, which is weighted to account for the time ~~-~~dependent valuation (TDV) of the electricity that is produced. Third-party field verification must be conducted to ensure that the components of the ~~solar~~ PV system and its installation are consistent with the characteristics used to determine ~~its~~ the estimated performance. Field verification is a value-added service paid for by the ~~builder~~ applicant that provides quality control and can protect the applicant, builder, installer, ~~and~~ supplier, and homeowner. Field verification is completed consistent with the procedures found in the current Building Energy Efficiency Standards [http://www.energy.ca.gov/title24]. Field verification for new housing developments may employ the sampling approach as allowed in the current Building Energy Efficiency Standards.[29]
~~of Chapter 7 of the *2005 Building Energy Efficiency Standards Residential Alternative Calculation Methods Approval Manual*.~~

The field verification and diagnostic testing procedures described in this Appendix are intended to ensure that the:

- PV modules and inverters used in the expected performance calculations are actually installed at the applicable site;
- PV modules are minimally shaded, or if shaded, that the actual shading does not exceed the shading characteristics that were included in the expected performance calculations; and

[28] The field verification procedures found in Appendix 2 are currently applicable only for solar energy systems using photovoltaic modules. Applicants using any other solar electric generating technology should contact the California Energy Commission.
[29] For the 2005 Building Energy Efficiency Standards see Chapter 7 of the Residential Alternative Calculation Method (ACM) Approval Manual. For the 2008 Building Efficiency Standards see Appendix RA2 of the 2008 Reference Appendices.

- Measured AC power output ~~power~~ from the PV system ~~matches~~ is equal to or exceeds that ~~expected~~ calculated by the CECPV Calculator within the specified margin at the prevailing conditions at the time of field verification and diagnostic testing.

B. Responsibilities

Field verification and diagnostic testing is the responsibility of both the PV system installer and ~~with~~ the ~~HERS (~~Home Energy Rating System~~)~~ (HERS) rater who completes the third-party field verification. The PV installer must perform the field verification and diagnostic testing procedures in this document for every system that they install. The HERS rater working under the oversight of an Energy Commission approved HERS provider then performs independent third-party field verification and diagnostic testing of the systems. ~~For new housing developments, the builder may choose to have the HERS rater complete field verification using the sampling approach described in Section 7.5, including subsections 7.5.1, 7.5.2 and 7.5.3, of the *2005 Building Energy Efficiency Standards Residential Alternative Calculation Methods Approval Manual*.~~

The field verification and diagnostic testing protocol is the same for both the PV installer and the HERS rater. The protocol anticipates that the PV installer will ~~be able to get on~~have access to the roof to make measurements, but that the HERS rater will not. The measurements required by this protocol are not required to be completed on the roof, but more accurate measurement techniques are possible with roof access. The measurements required by the protocol may be performed in multiple ways as described in the subsections below.

C. Field Verification and Diagnostic Testing Process

The NSHP field verification and diagnostic testing of ~~solar~~ PV systems follows the process described below. Note, for NSHP purposes, a ~~solar~~ PV system is one or more strings of PV modules connected to one inverter. Documentation of the process uses three forms that are counterparts to the compliance forms used for the *Building Energy Efficiency Standards*.

1. The applicant~~/builder's representative~~ enters the necessary input data into the CECPV Calculator, which produces an output report (Certificate of Compliance Form (CF-1R-PV)) that documents the specific modules, inverter(s) and meter(s) that are used in each ~~solar~~ PV system ~~that is installed on the building~~, the anticipated shading of each system (either the intent for the system to meet the minimal shading requirements or the actual shading that is anticipated), and a table of predicted electrical ~~power~~generation for each system for a range of solar ~~irradiation~~ irradiance and ambient air temperature. The CF-1R-PV ~~and the~~

~~associated input file are~~ is provided to the ~~Energy Commission~~ Program Administrator with the NSHP reservation application and to the HERS Provider.

2. Once each ~~solar~~ PV system is installed, the PV installer completes the field verification and diagnostic testing protocol for each ~~solar~~ PV system ~~on the building~~ and documents the results on the Installation Certificate (CF-6R-PV), verifying that the installation is consistent with the CF-1R-PV. The PV installer documents and certifies that the PV system meets the requirements of this appendix and provides ~~a copy~~ copies of the CF-6R-PV to the builder/homeowner, applicant, and ~~to the~~ HERS rater. The CF-6R-PV shall indicate the actual azimuth and tilt for all PV systems where the California Flexible Installation was used on the CF-1R-PV. The CF-6R-PV shall be completed by the PV system installer in all cases.

   EXCEPTION: If 100 percent of the PV systems in a NSHP application are being tested by a HERS rater (sampling is not being used), the HERS rater can complete the testing required for the CF-6R-PV; however, the PV installer is still required to sign the CF-6R-PV.

   The applicant shall provide the CF-6R-PV to the HERS rater. In conjunction with the CF-6R-PV, the applicant shall provide to the HERS rater a site plan for each lot:

   a) Identifying the height category (small, medium, or large) of all pre-existing, planted and planned trees and the location and height of any structures which will be built on the lot and neighboring lots of the building with the PV system; and

   b) Showing the bearing of the property lines and the azimuth and tilt or roof pitch of each PV system.

   The applicant shall also provide the HERS rater a product specification (cut-sheet) for the PV modules, inverter and meter for the specific system, attached to the CF-6R-PV along with an invoice or purchase document which lists the make and model of the PV modules installed.

3. The HERS rater completes independent third-party field verification and diagnostic testing of each ~~solar~~ PV system and documents the results on the Certificate of Field Verification and Diagnostic Testing (CF-4R-PV), independently verifying that the installation is consistent with the CF-1R-PV and the CF-6R-PV. The HERS rater provides a copy of the CF-4R-PV to the ~~builder~~ applicant and the HERS provider. The CF-4R-PV shall indicate the actual azimuth and tilt for all PV systems where the California Flexible Installation was used on the CF-1R-PV. ~~At the builder's option the HERS rater may complete field verification of a random sample of solar systems in the housing development in accordance with Section 7.5, including subsections 7.5.1, 7.5.2 and 7.5.3, of the *2005 Building Energy Efficiency Standards Residential Alternative Calculation*~~

~~*Methods Approval Manual.*~~ In cases where the CF-6R-PV or the CF-4R-PV show~~s~~ that the installed ~~solar~~ PV system is not consistent with the previously submitted CF-1R-PV ~~that has been previously submitted to the Energy Commission or its agents~~, a revised CF-1R-PV must be prepared and submitted with ~~its~~ the associated ~~input~~ electronic file~~s~~ to the ~~Energy Commission~~Program Administrator ~~and HERS Provider~~, that is consistent with the as-installed conditions. When such an inconsistency is found when the sampling approach is used, revised CF-1R-PVs must be prepared and submitted to the ~~Energy Commission or its agents~~Program Administrator ~~and the HERS Provider~~ for all systems in the sampling group~~, consistent with the Energy Commission's re-sampling and corrective action procedures in Chapter 7 of the *2005 Building Energy Efficiency Standards Residential Alternative Calculation Methods Approval Manual*~~.

4. As part of the payment process, ~~T~~the ~~builder (~~applicant~~)~~ submits a copy of the ~~Installation Certificate (CF-6R-PV) for each solar system installed on each residential building and the~~ Certificate of Field Verification and Diagnostic Testing (CF-4R-PV), to the Program Administrator, for each ~~solar~~ PV system ~~on each residential building; for housing developments where the builder has chosen to meet field verification requirements for a sample of residential buildings, the builder submits a CF-4R-PV form for each system for each residential building that is sample tested~~in the NSHP application. ~~The CF-4R-PV form must be generated through the data registry system of a Energy Commission-approved HERS Provider. Builders may be required to provide copies of Certificates of Field Verification and Diagnostic Testing to the Energy Commission for other residential buildings in the group upon request. The Payment Claim Form must be based on system characteristics that produce expected performance calculations that are no better than calculations based on the characteristics reported in the CF-4R-PV. In cases where the CF-4R-PV shows that the installed solar system is not consistent with CF-1R-PV that has been previously submitted to the Energy Commission or its agents, a revised CF-1R-PV shall be prepared and submitted that is consistent with the as-installed conditions. When such an inconsistency is found when the sampling approach is used, revised CF-1R-PVs shall be prepared for all systems in the group that was sampled, consistent with the Energy Commission's re-sampling and corrective action procedures.~~

   ~~In conjunction with the CF-6R-PV, the applicant/builder must provide to the installer and rater a site plan that for each lot:~~

   ~~a) identifies the species of all pre-existing, planted and planned trees and the location and height of any structures which will be built on the lot and neighboring lots of the building with the solar system; and~~

   ~~b) shows the bearing of the property lines and the azimuth and tilt or roof pitch of each PV array.~~

   ~~The builder must also provide the HERS rater a production specification (cut-sheet) for the modules, inverter and meter for the specific system, attached to the~~

~~CF-6R-PV along with an invoice or purchase document which lists the make and model of PV modules installed in the project.~~

D. Relationship to Other Codes, Standards and Verification

The local jurisdiction must issue a building permit for the qualifying PV system, either as a separate permit or as part of the new residential building permit~~, and~~. ~~t~~The PV system must meet all applicable electrical code, structural code, ~~and~~ building code, and local electric utility interconnection requirements. ~~In addition, the local electric utility will have standards regarding interconnection to the electric grid and other matters.~~

The field verification and diagnostic testing procedures described in this document do not substitute for normal electrical, structural or building plan check or field inspection. Nor do they substitute for field verification by the local utility regarding interconnection to the electric grid.

E. Field Verification Visual Inspection

The purpose of the visual inspection described in this protocol is to verify ~~that~~ the installation of the proper ~~module, inverter and meter~~equipment and the installation conditions specified ~~in~~ on the CF-1R-PV ~~for each residential building is properly installed in the field~~. The HERS rater shall use binoculars or another means to view the installation without being required to ~~get on~~have access ~~the~~to the roof~~, .~~ ~~and shall verify the models and numbers of modules against the cut sheet/invoices.~~ The HERS rater may rely on photographic evidence provided by the installer on the make, model~~s~~ and ~~numbers~~ quantity of PV modules, standoff distance and shading, but in the absence of such evidence, must rely on a conservative determination based solely on their own observation.

1. PV Modules

The PV installer and the HERS rater ~~must~~ shall verify that the ~~same number~~ make, model, and quantity ~~of each make and model number~~ of PV modules ~~used in the expected performance calculations~~specified on the CF-1R-PV are installed in the field. The PV installer and HERS rater ~~must also~~shall verify the module mounting type (flush mounted BIPV or rack mounted) and in the case of rack mounted modules, the standoff distance of the modules above the mounting surface. The PV installer and the HERS rater ~~also must observe and~~shall verify the mounting height of the modules above the ground (either one story, two story or ~~measured minimum~~applicant specified distance ~~above the ground~~).

2. Inverters

The PV installer and the HERS rater ~~must~~ shall verify that the make, ~~and~~ model, and quantity of inverters ~~used in the expected performance calculations~~specified on the CF-1R-PV are installed in the field.

3. System Performance Meters

The PV installer and the HERS rater ~~must~~ shall verify that either a ~~separate~~ standalone system performance meter or an inverter with ~~an integral~~a built-in system performance meter is installed that is the same make and model specified on the ~~Reservation Application Form~~CF-1R-PV and that the meter meets all Guidebook requirements for system performance meters.

4. Tilt and Azimuth

The PV installer and the HERS rater ~~must~~ shall verify that the tilt and ~~orientation (~~azimuth~~)~~ of the PV modules installed in the field match the values specified ~~that were used to determine the expected performance of each solar system~~on the CF-1R-PV, within ± 5 degrees. In some systems, PV modules may be installed in multiple ~~arrays~~ orientations with different tilts and azimuths. In these cases the tilt and azimuth of each array must be verified. Note that for systems using the California Flexible Installation criteria, the tilt and azimuth of each system must be shown to fall within the range of tilt and azimuth that is allowable under that criteria (see section E. 4. c) below).

a. Determining Tilt

The tilt angle of the PV modules is measured in degrees from the horizontal (~~e.g.~~ horizontal PV modules will have a tilt of zero and vertically mounted PV modules will have a tilt of 90 degrees). The tilt of the PV modules may be determined in the following ways:

i. Using the building plans

The as-built or construction drawings for the residential building will state the slope of the roof, usually as the ratio of rise to run. If the PV modules are mounted in the plane of the roof then the slope of the PV modules is the same as the slope of the roof. Table 1 may be used to convert rise to run ratios to degrees of tilt.

Table 1 – Conversion of Roof Pitch to Tilt

Roof Pitch (Rise:Run)	Tilt (degrees)
2:12	9.5
3:12	14.0
4:12	18.4
5:12	22.6
6:12	26.6
7:12	30.3
8:12	33.7
9:12	36.9
10:12	39.8
11:12	42.5
12:12	45.0

ii. Using a digital protractor

A digital protractor may be used to measure either horizontal or vertical angles (see Figure 1). These devices when sighted up the slope of the PV modules from the ground will display the slope, relative to the horizontal.

Figure 1 – Digital Protractor

b. Determining ~~Orientation (~~Azimuth~~)~~

The PV installer and the HERS rater must determine the ~~orientation by measuring the~~ azimuth of the PV modules and verify that the azimuth is the same as that used to determine the expected performance of each ~~solar~~ PV system. The convention that is used for measuring azimuth is to determine the degrees of angle clockwise from north~~,~~ ; ~~e.g.,~~ north azimuth is zero degrees, east is 90 degrees, south is 180 degrees and west is 270 degrees (see Figure 2).

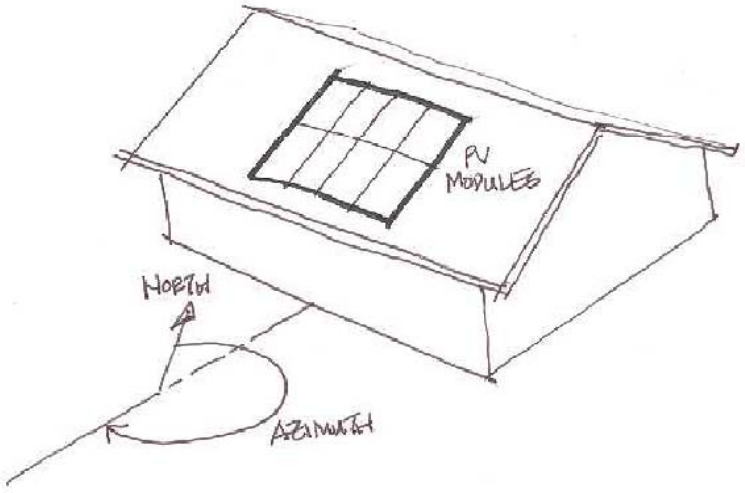


Figure 2 – Azimuth of the PV Array

The following methods may be used to determine the azimuth.

i. Using the site plans

In new subdivisions, the house plans will often not show the property lines since the plans are used on multiple lots. However, the subdivision plot plan will show the property lines of the lots. The plot plan will show the bearing of the property lines, and from this information the azimuth of the roof surfaces where the PV modules are mounted may be determined from the position of the house on the lot relative to the bearings of the property lines.

Figure 3 shows an example plot plan with a house located on it. In this case, the house does not align with any of the property lines, but is rotated 15 degrees from the westerly property line as shown. Property lines on plot plans are typically labeled in terms of their bearing, which is the direction of the line. The westerly property line is labeled “North 12° East”. If the house was aligned with this property line, the southerly exposure of the house would have an azimuth of 192° (180° plus the 12° bearing of the property line). Since the house is rotated an additional 15°, the azimuth of the southerly face of the house and the azimuth of the PV array is 207° (192° plus 15°). Usually, the house will be aligned with one of the property lines and the calculation described above will be simplified.

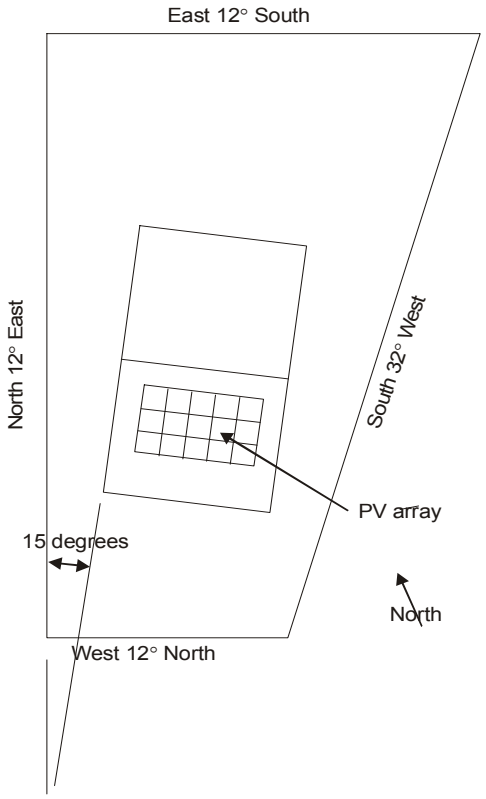


Figure 3 – Example Plot Plan

ii. Using a compass with a sighting feature and an adjustment for magnetic declination.

Make sure that the compass has a sighting feature. The compass may have an adjustment built in for magnetic declination so that the reading on the compass is true north or the installer and the HERS rater ~~must~~ shall determine the magnetic declination using the tool available at ~~[http://www.ngdc.noaa.gov/seg/geomag/jsp/Declination.jsp]~~ [http://www.ngdc.noaa.gov/geomagmodels/Declination.jsp] and adjust the compass reading to account for the magnetic declination. Position the compass and determine the ~~array azimuth~~ angle between compass north and the direction that the PV modules face. It's usually convenient and most accurate to align the compass along the edge of the array using the sighting feature (see Figure 4).

Figure 4 – Compass with a sighting feature

c. Verifying Tilt and Azimuth for Systems Meeting the California Flexible Installation Criteria

For new residential developments, ~~The~~ NSHP allows determination of expected performance using the California Flexible Installation criteria.~~, which bases the estimated performance on an estimate of the performance for a range of module orientations and tilts.~~ The California Flexible Installation criteria ~~applies to~~allow all ~~solar~~ PV systems that are installed with an azimuth ranging from 150 to ~~-~~ ~~and~~ 270 degrees ~~-~~ and ~~all modules installed at the same~~with a tilt ~~as the roof slope for roof pitches between~~ranging from ~~1~~0:12 and 7:12 to use a single expected performance calculation. The CECPV Calculator allows the user to choose the California Flexible Installation criteria for easy input and easy compliance when there are multiple systems at various azimuths and tilts. For each system on each building that has the expected performance based on the California Flexible Installation criteria, the HERS rater must verify that the ~~modules are~~array is installed with both an~~y~~ azimuth and with a~~ny~~ tilt within the acceptable range. ~~Note that to use the~~ The California Flexible Installation criteria~~,~~ require each ~~solar~~ PV system ~~on each site must~~ to meet the “minimal shading” criterion discussed below.

F. Shading Verification

Shading of photovoltaic systems, even partial shading of arrays, can be the most important cause of failure to achieve high system performance. Significant shading should be avoided whenever possible. Shading can be avoided by careful location of the array at the point of installation or in some cases, particularly during the process of constructing buildings, by moving obstructions to locations where they do not cast shading on the array. Partial shading from obstructions that are relatively close to the array, particularly obstructions that are on the roof even if they are relatively small, can be particularly problematic because they cause partial shading of the array for longer

time periods of the year. Shading caused in the future due to the maturing of trees that are immature at the time of installation of the PV system can also be a major cause of failure to achieve high performance over the life of the PV system.

The PV installer and the HERS rater must verify that the shading conditions on the PV system in the field are consistent with those used in the expected performance calculations ~~(CF-1R-PV)~~. The estimated performance calculations will be done either assuming that the "minimal shading" criterion is met or based on the specific shading characteristics of each system ~~and building~~.

1. Minimal Shading Criterion

The "minimal shading" criterion is that no obstruction is closer than a distance ("D") of twice the height ("H") it extends above the PV ~~modules~~array (see Figure 5 for an artistic depiction of "H" and "D"). As the figure illustrates the distance "D" must be at least two times greater than the distance "H." ~~Any~~ All obstruction~~s~~ that project~~s~~ above ~~any portion of the PV~~the point on the array that is closest to the obstruction must meet this criterion for the ~~PV~~ array to be considered minimally shaded. Obstructions that are subject to this criterion include:

i. Any vent, chimney, architectural feature, mechanical equipment or other obstruction that ~~projects above~~is on the roof or any other part of the ~~residential~~ building~~;~~.
ii. Any part of the neighboring terrain. ~~that projects above the roof;~~
iii. Any tree that is mature at the time of installation of the ~~solar~~ PV system.~~;~~
iv. Any tree that is planted on the building lot or neighboring lots or planned to be planted as part of the landscaping for the ~~residential~~ building (the expected ~~performance~~ shading must be based on the ~~expected~~ mature height of ~~any~~ the tree). ~~planted or planned to be planted as part of the landscaping for the residential building);~~
v. Any existing neighboring building~~;~~ or structure.
vi. Any planned neighboring building or structure that is known to the applicant or building owner.~~; if the builder does not know what building or other structure is planned for construction on land that is neighboring the solar system, the shading must be based on the highest and closest dimensions of the building model and setbacks offered by the builder on that land or if the land is not planned for development by the builder, the highest and closest dimensions allowed by the zoning.~~
vii. Any telephone or other utility pole that is closer than thirty feet from the nearest point of the array

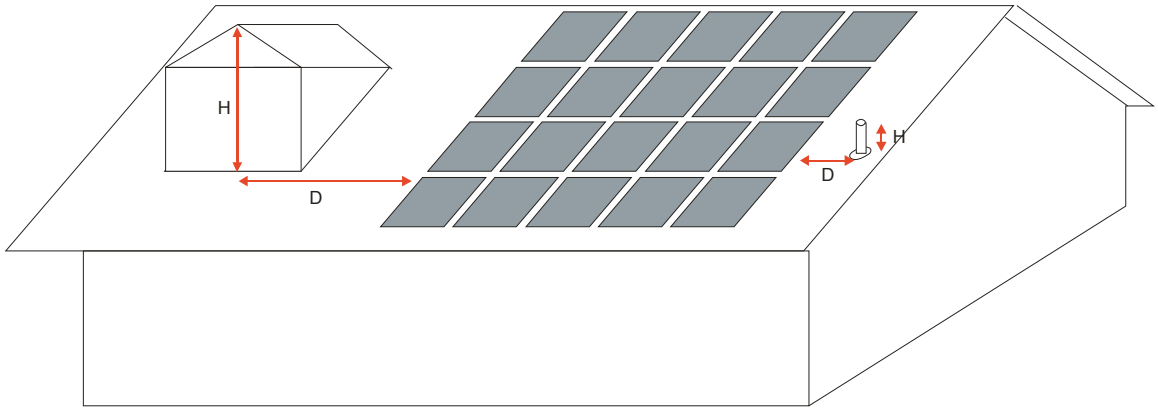


Figure 5 – The Minimal Shading Criterion - Artistic Depiction of "H" and "D"

~~Neither~~ To determine whether or not the minimal shading criterion is met, the PV ~~array nor the~~ installer or HERS rater shall determine for each shading obstruction ~~are single points in space, so it is the responsibility of the PV installer and the HERS rater to determine the worst condition by determining the point on the array and the point on the obstruction that would result in~~ the smallest ratio of the horizontal distance from the obstruction ~~point~~ to the array ~~point~~ divided by the vertical height of the obstruction ~~point~~ above that point on the array ~~point~~ (this is the "closest point on the array"). ~~Generally, the portion of the array that will most likely be shaded and thus represents the worst condition is the lower corner of the array that is closest to the obstruction and the portion of the obstruction that is the worst condition is the highest point of the obstruction, but this may not always be the case. Obstructions that are located north of the array at azimuths between 305 degrees and 55 degrees from north relative to the most northerly points on the PV array need not be considered as shading obstructions.~~ Often the point on the obstruction that results in the smallest ratio is the topmost point of the obstruction, but in cases where the shape of the obstruction is complex, points on the obstruction that are not the topmost but are closer to the array may actually produce the lowest ratio. "H" is the vertical height of the shading obstruction point above the horizontal projection to the closest point on the array. "D" is the horizontal distance from the closest point on the array to the vertical projection from the point on the obstruction that results in the lowest ratio of "D" divided by "H." Any obstruction located north of all points on the array need not be considered as shading obstructions. When an obstruction is north of some parts of an array but east, south or west of other parts of the array, the minimal shading criterion shall be determined to the closest point on the array that is west, north or east of the obstruction.

The PV installer and the HERS rater may verify through visual inspection that ~~most~~ all obstructions ~~above the roof~~ meet the 2:1 criterion (note that an altitude angle of 26.6 degrees is equivalent to the 2:1 criterion). For obstructions that visual inspection indicates potentially do not meet the criterion, the PV installer and HERS rater must measure the height and distance of the obstruction(s) relative to the PV array as described above to verify that the 2:1 shading criterion (or a lower than 26.6 altitude angle through the same points on the obstruction and array) is met. A tolerance of ± 5 percent will be permissible when determining the ratio (or the altitude angle)~~is met~~.

2. Accounting for Actual Shading

When a PV installation does not meet the minimal shading criterion, it can still qualify for an incentive and participate in the NSHP program, but the shading conditions for each ~~solar~~ PV system at the site must be accounted for in the expected performance calculation as described in this section. The basic method is used when the shading condition is measured using a tape measure or using a digital protractor. A different method is used when measurements are made with a solar assessment tool.

~~If shading (other than shading that meets the "minimal shading" criterion) is~~For shading obstructions that are accounted for in the expected performance calculation~~, then~~ the CECPV Calculator will produce on the CF-1R-PV a table similar to Table 2 that shows the distance to height ratio and altitude angle for the closest point on the array for each obstruction including mature trees that shade the PV array. ~~between the PV array and obstructions that shade the PV modules.~~ This table divides the compass into 11 (approximately 22.5 degree) ~~segments~~sectors, progressing clockwise around the compass from north. The table provides the distance to height ratio and altitude angle for each sector of the compass. When there is more than one obstruction in a sector, the information is reported for the obstruction with the lowest distance to height ratio (highest altitude angle). ~~is the angle from the point on the lowest shaded point on the PV array to the highest point on the shading obstruction in each direction segment around the compass. The table also shows the distance-to-height ratio for existing obstructions including mature trees. This~~ The distance to height ratio will be a number less than or equal to two, because if it is greater than two, the minimal shading criterion is satisfied in that direction and shading is not considered in the expected performance calculation for that ~~segment~~sector. The table also shows the minimum distance to small, medium and large trees to meet the minimal shading criterion for trees that are not at their mature heights. The data in Table 2 is specific to a particular PV system installation ~~on the specific residential building~~. In this example the minimal shading condition is ~~exceeded~~ not met for ~~four segments~~five sectors of the compass, ESE, SSE, S, SW, and WNW.

The PV installer and the HERS rater must verify that the shading conditions that exist (or are expected to exist in the case of the mature heights of trees ~~in~~ that are planted on the building lot or neighboring lots or planned to be planted as part of the landscaping ~~plan or unbuilt residential~~or planned buildings or structures on the building lot or neighboring lots that are known to the applicant or building owner) at the site will not cause greater shading of the ~~modules~~ PV array than the shading characteristics that were used in the expected performance calculations.

Table 2 – Example CF-1R-PV Format for PV Shading

Orientation	Obstruction Type	Altitude Angle to Shading Obstruction	Distance to Height Ratio	Minimum Distance to Small Tree	Minimum Distance to Medium Tree	Minimum Distance to Large Tree
ENE (55 – 79)	NA	Minimal Shading	2.00	16	46	76
E (79 -101)	NA	Minimal Shading	2.00	16	46	76
ESE (101 – 124)	Neighboring structure	45 degrees	1.00			
SE (124 – 146)		Minimal Shading	2.00	16	46	76
SSE (146 – 169)	On roof obstruction	50 degrees	0.84			
S (169 – 191)	Tree (existing-mature)	70 degrees	0.36			
SSW (191 – 214)		Minimal Shading	2.00	16	46	76
SW (214 – 236)	Tree (~~exisiting~~existing-not mature)	30 degrees	1.5			
WSW (236 – 259)		Minimal Shading	2.00	16	46	76
W (259 – 281)		Minimal Shading	2.00	16	46	76
WNW (281 – 305)	Tree (planned)	65 degrees	0.49			

3. Measuring Heights and Distances or Altitude Angles

One of the following procedures may be used to measure heights and distances or altitude angles to obstructions.

a) Using a Tape Measure

~~The simplest measurement technique is to use a~~A tape measure or other measuring device may be used to measure the distance ("D") from the point on the PV ~~module~~ array corresponding to the ~~maximum shading condition point on shading obstructions in~~lowest ratio of distance to height ("H") for each shading obstruction for each 22.5 degree compass ~~segment~~sector. The distance to a tree ~~that has not reached its mature height~~ is measured to the nearest edge of the trunk of the tree. ~~-~~Once the ~~elevation~~ height difference ("H") and distance ("D") are determined in each compass ~~segment~~sector, the ratio is calculated and must be greater than the value used in the expected performance calculation as reported on the CF-1R-PV (see the ~~third~~ fourth column in Table 2 labeled Distance to Height Ratio). This method ~~does not require getting on the roof.~~ can be employed from the ground without access to the roof, when factoring in the rooftop dimensions.

The height measurement for trees that are immature shall be based on the mature tree height discussed below. Determining the distances and heights of obstructions for buildings and structures that are planned but have not yet been constructed shall be based on plans for those structures.

b) Using a Digital Protractor

A digital protractor (see Figure 1) may be used to measure the highest altitude angle from the obstruction to the closest point on the array (using the same points on the array and on the obstruction that produce the lowest ration of "D" to "H" if those dimensions were measured instead of the altitude angle). The measured altitude angle for each obstruction in each compass sector must be smaller than or equal to that used in the expected performance calculation as reported on the CF-1R-PV (see the ~~second~~ third column ~~of~~ in Table 2). To use the digital protractor measurement directly, the measurement must be made from the roof. Alternatively, the digital protractor measurement may be made from the ground. ~~and trigonometric~~ Trigonometric adjustments will be required to ~~adjust~~ correct for the height difference between the ground where the measurements are made and the nearest point, ~~of maximum shading of~~on the PV ~~modules~~ array, to the shading obstruction. ~~in that compass segment~~

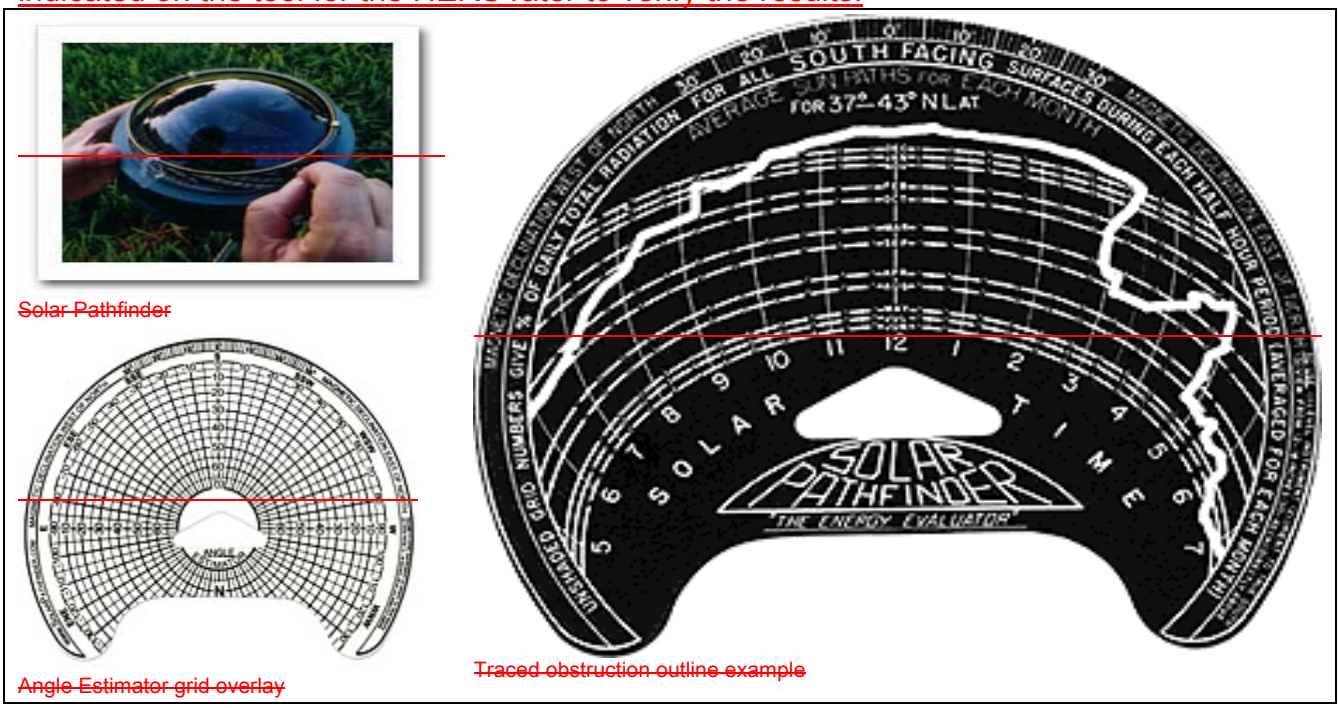
This method does not address expected shading resulting from the mature heights of planted immature trees or planned trees. To determine distances for planted immature trees a tape measure should be used. The height measurement for trees that are immature shall be based on the mature tree height discussed below. Determining the distances and heights of obstructions for buildings and structures that are planned but have not yet been constructed shall be based on plans for those structures..

c) Using a Solar ~~Access and Shading Analysis Instrument~~Assessment Tool

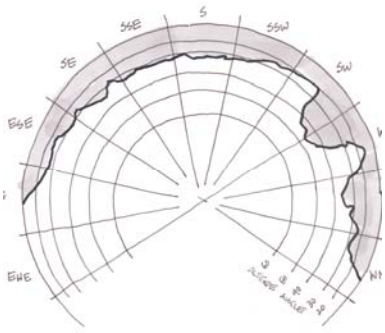
For shading from existing obstructions, ~~such as neighboring buildings or other structures, terrain or already mature trees, on-site~~ shading conditions ~~can~~ may be verified using a solar assessment tool. ~~an instrument such as the Solar Pathfinder (see Figure 6). This instrument must be positioned at the point on the PV array that has the maximum shading. Generally, this will be one of the two lower corners of the array, but depending on the conditions of the site, other locations may be subject to more shading by adjacent buildings or structures, trees, terrain or other obstructions.~~ This procedure will typically be used by the PV installer, but ~~not by~~ the HERS rater may not have direct access to the array and if not, would rely on the adequacy of documentation by the installer to confirm the shading conditions.~~since the HERS rater is not expected to be able to get on the roof.~~

~~Once the instrument is placed at the point on the PV array that has the maximum shading, it is leveled and oriented with true north. The orientation may be determined by using the site plan or a compass as described above. Once the instrument is properly positioned, objects that will cast a shadow on the PV modules will be shown for the month and time of day when shading will occur (see Figure 7). These results are then converted into the format used by the PV Calculator shown in Figure 7(b) by using an Angle Estimator grid overlay (shown in Figure 6) to determine the altitude angle of an obstruction in each compass segment. The installer shall attach the diagram shown in Figure 7(b) to the CF-6R-PV form, along with photographic evidence of the shading shown on the instrument, the location of the instrument on the array, and the hsading obstructions that are indicated on the instrument, for the HERS rater to verify the results~~

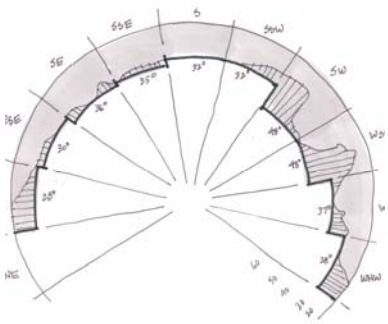
~~shown on the diagram. The results determined by the instrument are compared to the data that was used in the expected performance calculations to ensure that there is not greater shading at the site than was used in the expected performance calculations~~
At each point of measurement, the tool is placed on the PV array, leveled and oriented consistent with the manufacturer's instructions. Once the tool is properly positioned, it will determine the obstructions that cast shade and the month and time of day when shading will occur. The tool will enable these determinations either through the use of a digital photograph or a manual tracing on an angle estimator grid overlay. These results for a single point of reference on the array are converted into a format that can be used by the CECPV Calculator, either through software provided by the tool manufacturer or manually, as shown in Figure 6(b), to determine the altitude angle of an obstruction in each compass sector.~~.~~ The installer should keep documentation of the shading shown on the tool, the location of the tool on the array, and the shading obstructions that are indicated on the tool for the HERS rater to verify the results.



~~*Figure 6 – Example Solar Access and Shading Analysis Instrument*~~



(a) This diagram shows the 22.5 degree° compass ~~segments~~ sectors used by the CECPV Calculator and the altitude angles determined by a Solar Assessment Tool for a single point of reference on the array.



(b) Within each compass ~~segment~~sector, the highest altitude is selected and used for that entire ~~segment~~sector. This data is ~~input into the PV Calculator.~~shown for a single point of reference on the array.

Figure ~~7~~ 6 – Conversion of Results ~~from Solar Pathfinder~~ to CECPV Calculator Input

Measurements shall be made at all the major corners of the array with no adjacent measurement being more than 40 feet apart (see example in Figure 8). The points of measurement shall be distributed evenly between two major corners if they are more than 40 feet apart such that the linear distance between any sequential points is no more than 40 feet. However, if any linear edge of the array has no obstructions that are closer than two times the height they project above the closest point on the array, then the intermediate measurements along that edge do not need to be made.

The altitude angles measured at each major corner shall be overlapped onto a single diagram or processed with the tool manufacturer's software. The maximum altitude angles measured at any of the major corners of the array within a given sector shall be applied to the entire sector. This creates a set of 11 values which are used in the CECPV Calculator.

~~Note that t~~This method does not address expected shading resulting from the mature heights of planted immature trees or planned trees ~~in the landscaping plan~~ or expected construction of buildings or other structures on neighboring lots. ~~Determining~~ To determine distances for planted immature trees ~~should use~~ a tape measure should be used. ~~Determining~~ To determine distances for planned trees ~~should use~~ a landscape plan provided by the ~~builder~~applicant should be used. The height measurement for trees that are ~~not yet mature~~immature must be based on the mature tree height discussed below. Determining the distances and heights of obstructions for buildings and structures that are planned but have not yet been constructed ~~on neighboring lots must~~shall be based on plans for those structures. Such shading shall be addressed separately. ~~assuming that they will be located at the closest setbacks to the residential building that is being field-verified or the highest and closest dimensions allowed by zoning for future buildings on neighboring land.~~

The results determined by the tool in combination with the expected future shading described above are compared to the data that was used in the expected performance

calculations to ensure that there is not greater shading at the site than was used in the expected performance calculations.

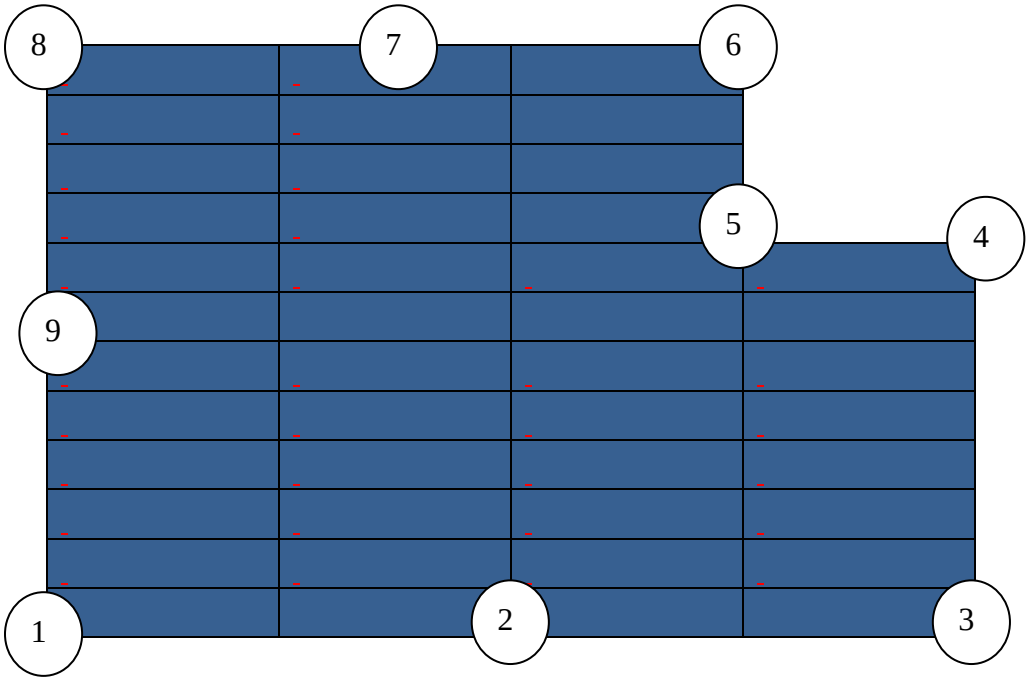


Figure 8 – Example of Points where Measurement shall be made using a Solar Assessment Tool (overall array dimensions 76 feet by 50 feet)

~~d) Using a Digital Camera with Fisheye Lens~~

~~An electronic enhancement of the Solar Pathfinder uses a digital camera with a fisheye lens that is mounted looking up. An image is taken that is automatically processed to produce data similar to the solar pathfinder. The data must be converted to the format used for determining expected performance as described above for the Solar Pathfinder. Note that determining distances and heights for trees that are not yet at mature heights and unconstructed buildings and structures on neighboring lots must be addressed as described above for the Solar Pathfinder. The installer shall attach the diagram shown in Figure 7(b) to the CF-6R-PV form, along with photographic evidence of the shading shown on the instrument, the location of the instrument on the array, and the shading obstructions that are indicated on the instrument, for the HERS rater to verify the results shown on the diagram. Note that this method does not address expected shading resulting from the mature heights of planted or planned trees in the landscaping plan or expected construction of buildings or other structures on neighboring lots. Such shading must be addressed separately.~~

4. Mature Tree Height

The expected performance calculations require the mature height to be used when accounting for the shading impact of planted immature trees.~~and planned trees in the landscaping plan that have not yet reached their mature heights~~. This section provides guidelines for determining the mature height of such trees. ~~Builders~~ Applicants must identify the ~~species~~ height category (small, medium, or large) of all planted and planned trees ~~in the landscaping plans~~at the site. That information must be documented in conjunction with the CF-6R-PV and provided to the HERS rater for verification. Any existing tree with a height greater than 50 feet at the time observations are made shall be recorded with its actual height or altitude angle instead of the height category.

All trees are classified as small, medium or large by species. Trees with a mature height of 20 feet or smaller are small trees. Trees with a mature height greater than 20 feet but less than 50 feet are medium trees. Trees with a mature height ~~greater to or~~ equal to or greater than 50 feet are large trees. If the type of tree is unknown, it must be assumed to be large. The mature heights of small, medium and large trees that must be used in the expected performance calculations are 20 feet, 35 feet, and 50 feet, respectively.

The Center for Urban Forestry Research of the U.S. Department of Agriculture's Forest Service has published tree guides for tree zones that are applicable to California. Table 3 shows the appropriate tree guide to use for each of California's climate zones for the expected performance calculations.

The guides provide tree selection lists for each tree zone. The lists provide either the mature height or the size category in that tree zone for each species. These tree guides are posted at:
[~~www.fs.fed.us/psw/programs/cufr/tree_guides.php~~http://www.fs.fed.us/psw/programs/cufr/tree_guides.php].

For trees not listed in the tree selection tables of the tree guides, the Sunset Western Garden book should be consulted. This document provides the mature height range or maximum height for each species. If a range is given, the average of the maximum height range should be used to determine if the tree is large, medium or small.

Table 3 – Appropriate Tree Guide to Use for each California Climate Zone

CEC Climate Zones	Tree Regions	Tree Guide to Use	
1, 2, 3, 4, 5	Northern California Coast	Under Development (Use Sunset Western Garden Book)	
6, 7, 8	Southern California Coast	McPherson, E.G., et al. 2000. Tree guidelines for coastal Southern California communities. Sacramento, CA: Local Government Commission	Chapter 5, pages 57-65
9, 10	Inland Empire	McPherson, E.G., et al. 2001. Tree guidelines for Inland Empire communities. Sacramento, CA: Local Government Commission	Chapter 6, pages 65-82
11, 12, 13	Inland Valleys	McPherson, E.G., et al. 1999. Tree guidelines for San Joaquin Valley communities. Sacramento, CA: Local Government Commission	Chapter 5, pages 50-55
14, 15	Southwest Desert	McPherson, E.G., et al. 2004. Desert southwest community tree guide: benefits, costs and strategic planting. Phoenix, AZ: Arizona Community Tree Council, Inc.	Chapter 7, pages 51-53
16	Northern Mountain and Prairie	McPherson, E.G, et al. 2003. Northern mountain and prairie community tree guide: benefits, costs and strategic planting. Center for Urban Forest Research, USDA Forest Service, Pacific Southwest Research Station.	Chapter 5, pages 47-55

Table 4 shows the horizontal distance that trees of each mature height category would need to be located from nearest point of the PV ~~modules~~ array in order to meet the condition of minimal shading.

Table 4 – Horizontal Distance Trees Would Need to be located from the Closest Point of a PV Array to Qualify for Minimal Shading

Mounting Location	Small Tree (20 ft)	Medium Tree (35 ft)	Large Tree (50 ft)
1 Story (Lowest Point of Array at 12 ft)	16	46	76
2 Story (Lowest Point of Array at 22 ft)	Any Distance	26	56
3 Story (Lowest Point of Array at 32 ft)	Any Distance	6	36

G. Verification of System Performance

The PV installer and HERS rater must verify that the AC power output ~~power~~ from the PV system is consistent with that predicted by the ~~PV Calculator~~expected performance calculations. The CECPV Calculator will determine an estimate of system AC power output ~~power~~ for a range of solar irradiance and ~~outdoor~~ ambient air temperature conditions and print a table on the CF-1R-PV form. The values in the table will be 90 percent of the output estimated by the CECPV Calculator for each set of conditions in the table (the calculations also include the default adjustment of 0.88 for losses such as dirt, dust and mismatched wiring). The values in the table are for an unshaded array. An example of the data that will be produced is shown in Table 5. ~~Note that the data calculated by the PV Calculator~~The data in the table is specific to each PV system.

Verification of system performance must be performed after the PV system is installed and connected to the electricity grid. Measurements must be made with a minimum irradiance of 300 W/m² in a plane parallel to the array. The PV installer and/or the HERS rater must 1) measure the solar irradiance in a plane parallel to the array 2) measure the ambient air temperature and 3) determine the expected AC power output ~~power~~ for the measured field conditions from the table on the CF-1R-PV form. The PV installer or the HERS rater must then observe the ~~output~~ AC power output displayed on the system performance meter (typically an inverter with a built-in performance meter) and verify that the ~~output~~ AC power output is ~~at least~~equal to or greater the amount shown in the table for the field measured conditions. To qualify for incentives under ~~the~~ NSHP, PV systems must have a standalone performance meter or an inverter ~~that has~~with a ~~built~~ built-in performance meter that measures ~~output~~ AC power output.

The PV installer and HERS rater must observe the ~~output~~ AC power output on the ~~inverter~~ system performance meter after waiting for a ~~five minute time~~ period of stable conditions during which the measured solar ~~irradiation level~~irradiance has stayed constant within ± 5 percent. ~~If the solar irradiation level changes outside of these ranges during the five minute waiting period, the PV installer and HERS rater must start over the five minute waiting period.~~

Table 5 – Example Table of Expected ~~Output~~ AC Power Output from CECPV Calculator (Watts)

(W/m²)	T=15	T=20	T=25	T=30	T=35	T=40	T=45	T=50	T=55	T=60	T=65	T=70	T=75	T=80	T=85	T=90	T=95	T=100	T=105	T=110	T=115	T=120
300	614	606	599	591	584	576	568	560	553	544	536	528	520	512	504	496	487	479	471	463	454	446
325	665	657	648	640	632	623	615	607	598	590	581	572	564	555	546	537	528	519	510	501	492	483
350	716	707	698	689	680	671	662	653	643	634	625	616	606	597	588	578	569	559	550	540	530	520
375	766	757	747	738	728	718	708	699	689	679	669	659	649	639	629	619	609	598	588	578	568	557
400	817	807	797	786	776	765	755	745	734	723	713	702	691	681	670	659	648	637	626	615	604	593
425	868	857	846	835	824	813	802	790	779	768	757	745	734	722	711	699	688	676	664	653	641	629
450	918	907	895	883	872	860	848	836	824	812	800	788	776	764	752	739	727	715	702	690	677	665
475	967	955	943	931	919	907	894	882	869	856	843	831	818	805	792	779	766	753	740	727	714	700
500	1016	1004	991	978	966	953	940	927	913	900	887	873	860	846	832	819	805	791	777	763	750	736
525	1065	1052	1038	1025	1012	998	984	971	957	943	929	915	901	887	872	858	843	829	814	800	785	770
550	1113	1099	1085	1071	1057	1043	1029	1014	1000	986	971	956	942	927	912	897	882	866	851	836	820	805
575	1161	1147	1132	1117	1102	1088	1073	1058	1043	1027	1012	997	982	966	951	935	919	903	887	871	855	839
600	1209	1194	1178	1163	1147	1132	1116	1100	1085	1069	1053	1037	1021	1005	989	972	956	940	923	906	890	873
625	1256	1240	1224	1208	1192	1176	1159	1143	1126	1110	1093	1077	1060	1043	1026	1009	992	975	958	941	924	906
650	1302	1286	1269	1252	1236	1219	1202	1185	1168	1150	1133	1116	1098	1081	1063	1046	1028	1010	992	974	957	939
675	1348	1331	1314	1296	1279	1261	1244	1226	1208	1190	1172	1154	1136	1118	1100	1081	1063	1045	1026	1007	989	970
700	1394	1376	1358	1340	1322	1304	1285	1267	1248	1230	1211	1192	1174	1155	1136	1117	1098	1078	1059	1040	1021	1001
725	1439	1420	1401	1383	1364	1345	1326	1307	1288	1269	1249	1230	1210	1191	1171	1151	1132	1112	1092	1072	1052	1032
750	1483	1464	1444	1425	1405	1386	1366	1346	1327	1307	1287	1267	1246	1226	1206	1185	1165	1144	1124	1103	1082	1061
775	1526	1506	1487	1466	1446	1426	1406	1385	1365	1344	1323	1303	1282	1261	1240	1219	1198	1176	1155	1134	1112	1090
800	1569	1549	1528	1507	1486	1466	1445	1423	1402	1381	1360	1338	1317	1295	1273	1252	1230	1208	1186	1164	1141	1119
825	1611	1590	1569	1547	1526	1504	1483	1461	1439	1417	1395	1373	1351	1328	1306	1284	1261	1238	1216	1193	1170	1147
850	1653	1631	1609	1587	1565	1542	1520	1498	1475	1452	1430	1407	1384	1361	1338	1315	1292	1268	1245	1221	1198	1174
875	1693	1671	1648	1626	1603	1580	1557	1534	1510	1487	1464	1440	1417	1393	1369	1345	1322	1298	1273	1249	1225	1200
900	1733	1710	1687	1663	1640	1616	1593	1569	1545	1521	1497	1473	1449	1424	1400	1375	1351	1326	1301	1276	1251	1226
925	1772	1748	1725	1701	1676	1652	1628	1603	1579	1554	1529	1505	1480	1455	1430	1404	1379	1354	1328	1302	1277	1251
950	1811	1786	1762	1737	1712	1687	1662	1637	1612	1586	1561	1536	1510	1484	1459	1433	1407	1381	1354	1328	1302	1275
975	1980	1823	1798	1772	1747	1721	1696	1670	1644	1618	1592	1566	1540	1513	1487	1460	1434	1407	1380	1353	1326	1299
1000	1980	1980	1980	1807	1781	1755	1729	1702	1676	1649	1622	1595	1569	1542	1514	1487	1460	1432	1405	1377	1349	1322
1025	1980	1980	1980	1980	1815	1788	1761	1734	1706	1679	1652	1624	1597	1569	1541	1513	1486	1457	1429	1401	1372	1344
1050	1980	1980	1980	1980	1980	1820	1792	1765	1737	1709	1681	1653	1624	1596	1568	1539	1511	1482	1453	1424	1395	1365
1075	1980	1980	1980	1980	1980	1980	1823	1795	1767	1738	1709	1680	1652	1623	1593	1564	1535	1506	1476	1446	1417	1387
1100	1980	1980	1980	1980	1980	1980	1980	1825	1796	1766	1737	1708	1678	1648	1619	1589	1559	1529	1499	1468	1438	1407
1125	1980	1980	1980	1980	1980	1980	1980	1980	1824	1794	1764	1734	1704	1674	1643	1613	1582	1551	1520	1490	1458	1427
1150	1980	1980	1980	1980	1980	1980	1980	1980	1980	1822	1791	1760	1729	1698	1667	1636	1605	1573	1542	1510	1479	1447
1175	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980	1817	1786	1754	1722	1691	1659	1627	1595	1563	1530	1498	1466
1200	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980	1810	1778	1746	1714	1681	1649	1616	1583	1550	1517	1484

1. Measuring Solar Irradiance

Solar irradiance must be measured ~~by using a solar pyranometer~~using an irradiance meter. When making this measurement, the PV installer or HERS rater must place the ~~pyranometer~~ irradiance meter in a plane that is parallel to the PV ~~modules~~array. The PV installer should position the ~~pyranometer~~ irradiance meter on top of the PV ~~modules~~ array or on the roof next to the PV ~~modules~~array. ~~The~~ If the HERS rater ~~who is~~ does not ~~likely to be able to get on~~ have direct access to the roof, he or she must position the ~~pyranometer~~ irradiance meter such that it is in full sun and is in a plane that is parallel to the PV ~~modules~~array. Digital protractors or other instruments may be used to properly position the ~~pyranometer~~irradiance meter.

2. Measuring Ambient Air Temperature

Ambient air temperature must be measured with a digital thermometer in the shade. The instrument must have an accuracy of ± 2 degrees Celsius.~~° C.~~

3. Observing ~~Output~~ AC Power Output at the ~~Inverter~~System Performance Meter

The PV installer and the HERS rater must observe and record the AC power output reading from the system performance meter ~~within five minutes of the time~~as soon as possible after making the measurements of solar ~~irradiation~~ irradiance and ambient temperature ~~were made~~. ~~Note that the~~The inverter may cycle between multiple readings (total kWh ~~of production~~, AC power output ~~power~~, etc.), so the PV installer or HERS rater will need to wait until the power is displayed and record this reading; several readings should be made to make sure that they are consistent and stable.

4. Multiple Orientation Arrays

Multiple orientation arrays are those with parallel strings, each with an equal number of modules, in different orientations (azimuth and tilt) and ~~For larger systems, PV modules~~ connected to the same inverter.[30] ~~may be installed with strings of equal numbers of modules connected in parallel in more than one orientation, each with its own tilt and azimuth (note that it is bad practice to install such strings in series or with a different number of modules in each string; either of these installations will lead to substantial reductions in performance). When strings are installed in multiple orientation arrays~~When parallel strings in different orientations are connected to the same inverter, separate CF-1R-PV forms must be prepared for each orientation and solar irradiance must be measured separately in a plane parallel to each ~~string that has a different~~

[30] Substantial reductions in performance will result if there are different numbers of modules in each string or if the strings with different orientations are connected in series.

~~azimuth and tilt.~~orientation. The expected ~~output~~ AC power output is determined separately for each ~~condition~~ orientation and the sum is used for verification purposes.

For example a qualifying 3 kW PV system has ~~42~~ 20 PV modules grouped evenly into two parallel strings of 10 modules each, one facing south with an ~~(~~azimuth of 170 degrees~~)~~ and one facing west with an ~~(~~azimuth of 260 degrees~~)~~. ~~The south facing array has 21 PV modules and the west facing array has 21 PV modules connected in parallel to maintain system voltage. The HERS rater verified~~The installer or HERS rater evaluates system performance at 11:30 AM in March with an ambient temperature of 62 degrees Fahrenheit. ~~and measured a solar irradiance of~~The installer or HERS rater measures 950 W/m² of solar irradiance in the ~~in a~~ plane parallel to the south ~~array~~ string and 500 W/m² in a plane parallel to the west facing ~~array~~string.[31] ~~The ambient temperature at the time of the testing is 62 ° F.~~

The total expected AC power output ~~power~~ table on the CF-1R-PV indicates that the system should be producing 1,200 W at 950 W/m² and 700 W at 500 W/m² of solar irradiance. The expected ~~output~~ AC power output is calculated as 1,900 W by summation of each orientation's expected AC power output (1,200 W + 700 W = 1,900 W). This calculated value must be compared to the value displayed on the system performance meter.
~~to be compared to the inverter display is calculated to be 1,900 W based on the following equation.~~

~~Expected AC Output Power (W) = 1,200 + 700~~

~~= 1,900 W~~

~~Note that to test systems with multiple arrays the solar irradiance levels on all of the arrays must stay constant for the five minute waiting period discussed in Section G above~~

[31] When testing systems with multiple orientation arrays, the solar irradiance levels on all arrays must remain constant within ± 5 percent as discussed in Verification of System Performance above.

Appendix ~~5~~ 3 – NSHP Forms

NSHP-1 Reservation Application Form

NSHP-1.5 Solar as an Option Approval Form

~~**NSHP-1.6 General Approval/6-Month Reservation Update Form**~~

NSHP-2 ~~Rebate~~ Payment Claim Form~~/Initial Approval for Solar as Option~~

NSHP-3 Ten-Year Warranty Form

~~**NSHP-4 Retailer Registration Form**~~

STD-204 Payee Data Record

The following forms are not in the Guidebook, and are either produced ~~either~~ by the CECPV Calculator or provided by ~~CEPEs~~ the solar energy system installer or HERS rater~~s~~:

CF-1R-PV Energy Commission CECPV Calculator Output Form

CF-4R-NSHP Above Code Energy Efficiency Checklist

CF-4R-PV Field Verification and Diagnostic Testing Form

CF-6R-PV Installation Certificate Form

NSHP-1

RESERVATION APPLICATION FORM
NEW SOLAR HOMES PARTNERSHIP

1. Applicant Name and Contact Information

Homeowner or Builder/Developer Name	Phone Number	Email Address

Please check one of the following:

I am the: ☐ Homeowner ☐ Builder/Developer

Mailing Address	City:	State:	Zip Code:

Contact Name (if different from above) & Company	Address	Phone, Fax and Email Address

2. Project Description

Please give a general project description including the site address of development.

Name of project: _____

Address to where the system will be installed (if this is a housing development, only the city or location to nearest city needs to be specified): _____

Please check all that apply to your project:

Occupancy type: ☐ Single Family ☐ Multifamily/Mixed ~~Use~~ Occupancy

Reservation type: ☐ Solar as Standard (More than 50 percent of the residential dwelling units in a large project (minimum of 6 residential dwelling units) will have solar energy systems installed)

☐ Base Incentive
- Custom home
- Small housing developments with less than 6 residential units
- Projects where solar will be installed on less than 50 percent of the residential dwelling units
- Common area systems in residential developments

Solar as an Option (Please note, if solar is offered as an option, your reservation can only be for up to 50 percent of the residential dwelling units in the project)
- Total number of residential dwelling units in the project: _____

Total number of residential dwelling units with solar energy systems installed: _____

☐ Affordable Housing
- ☐ Total number of common areas systems installed: _____
- ☐ Total number of residential dwelling units with solar energy systems installed: _____

Please note that only Solar as Standard, affordable housing, and solar as an option projects will receive a 36-month reservation. All others will receive an 18-month reservation.

Anticipated new construction permit issue date(s): _____

Anticipated solar permit issue date(s):_____ Anticipated occupancy permit issue date(s):_____

Please note that the building permit for the solar energy system should be approved by the building code enforcement agency prior to the original occupancy of the newly constructed building, but no later than 60 days after the issuance of the occupancy permit.

3. Electric Utility, Participation in Utility's Energy Efficiency Program

Please select the utility providing electricity to the project: ☐ PG&E ☐ SCE ☐ SDG&E ☐ BVE

Is your project participating in the electric utility's residential new construction program? ☐ Yes ☐ No

Please note that projects participating in the electric utility's residential new construction program can waive the submission of the energy efficiency documentation.

4. Home Energy Rating System (HERS) Information[32] (if available)

	HERS Rater Company	HERS Rater	Phone number	HERS Provider
Energy efficiency measures verification				
Solar energy system field verification				

5. Required Supporting Documentation

Solar as Standard Projects:
- ☐ Final Subdivision Map
- ☐ EPBI Documentation
  - ☐ CF-1R-PV form
  - ☐ Electronic input files (.emf, .her)
- ☐ Equipment Purchase Agreement
- ☐ Labor Contract (if separate from the equipment purchase agreement)
- ☐ Energy Efficiency Documentation*
  - ☐ CF-1R form
  - ☐ Electronic input file (.bld/.mp7)
  - ☐ Construction plan set

Base Incentive Projects, except Solar as an Option:
- ☐ Final Subdivision Map/Building Permit
- ☐ EPBI Documentation
  - ☐ CF-1R-PV form
  - ☐ Electronic input files (.emf, .her)
- ☐ Equipment Purchase Agreement
- ☐ Labor Contract (if separate from the equipment purchase agreement)
- ☐ Energy Efficiency Documentation*
  - ☐ CF-1R form
  - ☐ Electronic input file (.bld/.mp7)
  - ☐ Construction plan set

Solar as an Option Projects:
- ☐ Final Subdivision Map
- ☐ Equipment Purchase Agreement
- ☐ Labor Contract (if separate from the equipment purchase agreement)

To be submitted later when installation details are specified:
- ☐ EPBI Documentation
  - ☐ CF-1R-PV form
  - ☐ Electronic input files (.emf, .her)
- ☐ Energy Efficiency Documentation*
  - ☐ CF-1R form
  - ☐ Electronic input file (.bld/.mp7)
  - ☐ Construction plan set

Affordable Housing Projects: in addition to a copy of the regulatory agreement, submit all required supporting documentation pertaining to the project's housing type. TCAC projects have up to 60 days after funding approval to submit the Energy Efficiency Documentation.

*****_Waived if proof of participation in a utility residential new construction program is provided_

6. Declaration

The undersigned party declares under penalty of perjury that the information in this form and the supporting documentation submitted herewith is true and correct to the best of his or her knowledge and acknowledges the following program requirements to reserve funding:

- ☐ Incentives are based on the expected performance of the systems installed.
- ☐ Buildings must achieve at a ~~the~~ minimum Tier I Energy Efficiency to be eligible for the program.
- ☐ Systems that are leased or provide electricity under a power purchase agreement are subject to special reporting requirements. Applicant may be required to repay some or all of the NSHP funding he or she receives if the system is leased or provides electricity through a power purchase agreement, and the lease agreement or power purchase agreement is terminated within five years of the system's installation or the start date of the agreement, whichever is later.

The undersigned party further acknowledges that he or she is aware of the requirements and conditions of receiving funding under the New Solar Homes Partnership (NSHP) and agrees to comply with all such requirements and conditions as provided in the Energy Commission's NSHP Guidebook and Overall Program Guidebook as a condition to receiving funding under the NSHP. The undersigned party authorizes the Energy Commission, during the term of the NSHP, to exchange information on this form with applicable electric utility servicing the project to verify compliance with NSHP requirements.

Signature, Assignment of Administrative Rights and Incentive Recipient Information

NSHP Incentive Recipient: _____

Recipient's Address: _____

(Optional)

☐ I, the applicant, am designating _____ as my authorized representative for the New Solar Homes Partnership program. This party is permitted to sign the NSHP-2(s) and any revised EPBI Documentation on this project on my behalf.

Homeowner or Builder/Developer Name: _____ Date: _____

Signature: _____ Title: _____

[32] It will be the responsibility of the applicant to provide this information to the program administrators at the earliest opportunity, if not available at this time. This information is used to upload the project information to the HERS registry and has to occur in a timely manner at least 6 months prior to the field verification process.

NSHP-1.5

SOLAR AS AN OPTION APPROVAL FORM
NEW SOLAR HOMES PARTNERSHIP

1. Confirmation of Reservation Amount

This is to confirm that financial incentives have been reserved for _____ through the NSHP. The amount of funding reserved for your project is $_____.

The reserved funding is based on the following formula:

Total number of homes in a development or build-out phase x 50% x 2 kW per home x base incentive

Your reservation period begins _____ and will expire on _____. The payment will be made to _____.

The exact incentive amount for each site will not be confirmed until the applicant identifies a specific site to which a solar energy system will be installed. At that point, the applicant shall provide a copy of this form and the remaining required supporting documentation pertaining to the site to the Program Administrator. The Program Administrator will review and approve the information submitted. Once approved, the exact incentive amount will be confirmed, and the applicant will be provided a Payment Claim Form (NSHP-2) for the specified site.

2. Site Address

Address to where the system will be installed: _____

3. Home Energy Rating System (HERS) Information[33] (if previously not provided)

	HERS Rater Company	HERS Rater	Phone number	HERS Provider
Energy efficiency measures verification				
PV installation field verification				

4. Signatures

The undersigned parties declare under penalty of perjury that the information in this form and the supporting documentation submitted herewith is true and correct to the best of their knowledge.

Applicant/ Authorized Representative	***Required Supporting Documentation***
Name: _____ Title: _____ Signature: _____ Date: _____	☐ EPBI Documentation • CF-1R-PV form • Electronic input files (.emf, .her) ☐ Energy Efficiency Documentation* • CF-1R form • Electronic input file (.bld/.mp7) • Construction plan set **Waived if proof of participation in a utility residential new construction program is provided*

For the latest mailing address information, visit [http://www.gosolarcalifornia.ca.gov/contactus.html]. Alternatively, you may submit your application via the NSHP application tool at [https://www.newsolarhomes.org]. Please visit the Go Solar California website for tutorials on how to use the application tool.

[33] It will be the responsibility of the applicant to provide this information to the program administrators at the earliest opportunity, if not available at this time. This information is used to upload the project information to the HERS database and has to occur in a timely manner at least 6 months prior to the field verification process.

NSHP-2

PAYMENT CLAIM FORM
NEW SOLAR HOMES PARTNERSHIP

[CEC use only]

Incentive @ _____ = $_____

Payment Approval Date:_____

Reservation ID _____

Project Name _____

Address or _____

Site ID _____

1. Confirmation of Reservation Amount

_____ has been granted a reservation of $ _____ for a _____ kW solar energy system. This reservation is for a _____ project and will expire on _____. The system is being installed at _____. The payment will be made to _____.

The solar energy system must be completed and the claim submitted with the appropriate documentation by the deadline. Claims must be postmarked by the expiration date or the reservation will expire. This reservation is non-transferable. System must be installed at the installation address.

2. Major System Equipment of Record (Modules, Inverters, Meters)

Quantity	Manufacturer	Model	Cost

3. System Details

Total System Price: _____ Total HERS Cost: _____ Lot Number: _____

Equipment Cost (before rebate): _____ PV HERS Cost: _____ Final Address: _____

Installation Cost: _____ EE HERS Cost: _____ Interconnection Date: _____

Sales Arrangement: ☐ Purchased ☐ Leased ☐ PPA Annual kWh: New Construction Building Permit Issue Date:

Final Equipment Seller Name:	Final PV HERS Rater Name and Provider:
Final System Installer Name:	Final EE HERS Rater Name and Provider:

4. Modifications

Has any of the equipment or installation specifications changed since the reservation was approved? ☐ Yes ☐ No
If yes note the changes before claiming payment.

_____

_____

_____

_____

5. Payment Assignment

Is payment assigned to another party?

☐ **Yes (Please fill out all the sections below.)**

☐ **No (Please skip Section 5 and complete all others.)**

Assignment Request

I, _____, the designated payee or authorized representative of the payee, hereby assign the right to receive payment for the above noted reservation under the NSHP to the following individual or entity and request that payment be forwarded to this individual or entity at the address below. An STD-204 should be submitted for the person/entity receiving the payment, if not already on record with the Energy Commission.

Name: _____

Address: _____

_____

Phone Number: _____

As the designated payee or authorized representative, I understand that I remain responsible for complying with the requirements of the NSHP and will remain liable for any tax consequences associated with the reservation payment, despite the payment's assignment. I further understand that I may revoke this payment assignment at any time prior to the Energy Commission's processing of the payment by providing written notice to the Energy Commission's Renewable Energy Office.

Signature: _____ Date: _____

Name: _____ Title: _____

6. Signatures

The undersigned partyies declare under penalty of perjury that the information in this form and the supporting documentation submitted herewith is true and correct to the best of their knowledge. The parties further declare under penalty of perjury that the following statements are true and correct to the best of their knowledge:

(1) The electrical generating system described above and in any attached documents meets the terms and conditions of the Energy Commission's NSHP and has been installed and is operating satisfactorily as of the date stated below.

(2) The electrical generating system described above and in any attached documents is properly interconnected to the utility distribution grid and has been issued utility approval to operate the system as interconnected to the distribution grid.

(3) The rated electrical output of the generating system, the physical location of the system, and the equipment identified were installed as stated above.

(4) Except as noted above, there were no changes in the information previously submitted for this system.

The undersigned parties further acknowledge that they are aware of the requirements and conditions of receiving funding under the NSHP, including the special reporting and repayment requirements for leased systems and systems providing electricity under a power purchase agreement, and agree to comply with all such requirements and conditions as provided in the Energy Commission's NSHP Guidebook and Overall Program Guidebook as a condition to receiving funding under the NSHP. As specified in the NSHP Guidebook, the undersigned Purchaser authorizes the Energy Commission during the term of the NSHP to exchange information on this form with the electric utility servicing the system in order to verify compliance with the NSHP requirements.

Applicant/ Authorized Representative	***Required Supporting Documentation***	***Documents to be Verified by Program Administrator***
Name: _____ Title: _____ Signature: _____ Date: _____	• Ten-Year Warranty Form (NSHP-3) • Payee Data Record (STD-204) • Lease Agreement, if applicable	• Final EPBI Documentation (CF-4R-PV) • Final Energy Efficiency Documentation (CF-4R and/or CF-4R-NSHP) • Utility Approval of Interconnection

For the latest mailing address information, visit [http://www.gosolarcalifornia.ca.gov/contactus.html].

NSHP-3

TEN-YEAR WARRANTY FORM
NEW SOLAR HOMES PARTNERSHIP

System Information

This warranty applies to the following _____ kW solar electric generating system
Description: _____
Located at: _____

What is Covered

This ten-year warranty is subject to the terms below (check one of the boxes):

☐ **All components of the generating system AND the system's installation.** Said warrantor shall bear the full cost of diagnosis, repair, labor, and replacement of any system or system component, at no cost to the customer. Said warrantor also assumes coverage of the major system components in all situations where the manufacturer warranty does not cover the entire ten-year period; or

☐ **System's installation only.** Said warrantor shall bear the full cost of diagnosis, repair, labor, and replacement of any system or system component, exclusive of the manufacturer's coverage, at no cost to the customer. Copies of manufacturer ten-year warranty certificates for the major system components (i.e. photovoltaic modules and inverter MUST be provided with this form).

☐ **Owner-builder or self-installed installation.** Warranty is inclusive only of the manufacturer's coverage. Copies of manufacturer ten-year warranty certificates for the major system components (i.e. photovoltaic modules and inverter MUST be provided with this form). The owner-builder or self-installer assumes coverage of all other aspects of the ten-year warranty.

General Terms

This warranty extends to the original purchaser and to any subsequent purchasers or owners at the same location during the warranty period. For the purpose of this warranty, the terms "purchaser," "subsequent owner," and "purchase" include a lessee, assignee of a lease, and a lease transaction. This warranty is effective from _____ (date of completion of the system installation).

Exclusions

This warranty does not apply to:

- Damage, malfunction, or degradation of electrical output caused by failure to properly operate or maintain the system in accordance with the printed instructions provided with the system.
- Damage, malfunction, or degradation of electrical output caused by any repair or replacement using a part or service not provided or authorized in writing by the warrantor.
- Damage malfunction, or degradation of electrical output resulting from purchaser or third party abuse, accident, alteration, improper use, negligence or vandalism, or from earthquake, fire, flood, or other acts of God.

Obtaining Warranty Service

Contact the following warrantor for service or instructions:

Name: _____ Phone: ( )

Company: _____ Fax: ( )

Address: _____

Authorized Representative(s): _____ Date: _____