COMMISSION GUIDEBOOK

NEW SOLAR HOMES PARTNERSHIP GUIDEBOOK

Ninth Edition
Commission Guidebook

CALIFORNIA
ENERGY COMMISSION

Edmund G. Brown, Jr., Governor

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ABSTRACT

This guidebook details the eligibility requirements, rules, and process for reserving and claiming an incentive under the New Solar Homes Partnership Program. The New Solar Homes Partnership Program is part of a statewide solar program known as the California Solar Initiative and provides financial incentives for installing solar energy systems on new residential buildings. Incentives from the New Solar Homes Partnership Program are intended to help create a self-sustaining market for solar homes that incorporate high levels of energy efficiency and high-performing solar energy systems. Applicants are encouraged to achieve energy efficiency levels greater than the requirements of the California Building Energy Efficiency Standards, Title 24, Part 6. Incentives are determined based on the expected performance of the solar energy system and the level of documented building energy efficiency.

Keywords: New Solar Homes Partnership, NSHP, Energy Commission, PV, solar energy system, energy efficiency, standards, Title 24 Part 6, tier, incentive, CECPV Calculator, HERS Rater, field verification, shading, module, inverter, plan check

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What's New in This Guidebook?

Below are the major changes in this edition of the *New Solar Homes Partnership Guidebook* (*NSHP Guidebook*) as compared with the August 2014 eighth edition. These changes will become effective on July 8, 2015.

PV System Verification

- Requires field verification of solar energy systems in new housing developments to follow the sample testing requirements described in the *Building Energy Efficiency Standards* under which the project was permitted, with certain exceptions.

General Program Changes

- Revises the metering requirements for a project.

- For lease agreements or power purchase agreements (PPAs) where the lessee or end-use customer receives the NSHP funding directly from the Energy Commission, the lessee or end-use customer may be identified as the party responsible for repayment of the NSHP funding to the California Energy Commission when there is early termination of the lease agreement or PPA. Under these circumstances, demonstration that the NSHP funding benefits the end-use customer will not be required to be included in the lease or PPA.

- No longer require leases and PPAs to include an option to renew the agreement or purchase the system at the end of the initial term of the agreement.

- Revises the documentation required for an affordable housing project to show tax-exempt status to qualify for the higher, affordable housing incentive for affordable housing projects with qualifying solar energy systems owned by tax-exempt entities.

- Revises that reservation applications will be accepted until program funding is no longer available and the legislative goals of the program have been met.

- Revises the documentation required for an affordable housing project.

- Qualifying projects have either three months or 90 calendar days, whichever is later, after the project reservation expiration date to submit the required supporting documentation for a complete payment claim package.

- For projects with one solar energy system site, an increase in the expected performance of the solar energy system will be funded at the incentive level in effect at the time the complete payment claim package is submitted to the California Energy Commission.

- Projects with multiple solar energy system sites that do not have enough original project funding available to issue the payment for a site, including an increase in expected performance of a system, must first submit a complete payment claim package, including supporting documentation for any change, to the California Energy Commission to request additional reservation funding above the original reservation funding amount. The total incentive amount for a site that has not received a payment or the additional funding for a site that previously received an initial partial payment will be funded at the incentive level in effect at the time a complete payment claim package is submitted to the California Energy Commission.

- Applicants with approved project reservation with a payment claim that has not yet been approved may request that the project be subject to the reservation criteria and processes identified in this NSHP Guidebook, Ninth Edition.

- Payment claims that have not been approved for a payment may be subject to the payment claim criteria and processes identified in this NSHP Guidebook, Ninth Edition.

CHAPTER I: Introduction

The New Solar Homes Partnership (NSHP) provides financial incentives and other support for installing eligible solar energy systems on newly constructed residential buildings[1] that receive electricity from specified investor-owned utilities (IOUs).[2] The California Energy Commission implements the NSHP in coordination with the California Public Utilities Commission (CPUC) as part of the overall California Solar Initiative (CSI). This guidebook describes the requirements to receive incentives for constructing energy-efficient solar homes under the NSHP. This guidebook becomes effective on July 8, 2015.

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 nonfinancial 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 CSI. Senate Bill 1[3] establishes three goals for the CSI: 1) install 3,000 megawatts (MW) of distributed solar electric capacity in California by the end of 2016, 2) establish a self-sufficient solar industry in which solar energy systems are a viable mainstream option in 10 years, and 3) place solar energy systems on 50 percent of new homes in 13 years. The NSHP goal is to add 360 MW[4] of installed solar electric capacity in California by the end of 2016.

The Energy Commission and the CPUC each administer separate but coordinated elements of the CSI.

The NSHP is administered by the Energy Commission. The Energy Commission oversees the program and program administration for eligible customers of Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Bear Valley Electric Service (BVES).

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1 See Chapter II, Program Eligibility Requirements and the Glossary of Terms for the definition of 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.

4 This number is calculated by dividing the NSHP budget identified in Senate Bill 1 by the overall CSI budget and multiplying that number by the overall CSI MW goal.

The NSHP program provides two incentive structures: one for conventional or market-rate housing, affordable housing common area projects, and affordable housing residential projects with systems owned by non-tax-exempt entities; and another for affordable housing residential projects with systems owned by tax-exempt entities. For market-rate housing, affordable housing common area projects, and affordable housing residential projects with systems owned by non-tax-exempt entities, the incentive rate for the project is determined by the energy efficiency level that the newly constructed residential building(s) meets. Please see Appendix C, Section C for additional information. The NSHP offers a higher incentive to affordable housing residential projects with systems owned by tax-exempt entities 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.[5]

To qualify for an incentive, both the newly constructed residential building and the installed solar energy system must meet specific program requirements included in this guidebook.

Applicants are encouraged to achieve energy efficiency levels substantially greater than the requirements of the current *Building Energy Efficiency Standards*, Title 24, Part 6. Energy efficiency requirements may be satisfied either through code compliance ("Code-Compliant level") with the *2013 Building Energy Efficiency Standards,* Title 24, Part 6 (*2013 Standards*) or by reaching increased Tier I or Tier II levels of energy efficiency. Please see Chapter II, Section B, for additional information.

The Energy Commission places great importance on ensuring that newly constructed residential buildings that qualify for an incentive under the NSHP are as energy-efficient as possible. The Code-Compliant level is the minimum requirement for participation in the NSHP for projects that comply with the *2013 Standards* and is not available to buildings complying with previous updates of the *Building Energy Efficiency Standards*. The Tier I level is consistent with the energy efficiency savings needed to qualify for incentives from current residential new construction energy efficiency programs offered 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-net-energy residential buildings. For both Tiers I and II, 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 participate in their utility's new construction energy efficiency program to obtain the financial incentives that may be available for meeting either Tier I or Tier II energy efficiency requirements and to streamline the NSHP energy efficiency verification process. See Chapter II, Section C, for additional information.

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 at the Code-Compliant, Tier I,

5 These higher incentives are provided consistent with Public Resources Code section 25401.6.

and Tier II incentive levels. The incentive is paid once the system is installed and operational and has met all program requirements.

Along with the financial incentive, the NSHP may provide nonfinancial support services, such as offering marketing and technical assistance to builders, as well as training to building officials and salespeople. The Energy Commission may provide more assistance to builders choosing to build to Tier II energy efficiency levels. The Energy Commission's goal is to help the building and solar industries, to the maximum extent feasible, construct and sell new energy-efficient solar homes.

By participating in the NSHP, applicants authorize the Energy Commission, during the life 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 the Energy Commission with new homeowner contact information when requested by the Energy Commission.

The NSHP may be periodically evaluated and modified to ensure progress toward program goals. The evaluation may include comparing the expected energy generation of systems to the actual output over time, determining the cost-benefit profile of systems, and assessing overall program progress toward 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 as a result of Senate Bill 107.[6]

Funding for the NSHP is provided through the Energy Commission's Renewable Resource Trust Fund in accordance with Public Resources Code Sections 25744.5 and 25751, which authorize the allocation and use of funding available for emerging renewable technologies in the Renewable Resource Trust Fund to fund photovoltaic and solar thermal electric systems in accordance with the eligibility requirements established under SB 1.

To qualify for funding under the NSHP, applicants must satisfy the requirements specified in this *NSHP Guidebook.* The energy efficiency requirements of the NSHP are subject to the requirements of the *Building Energy Efficiency Standards* (Title 24, Part 6). **Applicants are strongly encouraged to read and understand their responsibilities as described in these documents.**

6 SB 107 (Simitian), Chapter 464, Statutes of 2006, § 7, as codified in Public Resources Code Section 25744.5.

C. Summary of New Solar Homes Partnership Guidebook Requirements

The following table summarizes program eligibility requirements. The applicant should refer to Chapter II for more detailed descriptions of the requirements.

Table 1-1: Summary of Program Eligibility Requirements

Program Element	NSHP Requirement
Eligible Technologies	Flat-plate photovoltaics only
Eligible Electric Service Territories	PG&E, SCE, SDG&E, and BVES
Eligible Housing Types	New residential construction, including total building renovations, common areas of housing developments, and qualifying mixed-use projects.
Eligible Equipment	New and not previously placed in service, and on the Energy Commission's eligible equipment website.
Reservation Period	36 months for qualifying large developments, all affordable housing projects (includes projects with a non-tax-exempt system owner), and virtual net-metered projects. 18 months for all other projects.
Incentive Level	Expected Performance-Based Incentive (EPBI) for Incentive Level 7 for market-rate housing projects, affordable housing common areas, or affordable housing projects with a non-tax-exempt system owner, and Incentive Level 6 for affordable housing residential units with tax-exempt system owners, based on the reference system receiving: • $1.50/watt for affordable housing residential units with tax-exempt system owners meeting Code-Compliant energy efficiency requirements, • $1.85/watt for affordable housing residential units with tax-exempt system owners meeting Tier I or Tier II energy efficiency requirements, • $0.75/watt for market-rate housing projects, affordable housing common areas, or affordable housing projects with a non-tax-exempt system owner meeting Code-Compliant energy efficiency requirements, • $1.00/watt for market-rate housing projects, affordable housing common areas, or affordable housing projects with non-tax-exempt system owners meeting Tier I energy efficiency requirements, or • $1.50/watt for market-rate housing projects, affordable housing common areas, or affordable housing projects with non-tax-exempt system owners meeting Tier II energy efficiency requirements. Additional funding may be available from the utilities for meeting Tier I and Tier II energy efficiency requirements.
Incentive Level Adjustment	Volumetric trigger. Declines as prespecified target MW volumes are reached.
Incentive Adjustments	Depends on geographic location, orientation, tilt, shading, and equipment efficiency.

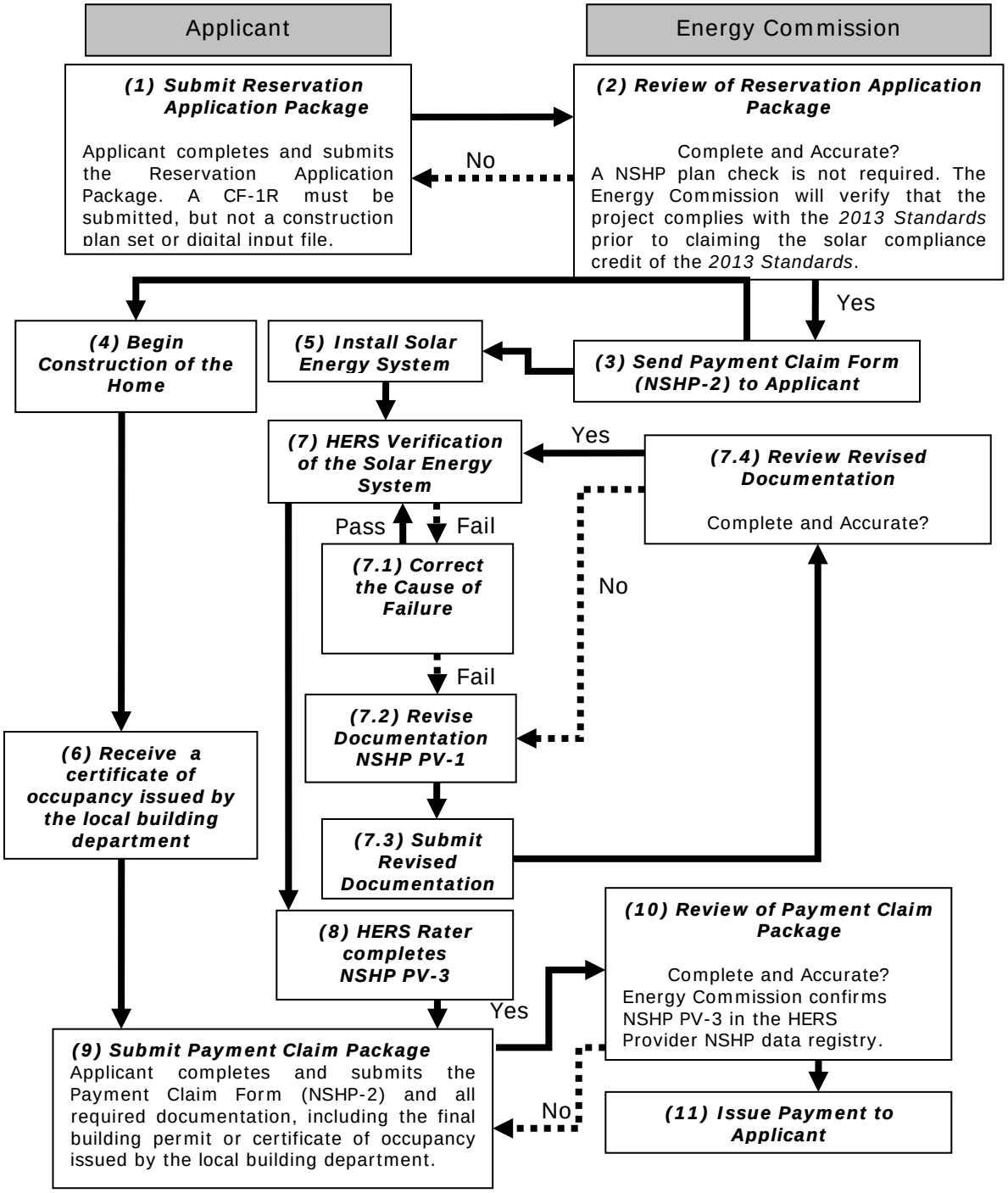
Energy Efficiency Requirements	Code-Compliant: The building complies with the *2013 Standards*. Tier I: Residential buildings that exceed the *Building Energy Efficiency Standards* in effect on the date the building permit is applied for by at least 15%. Tier II: Residential buildings that exceed the *Building Energy Efficiency Standards* in effect on the date the building permit is applied for by at least 30%. An ENERGY STAR® label is required for appliances provided by the builder for all projects.
Interconnection	Grid connected with eligible utility required.
Solar Energy System Installation Field Verification Checkpoints	Solar energy system installation, equipment, and performance shall be verified by the installing contractor and a certified HERS Rater.
Program Element	**NSHP Requirement for Tier I or Tier II**
Energy Efficiency Measures Installation Field Verification	Energy efficiency measures used to meet the Tier I or Tier II performance level shall be field verified by the installing contractor and a certified HERS Rater.

Source: California Energy Commission

D. Flow Charts of the NSHP Application and Payment Process

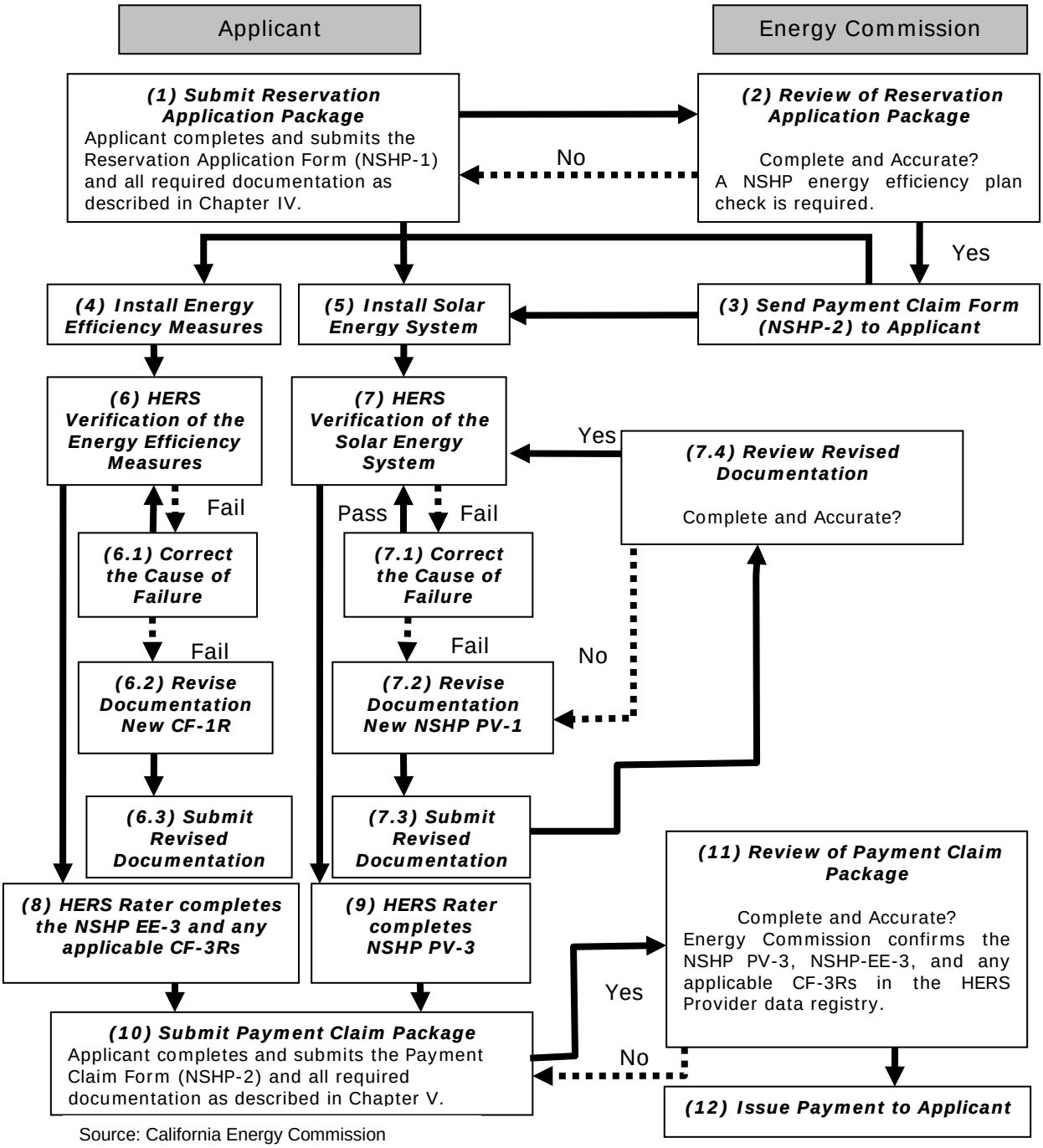
The following flow charts summarize the application and payment processes of the NSHP program. Figure 1-1 shows the process for Code-Compliant projects (those complying with the *2013 Standards*). Figure 1-2 shows the process for Tier I or Tier II projects with the NSHP energy efficiency plan check, and Figure 1-3 shows the process for Tier I or Tier II projects participating in the utility's new construction energy efficiency program. Applicants using the partial payment option should refer to Chapter V, Section B, because certain aspects of the process are not shown on Figure 1-3.

Figure 1-1: Application Process Flow Chart for NSHP Code-Compliant Projects



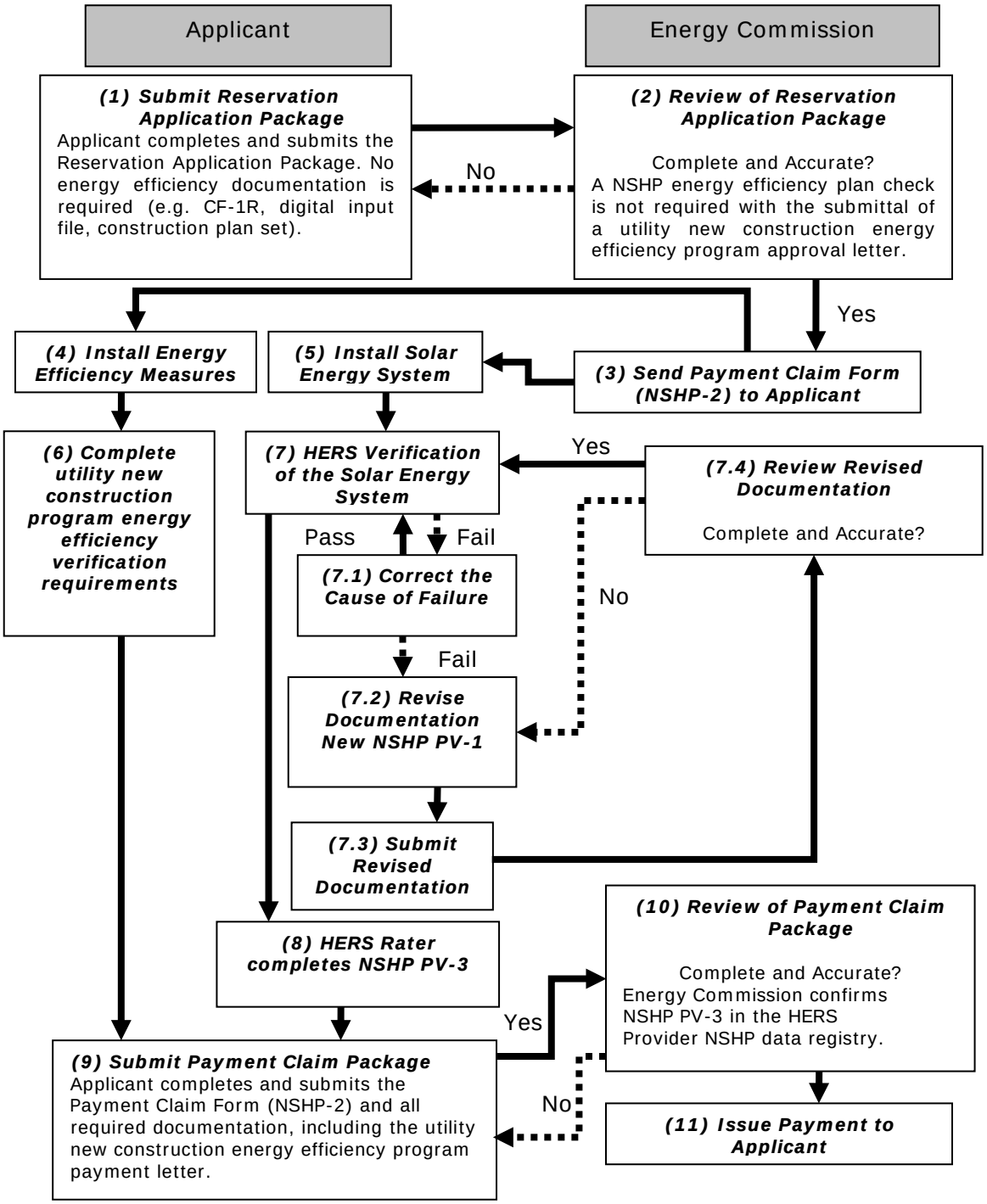
Source: California Energy Commission

Figure 1-2: Application Process Flow Chart for NSHP Tier I or Tier II Projects With the NSHP Energy Efficiency Plan Check



Source: California Energy Commission

Figure 1-3: Alternate Application Process Flow Chart for NSHP Tier I or Tier II Projects Participating in a Utility New Construction Program



Source: California Energy Commission

E. Renewable Energy Credits/Certificates

When electricity is generated using an eligible renewable energy resource, two commodities are created: electricity and renewable energy credits (also referred to as *renewable energy certificates*, or *RECs*) representing the nonenergy, environmental attributes associated with the electricity. For 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 an eligible renewable energy resource..."[7]

The Energy Commission recognizes that owners of solar energy systems, including those participating in the NSHP, may assert claims concerning renewable energy credits attributed to their 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 for 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

The rules below explain the applicability of this ninth edition of the *NSHP Guidebook* to existing project reservations. For this section, "approved project" means a reservation application that the Commission approved before the date the *NSHP Guidebook* becomes effective and that has a valid, unexpired reservation.

1. An approved project that has not received an approved payment claim for all solar energy system sites within the project will continue to be governed by the edition of the guidebook the project was approved under except as follows:
    a) Applicants may request the project be subject to the reservation criteria and processes identified in this ninth edition of the guidebook.
    b) Payment claims that have not been approved may be subject to the payment claim criteria and processes identified in this ninth edition of the guidebook.
2. Approved applications that have been paid or that have approved payment claims are not eligible for additional compensation, or to claim additional compensation for past reservation applications previously disapproved and required to reapply.
3. An applicant who submitted an application prior to the effective date of this ninth edition of the guidebook and did not receive approval of the application by the effective date may opt to follow either the previous guidebook edition or this ninth edition. The applicant must provide written or e-mail notice to be subject to this ninth edition of the guidebook. If no notice is received by the Energy Commission prior to the reservation approval of the application by the Energy Commission, the application will be governed by the previous edition of the guidebook.

7 Refer to definition in the *Renewables Portfolio Standard Eligibility Guidebook, Seventh Edition*, pages 123-125.

4. All applications submitted on or after the effective date will be governed by this ninth edition of the guidebook.

CHAPTER II:
Program Eligibility Requirements

This chapter covers the eligibility requirements necessary to receive incentives. Applicants may be either building owners or builders/developers. Eligible solar energy systems are limited to systems that use flat-plate photovoltaic technology installed on newly constructed residential buildings that have achieved an Energy Commission-specified level of energy efficiency that meets or exceeds that required by the *Building Energy Efficiency Standards*, Title 24, Part 6.

Solar energy systems that service the following newly constructed residential buildings where the entire building meets the energy efficiency requirements described in Chapter II, Section B qualify for NSHP incentives:

- Single-family homes
- Duplexes
- Triplexes
- Condominiums
- Multifamily buildings (including market-rate and affordable housing projects)
- Mixed-use[8] buildings
- Common areas in single- and multifamily developments that are shown to be for the primary benefit of the residential occupants

NSHP incentives will not be provided to any solar energy system serving electrical loads in the nonresidential portions of a development, except in cases of mixed-use buildings or the common areas of residential developments that meet the requirements of Chapter II, Section B. NSHP incentives will not be provided to any solar energy systems installed on transient residences (for example, motels and hotels). (See Chapter II, Section E, for additional information on transient residences.)

To be eligible for NSHP incentives, a 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 complete building permit application for the solar energy system should be submitted to the building code enforcement agency prior to the original occupancy of the newly constructed building but shall be submitted no later than 60 calendar days after the issuance of the occupancy permit, with original occupancy occurring on or after January 1, 2007.[9] If the application date for the building permit for the solar energy system cannot be verified with the building code enforcement agency, the approval date of the building permit for the solar energy system shall be used to verify program eligibility.

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8 A *mixed-use building* has both residential and nonresidential occupancies (for example, first floor retail, upper floors multifamily residential).

9 The 60-calendar-day limit may be extended under limited circumstances if the conditions for obtaining additional time under Chapter VI, Section O, are satisfied.

A. Technology and System Ownership

Flat-plate photovoltaic technology is the only technology eligible to receive NSHP incentives. Eligible solar energy systems shall be 1.00 kilowatt (kW) alternating current (AC) or larger, measured after the inverter. The solar energy system must be located on the same site where the end-use customer's own electricity demand is located. 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 at least the 10-year warranty period. If the system is removed from the building on which it was originally installed within the 10-year warranty period, the Energy Commission may request repayment of all or a portion of the NSHP funding provided for that system.

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 Chapter II, Section O.

B. NSHP Energy Efficiency Requirements

Buildings are subject to the *2008 Building Energy Efficiency Standards* (*2008 Standards*) or the *2013 Building Energy Efficiency Standards (2013 Standards)*, depending on which update of the *Building Energy Efficiency Standards* were in effect on the date of application for the building permit.[10]

Buildings subject to the *2013 Standards* are required to meet one of the following three tiers of energy efficiency:

- Code-Compliant: The building must comply with the *2013 Standards* prior to claiming the solar compliance credit for the *2013 Standards*.
- Tier I: For residential buildings, a total compliance margin of 15 percent better than standard as indicated on the CF-1R. For qualifying nonresidential buildings, a total compliance margin of 10 percent better than standard as indicated on the Performance Certificate of Compliance (PERF-1).
- Tier II: For residential buildings, a total compliance margin of 30 percent better than standard as indicated on the CF-1R and a space-cooling compliance margin of at least 30 percent better than standard. For qualifying nonresidential buildings, a total compliance margin of 15 percent better than standard as indicated on the PERF-1 and a space-cooling compliance margin of at least 15 percent better than standard.

Buildings subject to the *2008 Standards* are required to meet one of the following two tiers of energy efficiency:

10 The *2013 Building Energy Efficiency Standards* (Title 24, Part 6) became effective on July 1, 2014. The *2008 Building Energy Efficiency Standards* (Title 24, Part 6) became effective on January 1, 2010.

- Tier I: For residential buildings, a total compliance margin of 15 percent better than standard as indicated on the CF-1R. For qualifying nonresidential buildings, a total compliance margin of 15 percent better than standard, as indicated on the PERF-1.
- Tier II: For residential buildings, a total compliance margin of 30 percent better than standard as indicated on the CF-1R and a space-cooling compliance margin of at least 30 percent better than standard. For qualifying nonresidential buildings, a total compliance margin of 30 percent better than standard as indicated on the PERF-1 and a space-cooling compliance margin of at least 30 percent better than standard.

Please see Appendix C, Section C, for more information about the Tier I and Tier II efficiency requirements for different eligible building types.

Each building where a portion of the electrical load is served by the solar energy system shall meet the NSHP energy efficiency requirements. Energy efficiency compliance shall be demonstrated for a building as a whole and cannot combine unrelated or detached buildings.

Solar energy systems installed on additions or alterations to existing buildings do not qualify for NSHP incentives except in the case of residential buildings where the energy efficiency requirements are met for the entire structure by using the whole building compliance approach[11] in the *2008* or *2013 Standards*. Meeting the energy efficiency requirements by using the addition alone compliance approach or the existing+addition+alteration compliance approach will not be accepted. Refer to Chapter 9 of the *2013 Title 24, Part 6, Residential Compliance Manual*[12] or Chapter 8 of the *2008 Title 24, Part 6, Residential Compliance Manual.*[13]

NSHP incentives will not be provided to any solar energy system serving electrical loads in the nonresidential portions of a development, except in cases of mixed-use buildings or the common areas[14] of single-family residential developments (subdivisions) or multifamily developments. Solar energy systems serving electrical loads only in the common areas of multifamily developments are eligible for NSHP incentives if the entire multifamily residential building associated with the common area meets the NSHP energy efficiency requirements. Solar energy systems serving electrical loads only in the common areas of a single-family residential development (subdivision) are eligible for NSHP incentives if all homes in the residential development meet the NSHP energy efficiency requirements. Any additional buildings where electrical loads are served by the solar energy system must also meet the NSHP

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11 The whole building approach is defined in Section 8.7.1 of the *2008 Building Energy Efficiency Standards Residential Compliance Manual*, www.energy.ca.gov/2008publications/CEC-400-2008-016/CEC-400-2008-016-CMF-REV1.PDF, and Section 8.5.1 of the *2013 Building Energy Efficiency Standards Residential Compliance Manual*, http://www.energy.ca.gov/2013publications/CEC-400-2013-001/chapters/08_Performance_Method.pdf.

12 http://www.energy.ca.gov/2013publications/CEC-400-2013-001/chapters/09_Additions_Alterations_and_Repairs.pdf.

13 www.energy.ca.gov/2008publications/CEC-400-2008-016/CEC-400-2008-016-CMF-REV1.PDF.

14 *Common areas* are defined as those nondwelling 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.

energy efficiency requirements. If the solar energy system does not serve any electrical loads in a building or serves electrical loads in a building that does not have any conditioned space,[15] then for multifamily developments at least one residential building must meet the NSHP energy efficiency requirements, and for single-family residential developments (subdivisions), all homes in the residential development must meet the energy efficiency requirements.

When there is a new update of the *Building Energy Efficiency Standards*, buildings for which a building permit has been applied for before the effective date of that new update shall meet or exceed the NSHP energy efficiency requirements based on the prior update of the *Building Energy Efficiency Standards*. Buildings for which a building permit has been applied for on or after the effective date of the new update of the *Building Energy Efficiency Standards* shall meet the NSHP energy efficiency requirements based on the new update of the *Building Energy Efficiency Standards*.

Projects with an existing NSHP reservation that include buildings that must meet the NSHP energy efficiency requirements based on the new update of the *Building Energy Efficiency Standards* shall be subject to a new NSHP energy efficiency plan check, with the exception of Code-Compliant incentive projects.

EXCEPTION: If the NSHP applicant provides a building permit for the buildings associated with the solar energy system, or other documentation from the authority having jurisdiction, indicating that the building permit was applied for prior to the effective date of the new update of the *Building Energy Efficiency Standards*, the NSHP energy efficiency requirements shall be met based on the prior update of the *Building Energy Efficiency Standards*.

Questions concerning energy efficiency requirements should be directed to the Energy Standards Hotline at title24@energy.ca.gov or 1-800-772-3300. Questions concerning HERS documentation delays should be directed to the HERS Provider prior to contacting the Energy Standards Hotline. Additional information can be found on the Building Energy Efficiency Standards Web page at [www.energy.ca.gov/title24/].

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15 *Conditioned space* may be directly conditioned or indirectly conditioned. *Directly conditioned space* is an enclosed space that is provided with wood heating, is provided with mechanical heating that has a heating capacity exceeding 10 British thermal unit per hour square foot (Btu/hr-ft^2), or is provided with mechanical cooling that has a cooling capacity exceeding 5 Btu/hr-ft^2, unless the space-conditioning system is designed for a process space. *Indirectly conditioned space* is enclosed space, including, but not limited to, an unconditioned volume in atria of a building, 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. See the *2013 Building Energy Efficiency Standards*. www.energy.ca.gov/2012publications/CEC-400-2012-004/CEC-400-2012-004-CMF-REV2.pdf.

1. Compliance Documentation Author Requirements

Compliance with the NSHP Tier I or Tier II energy efficiency requirements shall be determined using the performance compliance approach using software approved by the Energy Commission. A signed Certificate of Compliance (CF-1R) or Performance Certificate of Compliance (PERF-1) must be submitted as part of the reservation application, with the exception of projects participating in a utility new construction program. The compliance documentation must be signed by a Certified Energy Plans Examiner (CEPE) or a Certified Energy Analyst (CEA) who is approved by the California Association of Building Energy Consultants (CABEC). CABEC requires CEPEs and CEAs to have separate certifications for residential and nonresidential standards, as well as separate certifications for each of the different updates of Title 24, Part 6. At the time the compliance documentation is signed, the CEPE or CEA must have a valid CABEC certification for the building type (residential or nonresidential) and for the update of Title 24, Part 6, in effect on the date the building permit is applied for. The CEPE or CEA can help determine which energy efficiency measures are needed to meet NSHP energy efficiency requirements and prepare the necessary documentation that must be submitted as part of the NSHP application. For a list of CEPEs and CEAs, visit the CABEC website at [www.cabec.org]. If there are no CEPEs or CEAs listed on the CABEC website for the update of Title 24, Part 6, in effect on the date the building permit is applied for, then an NSHP applicant may use a CEPE or CEA certified for the previous update of the Title 24, Part 6. Once CEPEs or CEAs are listed on the CABEC website for the update of Title 24, Part 6, in effect on the date the building permit is applied for, then an NSHP applicant must use a CEPE or CEA certified for that update of Title 24, Part 6, unless otherwise excused by the Energy Commission because the number or availability of CEPEs or CEAs listed on the CABEC website are inadequate to accommodate program demand and may delay the processing of reservation applications or payment claims.

For projects applying for the Code-Compliant incentive, the project compliance documentation may be signed by any person legally authorized to sign 2013 Title 24 compliance documentation, including the CF-1R. Please refer to Chapter 2 of the *2013 Title 24, Part 6, Residential Compliance Manual*[16] for additional information about who is legally authorized to sign Title 24 compliance documentation.

2. Code-Compliant Energy Efficiency and Third-Party Field Verification Requirements

The Code-Compliant incentive option is available only to applicants whose building(s) comply with the *2013 Standards*. Buildings applying for the Code-Compliant incentive must comply with the *2013 Standards* prior to claiming the solar compliance credit of the *2013 Standards*. This will be verified by the Energy Commission during its review of the reservation application. Reservation applications submitted for the Code-Compliant incentive shall include a copy of the Title 24 compliance documentation (CF-1R or PERF-1) run using the 2013 compliance software. The Title 24 compliance documentation submitted to the NSHP should be the same Title 24 compliance documentation that was or will be submitted to the building department to obtain a building permit. The documentation author for the Title 24 compliance documentation

16 http://www.energy.ca.gov/title24/2013standards/residential_manual.html.

may be any person legally authorized to sign these forms. Applicants are not required to submit a construction plan set with their reservation application, nor are they required to have a NSHP plan check completed prior to receiving a reservation.

A Code-Compliant NSHP application must identify a Home Energy Rating System (HERS) Rater for the solar energy system. The HERS Rater will verify the installation of the solar energy system for compliance with the NSHP PV requirements described in Appendix B.

3. Tier I and Tier II Third-Party Field Verification Requirements

A Tier I or Tier II NSHP application must identify a HERS Rater for both the energy efficiency measures and for the solar energy system. A HERS Rater will verify the installation of both the energy efficiency measures and the solar energy system for compliance with NSHP requirements. The energy efficiency measures include all applicable Title 24 HERS measures and the NSHP-specific Additional Energy Features Checklist (NSHP EE-3). Applicants may select a different HERS Rater for verification of Title 24 HERS measures, NSHP energy efficiency requirements, and the solar energy system, but the documentation must be submitted to the same HERS Provider. There may be energy efficiency inspections that need to take place early in construction; therefore, it is critical that there be good communication among the NSHP applicant, builder, solar installer, and HERS Rater to coordinate Title 24 or NSHP energy efficiency requirement verification.

EXCEPTION: Nonresidential and high-rise residential projects using a PERF-1 as energy efficiency documentation shall submit a final building permit signoff or occupancy permit. Furthermore, these projects do not need to identify an energy efficiency HERS Rater, nor do they need to submit a NSHP EE-3 form.

4. NSHP Plan Check Requirements

All NSHP projects will be required to have a NSHP plan check conducted unless they fall into one of the following categories:

- The project is applying for the Code-Compliant incentive.
- The project meets the Tier I or Tier II NSHP energy efficiency requirements under the *2013 Standards* and has compliance documentation completed by a CEA certified for the *2013 Standards*.
- The project is participating in a utility new construction energy efficiency program.

If the project is not required to complete a NSHP plan check, then the construction plan set will not be required as part of the reservation application. The Energy Commission reserves the right to complete a quality assurance plan check for a project that falls into one of the categories listed above, and will request the energy efficiency documentation, including the construction plan set prior to this plan check. The plan check may occur at any time during the reservation or payment review process. The plan check results will be used by the Energy Commission to evaluate the projects that are not required to complete a plan check as part of the NSHP

reservation review, as listed above. In all cases, a project must meet the NSHP energy efficiency requirements prior to issuance of a NSHP incentive.

5. *2013 Building Energy Efficiency Standards* Solar Compliance Credit

The *2013 Standards* allow solar energy systems to claim a compliance credit when using the performance compliance approach. Refer to Section 2.2.3 of the *2013 Title 24, Part 6, Residential Alternative Calculation Method*.

Projects that request the Code-Compliant incentive must comply with the *2013 Standards* prior to claiming the solar compliance credit of the *2013 Standards*. Projects complying with either the Tier I or Tier II energy efficiency requirements under the *2013 Standards* will be allowed to claim this credit in the Title 24 compliance documentation as part of meeting the *2013 Standards*.

C. Utility New Construction Energy Efficiency Program Participation

Applicants are strongly encouraged to participate in their utility's new construction energy efficiency program to obtain the financial incentives that may be available for meeting either Tier I or Tier II energy efficiency requirements and to streamline NSHP energy efficiency verification.

When a project is participating in both the NSHP and a utility new construction energy efficiency program, the project shall meet the energy efficiency requirements of the utility new construction program in lieu of the NSHP energy efficiency requirements as long as the Energy Commission determines that the utility new construction energy efficiency requirements are equivalent to or exceed the NSHP energy efficiency requirements. The utility new construction energy efficiency program is meant to provide a separate, alternate path for NSHP energy efficiency compliance.

For projects participating in a utility new construction energy efficiency program, the following apply:

- For NSHP projects where a utility new construction energy efficiency program approval letter is submitted with the NSHP reservation application, or the approval is otherwise confirmed by the utility program administrator, the applicant is not required to provide the building permit/subdivision map or energy efficiency documentation (for example, CF-1R form, electronic input files, plan set, and checklist items) with the NSHP reservation application. Furthermore, the project is not required to complete a NSHP plan check. NSHP projects that have not received a utility new construction energy efficiency program approval letter or cannot provide documentation confirming the NSHP project meets the requirements of the utility new construction energy efficiency program at the time of the Energy Commission review of the NSHP reservation application will be given up to 60 calendar days after the Energy Commission reservation application review to provide this necessary documentation.

- For NSHP projects where a utility new construction energy efficiency program payment letter is submitted, or the payment is otherwise confirmed by the utility program administrator, the applicant is not required to provide the Additional Energy Features Checklist (NSHP EE-3) or any CF-3Rs during the NSHP payment process. The energy efficiency field verification documentation for that project will be confirmed to be in a HERS Provider data registry by the utility program administrator during the utility new construction energy efficiency program payment process.

Once an NSHP applicant chooses to have its project participate in a utility new construction energy efficiency program, it is expected that the project will successfully complete the utility new construction energy efficiency program. If, for some reason, the project is not able to successfully complete the utility new construction energy efficiency program, then all the NSHP energy efficiency requirements shall be met.

The energy efficiency requirements, and the document requirements and processes for these requirements, are summarized below in Table 2-1. For additional information on the documents listed in Table 2-1, please see Chapter IV, Section B, and Chapter V, Section A. For additional information on the processes identified in Table 2-1, please see Chapter II, Section B, and Appendix C.

Table 2-1: Energy Efficiency Requirements and the Corresponding Documents and Processes

		Energy Efficiency Requirements			
		Code-Compliant*	Tier I	Tier II	Approval for Utility New Construction Energy Efficiency Program
Documents					
	CF-1R Form	X	X	X	**
	Electronic Input Files (.bld/.mp7, .mp8, .ribd)		X***	X***	**
	Construction Plan Set and Checklist Items		X***	X***	**
	Final Building Permit Sign-Off	X			
Processes					
	Plan-Check		X***	X***	
	Energy Efficiency Verification (CF-3R and NSHP EE-3)		X	X	****
	PV Verification	X	X	X	X

*The Code-Compliant incentive is available only for projects complying with the *2013 Standards*.
** If the project is approved for the utility new construction energy efficiency program, then the applicant may submit the program approval letter in place of the CF-1R, corresponding electronic input file, and construction plan set.
***Buildings complying with the *2013 Standards*, with compliance documentation completed by a CEA certified for the *2013 Standards*, will bypass the construction plan set document requirement, electronic input files requirement, and plan check process. Please refer to Chapter II, Section B.4, for additional information on the NSHP plan check requirements.
**** If the project is approved for the utility new construction energy efficiency program, then the applicant may submit the program payment approval letter in place of the energy efficiency verification documentation.

Source: California Energy Commission

D. Permanent Foundation

Eligible solar energy systems must be installed on newly constructed buildings permanently fixed to their foundation. Permanent foundation is defined in the "Permanent Foundations Guide for Manufactured Housing" (HUD-7584).[17]

Manufactured housing seeking eligibility for the NSHP must provide a "Notice of Manufactured Home or Commercial Modular Installation on a Foundation System" (HCD 433A) or a Certificate of Occupancy (HCD 513C) prior to approval of a payment claim.

17 U.S. Department of Housing and Urban Development, *Permanent Foundations Guide for Manufactured Housing*, HUD 7584, Issued September 1996.

E. Transient Housing

Solar energy systems installed on transient residences are not eligible to receive NSHP incentives. Only buildings where 50 percent or more of the residential units are occupied for 30 days or more and are one of the following occupancy groups listed in the California Building Code, Title 24, Part 2[18] are eligible for NSHP funding.

- Occupancy Group R, Division 2
- Occupancy Group R, Division 2.1
- Occupancy Group R, Division 3
- Occupancy Group R, Division 3.1
- Occupancy Group R, Division 4

The Energy Commission reserves the right to request that applicants provide documentation verifying that the project meets the transient housing requirements listed above.

F. Grid Interconnection

Eligible 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. 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 electric utility.

Multifamily housing projects, both market rate and affordable, using virtual net metering[19] are eligible for NSHP incentives. For multifamily housing projects using virtual net metering, the residential dwelling units must meet the energy efficiency requirements in Chapter II, Section B.

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18 http://publicecodes.cyberregs.com/st/ca/st/b200v10/st_ca_st_b200v10_3_par046.htm.

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 a 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 and modified in Decision 11-07-031. [docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/139683.htm].

G. System Components

Major solar energy system components are defined as flat-plate 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 installed more than six months prior to submitting an initial reservation application is not eligible.** System components must satisfy the eligibility requirements specified in the most recently approved edition of *Guidelines for California's Solar Electric Incentive Programs (Senate Bill 1)* [www.energy.ca.gov/sb1/meetings/index.html]. Approved major components will be posted on the Energy Commission's eligible equipment website available at [www.gosolarcalifornia.ca.gov/equipment/index.php].

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

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

H. Meters

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.

Projects that qualify for virtual net metering (VNM), as adopted by the California Public Utilities Commission (CPUC) in decisions including but not limited to Decision 08-10-036 that was modified in Decision 11-07-031, are not required to separately net-meter each residential dwelling unit that will be allocated electricity from the solar system.

I. System Sized to Offset On-Site Electricity Load

Eligible solar energy systems shall be a minimum size of 1.00 kW AC measured after the inverter and shall 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 installation site. 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 serving a single-family residential unit is limited to the first 7.5 kW

AC of the system. For systems larger than 7.5 kW, see "Calculator Examples" at [www.gosolarcalifornia.ca.gov/tools/nshpcalculator/download_calculator.php] for further details on how to determine the maximum incentive. While common areas are not subject to the 7.5 kW AC cap, the Energy Commission may request additional documentation justifying the system size. See Chapter III, Section D, for additional information on maximum incentives.

J. System Performance

The incentive amount will be based on the estimated performance of the solar energy system[20], calculated using the Energy Commission's PV Calculator (CECPV Calculator). The estimated performance of the system will be the basis for qualifying for a reservation and for the final incentive amount. System installation shall be consistent with the characteristics used to determine estimated performance to receive the reserved incentive amount. The final incentive amount is subject to available funds. The characteristics that are addressed by the CECPV Calculator include shading by any obstruction of the modules.

The CECPV Calculator will include "California Flexible Installation" criteria (as detailed in Chapter III, Section B) to estimate performance for a range of module orientations and tilts. The California Flexible Installation is intended for use only by new single-family residential developments (subdivisions) and is not allowed for applications consisting of only one single-family dwelling or only the common area of a residential development. Systems installed within the allowable range of 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 providing more specific orientations and tilts. Third-party field verification will be conducted to assess whether systems have been installed consistent with the characteristics used to determine estimated performance.

K. System Installation

Solar energy systems must be installed in conformance with the manufacturer's specifications and installation instructions; all applicable electrical, fire, and building codes and standards; all utility interconnection requirements; and any local codes and ordinances.

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.[21] Contractors with roofing-specific licenses may install photovoltaic modules in accordance with limitations

20 Solar energy systems using flat-plate photovoltaic technology are the only systems eligible to receive NSHP incentives.

21 Contractors State License Board Check a Contractor License Registration [www2.cslb.ca.gov/OnlineServices/CheckLicenseII/CheckLicense.aspx].

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.[22]

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

L. Solar Energy System Field Verification

All installed solar energy systems shall be third-party field-verified as described in Appendix B to ensure that installations are consistent with the information used to determine the estimated performance, reservations, and ultimately the final incentive amount. Field verification procedures shall be consistent with the current *Building Energy Efficiency Standards* [www.energy.ca.gov/title24]. Field verification of solar energy systems in new housing developments shall employ the sampling approach described in Appendix B, Section A.

Field verification will determine if the installed solar energy system is consistent with the "California Flexible Installation" criteria (including the minimal shading criteria) or the uniquely specified orientation, tilt, and shading characteristics of the system, as appropriate. When field verification indicates that the installation is not consistent with the parameters used to calculate the estimated performance submitted in the NSHP application, the deficiencies must be corrected or the estimated performance must be recalculated based on the actual installation parameters. When field verification indicates that the installation will achieve an estimated performance greater than that used for the reservation, the estimated performance may be recalculated at the applicant's option to reflect the higher performance. Any revised estimated performance documentation must be resubmitted to NSHP.

M. Warranty Requirements

All solar energy systems must have a minimum 10-year warranty provided in combination by the manufacturer and equipment seller/installer. During the 10-year period, the warranty must protect against:

1) Defects in materials and workmanship.
2) System or component breakdown.
3) Degradation in electrical output of more than 15 percent from the originally rated electrical output.

The warranty must cover the solar generating system, including the flat-plate photovoltaic modules, 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.

22 For information on restrictions placed on owner-builders, contact the Contractors State License Board at (800) 321-CSLB (2752) to obtain a current edition of the *Contractor's License Law and Handbook.*

N. Equipment Sellers/Installers

Companies that sell and/or install solar energy system equipment do not need to be registered with the Energy Commission Contractors, Installers, and Sellers Database, located on the Go Solar California website. Contractors, installers, and sellers listed in the online database are self-registered, and it is their responsibility to provide accurate, up-to-date information. The Energy Commission does not verify or update any of the information in this database. Please see Chapter II, Section K, for licensing requirements for installation contactors.

O. 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 before 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 an initial term of no less than 10 years and must provide the lessee or customer the following option at the end of the initial term of the agreement:

- Remove the system at no cost to the lessee or customer.

Any other options provided to the lessee or customer, such as the option to renew the agreement or purchase the system, should be clearly described in the lease agreement or PPA. In addition, lease agreements and PPAs must demonstrate that the NSHP funding benefits the end-use customer by reducing the lease payments for the system or the cost of electricity produced by the system. For a lease agreement or PPA to show the NSHP funding benefits the end-use customer, the lease agreement or PPA must include express provisions showing the cost to the end-use customer without the NSHP funding and the reduced cost to the end-use customer with the NSHP funding.

The NSHP incentive amount requested when claiming payment (as estimated by the CECPV Calculator) may exceed the NSHP funding amount identified in the lease agreement or PPA by up to 10 percent of the amount listed in the lease agreement or PPA. If the NSHP incentive amount requested when claiming payment exceeds the NSHP funding amount identified in the lease agreement or PPA by more than 10 percent of the amount listed in the lease agreement or PPA, a revised lease agreement, PPA, or addendum to the lease agreement or PPA listing the correct incentive amount must be provided to the Energy Commission to claim the higher NSHP incentive amount.

For the first five years of the lease or PPA, the lessor (in the case of a lease) or owner of the solar energy system (in the case of a PPA) shall provide an annual status report to the Energy Commission on the operation of the NSHP-incentivized solar energy system. The annual status report shall address agreements executed through December 31 of each year, be submitted to the Energy Commission 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
3) Status of the agreement and, if status has changed, date of change and reason for the change. (Status changes primarily include change in lessee or customer, system purchase, termination of agreement, and system removal.)

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 within the 10-year warranty period, the Energy Commission **may** request repayment of all or a portion of the NSHP funding provided for that system. 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.

The lessor or system owner is responsible for repayment of NSHP funding and is required to inform the lessee or end-use customer of this requirement. The lease agreement or PPA shall include provisions that specifically discuss repayment obligations of the NSHP funding when there is early termination of the lease agreement or PPA, and identify that the party responsible for repayment of the NSHP funding to the Energy Commission is the lessor or system owner.

EXCEPTION: If the lessee or end-use customer receives the NSHP funding directly from the Energy Commission, the lessee or end-use customer may provide a lease agreement or letter signed by the lessee or end-use customer that identifies the lessee or end-use customer as the party responsible for repayment of the NSHP funding to the Energy Commission if the lease agreement or PPA is terminated early. Under these circumstances, the lease agreement or PPA does not need to demonstrate that the NSHP funding benefits the end-use customer by reducing the lease payments for the system or the cost of the electricity produced by the system.

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 PPA.

CHAPTER III:
Incentive Levels and Structure

This chapter describes the incentives offered by the NSHP program. The NSHP provides an Expected Performance-Based Incentive (EPBI) using a specific dollar-per-watt amount applied to the Energy Commission-specified reference solar energy system. The incentive amount for each solar energy system is determined by analysis using the CECPV Calculator and is paid when the solar energy system has been installed and 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 of this chapter.

Incentives will decline over the life of the program, with the application process of the program closing when funding is no longer available and the legislative goals of the program have been met. Incentive levels and reserved volume are subject to funding availability.

A. Incentive Levels and Decline Schedule

1. Incentive Levels for Market-Rate Housing, Affordable Housing Common Areas, and Affordable Housing Systems Owned by Non-Tax-Exempt Entities

There are two available incentive levels for projects complying with the *2008 Standards* and three available incentive levels for projects complying with the *2013 Standards*:

- **Code-Compliant Incentive (applies only to projects complying with the *2013 Standards*):** The Code-Compliant incentive applies to projects that have met all requirements of the *2013 Standards,* as specified in Chapter II, Section B.
- **Tier I Incentive:** The Tier I incentive applies to projects that have met all of the *Building Energy Efficiency Standards* requirements for Tier I projects, as specified in Chapter II, Section B.
- **Tier II Incentive:** The Tier II incentive applies to projects that have met all of the *Building Energy Efficiency Standards* requirements for Tier II projects, as specified in Chapter II, Section B.

The actual incentive amount for a particular solar energy system and installation depends on the EPBI calculation of the expected performance of the system compared to the reference solar energy system and the applicable incentive level. Incentive levels will decline when the cumulative MW capacity of applications submitted under an incentive level equals the MW reserved volume target specified in Table 3-1.[23]

Table 3-1: EPBI Incentive Levels and Related Reservation Volumes

Code-Compliant Incentive* (per watt, reference system)	**Tier I Incentive** (per watt, reference system)	**Tier II Incentive** (per watt, reference system)	**Reserved Volume Target**** (MW-AC)
$2.25	$2.50	$2.60	55.3
$2.00	$2.25	$2.35	N/A
$1.75	$2.00	$2.25	5
$1.50	$1.75	$2.00	10
$1.25	$1.50	$1.75	15
$1.00	$1.25	$1.50/$1.75***	35
$0.75	$1.00	$1.50	50
$0.50	$0.75	$1.25	60
$0.35	$0.50	$1.00	65
$0.25	$0.35	$0.75	72

For the original incentive levels, please refer to the fourth edition of the *NSHP Guidebook*. The rows shaded in the table indicate past incentive levels.
* The Code-Compliant incentive is available only for projects complying with the *2013 Standards*.
**Reserved volume includes reserved affordable housing residential unit volume, discussed later in this guidebook.
***The Incentive Level 6 rate of $1.75/watt will be available only for Tier II projects complying with the *2013 Standards*. Tier II projects complying with the *2008 Standards* will receive an Incentive Level 6 rate of $1.50/watt.

Source: California Energy Commission

23 For example, when the cumulative MW capacity of Code-Compliant, Tier I, Tier II, and affordable housing applications submitted and approved under the specific incentive level equals 50 MW, the Code-Compliant incentives will drop from $0.75/watt to $0.50/watt, the Tier I incentives will drop from $1.00/watt to $0.75/watt, and the Tier II incentives will drop from $1.50/watt to $1.25/watt. The incentive level for affordable housing projects will drop when the cumulative MW capacity of affordable housing residential unit applications submitted and approved under the specific incentive level equals the MW reserved volume target for affordable housing projects.

2. Incentive Levels for Affordable Housing Residential Unit Projects With Tax-Exempt System Owners

For projects meeting the *2013 Standards*, or the Tier I or Tier II energy efficiency requirements described in Chapter II, Section B, the following incentive levels apply to eligible affordable housing residential unit projects with tax-exempt system owners. Eligibility requirements for affordable housing can be found in Chapter IV, Section C. The design of the incentive levels and decline structure for affordable housing projects with tax-exempt system owners is the same as the design for market-rate housing, as discussed earlier.

Table 3-2: EPBI Incentive Levels for Affordable Housing Residential Unit Projects With Tax-Exempt System Owners

Code-Compliant Incentive* (per watt, reference system)	**Residential Dwelling Unit Incentive** (per watt, reference system)	**Common Area Incentive** (per watt, reference system)	**Reserved Volume Target** (MW-AC)
$3.25	$3.50	$3.30	5.5
$2.90	$3.15	$2.97	N/A
$2.55	$2.90		0.25
$2.20	$2.55		0.5
$1.85	$2.20		0.75
$1.50	$1.85		3.5
$1.15	$1.50		5.0
$0.80	$1.25		6.0
$0.55	$1.00		6.5
$0.35	$0.75		7.2

For the original incentive levels, please refer to the fourth edition of the *NSHP Guidebook*. The rows shaded in the table indicate past incentive levels.

* The Code-Compliant incentive is available only for projects complying with the *2013* Standards.

Source: California Energy Commission

Multifamily affordable housing projects using virtual net metering are eligible for the affordable housing residential dwelling unit incentive for the portion of the solar energy system that is allocated to the tenants. For multifamily affordable housing projects using virtual net metering, the residential dwelling units must meet the energy efficiency requirements in Chapter II, Section B.

3. Incentives for Systems With a West-Facing Azimuth

The portion of a solar energy system that is installed with an azimuth between 259 degrees and 281 degrees will receive an additional incentive. This additional EPBI amount will be the amount determined using the following formula, up to a maximum of $500 for each site.

Additional EPBI Amount for West Facing Azimuth = 0.15 x NSHP incentive amount

The NSHP incentive amount used in the formula above is the final NSHP incentive amount for the portion of the system with an azimuth between 259 and 281 degrees site as calculated by the CECPV Calculator.

4. Change in Incentive Level

When the cumulative MW capacity of applications submitted under an incentive level equals the MW reserved volume target for that incentive level, the incentive level will drop to the next incentive level. If the capacity for an application exceeds the remaining capacity in the current incentive level, the reservation for that application will be split between the current incentive level and the next incentive level. **The Energy Commission will not provide advance notice to program participants of a drop in the incentive levels as shown in the above tables. However, information on the current incentive level, the MW capacity approved for the current incentive level, and the MW under review will be available on the NSHP Application Web Tool, [www.newsolarhomes.org/WebPages/Public/RebateLevelView.aspx], to help applicants make an informed decision on program incentives.** It is the applicant's responsibility to be aware of the current incentive level and the MW capacity remaining in the current incentive level. Projects may be reserved at a lower incentive level than the incentive level in effect at the time the reservation application is submitted, if there has been a drop in the incentive level.

B. Expected Performance-Based Incentive Calculation

The NSHP provides an incentive based on the expected performance (that is, expected annual electrical generation) of a solar energy system installed in a specific location. The EPBI is determined by analysis using the CECPV Calculator. 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 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 electric generation to the utility system (referred to as *time-dependent valuation* [TDV[24]]).

The weighted TDV annual kilowatt-hour (kWh) production of an applicant's system is compared to the weighted TDV annual kWh production of the reference system shown in Table 3-3. 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

24 The TDV and weather data used for the *Building Energy Efficiency Standards* were revised for the *2013 Standards* update. The CECPV calculator will use the revised TDV and weather data from the *2013 Standards* for all future updates of the CECPV calculator.

performance determined by the CECPV Calculator for the applicant system to determine the incentive for the specific equipment and installation characteristics of that system.

Table 3-3: Reference 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	Building Integrated Photovoltaics (BIPV)
Photovoltaic Modules	Matches Systems Installed at Premier Gardens, Sacramento[25]
Number of Modules	
Strings (series and parallel)	
Inverter	
Shading	None
Default Losses	0.88 for dirt, dust and mismatched wiring

Source: California Energy Commission

1. 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 single-family residential developments (subdivisions) and is not allowable for applications consisting of only one single-family home 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 meet all of the following criteria: 1) have an azimuth ranging from 150 to 270 degrees; 2) have a tilt corresponding to a roof pitch between 0:12 and 7:12; 3) meet the "minimal shading criteria"; 4) use the same make, model, and quantity of major system components; and 5) have fixed, nontracking mounting. The minimal shading criteria imply no existing, planned, or potential shading obstructions that are closer than a distance of twice the height that the obstruction extends above the nearest point on the array.

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 nontracking 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.

25 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 building-integrated photovoltaic (BIPV) modules connected in a single series string to a 2.5 kW inverter.

C. Project-Level Funding

The estimated incentive amount for each solar energy system site identified within a reservation application package will be determined using the CECPV Calculator. The funds reserved for a project will be the sum of those estimated incentive amounts. However, the reserved funding for projects with multiple system sites will be reserved at the project level, not the individual solar energy system site level. Once the solar energy system has been installed and the payment claim package submitted, the incentive for the solar energy system will come from the overall project funding. If a solar energy system site uses more or less funding than originally estimated by the CECPV Calculator, that funding difference will be reflected in the overall project funding. Please see Appendix A, Section A, for additional information on calculating the incentive amount when there has been a change to a solar energy system.

Funds reserved for projects with 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 reserved volume targets from that point forward will be adjusted to reflect the funds from the expired or cancelled reservations.

D. NSHP Incentive Amount Cap

Incentives for affordable housing projects (residential dwelling unit and common areas) will be limited to 75 percent of the total system cost. Incentives for all other projects will be limited to 50 percent of the total system cost. For projects subject to the 7.5 kW AC system size cap referenced in Chapter II, Section I, the incentive will be equal to whichever amount is less. For projects where the incentive has been limited to the first 7.5 kW AC of the system:

- If this project is an affordable housing project and the 7.5 kW AC capped incentive is greater than 75 percent of the total system cost, then the total incentive will be 75 percent of the total system cost.

- If this project is a market-rate housing project and the 7.5 kW AC capped incentive is greater than 50 percent of the total system cost, then the total incentive will be 50 percent of the total system cost.

- If this project is an affordable housing project and the 7.5 kW AC capped incentive is less than 75 percent of the total system cost, then the total incentive will be the 7.5 kW AC capped incentive.

- If this project is a market-rate housing project and the 7.5 kW AC capped incentive is less than 50 percent of the total system cost, then the total incentive will be the 7.5 kW AC capped incentive.

"Total system cost" consists of the cost of the equipment and materials incurred by the system owner for the solar energy system, including sales tax, labor to install the solar energy system,

and costs of solar energy system permits issued by the authority having jurisdiction. All other costs, including financing fees, origination fees, processing fees, or administrative fees, incurred by any party are not considered part of the total system cost. The cost of any equipment used to store the electricity produced by the solar energy system is not considered part of the total system cost. The total amount of incentives or discounts received from a source, other than the sources identified below in Section E, may be subtracted from the total system cost before applying the incentive amount cap.

E. Incentives Affecting the NSHP Incentive Amount

Incentives received from sources other than the NSHP that lower the cost of the 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 California-sponsored incentive program, or a federal government-sponsored incentive program (other than tax credits), a minimum of 5 percent of the total incentives received or expected from other sources will be subtracted from the NSHP incentive amount. The percentage 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 or any other incentive program for solar energy systems using investor-owned electric utility ratepayer funds.

CHAPTER IV:
Reservation Process

This chapter describes the types of reservations and the documentation required to reserve funding from the NSHP.

Please read the following descriptions carefully to determine the reservation for which the project may qualify and the necessary documentation. Once the required information has been submitted and confirmed to meet the requirements of the NSHP, the reservation application will be approved, and funding will be reserved for the project.

A. Types of Reservations

Projects will receive an 18-month or 36-month reservation, depending on the project type.

1. 36-Month Reservation

The following projects are eligible for a 36-month reservation period:

- Large Developments: Developments/buildout phases[26] of six or more residential units where the builder/developer has committed to installing solar energy systems on 50 percent or more of the dwelling units and that meet the California Flexible Installation criteria are eligible for a Large Development reservation. This project type includes single-family and multifamily projects. Please see Chapter IV, Section D, for additional information.
- Affordable Housing Projects: This includes affordable housing residential dwelling unit projects and affordable housing common area projects. Please see Chapter IV, Section C, for additional information.
- Virtual-Net-Metered Projects: This includes affordable housing and nonaffordable housing projects. Please see Chapter IV, Section C, for additional information.

2. 18-Month Reservation

The following projects are eligible for an 18-month reservation period:

- Custom homes
- Small developments (fewer than six residential dwelling units)
- Projects where solar will be installed on less than 50 percent of the residential dwelling units

26 A *buildout phase* is part or all of a development that an applicant plans to build within the reservation period.

- Common areas of market-rate residential developments

Table 4-1 lists the project types and required documentation for the reservation application package.

B. Forms and Documentation

1. Reservation Application Form

The Reservation Application Form (NSHP-1) provides general information about the proposed project and the electric utility service area in which the project will be located, and must be signed by the homeowner or builder/developer. The form also identifies what information must be submitted with the application and requires applicants to provide the contact information of the HERS Rater. The NSHP-1 provides the homeowner or builder/developer an opportunity to assign his/her administrative rights.

2. Proof of Newly Constructed Residential Building

Applicants must submit either a copy of the tentative or final subdivision map or building permits for newly constructed buildings. 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. Please refer to Chapter II, Section B, for information on the energy efficiency requirements and additional building permit requirements when there is a new update of Title 24, Part 6.

3. Expected Performance-Based Incentive (EPBI) Documentation

The Expected Performance-Based Incentive (EPBI) documentation specifies the expected performance of the solar energy system(s) to be installed and the eligible funding amount to the applicant. To complete this documentation, the applicant must use the CECPV Calculator for each unique solar energy system.[27] The CECPV Calculator will produce the NSHP PV-1[28] compliance form. A development may use the California Flexible Installation criteria to calculate the incentives for all systems that meet the criteria.[29] In cases where there is more than one solar energy system design that results in different levels of expected performance, a NSHP PV-1 for each system design that results in a unique expected performance calculation must be submitted.

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27 For providing information to the CECPV Calculator, a *photovoltaic solar energy system* is defined as one or more modules connected to one inverter.

28 The NSHP PV-1 Compliance Form was formerly called the CF-1R-PV.

29 The California Flexible Installation criteria offers a simplified approach to estimating the incentives for those solar energy systems in a single-family housing development (subdivision) that are designed and installed to meet the criteria outlined in Chapter III, Section B.

Table 4-1: Project Types and Required Reservation Application Documentation

Reservation Application Documents	Project Type						
	Affordable Housing Residential Dwelling Unit	Affordable Housing Common Area	Custom Home	Large Developments	Small Developments	Projects w/ Solar on Fewer Than 50% of Residential Units	Market-Rate Common Areas
Reservation Application Form: NSHP-1	X	X	X	X	X	X	X
Subdivision Map*, ***				X	X	X	
Building Permit***	X	X	X				X
EPBI Documentation							
NSHP PV-1 Compliance Form	X	X	X	X	X	X	X
Electronic Input Files (.emf, .her)	X	X	X	X	X	X	X
Energy Efficiency Documentation							
CF-1R Form	X	X	X	X	X	X	X
Electronic Input Files (.bld/.mp7, .mp8, .ribd)**	X	X	X	X	X	X	X
Plan Set and Checklist Items**	X	X	X	X	X	X	X
Utility New Construction Energy Efficiency Program Approval Letter***							
Lease Agreement/Power Purchase Agreement (PPA)							
Installation Contract****	X	X	X	X	X	X	X
Regulatory Agreement	X	X					

*Applicants may provide either a tentative or final subdivision map or building permit as proof of residential new construction.
**For projects complying with the *2013 Standards* and applying for the Code-Compliant incentive, the electronic input file, plan set, and checklist items are not required to be submitted.
***If the project is participating in the utility new construction energy efficiency program, then the applicant may submit the program approval letter in place of the building permit/subdivision map and energy efficiency documentation.
****For systems that are self-installed, an equipment purchase agreement must be submitted in place of an installation contract.
Source: California Energy Commission

Applicants must submit each NSHP PV-1 form and the associated .emf digital input file and .her digital output file for review by the Energy Commission. The .her digital output file shall be uploaded into the HERS Provider data registry of an Energy Commission-approved NSHP HERS Provider.[30] Applicants must identify the HERS Rater and HERS Provider during the application process.

4. Energy Efficiency Documentation

To participate in the NSHP, buildings associated with the solar energy system(s) must be highly energy-efficient. Compliance documentation (CF-1R or PERF-1) run using the 2013 compliance software is required for the Code-Compliant incentive level. The compliance documentation submitted to the NSHP should be the same compliance documentation that was or will be submitted to the building department to obtain a building permit. Documentation showing efficiency levels that exceed the *Building Energy Efficiency Standards* in effect at the time the building permit was applied for by at least 15 percent is required for the Tier I and Tier II incentives. All projects must provide documentation that appliances provided by the builder are ENERGY STAR®-labeled if ENERGY STAR applies to that appliance. Solar water heating may be used to assist in meeting the energy efficiency requirements for any of the three incentive levels (Code-Compliant, Tier I, and Tier II).

Applicants must submit a CF-1R (or PERF-1 when applicable) and the associated digital input files. For Tier I and Tier II projects, applicants must also submit a copy of the construction plan set. For additional details about energy efficiency documentation submittal, please see Chapter II, Section B, and Appendix C.

Applicants are strongly encouraged to participate in their utility's new construction energy efficiency program to obtain the financial incentives that may be available for meeting either Tier I or Tier II energy efficiency requirements and to streamline the NSHP energy efficiency verification. Please see Chapter II, Section C, for additional information.

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 in Chapter II, Section B.

5. Installation Contract

The installation contract indicates the applicant's commitment to installing solar energy systems. The applicant must submit an installation agreement for all the residential dwelling units in the reservation.

An installation contract must specify the price charged for the installation of equipment and the estimated NSHP incentive amount for all the residential dwelling units in the reservation.

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30 HERS Providers that provide services for NSHP applicants must be approved by the Energy Commission to be HERS Providers for the *Building Energy Efficiency Standards*.

Installation contracts must comply with the CSLB requirements. In general, proper contracts will contain:

- Name, address, and contractor's license number of the company performing the system installation.
- Site address for the system installation or total number of residential dwelling units that will have a solar energy system installed.
- Description of the work to be performed.
- Quantity, make, and model of the photovoltaic modules, inverters, and meters to be installed at each address.
- Total agreed price to install the system.
- Printed names and signatures of the applicant or the applicant's representative and the installation company's authorized representative.

For more information on CSLB guidelines, please refer to the website at [www.cslb.ca.gov/].

A master equipment purchase and installation agreement for all the residential dwelling units in the reservation may be submitted.

For systems that are self-installed, instead of providing an installation contract, applicants must provide an equipment purchase agreement. 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 (photovoltaic modules, inverters, and performance meter[s]) or $1,000 per residential unit has been paid to the seller(s).

C. Affordable Housing Projects

The NSHP offers higher incentives for qualifying solar energy systems owned by tax-exempt entities and installed on affordable housing residential unit projects. Affordable housing projects with qualifying solar energy systems owned by non-tax-exempt entities are eligible for the lower, market-rate housing incentive level.

The tax status of the owner of a solar energy system installed on an affordable housing residential unit project may be based on the system owner's property tax status. For determining the property tax status of the system owner for an affordable housing residential unit project with one limited partnership as the owner of both the project and the qualifying solar energy system, the system owner's tax status will be based on the property tax status of the managing general partner in the limited partnership. The Energy Commission will verify property tax status through the existence of a Supplemental Clearance Certificate issued to the

solar energy system owner for the property by the California Board of Equalization at: [www.boe.ca.gov/proptaxes/welfarelowinc.htm] and [www.boe.ca.gov/proptaxes/welfarescc.htm]. If the Supplemental Clearance Certificate is not available during the reservation application review, the Energy Commission will accept the Organizational Clearance Certificate. However, the Supplemental Clearance Certificate must be submitted as part of the payment claim package and will be the final determination of the property tax status for calculating the final incentive amount.

For entities unable to verify tax status through Supplemental Clearance Certificates, the Energy Commission will verify the entity is registered as a current 501(c)(3) organization on the Internal Revenue Service's (IRS) "Exempt Organization" list or registered on the State of California Franchise Tax Board's "Exempt Organization List" to determine the system owner's tax status. The IRS "Exempt Organizations" list is located at: [http://www.irs.gov/Charities-&-Non-Profits/Exempt-Organizations-Select-Check]. The California Franchise Tax Board's "Exempt Organizations list" can found at: [https://www.ftb.ca.gov/businesses/Exempt_organizations/Entity_list.shtml].

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 at least 10 years. Qualifying systems must be connected to and serve the energy needs of 1) residential dwelling units subject to affordability requirements; or 2) the office and residential unit of the 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 residential units of the project 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.

Additional requirements for affordable housing projects are described below.

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. An applicant must provide documentation that demonstrates 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 development of the project 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 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 at least 10 years. The regulatory agreement must be with a housing agency qualified to enter into the agreement, such as the Tax Credit Allocation Committee (TCAC), the California Debt Limit Allocation Committee (CDLAC), the California Department of Housing and Community Development/California Housing Finance Agency (HCD/CalHFA), the U.S. Department of Housing and Urban Development (HUD), a redevelopment agency (RDA) or RDA successor agency, a housing authority, or a city or county in the case of a project funded by the HUD HOME Investment Partnerships Program. Examples of an approval for the development of the project include a Section 8 or similar project-based rental assistance contract between the property owner and HUD, or the property owner and a contract agency or public agency, a project-based voucher contract between a property owner and a public housing authority, and an annual contributions contract between HUD and a public housing authority.

The Energy Commission may consult with the agency identified on the regulatory agreement or approval document to confirm that the project is in good standing.

2. Individual Meter Requirement

Each residential dwelling unit for which a solar energy system is being installed must have an 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 electricity consumption meter. 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: Projects that qualify for virtual net metering (VNM), as adopted by the California Public Utilities Commission (CPUC) in decisions including but not limited to, Decision 08-10-036 that was modified in Decision 11-07-031, are not required to separately net-meter each residential dwelling unit that will be allocated electricity from the solar system.

3. Maintenance and Monitoring Plan

Affordable housing applicants shall develop a maintenance and monitoring plan for NSHP-funded systems and shall retain a copy of such plan for inspection by the Energy Commission. This plan shall be provided to the system owner and the building or property manager and shall identify specific maintenance, monitoring, and inspections the building or property manager will need to undertake, or have contracted for, to ensure that the system produces maximum output over the expected life of the system. The plan should include activities such as 1) cleaning schedule for the removal of any dirt and dust buildup on the solar energy system, 2) periodic checking of all electrical connections for corrosion and looseness, 3) checking the inverter for instantaneous power and long-term energy output and diagnosing and taking corrective action needed if production is significantly lower than expected, and 4) 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 reserves the right to request applicants to provide a copy of the maintenance and monitoring plan at any time during the NSHP.

D. Large Developments

For projects where the builder/developer has committed to installing solar on 50 percent or more of the dwelling units and that meet, at minimum, the California Flexible Installation criteria, a reservation application may be submitted for a build-out phase of six or more residential units.

1. Reservation Funding Decrease Schedule

The Energy Commission will evaluate the progress of the project beginning 12 months after the project is approved for an NSHP reservation and at subsequent 6-month intervals. This evaluation will consider the number of payment claims that have been submitted and the number of residential units indicated to have solar in the reservation application. If the Energy Commission concludes that the project is not progressing as expected, the funding reservation of the project may be reduced or completely disencumbered, according to the following schedule:

- Twelve months after the project reservation is approved, if the sum of the incentive amounts for sites with submitted incentive payment claim forms (NSHP-2) and PV Field Verification and Diagnostic Testing Forms (NSHP PV-3) totals less than 15 percent of the original project funding amount, the remaining project funding may be reduced up to a level equal to 85 percent of the original project funding amount.

- Eighteen months after the project reservation is approved, if the sum of the incentive amounts for sites with submitted incentive payment claim forms (NSHP-2) and PV Field Verification and Diagnostic Testing Forms (NSHP PV-3) totals less than 35 percent of the original project funding amount, the remaining project funding may be reduced up to a level equal to 65 percent of the original project funding amount.

- Twenty-four months after the project reservation is approved, if the sum of the incentive amounts for sites with submitted incentive payment claim forms (NSHP-2) and PV Field Verification and Diagnostic Testing Forms (NSHP PV-3) totals less than 55 percent of the original project funding amount, the remaining project funding may be reduced up to a level equal to 45 percent of the original project funding amount.

- Thirty months after the project reservation is approved, if the sum of the incentive amounts for sites with submitted incentive payment claim forms (NSHP-2) and PV Field Verification and Diagnostic Testing Forms (NSHP PV-3) totals less than 75 percent of the

original project funding amount, the remaining project funding may be reduced up to a level equal to 25 percent of the original project funding amount.

E. Additional Information for All Reservation Applications

Funding is available on a first-come, first-served basis until available program funds are exhausted, and funding is subject to any waiting list criteria established by the Energy Commission for applicants who submit complete and accurate applications. Complete applications will be reviewed in the order in which they are submitted to the Energy Commission. To ensure timely receipt of an application, it is recommended that applications be submitted electronically via the NSHP Application Web Tool, [www.newsolarhomes.org]. Applications submitted via the NSHP Application Web Tool will be given priority over mailed-in applications received on the same date. Only one reservation and one incentive payment will be allowed for each residential dwelling unit during the reservation period.[31] Applicants will not be allowed to submit multiple reservation applications for the same residential dwelling unit.

Only applicants who submit complete and accurate reservation applications and provide all supporting documentation will receive reservation approval. For complete reservation applications found to have only minor errors or discrepancies during the reservation review, the Energy Commission will request clarification of information. If the additional information is not supplied within 10 business days, the applicant may be required 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 will require reapplication. If an applicant reapplies, 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 reapplication.

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 ensure all names, 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.

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31 An applicant may cancel his or her reservation and reapply for a new reservation within the original reservation period only if the incentive has dropped at least one level from the incentive level in the original reservation. A letter explaining the request must be submitted with a new reservation Application Form signed by the 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.

A complete application will be approved for a reservation based on the date it was submitted. The submittal date for applications received by mail is the date the application is received by the Energy Commission. The program criteria applicable on the date the application was submitted will apply. However, because a drop in the incentive level may occur without advance notice, projects may be reserved at a lower incentive level than the incentive level initially in effect on the date the reservation application is submitted. **Applicants are strongly encouraged to keep copies of all applications and supporting documentation submitted to the Energy Commission.**

Because program funding will decrease over the term of the program and ultimately be exhausted, the Energy Commission recommends that applicants not start construction on residential buildings and system installations until they receive a reservation confirming the availability and amount of funding approved for their application. The Energy Commission intends to provide regular updates on program funding through the Go Solar California website at [www.gosolarcalifornia.org/about/nshp.php]. Applicants are encouraged to check the Go Solar California website to determine available funding before applying for reservations.

Once program funding is exhausted, the Energy Commission may suspend the NSHP and/or establish a waiting list for complete applications that are not funded. Applications on a waiting list may be funded if additional program funding becomes available. The Energy Commission may establish additional conditions for applications on the waiting list, including, but not limited to, conditions that limit the total dollar amount of applications on the waiting list and the duration of time applications may remain on the waiting list.[32]

F. Where to Send Reservations

Applicants are strongly encouraged to send applications electronically through the NSHP Application Web Tool [www.newsolarhomes.org]. Please visit the Go Solar California website for tutorials on how to use and navigate the NSHP Application Web Tool before submitting applications electronically.

Alternatively, the complete reservation application may be delivered to the Energy Commission. For mailing address, fax and contact information, please visit [www.gosolarcalifornia.ca.gov/contacts/consumers.php].

32 On November 16, 2011, the Energy Commission established waiting list criteria for the NSHP. These criteria are described in a November 4, 2011, notice, which is available at [www.energy.ca.gov/renewables/06-NSHP-1/notices/2011-11-04_NSHP_Waiting_List_Notice.pdf].

CHAPTER V:
Payment Process

This chapter identifies the information and steps necessary to receive the incentive payment. To be eligible, all applications must first have followed the instructions outlined in Chapter IV in securing a reservation. In addition, the 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. The applicant must complete the Payment Claim Form (NSHP-2), which the applicant should have received when the reservation was approved, and submit it to the Energy Commission on or before the reservation expiration date. If the complete NSHP-2 is submitted to the Energy Commission on or before the reservation expiration, the applicant is provided an additional 3 months or 90 calendar days, whichever is later, after the reservation expiration date to complete and submit the remaining required supporting documentation that make up the payment claim package to the Energy Commission.

If the reservation expires before the completed NSHP-2 has been submitted to the Energy Commission, or the required supporting documentation is not completed and submitted to the Energy Commission within the 3-month or 90-calendar-day period provided as described above, the applicant will be required to reapply under the program eligibility requirements and incentive levels in effect at the time of the reapplication. **No time extensions or exceptions will be granted under any circumstances, except as provided in Chapter VI, Section O. Applicants are strongly encouraged to complete their project three to six months prior to the reservation expiration date to provide time for unexpected delays.**

A. Forms and Documentation

1. Payment Claim Form (NSHP-2)

Upon reservation approval, the applicant will receive a Payment Claim Form (NSHP-2) for each residential dwelling unit. When the system has been installed, the applicant may submit the completed NSHP-2 to request payment. The completed NSHP-2 must identify any changes (for example, changed equipment, installer, or equipment seller) that have been made to the information submitted since the reservation was approved. Additional pages may be attached if needed. Please see Appendix A 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 identified by unit, the HERS rating cost shall also be reported.

Assignment and reassignment of incentive payment. The designated payee may use the NSHP-2 to assign his or her right to receive the incentive payment to another party. If a designated payee assigns his or her rights to receive the incentive payment to one party and then cancels that assignment, the designated payee may subsequently reassign his or her right to receive payment to another party. Designated payees 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) must be submitted to the Energy Commission by mail. The Energy Commission encourages applicants to sign with blue or other ink that is clearly distinguishable as original. Stamped signatures will not be accepted.

2. Final Building Permit

Applicants who submitted a PERF-1 for the energy efficiency documentation during the reservation process or who are requesting the Code-Compliant incentive must submit a copy of the final building permit signoff or occupancy permit. The address on the final building permit or occupancy permit must match the address on the Payment Claim Form (NSHP-2). Please see Chapter II, Section B, for information on the Code-Compliant incentive.

3. Documentation Confirming the Total System Cost

Prior to issuing payment, the Energy Commission will verify that the amount of the NSHP incentive does not exceed the funding cap based on total system cost as described in Chapter III, Section D. Upon request of the Energy Commission, the applicant must provide final total system cost documentation clearly identifying the final amount paid or legally incurred by the applicant, lessor, or owner of the solar energy system (in the case of a PPA), as applicable, for the purchase and installation of the solar energy system.

4. Expected Performance-Based Incentive (EPBI) Documentation

A HERS Rater must complete a PV Field Verification and Diagnostic Testing Form[33] (NSHP PV-3) for each solar energy system consistent with the procedures found in Appendix B.[34] HERS Raters must be certified and work under the oversight of an Energy Commission-approved NSHP HERS Provider. Web links to these HERS Providers can be found on the Energy Commission website: [www.energy.ca.gov/HERS]. The NSHP PV-3 must be generated through the HERS Provider data registry. The applicant must provide the solar energy system information specified in Appendix B, Section C.2, to the HERS Rater for each solar energy system being tested. In cases where the NSHP PV-3 shows that the installed solar energy system

33 The NSHP PV-3 was formerly called the "CF-4R-PV Certificate of Field Verification and Diagnostic Testing."

34 The field verification procedures found in Appendix B are applicable only for solar energy systems using flat-plate photovoltaic modules.

is not consistent with the NSHP PV-1 that has been previously submitted to the Energy Commission, a revised NSHP-PV-1 that reflects the actual installation shall be prepared and submitted. When such an inconsistency is found when the sampling approach is used, a revised NSHP PV-1 shall be prepared for all systems in the group that was sampled, consistent with the resampling and corrective action procedures described in Appendix B, Section A. Applicants may be required to submit PV Installation Forms (NSHP PV-2) to the Energy Commission upon request.

5. Energy Efficiency Documentation

For Tier I and Tier II projects, the Energy Commission will confirm, in the HERS Provider data registry, that the following documents have been completed:

- Certificate of Field Verification and Diagnostic Testing (CF-3R) as applicable
- Additional Energy Features Checklist (NSHP EE-3)

A complete description of the energy efficiency documentation requirements can be found in Chapter II, Section B. For projects using a PERF-1 as energy efficiency documentation, the final building permit signoff or occupancy permit shall be submitted to the Energy Commission. For projects using a PERF-1 as energy efficiency documentation, the NSHP EE-3 form is not required.

Applicants are strongly encouraged to participate in their utility's new construction energy efficiency program to obtain the financial incentives that may be available for meeting either Tier I or Tier II energy efficiency requirements and to streamline the NSHP energy efficiency verification process. Please see Chapter II, Section C, for additional information.

Code-Compliant projects must submit the final building permit signoff or occupancy permit in lieu of the CF-3R(s) or NSHP EE-3. Please see Chapter V, Section A.2, for additional information.

6. Ten-Year Warranty (NSHP-3)

A Ten-Year Warranty Form (NSHP-3) must be completed and signed by the appropriate party(ies).

For owner-builder installed systems, please submit copies of the manufacturers' 10-year warranties for the inverter(s) and solar electric generating equipment. Please see Chapter II, Section M, for additional information on warranties.

7. System Interconnection With Utility Grid

The solar energy system must be interconnected prior to, or within, the 3-month or 90-calendar-day period after the reservation expiration date. The Energy Commission will verify that the system has been approved for interconnection by the utility within 3 months or 90 calendar days, whichever is later, of the reservation expiration date. This verification will occur prior to approval of a payment claim. Each utility may have different requirements for a complete interconnection package. Applicants are strongly encouraged to contact their utility interconnection department for the specific requirements. The applicant must provide proof from the electric utility that the solar energy system is interconnected to the utility distribution grid and that the utility has approved the interconnection of the system.

If the system is virtual net-metered, the Energy Commission will verify that the system generation allocation percentages provided in the NSHP Reservation Application Form (NSHP-1) match the system generation allocation percentages provided to the utility interconnection department. If the system generation allocation percentages do not match, the system generation allocation percentages provided to the utility interconnection department will be used to recalculate the correct incentive payment amount.

8. Payee Data Record (STD-204)

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 previous program administrator or 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 have changed, the designated payee must submit a new STD-204. The STD-204 is available at [www.gosolarcalifornia.ca.gov/documents/STD-204.pdf].

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.

9. Lease Agreement or Power Purchase Agreement

For systems using third-party ownership structures, the lease agreement or power purchase agreement shall be submitted to the Energy Commission. See Chapter II, Section O, for requirements.

B. Partial Payment Option

Applicants with a Tier I or Tier II NSHP reservation who are approved for a utility new construction energy efficiency program may claim a partial incentive payment before meeting all of their NSHP energy efficiency requirements. This includes projects with approved reservations that are subject to previous editions of the *NSHP Guidebook.*

To receive a partial payment for a site, the NSHP PV-3 form must be completed by a HERS Rater and the results uploaded to the HERS Provider registry. Once the NSHP PV-3 is uploaded to the registry, the applicant must submit a complete payment claim package, with the exception of the CF-3R(s) and NSHP EE-3 form, to the Energy Commission. The Energy Commission will verify that the payment claim package is complete, minus the CF-3R(s) and NSHP EE-3 form, prior to issuing the partial incentive payment. A payment claim package consists of the forms and documentation identified in Chapter V, Section A. The partial incentive payment will be determined using the following formula:

Partial Incentive = 0.75 x NSHP Incentive

The NSHP incentive amount used in the formula above is the final NSHP incentive amount for the site as calculated by the CECPV Calculator.

Applicants may claim the balance of their incentive for a site once they have notified the Energy Commission in writing that all required energy efficiency documents (CF-3R[s] and NSHP EE-3) have been completed by a HERS Rater and the results have been entered into a HERS Provider registry.

The deadline for an applicant to complete the NSHP energy efficiency requirements and submit the CF-3R(s) and NSHP EE-3 form for the balance of the incentive is 3 months or 90 calendar days, whichever is later, after the reservation expiration date. If an applicant fails to submit the complete, required documentation prior to the 3-month or 90-calendar-day deadline, the balance of the incentive will be lost and returned to the program fund at the incentive level in effect at that time.

Projects are expected to complete the energy efficiency requirements committed to by the applicant. The Energy Commission will monitor the completion rates of projects participating in the partial payment option. If there are repetitive, systematic, or high rates of noncompletion for projects using the partial payment option, the Energy Commission will take corrective action. This corrective action may include, but is not limited to, disallowing current and future participation in the partial payment option.

Questions concerning HERS documentation delays should be directed to the HERS Provider. For additional assistance, the applicant can contact the Energy Standards Hotline at title24@energy.ca.gov or 1-800-772-3300.

C. Additional Information on Payment Claims

Applicants must submit the complete NSHP-2 to the Energy Commission on or before the reservation expiration date specified on the NSHP-2. If the applicant submits a complete NSHP-2 to the Energy Commission on or before the reservation expiration date, the applicant is provided an additional 3 months or 90 calendar days, whichever is later, after the reservation expiration date to complete and submit the remaining required supporting documentation that make up the payment claim package to the Energy Commission.

Applicants must ensure that all program requirements as stated in Chapter II have been met prior to the submission of a complete payment claim package. A payment claim package consists of the forms and documentation identified in Chapter V, Section A.

A payment claim package is for one residential dwelling unit. Multiple payment claim packages for multiple residential dwelling units may be submitted at the same time. 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 included in the payment claim package submitted to the Energy Commission.**

If, during the Energy Commission review, the complete payment claim package is found to contain minor errors or discrepancies, the Energy Commission will request clarification from the applicant. The applicant will be responsible for obtaining revised information from the equipment seller, installer, or HERS Rater to process the request. The Energy Commission will allow the applicant up to 10 business days to respond with corrections to all the unclear information to approve payment.

If the complete NSHP-2 is submitted to the Energy Commission after the expiration date of the reservation, or the payment claim package is otherwise ineligible, the Energy Commission will not process the payment claim package, and the reserved incentive will be returned to the NSHP. The applicant may reapply for an incentive reservation but will be subject to the program eligibility requirements, incentive levels, and funding available at the time of the reapplication. **Applicants are strongly encouraged to complete their project three to six months prior to the reservation expiration date to provide time for unexpected delays.**

The complete payment claim package must be delivered to the Energy Commission. For mailing address, fax, and contact information, please visit [www.gosolarcalifornia.ca.gov/contacts/consumers.php]. 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 intends to make payments within six to eight weeks of receipt of a complete payment claim package. Payment will be made to the payee and mailed to the address on the NSHP-2 and Payee Data Record (STD-204).

D. Claiming an Incentive Payment Without a Prior Reservation

If a solar energy system has been installed without a prior incentive reservation, and the applicant subsequently wishes to receive an incentive from the NSHP program, the reservation process in Chapter IV must still be followed. However, applicants 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.

CHAPTER VI: Administration

A. Authority

This *NSHP Guidebook* is adopted pursuant to Public Resources Code Section 25747, Subdivision (a), and Section 25784, which direct the Energy Commission to adopt guidelines governing the New Solar Homes Partnership program authorized by Public Resources Code Sections 25740 through 25751. This guidebook adopted pursuant to this authority is exempt from the rulemaking requirements of the Administrative Procedures Act, as specified in Chapter 3.5 (commencing with Section 11340) of Division 3 of Title 2 of the Government Code. This guidebook may be revised pursuant to Public Resources Code Section 25747, Subdivision (a), and Section 25784.

B. Interpretation

Nothing in this guidebook shall be construed to abridge the powers or authority of the Energy Commission or any Energy Commission-designated committee as specified in Division 15 of the Public Resources Code, commencing with Section 25000, or Division 2 of Title 20 of the California Code of Regulations, commencing with Section 1001.

C. Effective Date

New editions of the guidebook shall take effect once adopted by the Energy Commission at a publicly noticed business meeting pursuant to Public Resources Code Section 25747, Subdivision (a), and Section 25784, unless otherwise stated in the guidebook. The guidebook may be given retroactive effect as specified by the Energy Commission and according to its statutory authority.

D. Substantive Changes

The Energy Commission may make substantive changes to this guidebook pursuant to Public Resources Code Section 25747, Subdivision (a), and Section 25784. Substantive changes shall take effect once adopted by the Energy Commission at a publicly noticed business meeting, unless a future effective date is provided, with no fewer than 10 days public notice. Substantive changes include, but are not limited to:

- Changes in the eligibility or evaluation criteria.
- Changes to funding or incentives levels.

E. Cancellation of NSHP Reservations

The Energy Commission, through its Executive Director, may cancel the reservation for any project that changes the basis for program eligibility under this guidebook and no longer satisfies the requisite eligibility criteria. The Executive Director shall notify the applicant in writing of the basis for cancelling the applicant's reservation, the effective date of the cancellation, and the terms and conditions for the repayment of any portion of the NSHP incentive the applicant was not otherwise entitled to receive. The written notice required herein shall be given at least 15 days before the effective date of the cancellation to provide the applicant an opportunity to file a petition for reconsideration under Chapter VI, Section K.

F. Funding Award Payments

Funding award payment shall be made to applicants as specified in this guidebook. However, funding award payments shall not be made under any of the following conditions:

- The Executive Director determines, under Chapter VI, Section E, that the applicant is no longer eligible to receive a funding award.
- The applicant fails to properly request payment from the Energy Commission, as specified in this guidebook.
- An audit conducted pursuant to Chapter VI, Section G, reveals an applicant's request for payment, submitted under the requirements of this guidebook, is overstated, inaccurate, or unsupported.
- The applicant fails to repay the Energy Commission for any overpayment the applicant received as specified in the written notice issued under Chapter VI, Section G.
- Based on an investigation conducted under Chapter VI, Section M.2, the Executive Director determines that the applicant has misstated, falsified, or misrepresented information in applying for a funding award, in invoicing for a funding award payment, or in reporting any information required by this guidebook.

G. Audits

The Energy Commission or its authorized agents may audit any applicant to verify the accuracy of any information included as part of a reservation application, payment claim, or report required under this guidebook. As part of an audit, an applicant may be required to provide the Energy Commission or its authorized agents with all information and records necessary to verify the accuracy of any information included in the applicant's reservation application, payment claims, or reports. An applicant may also be required to open its business records for on-site inspection and audit by the Energy Commission or its authorized agents to verify the accuracy of any information included in the applicant's reservation application, payment claims, and reports.

If an audit finds that an applicant has incorrectly stated or falsified information included on the applicant's reservation application, payment claims, or reports, the Energy Commission shall

notify the applicant of its findings in writing within 30 days of completing the audit. Based on the audit results, an applicant may be required to refund all or a portion of the NSHP incentive payments it has received. In addition, the applicant's reservation may be cancelled pursuant to Chapter VI, Section E, and enforcement actions initiated pursuant to Chapter VI, Section M.

H. Record Retention

Applicants shall keep all records relating to and verifying the accuracy of any information included as part of a reservation application, payment claim, or report submitted pursuant to this guidebook. These records shall be kept for no fewer than three years after the end of the calendar year in which the reservation application is approved or the final payment claim is made, whichever is longer. These records shall be made available to the Energy Commission or its authorized agents as part of any audit conducted pursuant to this guidebook.

I. Use and Disclosure of Information and Records

The Energy Commission or its authorized agents may use any information or records submitted to the Energy Commission or obtained as part of any audit pursuant to this guidebook to determine eligibility and compliance with this guidebook, evaluate the NSHP program or related Energy Commission program, and prepare necessary reports as required by law. The information and records include, but are not limited to, reservation applications, payment claims, and any documentation submitted in support of said reservation applications or payment claims.

Information and records submitted pursuant to this guidebook will be disclosed to other governmental entities and policing authorities for civil and criminal investigation and enforcement purposes. This information and records may also be disclosed to the public pursuant to the California Public Records Act (Government Code Section 6250, et seq.). Personal information, such as taxpayer identification or social security numbers, will not be disclosed to the public.

Information concerning the identity of applicants and the amount or payment of reservations is public information and will be disclosed pursuant to the California Public Records Act. This information, along with other public information describing program participants, may be disclosed to members of the public to educate them and encourage further program participation. The information may be disclosed through the Energy Commission's website or other means, as the Energy Commission deems appropriate.

If, as part of any reservation application, payment claim, required report, or audit, the Energy Commission requires the applicant to provide copies of records that the applicant believes contain proprietary information entitled to protection under the California Public Records Act or other law, the applicant may request that such records be designated confidential pursuant to

the Energy Commission's regulations for confidential designation, Title 20, California Code of Regulations, Section 2505.

J. Tax Consequences

Applicants are responsible for any federal and state tax associated with the receipt of incentive payments. The Energy Commission will report incentive payments to the Internal Revenue Service and issue the applicant an informational form (for example, 1099-Misc) when required to do so by law. To process payment claims for tax purposes, applicants must complete a Payee Data Record form to provide the Energy Commission taxpayer information. The taxpayer identified in this form must be the payee as identified in the reservation application. Applicants who assign their NSHP incentive(s) to third parties will be reported as the recipient of said payment and issued the informational form when required by law. Applicants should carefully consider the tax consequences of receiving an NSHP incentive when applying to the NSHP.

K. Reconsideration of Funding Awards, Reservation Cancellations

Pursuant to Public Resources Code Section 25747, Subdivision (c), applicants of funding may appeal the Energy Commission's denial, reduction, cancellation, or revocation of a reservation or payment claim under this guidebook. Appeals will be considered as provided in this section only upon a showing that factors other than those described in this guidebook were applied by the Energy Commission in denying, reducing, canceling, or revoking a reservation or payment claim.

1. Executive Director Reconsideration of a Reservation Application

An applicant may petition the Executive Director for reconsideration if the reservation application was denied or the reservation amount was reduced or cancelled. The petition for reconsideration shall be in writing and shall be submitted, together with any supporting documentation, to the Office of the Executive Director at the following address within 30 days of the date of the notice of the reservation cancellation, reduction, or revocation.

California Energy Commission
Office of the Executive Director
1516 9th Street, MS-39
Sacramento, CA 95814-5512

The petition shall specify the basis for the appeal; state why the petitioner believes the reservation application or payment claim denial, cancellation, reduction, or revocation is improper given the eligibility criteria for the reservation or payment claim; explain any

supporting documentation filed with the petition; identify any legal authority or other basis supporting the petitioner's position; and identify the remedy sought.

Within 60 days of receiving a complete petition, the Office of the Executive Director shall issue a decision based on the petition and the written response of Energy Commission staff.

If petitioner disagrees with the decision of the Office of the Executive Director, the petitioner may appeal the decision to the Energy Commission in accordance with Chapter VI, Section K.2.

2. Energy Commission Appeals

Within 30 days of the date of the decision of the Office of the Executive Director, the appealing party may file a letter of appeal to the Energy Commission. The letter of appeal shall be submitted to the Energy Commission and processed as a request for investigation pursuant to the Energy Commission's regulations for complaints and investigations, Title 20, California Code of Regulations, Section 1230, et seq. The letter of appeal shall include the information specified in Title 20, California Code of Regulations, Section 1231 (b). In place of the information specified in Sections 1231 (b)(2), (b)(4), and (b)(6), the letter of appeal shall identify the eligibility criteria in this guidebook that the appealing party believes were applied incorrectly in denying, reducing, canceling, or revoking the funding. Energy Commission staff shall be designated the respondent in the letter of appeal.

In addition to the information required by Title 20, California Code of Regulations, Section 1231, the letter of appeal shall include a copy of the petition for reconsideration and all supporting documentation, and a copy of the written decision of the Office of the Executive Director.

An applicant seeking to file a petition for reconsideration or appeal pursuant to this section may contact the Public Adviser's Office for information on the filing process. The contact information for the Public Adviser's Office is:

California Energy Commission
Public Adviser's Office
1516 9th Street, MS-12
Sacramento, CA 95814-5512
E-mail: PublicAdviser@energy.ca.gov

L. Disputes of Incentive Payments

Pursuant to Public Resources Code Section 25747, Subdivision (c), an applicant may appeal the Energy Commission's payment of an incentive under this guidebook. Appeals will be considered only as provided in this section and upon a showing that factors other than those described in this guidebook were applied by the Energy Commission in making, reducing, or denying an incentive payment.

1. Accounting Office Review

Applicants may dispute the amount of an incentive payment by filing a written claim with the Energy Commission's Accounting Office. Applicants shall file the claim within 30 days of the date of the payment, the amount of which is disputed, or a notice from the Energy Commission's Accounting Office indicating no payment will be made. The claim must be filed, together with any evidence supporting the applicant's position, with the Energy Commission's Accounting Office at the following address:

California Energy Commission
Accounting Office
1516 9th Street, MS-2
Sacramento, CA 95814-5512

The claim shall identify the payment in dispute, the date on which payment was received or expected, an explanation of the evidence supporting the applicant's position, any legal authority or other basis supporting the applicant's position, and the amount of repayment sought. The Accounting Office will review the claim within 30 days of its receipt, determine its validity, and provide the applicant with a written decision supported by its reasons. The written decision shall specify that portion of the claim, if any, determined to be valid and the amount and date when payment will be made. If the applicant disagrees with the decision of the Accounting Office, the applicant may seek reconsideration with the Office of the Executive Director in accordance with Chapter VI, Section L.2.

2. Executive Director Review

Within 30 days of the date of the written decision of the Accounting Office, the applicant may file a letter of reconsideration stating why he or she believes the written decision to be unacceptable. The letter shall be filed with the Office of the Executive Director, along with a copy of the original dispute claim, supporting documents, and the written decision of the Accounting Office, at the following address:

California Energy Commission
Office of the Executive Director
1516 9th Street, MS-39
Sacramento, CA 95814-5512

The Office of the Executive Director will review the letter of reconsideration within 30 days of its receipt, assess the Accounting Office's written decision, and provide the applicant with a written decision. The written decision shall specify whether the Accounting Office's determination shall be upheld, whether any portion of the applicant's original dispute claim is deemed valid, and the amount and date that any repayment will be made. If the applicant

disagrees with the decision of the Office of the Executive Director, the applicant may appeal to the Energy Commission in accordance with Chapter VI, Section L.3.

3. Energy Commission Appeals

Within 30 days of the date of the decision of the Office of the Executive Director, the applicant may file a letter of appeal with the Energy Commission. The letter of appeal shall be submitted to the Energy Commission and processed as a request for investigation pursuant to the Energy Commission's regulations for complaints and investigations, Title 20, California Code of Regulations, Section 1230, et seq. The letter of appeal shall include the information specified in Title 20, California Code of Regulations, Section 1231 (b). In place of the information specified in Sections 1231 (b)(2), (b)(4), and (b)(6), the letter of appeal shall identify the criteria in this guidebook that the applicant believes were applied incorrectly in making, reducing, or denying the incentive payment. Energy Commission staff shall be designated the respondent in the letter of appeal.

In addition to the information required by Title 20, California Code of Regulations, Section 1231, the letter of appeal shall include a copy of the original disputed claim and supporting documents, and copies of the Accounting Office and Office of the Executive Director written decisions.

An applicant seeking to file a letter of reconsideration or appeal pursuant to this section may contact the Public Adviser's Office for information on the filing process. The contact information for the Public Adviser's Office is:

California Energy Commission
Public Adviser's Office
1516 9th Street, MS-12
Sacramento, CA 95814-5512
E-mail: PublicAdviser@energy.ca.gov

M. Enforcement Action

1. Recovery of Overpayment

The Energy Commission may direct the Energy Commission's Office of Chief Counsel to commence formal legal action against any applicant or former applicant to recover any portion of an incentive payment that the Executive Director determines the applicant or former applicant was not otherwise entitled to receive.

2. Fraud and Misrepresentation

The Executive Director may initiate an investigation of any applicant that the Executive Director has reason to believe may have misstated, falsified, or misrepresented information in submitting a reservation application, payment claim, or reporting any information required by this guidebook. Based on the results of the investigation, the Executive Director may take any action deemed appropriate, including, but not limited to, cancellation of the reservation, recovery of any overpayment, and, with the concurrence of the Energy Commission, recommending the Attorney General initiate an investigation and prosecution pursuant to Government Code Section 12650, et seq., or other provisions of law.

N. Arbitration

If an applicant's dispute of the incentive payment is not resolved to the satisfaction of the applicant through the appeal process specified in Section L, the applicant and the Energy Commission may mutually agree to have the dispute resolved through binding arbitration. The arbitration proceeding shall take place in Sacramento County, California, and shall be governed by the commercial arbitration rules of the American Arbitration Association (AAA) in effect on the date the arbitration is initiated. One arbitrator who is an expert in the particular field of the dispute shall resolve the dispute. The arbitrator shall be selected in accordance with the aforementioned commercial arbitration rules. The decision rendered by the arbitrator shall be final, and judgment may be entered upon it in accordance with the applicable law in any court having jurisdiction thereof. The demand for arbitration shall be made no later than 6 months after the date the Energy Commission renders a decision through the appeal process specified in Section L, irrespective of when the dispute arose and irrespective of the applicable statute of limitations for a suit based on the dispute. If the applicant and the Energy Commission do not mutually agree to arbitration, the sole forum to resolve the dispute is state court.

The cost of arbitration shall be borne by the applicant and Energy Commission as follows:

- The AAA's administrative fees shall be borne equally by the parties.
- The expense of a stenographer shall be borne by the party requesting a stenographic record.
- Witness expenses for either side shall be paid by the party producing the witness.
- Each party shall bear the cost of its own travel expenses.
- All other expenses shall be borne equally by the parties, unless the arbitrator apportions or assesses the expenses otherwise as part of his or her award.

O. Limited Extensions of Time

The Executive Director may waive and extend the reservation period, including the additional 3-month or 90-calendar-day period after reservation expiration, or the building permit application period under limited circumstances based on the following criteria and process.

1) The NSHP applicant shall submit a written request for an extension of time to the Office of the Executive Director at the following address:

   California Energy Commission
   Office of the Executive Director
   1516 9th Street, MS-39
   Sacramento, CA 95814-5512

2) The request shall include the following information:
   a) The name and address of the applicant.
   b) The project name and NSHP project reservation number.
   c) The amount of additional time being requested for the applicant to complete the project and submit a completed NSHP-2 or submit the documentation required during the 3-month or 90-calendar-day period after reservation expiration, or the amount of additional time needed to submit the building permit for the solar energy system or to receive an issued permit.
   d) An explanation of the circumstances why the applicant is or was unable to complete the project on time and submit a completed NSHP-2 prior to the expiration date of the reservation or submit the documentation required during the 3-month or 90-calendar-day period after reservation expiration, or is or was unable to submit the building permit for the solar energy system or receive an issued permit within the required period, and whether these circumstances were beyond the applicant's control.
   e) An explanation of any other good cause that exists for granting the request for an extension of time.
   f) Documentation, if available, to support the information provided in items (a) through (e).

3) The Executive Director may grant an extension of time if he or she determines there were circumstances beyond the applicant's control that caused a delay in the completion of the project and precluded the applicant from submitting a completed NSHP-2 prior to the expiration date of the reservation or submitting the documentation required during the 3-month or 90-calendar-day period after reservation expiration, or precluded the applicant from applying for a building permit for the solar energy system or receiving an issued permit within the required time period. For this determination, the circumstances shall be limited to natural events or disasters, such as wildfires, or unanticipated construction-related delays that could not be avoided by the applicant. Poor planning, carelessness, or negligence of the applicant or his/her agents, or

ignorance of the applicable NSHP Guidebook requirements or deadlines do not constitute circumstances beyond the applicant's control.

4) The extension of time granted by the Executive Director shall be limited to that time reasonably necessary for the applicant to complete the project and submit a completed NSHP-2 or submit the documentation required during the 3-month or 90-calendar-day period after reservation expiration, or that period reasonably necessary for the applicant to submit the building permit for the solar energy system to the code enforcement agency or receive an issued permit, but under no event shall the extension of time exceed 6 months.

5) Requests for time extensions may be submitted only for projects with an approved reservation and must be submitted before or within the 3-month or 90-calendar-day period, whichever is later, after reservation expiration.

List of Acronyms and Abbreviations

2005 Standards	-	*2005 California Building Energy Efficiency Standards*, Title 24, Part 6
2008 Standards	-	*2008 California Building Energy Efficiency Standards*, Title 24, Part 6
2013 Standards	-	*2013 California Building Energy Efficiency Standards*, Title 24, Part 6
AC	-	Alternating current
AHRI	-	Air-Conditioning, Heating and Refrigeration Institute
AAA	-	American Arbitration Association
BIPV	-	Building-integrated photovoltaic
BVES	-	Bear Valley Electric Service
CABEC	-	California Association of Building Energy Consultants
CAHP	-	California Advanced Homes Program
CEA	-	Certified Energy Analyst
CECPV Calculator	-	California Energy Commission's PV Calculator
CEPE	-	Certified Energy Plans Examiner
CF-1R	-	Certificate of Compliance
CF-2R/CF-6R	-	Certificate of Installation
CF-3R/CF-4R	-	Certificate of Verification
CPUC	-	California Public Utilities Commission
CSI	-	California Solar Initiative
CSLB	-	Contractors State License Board
DOE	-	Department of Energy
EER	-	Energy efficiency ratio
EPBI	-	Expected Performance Based Incentive
guidebook	-	*New Solar Homes Partnership Guidebook*
HERS	-	Home Energy Rating System
HCD	-	Housing and Community Development
HUD	-	Housing and Urban Development
IOU	-	Investor-owned Utility
kW	-	Kilowatt
kWh	-	Kilowatt-hour
MW	-	Megawatt
NABCEP	-	North American Board of Certified Energy Practitioners
NSHP	-	New Solar Homes Partnership
NSHP EE-3	-	Additional Energy Efficiency Features Checklist
PERF-1	-	Performance Certificate of Compliance

PG&E	-	Pacific Gas and Electric
PPA	-	Power Purchase Agreement
PV	-	Photovoltaic
REC	-	Renewable Energy Certificate
SB	-	Senate Bill
SCE	-	Southern California Edison Company
SDG&E	-	San Diego Gas & Electric Company
SEER	-	Seasonal energy efficiency ratio
SHGC	-	Solar heat gain coefficient
Building Energy Efficiency Standards	-	*California Building Energy Efficiency Standards*, Title 24, Part 6
TCAC	-	Tax Credit Allocation Committee
TDV	-	Time-dependent valuation
VNM	-	Virtual net metering

Glossary of Terms

Capacity — the maximum amount of electricity that a generating unit, power facility, or utility can produce under specified conditions. Capacity is measured in kilowatts or megawatts.

Distributed generation facility — a small-scale electricity generation facility that is interconnected to a distribution network and is generally 20 MW or smaller. Distributed generation facilities may serve on-site load or off-site load or both.

Electrical corporations — Pacific Gas and Electric Company, San Diego Gas & Electric Company, Southern California Edison Company, PacifiCorp, Liberty Energy-California Pacific Electric Company (formerly Sierra Pacific Power Company), Bear Valley Electric Service (a division of Golden State Water Company), or other electrical corporations as defined by Public Utilities Code Section 218. Also referred to as "investor-owned utilities."

End-use customer (end user) — a residential or commercial electric customer who buys electricity to be consumed as a final product (not for resale).

Grid — the electrical transmission and distribution system linking power plants to customers through high power transmission line service.

Investor-owned utility (IOU) — synonymous with "electrical corporations" as defined herein.

Refers collectively to Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, and Bear Valley Electric Service (a division of Golden State Water Company), the four electrical corporations whose ratepayers were subject to a surcharge for funding various public goods programs, including the Energy Commission's New Solar Homes Partnership program.

Kilowatt (kW) — 1,000 watts. A unit of measure for the amount of electricity needed to operate given equipment. A typical home using central air conditioning and other equipment might have a demand of 4-6 kW on a hot summer afternoon.

Kilowatt hour (kWh) — the most commonly used unit of measure telling the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour. A typical California household consumes about 500 kWh in an average month.

Megawatt (MW) — 1,000 kilowatts. One megawatt is about the amount of power to meet the peak demand of a large hotel.

Metered — the independent measurement with a standard meter of the electricity generated by a project or facility.

Net metering — contractual agreement or tariff wherein the system owner/generator produces more electricity than is needed to serve the on-site electrical load, and the surplus electricity is supplied to the electrical distribution grid. The owner/generator's utility meter records the difference, or net, between what the utility supplies to the owner/generator and what the owner/generator supplies to the grid.

On-site generation — See "Distributed Generation."

PG&E — Pacific Gas and Electric Company

Photovoltaic (PV) — a technology that uses a semiconductor to convert sunlight directly into electricity.

Placed in service — refers to a generating system that has been installed, is operational, and is capable of producing electricity.

Project — "project" refers to all otherwise eligible generating systems installed during the term of this program at one physical location, and may include multiple system sites within a project, serving the electrical needs of all real and personal property at this location, as evidenced by the electric utility meter(s) for this location.

PTC — PVUSA Test Conditions, which were developed to test and compare PV systems as part of the PVUSA (Photovoltaics for Utility Scale Applications) project. PTCs are 1,000 watts per square meter solar irradiance, 20 degrees C air temperature, and wind speed of 1 meter per second at 10 meters above ground level. PV manufacturers use Standard Test Conditions, or STC, to rate their PV products. STC are 1,000 watts per square meter solar irradiance, 25 degrees C cell temperature, air mass equal to 1.5, and ASTM G173-03 standard spectrum. The PTC rating, which is lower than the STC rating, is generally recognized as a more realistic measure of PV output because the test conditions better reflect "real-world" solar and climatic conditions, compared to the STC rating.

Public Goods Charge (PGC) — a surcharge applied to the electric bills of IOU ratepayers used to support energy efficiency, public interest research, development, and demonstration, and low-income and renewable energy programs and collected pursuant to Public Utilities Code Section 399 et seq. The Public Goods Charge expired on December 31, 2011, and was not reauthorized by the Legislature.

Public information — any information in the Energy Commission's possession that is not subject to a request or determination of confidential designation pursuant to Title 20 of the California Code of Regulations, Section 2505 et seq., and may be disclosed pursuant to the California Public Records Act (Government Code Section 6250, et seq.) and the Information Practices Act (Civil Code Section 1798, et seq.).

Renewable — a power source other than a conventional power source within the meaning of Section 2805 of the Public Utilities Code. Section 2805 states: " 'Conventional power source' means power derived from nuclear energy or the operation of a hydropower facility greater than 30 megawatts or the combustion of fossil fuels, unless cogeneration technology, as defined in Section 25134 of the Public Resources Code, is employed in the production of such power."

Renewable energy public goods charge — as defined in Public Resources Code Section 25741, Subdivision(c), to mean that portion of the nonbypassable system benefits charge required to be collected to fund renewable energy and to be transferred to the Renewable Resource Trust Fund pursuant to the Reliable Electric Service Investments Act (Article 15 [commencing with Section 399] of Chapter 2.3 of Part 1 of Division 1 of the Public Utilities Code).

Renewables Portfolio Standard (RPS) — "Renewables Portfolio Standard" is defined in Public Utilities Code Section 399.12, Subdivision (i), to mean the specified percentage of electricity generated by eligible renewable energy resources that a retail seller or local publicly owned electric utility is required to procure pursuant to Public Utilities Code Section 399.11 et seq. Under the RPS, a retail seller or local publicly owned electric utility must increase its total procurement of eligible renewable energy resources so that 33 percent of its retail sales are procured from eligible energy resources no later than December 31, 2020.

Residential building – includes a newly constructed house, condominium, apartment, or other residential unit that has not been used or occupied for any purpose. For NSHP purposes, this also includes common areas in single and multifamily developments shown to be for the primary benefit of the residential occupants.

SCE — Southern California Edison Company

SDG&E — San Diego Gas & Electric Company

Self-generation — See "Distributed generation facility."

Solar thermal electric — the conversion of sunlight to heat and its concentration and use to power a generator to produce electricity.

Watt — a unit of electrical power, equal to the power developed in a circuit by a current of one ampere flowing through a potential difference of one volt.

APPENDIX A:
Frequently Asked Questions

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

The California Energy Commission expects a solar energy system to be installed as described in the Expected Performance Based Incentive Documentation (NSHP PV-1) 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 rerunning the CECPV Calculator.

If the applicant uses the California Flexible Installation criteria, the payment claim package may be completed using the expected performance calculated for the reservation as long as the orientation, tilt, and minimal shading criteria are confirmed 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 are not met, the expected performance shall be recalculated based on the actual orientation, tilt, and shading.

The revised incentive amount for a solar energy system will be calculated when the complete payment claim package, including the Payment Claim Form (NSHP-2), and complete documentation supporting the changes to the project are submitted to the Energy Commission.

In the case of projects with a single solar energy system site, when a change in the expected performance of the system results in a decrease in the incentive, the monetary difference between the original estimated incentive amount and the actual incentive amount will be reallocated to the incentive level in effect at the time the complete payment claim package, including the NSHP-2 and documents supporting the changes to the system, is submitted to the Energy Commission. When a change increases the expected performance of the system, the incremental increase in expected performance will be funded at the incentive level in effect at the time the complete payment claim package, including the NSHP-2 and documents supporting the changes to the system, is submitted to the Energy Commission.

In the case of projects with multiple solar energy system sites, when a change in the expected performance of a system of a site results in a decrease in the incentive for that site, the monetary difference between the original estimated incentive amount for that site and the actual incentive amount for that site will remain as part of the project funding. When a change increases the expected performance of a system, the incremental increase in expected performance will be funded at the incentive level under which the project was reserved, provided project funding is available. The supporting documentation for these changes must be submitted to the Energy Commission with the NSHP-2.

Projects with multiple solar energy system sites that do not have enough original project funding available to fund the incentive payment for a site, including an increase in expected performance of a system, must first submit a complete payment claim package, including supporting documentation for any change, to the Energy Commission to request additional reservation funding above the original reservation funding amount. The total incentive amount for a site that has not received a payment or the additional funding for a site that previously received an initial partial payment will be funded at the incentive level in effect at the time the complete payment claim package is submitted to the Energy Commission.

B. Can Applicants Add Solar Energy System Sites to Their Existing Reservation?

An applicant may add additional solar energy system sites to a project with a valid, unexpired reservation. A project for which all solar energy system sites have received an approved payment claim is considered to have finished the NSHP program and will no longer have a valid reservation. The applicant must notify the Energy Commission of this request and provide the relevant supporting documentation described in Chapter IV for the additional solar energy system sites prior to the project finishing the NSHP program and/or the reservation expiration.

The additional solar energy system sites will be subject to the program eligibility requirements of the *NSHP Guidebook* edition under which the existing project received a reservation. However, these additional solar energy system sites will be funded at the incentive level in effect at the time the request and supporting documentation are submitted to the Energy Commission. The additional solar energy system sites will be subject to the reservation expiration date of the existing project.

C. Can 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 NSHP funding may apply to the California Solar Initiative Program administered by the California Public Utilities Commission. See **[www.gosolarcalifornia.ca.gov/csi/index.php]** for additional information and requirements.

D. Time Extensions

Projects with valid, unexpired reservations as of January 1, 2010, were automatically granted a one-time time extension as follows: Solar as Standard and affordable housing projects, both as defined by previous editions of the guidebook, had an additional 12 months from the expiration date of the reservations as stated on the NSHP-2 to submit a payment claim package. Base incentive projects (as defined by previous editions of the guidebook) had an additional six months from the expiration date of the 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, except as provided in Chapter VI, Section O.

E. Can the Equipment Seller/Installer Be Different From the Equipment Seller/Installer in the Reservation Application?

Applicants wishing to use a different equipment seller/installer from the equipment seller/installer selected in their reservation application must notify the Energy Commission and provide the following supporting documentation verifying this change. The supporting documentation consists of:

- An installation contract.
- An equipment purchase agreement (for self-installs).
- A revised NSHP PV-1.

If the original equipment seller/installer is the rebate payee, as indicated on the NSHP-1, he or she must provide written confirmation acknowledging that he or she is no longer the equipment seller/installer for the specific project and will no longer receive the NSHP incentive.

Before approving the change in equipment seller/installer, the Energy Commission will verify that the new equipment seller/installer meets the program eligibility requirements outlined in Chapter II, Section K, and the supporting documentation meets the document requirements outlined in Chapter IV, Section B.

F. Reservation Cancellations

Project reservations may be cancelled only by the applicant. Applicants wishing to cancel their project reservation must provide written notification to the Energy Commission. The written notification must include:

- Date of the notification.
- The name of the project.
- The site address(es).
- Statement that the applicant would like to cancel the project reservation.
- Acknowledgement that if the applicant cancels his or her reservation on or before the reservation expiration date, he or she may not reapply for a new reservation for the project until the incentive level has dropped at least one level from the incentive level in the original reservation.
- Printed name and signature of the applicant.

APPENDIX B:
Field Verification and Diagnostic Testing of Systems

A. Background

The NSHP provides incentives for installing high-performance solar energy systems on energy-efficient, newly constructed residential buildings. The incentive amount is determined by the expected performance of the solar energy system. The expected performance calculation accounts for the tested and certified performance of the specific photovoltaic (PV) modules and inverter, mounting type, cell temperature, module orientation and tilt, and the extent to which the system is shaded. The CECPV Calculator, developed by the Energy Commission, accounts for these parameters as well as the solar and climatic conditions for the location of the 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[35] must be conducted to ensure that the components of the PV system and the installation are consistent with the characteristics used to determine the estimated performance. Field verification is a value-added service paid for by the applicant that provides quality control and can protect the applicant, builder, installer, supplier, and homeowner. Field verification is completed consistent with the procedures found in the current *Building Energy Efficiency Standards* [www.energy.ca.gov/title24].

Field verification of solar energy systems may employ a sampling approach as allowed in the current *Building Energy Efficiency Standards*[36] with the following exceptions:

- Open group sampling as defined in the *Building Energy Efficiency Standards* is not allowed for PV systems.
- The results of the PV Installation Form (NSHP PV-2) form do not need to be uploaded to a HERS Provider Registry; however, these records must be retained by the applicant, installer, and HERS Rater for a minimum of three years after the NSHP reservation expiration date. The installer is required to provide copies of NSHP PV-2 forms for all homes in the sample group to the HERS Rater. Applicants, installers, or HERS Raters may be required to submit NSHP PV-2 forms to the Energy Commission upon request.
- When a failure is encountered during the sample testing, an installer has two options to correct the failure:

35 The field verification procedures found in Appendix B are applicable only for solar energy systems using flat-plate photovoltaic modules.
36 For the *2013 Building Efficiency Standards*, see Appendix RA2 of the *2013 Reference Appendices*. For the *2008 Building Efficiency Standards*, see Appendix RA2 of the *2008 Reference Appendices*.

- An installer may follow the resampling procedures described in the *Building Energy Efficiency Standards*; however, he or she will not be required to report the failure or the corrective measures taken to a HERS Provider.
- An installer may generate and submit a revised Compliance Form (NSHP PV-1) to the Energy Commission for all systems in the sample group.

After one of these two steps is taken and the HERS Rater passes the tested solar energy system, the NSHP PV-3 will be made available for all homes in the sample group.

When solar energy systems are grouped for sampling, all solar energy systems that meet the minimal shading criterion may be included in the grouping, regardless of the actual azimuth, tilt, array capacity, and so forth. Solar energy systems included in a sample group must be installed by the same installer. The solar energy systems must also be located on buildings constructed by the same builder and located in the same subdivision or multifamily development.

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.

- Measured AC power output from the PV system is equal to or exceeds that 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 are the responsibility of both the PV system installer and the HERS Rater who completes the third-party field verification. The PV installer must perform the field verification and diagnostic testing procedures described in this document for every system that he or she installs. 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.

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 have access to the roof to make measurements, but that the HERS Rater may 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 PV systems follow the process described below. For NSHP purposes, a PV system is one or more 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 enters the necessary input data into the CECPV Calculator, which produces an Certificate of Compliance Form (NSHP PV-1) that documents the specific modules and inverter(s) that are used in each PV system; 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 the predicted electrical generation for each system for a range of solar irradiance and ambient air temperature. The NSHP PV-1 is provided to the Energy Commission with the NSHP reservation application and to the HERS Provider.

2. Once each PV system is installed, the PV installer completes the field verification and diagnostic testing protocol for each PV system and documents the results on the PV Installation Form[37] (NSHP PV-2), verifying that the installation is consistent with the NSHP PV-1. The PV installer documents and certifies that the PV system meets the requirements of this appendix and provides copies of the NSHP PV-2 to the builder/homeowner, applicant, and HERS Rater. The NSHP PV-2 shall indicate the actual azimuth and tilt for all PV systems where the California Flexible Installation was used on the NSHP PV-1. The NSHP PV-2 shall be completed by the PV system installer in all cases.

   EXCEPTION: If 100 percent of the PV systems in an NSHP application are being tested by a HERS Rater (sampling is not being used), the HERS Rater can complete the testing required for the NSHP PV-2; however, the PV installer is still required to sign the NSHP PV-2.

   The applicant shall provide the NSHP PV-2 to the HERS Rater. In conjunction with the NSHP PV-2, 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 that will be built on the lot and neighboring lots of the building with the PV system
   b) Showing the bearing of the property lines and the azimuth and tilt or roof pitch of each PV system.

37 The PV Installation Form (NSHP PV-2) was formerly called the Installation Certificate (CF-6R-PV).

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 NSHP PV-2, along with an invoice or purchase document that lists the make and model of the PV modules installed.

The NSHP PV-2 forms do not need to be uploaded to the HERS Provider Registry; however, these records must be retained by the applicant, installer, and HERS Rater in accordance with the record retention requirements in Chapter VI, Section H. Applicants, installers, or HERS Raters may be required to submit NSHP PV-2 forms to the Energy Commission upon request.

3. The HERS Rater completes independent third-party field verification and diagnostic testing of each PV system and documents the results on the PV Field Verification and Diagnostic Testing Form (NSHP PV-3), independently verifying that the installation is consistent with the NSHP PV-1 and the NSHP PV-2. The HERS Rater provides a copy of the NSHP PV-3 to the applicant and uploads the results to a HERS Provider data registry. The NSHP PV-3 shall indicate the actual azimuth and tilt for all tested PV systems where the California Flexible Installation was used on the NSHP PV-1. In cases where the NSHP PV-2 or the NSHP PV-3 show that the installed PV system is not consistent with the previously submitted NSHP PV-1, a revised NSHP PV-1 that is consistent with the as-installed conditions must be prepared and submitted with the associated electronic files to the Energy Commission. If such an inconsistency is found when the sampling approach is used, either revised NSHP PV-1s may be prepared and submitted to the Energy Commission for all systems in the sampling group or the resampling procedure as described in the *Building Energy Efficiency Standards* may be used to correct the inconsistency.

4. As part of the payment process, the Energy Commission will confirm, in the HERS Provider data registry, that the PV Field Verification and Diagnostic Testing Form (NSHP PV-3) has been completed for each PV system in the NSHP application.

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. The PV system must meet all applicable electrical code, structural code, building code, fire code, and local electric utility interconnection requirements.

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 visual inspection, as described in this protocol, verifies the installation of the proper equipment and the installation conditions specified on the NSHP PV-1. The HERS Rater shall use binoculars or another means to view the installation without being required to have access to the roof. The HERS Rater may rely on photographic evidence provided by the installer on the make, model, and quantity of PV modules; standoff distance; and shading, but in the absence of such evidence, must rely on a conservative determination based solely on his or her own observation.

1. PV Modules

The PV installer and the HERS Rater shall verify that the make, model, and quantity of PV modules specified on the NSHP PV-1 are installed in the field. The PV installer and HERS Rater shall verify the module mounting type (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 shall verify the mounting height of the modules above the ground (either one-story, two-story, or applicant-specified height).

2. Inverters

The PV installer and the HERS Rater shall verify that the make, model, and quantity of inverters specified on the NSHP PV-1 are installed in the field.

3. System Performance Meters

The PV installer and the HERS Rater shall verify that either a stand-alone system performance meter or an inverter with a built-in system performance meter is installed that meets all guidebook requirements for system performance meters.

4. Tilt and Azimuth

The PV installer and the HERS Rater shall verify that the tilt and azimuth of the PV modules installed in the field match the values specified on the NSHP PV-1, within ± 5 degrees. In some systems, PV modules may be installed in multiple orientations with different tilts and azimuths. In these cases the tilt and azimuth of each array must be verified. The tilt and azimuth measurement tolerance also applies to systems using the California Flexible Installation criteria.

a) *Determining Tilt*

The tilt angle of the PV modules is measured in degrees from the horizontal (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 B-1 may be used to convert rise to run ratios to degrees of tilt.

Table B-1: Conversion of Roof Pitch to Tilt

Roof Pitch (Rise:Run)	Tilt (degrees)
1:12	4.8
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

Source: California Energy Commission

ii. Using a Digital Protractor

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

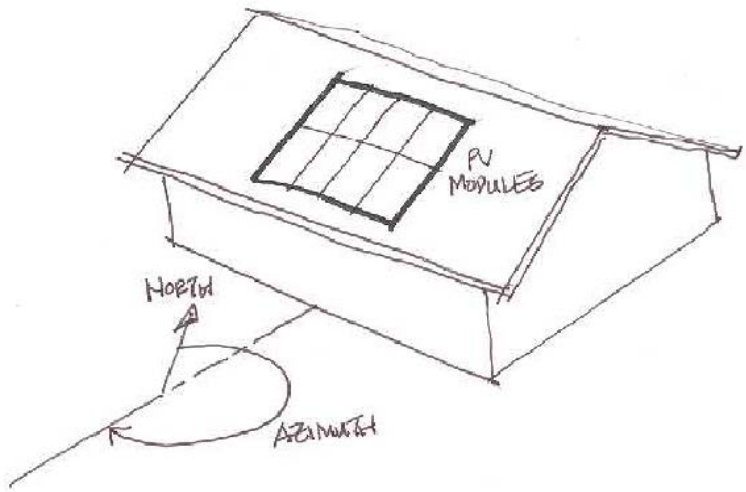
Figure B-1: Digital Protractor

Source: www.smarttooltech.com/category.php?category=1

b) Determining Azimuth

The PV installer and the HERS Rater must determine the azimuth of the PV modules and verify that the azimuth is the same as that used to determine the expected performance of each PV system. The convention that is used for measuring azimuth is to determine the degrees of angle clockwise from north: north azimuth is zero degrees, east is 90 degrees, south is 180 degrees,and west is 270 degrees. (See Figure B-2.)

Figure B-2: Azimuth of the PV Array



Source: California Energy Commission

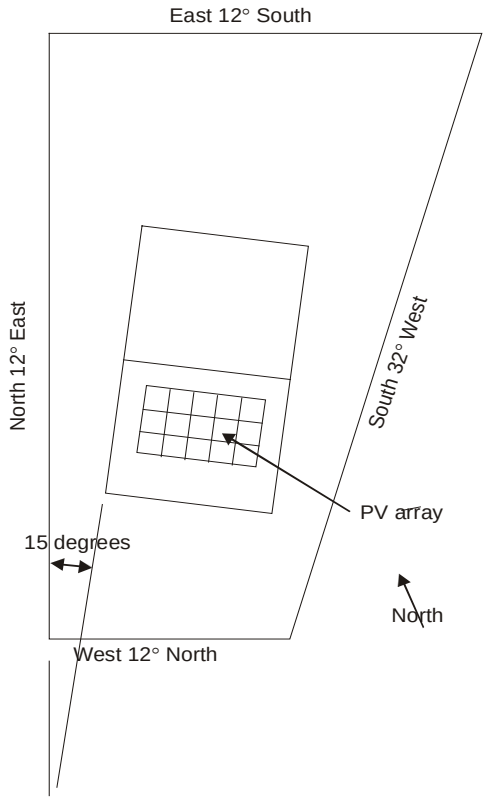
The following methods may be used to determine the azimuth.

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 B-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 are 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 B-3: Example Plot Plan



Source: California Energy Commission

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 shall determine the magnetic declination using the tool available at [http://www.ngdc.noaa.gov/geomag-web/] and adjust the compass reading to account for the magnetic declination. Position the compass and determine the angle between compass north and the direction that the PV modules face. It is usually convenient and most accurate to align the compass along the edge of the array using the sighting feature. (See Figure B-4.)

Figure B-4: Compass With a Sighting Feature

Source: www.rei.com/product/638694/brunton-eclipse-8099-compass , www.opticsplanet.net/silva-olive-drab-compass-15118.html

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

For new single-family subdivisions, NSHP allows determination of expected performance using the California Flexible Installation criteria. The California Flexible Installation criteria allow all PV systems that are installed with an azimuth ranging from 150 to 270 degrees, with a tilt ranging from 0:12 and 7:12, and meeting the minimal shading criterion 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 tested system on each building that has the expected performance based on the California Flexible Installation criteria, the HERS Rater must verify that the array is installed with both an azimuth and a tilt within the acceptable range and record the actual values on the NSHP PV-3. The ± 5 degree measurement tolerance for tilts and azimuths described in Section E.3 of this appendix also apply to California Flexible Installation projects. The California Flexible Installation criteria require each PV system 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 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.

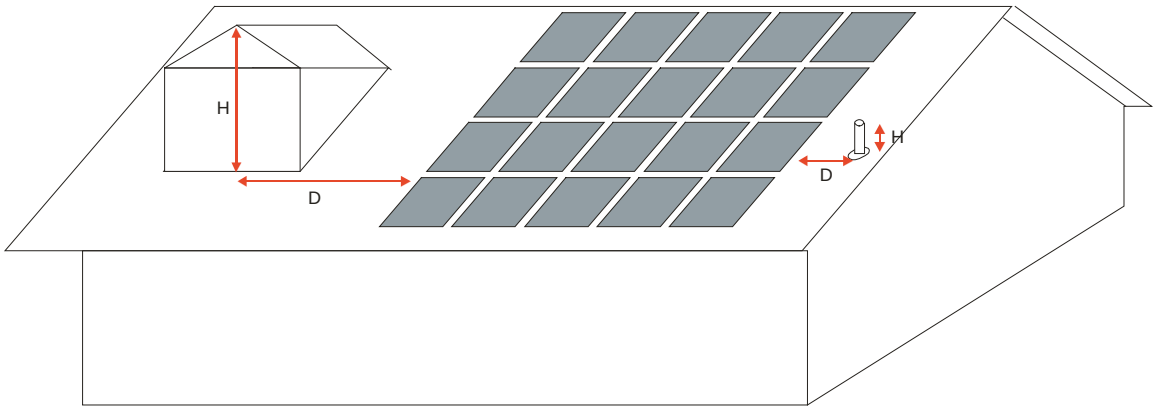
The PV installer and the HERS Rater must verify that the shading conditions on the PV system in the field are consistent with those used in the expected performance calculations. The estimated performance calculations will be done either assuming that the minimal shading criterion is met or based on the specific shading characteristics of each system.

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 array. (See Figure B-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." All obstructions that project above the point on the array that is closest to the obstruction must meet this criterion for the array to be considered minimally shaded. Obstructions that are subject to this criterion include:

- Any vent, chimney, architectural feature, mechanical equipment, or other obstruction that is on the roof or any other part of the building.
- Any part of the neighboring terrain.
- Any tree that is mature at the time of installation of the PV system.
- Any tree that is planted on the building lot or neighboring lots or planned to be planted as part of the landscaping for the building (the expected shading must be based on the mature height of the tree).
- Any existing neighboring building or structure.
- Any planned neighboring building or structure that is known to the applicant or building owner.
- Any telephone or other utility pole that is closer than 30 feet from the nearest point of the array.

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



Source: California Energy Commission

To determine whether the minimal shading criterion is met, the PV installer or HERS Rater shall determine for each shading obstruction the smallest ratio of the horizontal distance from the obstruction to the array divided by the vertical height of the obstruction above that point on the array. (This is the "closest point on the array.") 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 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 all obstructions meet the 2:1 criterion. (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).

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 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.

For shading obstructions that are accounted for in the expected performance calculation, the CECPV Calculator will produce on the NSHP PV-1 a table similar to Table B-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. This table divides the compass into 11 (approximately 22.5 degree) 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). 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 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 B-2 are specific to a particular PV system installation. In this example the minimal shading condition is not met for five sectors of the compass, ESE, SSE, S, SW, and WNW.

Table B-2: Example NSHP PV-1 Format for PV Shading

Source: California Energy Commission

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)		Minimal Shading	2.00	16	46	76
E (79 -101)		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 (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			

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 that are planted on the building lot or neighboring lots or planned to be planted as part of the landscaping 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 PV array than the shading characteristics that were used in the expected performance calculations.

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

A tape measure or other measuring device may be used to measure the distance ("D") from the point on the PV array corresponding to the lowest ratio of distance to height ("H") for each shading obstruction for each 22.5 degree compass sector. The distance to a tree is measured to the nearest edge of the trunk of the tree. Once the height difference ("H") and distance ("D") are determined in each compass sector, the ratio is calculated and must be greater than the value used in the expected performance calculation as reported on the NSHP PV-1. (See the fourth column in Table B-2 labeled Distance-to-Height Ratio.) This method 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 B-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 NSHP PV-1. (See the third column in Table B-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. Trigonometric adjustments will be required to correct for the height difference between the ground where the measurements are made and the nearest point, on the PV array, to the shading obstruction.

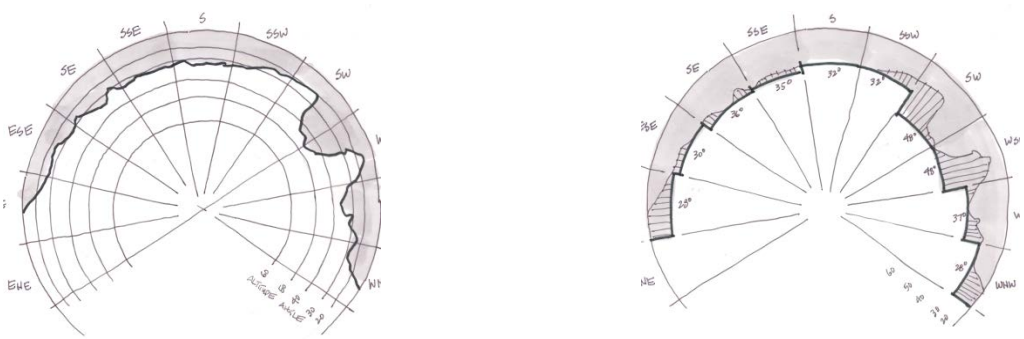
This method does not address expected shading resulting from the mature heights of planted immature trees or planned trees. To determine distances for planted immature trees, a tape measure should be used. The height measurement for trees that are immature shall be based on the mature tree height discussed 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.

1. *Using a Solar Assessment Tool*

For shading from existing obstructions, shading conditions may be verified using a solar assessment tool. This procedure will typically be used by the PV installer, but 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.

At each measurement point, 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 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 B-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 B-6: Conversion of Results to CECPV Calculator Input



(a) This diagram shows the 22.5 degree compass 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 sector, the highest altitude is selected and used for that entire sector. This data is shown for a single point of reference on the array.

Source: California Energy Commission

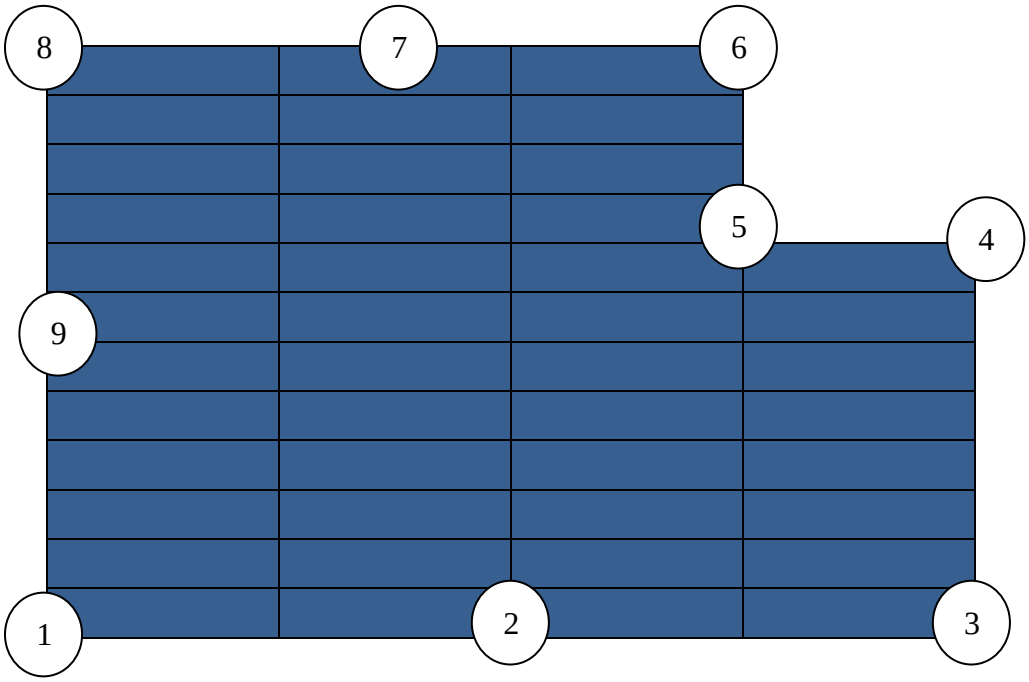
Measurements shall be made at all the major corners of the array with no adjacent measurement being more than 40 feet apart. (See example in Figure B-7.) The points of measurement shall be distributed evenly between two major corners if they are more than 40 feet apart such that the linear distance between 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 that are used in the CECPV Calculator.

This method does not address expected shading resulting from the mature heights of planted immature trees or planned trees or expected construction of buildings or other structures on neighboring lots. To determine distances for planted immature trees, a tape measure should be used. To determine distances for planned trees, a landscape plan provided by the applicant should be used. The height measurement for trees that are 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 shall be based on plans for those structures. Such shading shall be addressed separately.

The results determined by the tool in combination with the expected future shading described above are compared to the data that were 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 B-7: Example of Points Where Measurement Shall Be Made Using a Solar Assessment Tool (overall array dimensions 76 feet by 50 feet)



Source: California Energy Commission

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. This section provides guidelines for determining the mature height of such trees. Applicants must identify the height category (small, medium, or large) of all planted and planned trees at the site. That information must be documented in conjunction with the NSHP PV-2 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 the 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 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 B-3 shows the appropriate tree guide to use for each of California's climate zones for the expected performance calculations.

Table B-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

Source : California Energy Commission

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 [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 B-4 shows the horizontal distance that trees of each mature height category would need to be located from nearest point of the PV array to meet the condition of minimal shading.

Table B-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

Source: California Energy Commission

G. Verification of System Performance

The PV installer and HERS Rater must verify that the AC power output from the PV system is consistent with that predicted by the expected performance calculations. The CECPV Calculator will determine an estimate of system AC power output for a range of solar irradiance and ambient air temperature conditions and print a table on the NSHP PV-1 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 B-5. The data in the table are 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 for the measured field conditions from the table on the NSHP PV-1 form. The PV installer or the HERS Rater must then observe the AC power output displayed on the system performance meter (typically an inverter with a built-in performance meter) and verify that the AC power output is equal to or greater the amount shown in the table for the field-measured conditions. To qualify for incentives under NSHP, PV systems must have a stand-alone performance meter or an inverter with a built-in performance meter that measures AC power output.

The PV installer and HERS Rater must observe the AC power output on the system performance meter after waiting for a period of stable conditions during which the measured solar irradiance has stayed constant within ± 5 percent.

Table B-5: Example Table of Expected 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

Source: California Energy Commission

1. Measuring Solar Irradiance

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

3. Observing AC Power Output at the System Performance Meter

The PV installer and the HERS Rater must observe and record the AC power output reading from the system performance meter as soon as possible after measuring solar irradiance and ambient temperature. The inverter may cycle between multiple readings (total kWh, AC power output, and so forth), 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 connected to the same inverter.[38] When parallel strings in different orientations are connected to the same inverter, separate NSHP PV-1 forms must be prepared for each orientation, and solar irradiance must be measured separately in a plane parallel to each orientation. Field verification will require separate NSHP PV-2 and NSHP PV-3 forms for each orientation. The expected AC power output is determined separately for each orientation, and the sum is used for verification.

For example, a qualifying 3 kW PV system has 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 installer or HERS Rater evaluates system performance at 11:30 a.m. in March with an ambient temperature of 62 degrees Fahrenheit. The installer or

38 Substantial reductions in performance will result if there are different numbers of modules in each string or if modules with different orientations are connected in series.

HERS Rater measures 950 W/m² of solar irradiance in the plane parallel to the south string and 500 W/m² in a plane parallel to the west-facing string.[39]

The total expected AC power output table on the NSHP PV-1 indicates that the system should be producing 1,586 W at 950 W/m² and 900 W at 500 W/m² of solar irradiance. The expected AC power output is calculated as 2,486 W by summation of each orientation's expected AC power output (1,586 W + 900 W = 2,486 W). This calculated value must be compared to the value displayed on the system performance meter for the entire system.

39 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 C:
Energy Efficiency Documentation Requirements

A. Plan Check Checklist

This checklist expedites the required plan check process. **Applications submitted without the following documents will be returned to the applicant. Additional documentation may be requested during the plan check process.**

1. A complete set of construction plans[40] that contain:
   - Architectural, electrical, mechanical, and plumbing information (as applicable).
   - A window and door schedule that shows sizes and includes all skylights (if not shown on the floor plan).
   - Elevation, wall, roof, and floor construction assemblies.
   - Floor finish schedule (if CF-1R shows high mass design).
   - A list of lots and addresses (for residential developments).
   - A site plan with a north arrow (for custom homes).
2. Compliance forms and electronic files:
   - Hard copy of the final CF-1R or PERF-1 signed by a CEPE or CEA.
   - Electronic input file(s) for the CF-1R or PERF-1.
3. Equipment and materials documentation:
   - Windows, glazed doors, skylights—specification sheet with manufacturer's name that demonstrates U-factor and solar heat gain coefficient (SHGC).
   - Space-heating equipment—specification sheet with manufacturer's name/model number and efficiency rating for each unit.
   - Air conditioner—specification sheet with manufacturer's name/model numbers for condenser/coil match or AHRI reference number for each proposed unit (www.Ahridirectory.org) that has an efficiency rating greater than SEER 13, EER 11.

40 Plans may be submitted electronically either as a .pdf file or .dwf file, minimum plan size of 15″ x 21″ for printed plans.

- Water heater—specification sheet with manufacturer's name/model number and efficiency rating. If installing a solar water heater, a Solar Water Heating Calculation Form (CF-SR) from either the California F-Chart (OG 100) or Solar Fraction Calculator for Rated Systems (OG 300) is required.

- Roofing material—specification sheet that shows emissivity and reflectivity value of product.

- Specification sheets for any special features or equipment used for compliance with the energy efficiency requirements.

4. Additional requirements:
   - For appliances provided by the builder, specification sheets with manufacturer's name/model number that demonstrate the appliance is ENERGY STAR®-labeled if ENERGY STAR is applicable to that appliance. Only products listed under the "Appliances" heading of the ENERGY STAR website need to be verified as ENERGY STAR-labeled.[41]

B. Additional Energy Features Checklist Verification Guidelines

The Additional Energy Features Checklist (NSHP EE-3) is required for all Tier I and Tier II projects and is completed by a HERS Rater to verify the energy efficiency requirements of the NSHP program. This verification is in addition to any verifications required for any applicable Title 24, Part 6 HERS measures. The process to verify energy efficiency compliance involves a field inspection by a HERS Rater where the measures listed on the NSHP EE-3 are checked off as having passed or failed inspection. The NSHP EE-3 will be prepopulated with information from the CF-1R submitted in the NSHP application and that has been uploaded to a HERS Provider data registry. The HERS Rater will need to check off only whether a measure passed or failed.

The NSHP EE-3 will verify the following features of a home:

- Opaque surfaces
- Glazing (window) values
- HVAC efficiency
- Water heater efficiency
- Radiant barrier installation

Items listed in the Opaque Surfaces section require the Rater to verify the R-values of insulation installed in the building. These items can be verified either by having a HERS Rater on-site while the item is accessible or by providing the HERS Rater with any of the following:

41 www.energystar.gov/index.cfm?c=products.pr_find_es_products.

photographs of the installed items, invoices for materials purchased, and any relevant CF-6Rs. Acceptance of photographs, invoices, and relevant CF-6Rs is solely at the discretion of the HERS Rater.

Note: The HERS verification measure, Quality Installation of Insulation (QII), cannot be verified using photographs, invoices, or CF-6Rs. A HERS Rater must be on-site and perform the required verification prior to wall enclosure, or QII may not be used to meet the NSHP energy efficiency requirements.

Items listed in the Glazing (Window) Values section require the Rater to verify the area, solar heat gain coefficient (SHGC), and U-factor for each glazing product. Items listed in the HVAC Effieciency section will require the Rater to verify the cooling (for example, SEER) and heating efficiency (for example, AFUE) of all HVAC units in the building. Items listed in the Water Heater Efficiency section will require the Rater to verify the water heater efficiency values (for example, energy factor) of all water heaters installed in the building.

Each item listed on the NSHP EE-3 must be compared and verified against what was actually installed because each item is critical to the overall performance and energy savings of the building.

For projects using a PERF-1 as energy efficiency documentation, the NSHP EE-3 form is not required.

If an applicant is participating in a utility new construction energy efficiency program, such as the California Advanced Homes Program (CAHP), he or she must meet the energy efficiency requirements of that utility new construction energy efficiency program rather than the NSHP energy efficiency requirements (that is, the NSHP EE-3 will not be completed). See Chapter II, Section C, for additional information on participation in a utility new construction energy efficiency program.

C. NSHP Tier I and Tier II Requirements for Different Eligible Building Types

Tables C-1 and C-2 show the compliance documentation that must be submitted and the efficiency requirements that must be met for different eligible building types to receive an NSHP incentive.

Table C-1: NSHP Energy Efficiency Requirements for Eligible Building Types, Excluding Mixed-Use Buildings

Building Type[42]	**Code-Compliant Energy Efficiency Requirements (*2013 Standards*)**[43]	**Tier I Energy Efficiency Requirements (*2013 Standards*)**	**Tier II Energy Efficiency Requirements (*2013 Standards*)**
Low-Rise Residential[44]	Compliance with the *Building Energy Efficiency Standards* as indicated on the CF-1R	Total compliance margin of at least 15 percent[45] better than standard as indicated on the Certificate of Compliance (CF-1R).	Total compliance margin of at least 30 percent[46] better than standard as indicated on the CF-1R AND space cooling compliance margin of at least 30 percent better than standard.
High-Rise Residential[47]	Compliance with the *Building Energy Efficiency Standards* as indicated on the PERF-1	Compliance margin, excluding receptacle, process,[48] process lighting, of at least 10 percent[49] better than standard as indicated on the PERF-1.	Compliance margin, excluding receptacle, process, process lighting, of at least 15 percent[50] better than standard as indicated on the PERF-1 AND space cooling compliance margin of at least 15 percent better than standard.

42 The entire building must meet the energy efficiency requirements. Each appliance provided by the builder must be ENERGY STAR®-labeled if ENERGY STAR® is applicable to that appliance. This applies to Code-Compliant, Tier I, and Tier II projects.
43 The building must comply with the *2013 Building Energy Efficiency Standards* prior to claiming the solar compliance credit for the *2013 Standards*.
44 A building, other than a hotel/motel that is of Occupancy Group R, Division 1, and is multifamily 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. Refer to Title 24, Part 2, for building occupancy groups.
45 For both the *2008* and *2005 Standards*, the Tier I energy efficiency requirements for low-rise residential buildings are a total compliance margin of at least 15 percent better than standard.
46 For the *2008 Standards*, the Tier II energy efficiency requirements for low-rise residential buildings are a total compliance margin of at least 30 percent better than standard AND space cooling compliance margin of at least 30 percent better than standard. For the *2005 Standards*, theTier II energy efficiency requirements were a total compliance margin of at least 35 percent better than standard AND space cooling compliance margin of at least 40 percent better than standard.
47 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 provisions of the *Building Energy Efficiency Standards*, for nonresidential buildings. Refer to Title 24, Part 2, for building occupancy groups.

Detached nonresidential building that is solely for the use and benefit of the residential occupants.[51]	Compliance with the *Building Energy Efficiency Standards* as indicated on the PERF-1	Compliance margin, excluding receptacle, process, process lighting, of at least 10 percent[52] better than standard as indicated on the PERF-1.	Compliance margin, excluding receptacle, process, process lighting, of at least 15 percent[53] better than standard as indicated on the PERF-1 AND space cooling compliance margin of at least 15 percent better than standard.

Source: California Energy Commission

48 *Process* is an activity or treatment that is not related to the space conditioning, lighting, service water heating, or ventilating of a building as it relates to human occupancy. Refer to the *2008* and *2013 Standards* for additional information.

49 For both the the *2008* and *2005 Standards*, Tier I energy efficiency requirements for high-rise residential buildings are a total compliance margin of at least 15 percent better than standard.

50 For the *2008 Standards*, the Tier II energy efficiency requirements for high-rise residential buildings are a total compliance margin of at least 30 percent better than standard AND space cooling compliance margin of at least 30 percent better than standard. For the *2005 Standards*, Tier II energy efficiency requirements were a total compliance margin of at least 35 percent better than standard AND space cooling compliance margin of at least 40 percent better than standard.

51 Additional energy efficiency requirements: For multifamily developments, at least one residential building must meet the same energy efficiency requirements as the detached nonresidential building. For single-family residential developments (subdivisions), all homes in the residential development must meet the same energy efficiency requirements as the detached nonresidential building.

52 For both the *2008* and *2005 Standards*, the Tier I energy efficiency requirements are a total compliance margin of at least 15 percent better than standard.

53 For both the *2008* and *2005 Standards*, the Tier II energy efficiency requirements are a total compliance margin of at least 30 percent better than standard AND space cooling compliance margin of at least 30 percent better than standard.

Table C-2: NSHP Energy Efficiency Requirements for Eligible Mixed-Use Buildings

Building Type	**Code-Compliant Energy Efficiency Requirements (*2013 Standards*)**[54]	**Tier I Energy Efficiency Requirements (*2013 Standards*)**	**Tier II Energy Efficiency Requirements (*2013 Standards*)**
Low-rise mixed-use where the CFA[55] of the nonresidential occupancy comprises no more than 20 percent of the CFA of the building. [56]	Compliance with the *Building Energy Efficiency Standards* as indicated on the CF-1R.	Total compliance margin of at least 15 percent better than standard as indicated on the CF-1R.[45]	Total compliance margin of at least 30 percent better than standard as indicated on the CF-1R AND space cooling compliance margin of at least 30 percent better than standard.[46]
Low-rise mixed-use where the CFA of the nonresidential occupancy comprises more than 20 percent of the CFA of the building. [57]	Residential Occupancy: Compliance with the *Building Energy Efficiency Standards* as indicated on the CF-1R AND Nonresidential Occupancy: Compliance with the *Building Energy Efficiency Standards* as indicated on the PERF-1.	Residential Occupancy[58]: Total compliance margin of at least 15 percent better than standard as indicated on the CF-1R AND Nonresidential Occupancy: Compliance margin, excluding receptacle, process, process lighting, of at least 10 percent better than standard as indicated on the PERF-1.	Residential Occupancy[59]: Total compliance margin of at least 30 percent better than standard as indicated on the CF-1R AND space cooling compliance margin of at least 30 percent better than standard AND Nonresidential Occupancy: Compliance margin, excluding receptacle, process, process lighting, of at least 15 percent better than standard as indicated on the PERF-1.

54 The building must comply with the *2013 Standards* prior to claiming the *2013 Standards* solar compliance credit.
55 Conditioned floor area (CFA) is the floor area (in square feet) of enclosed conditioned space on all floors of a building, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space.
56 A solar energy system serving electrical loads in the entire mixed-use building shall be eligible for NSHP. The entire building is subject to the provisions of the *Building Energy Efficiency Standards*, for low-rise residential buildings.
57 Only the portion of a solar energy system serving electrical loads in the low-rise residential occupancy shall be eligible for NSHP. Each occupancy shall meet the provisions of the *Building Energy Efficiency Standards*, applicable to that occupancy.
58 For the *2008 Standards*, the energy efficiency requirements are a total compliance margin of at least 15 percent better than standard for the residential occupancy AND 15 percent better than standard for the nonresidential occupancy.

High-rise mixed-use where the CFA of the nonresidential occupancy comprises no more than 20 percent of the CFA of the building.[60]	Compliance with the *Building Energy Efficiency Standards* as indicated on the PERF-1.	Compliance margin, excluding receptacle, process, process lighting, of at least 10 percent better than standard as indicated on the PERF-1.[49]	Compliance margin, excluding receptacle, process, process lighting, of at least 15 percent better than standard as indicated on the PERF-1 AND space cooling compliance margin of at least 15 percent better than standard.[50]
High-rise mixed-use where the CFA of the nonresidential occupancy comprises more than 20 percent of the CFA of the building.[61]	High-rise residential occupancy: Compliance with the *Building Energy Efficiency Standards* as indicated on the PERF-1 AND Nonresidential Occupancy: Compliance with the *Building Energy Efficiency Standards* as indicated on the PERF-1.	High-rise residential occupancy: Compliance margin, excluding receptacle, process, process lighting, of at least 10 percent better than standard as indicated on the PERF-1 AND Nonresidential Occupancy: Compliance margin, excluding receptacle, process, process lighting, of at least 10 percent better than standard as indicated on the PERF-1.[58]	High-rise residential occupancy: Compliance margin, excluding receptacle, process, process lighting, of at least 15 percent better than standard as indicated on the PERF-1 AND space cooling compliance margin of at least 15 percent better than standard AND Nonresidential Occupancy: Compliance margin, excluding receptacle, process, process lighting, of at least 15 percent better than standard as indicated on the PERF-1.[59]

Source: California Energy Commission

59 For the *2008 Standards*, the residential and nonresidential occupancy energy efficiency requirements are a total compliance margin of at least 30 percent better than standard AND space-cooling compliance margin of at least 30 percent better than standard.
60 A solar energy system serving electrical loads in the entire mixed-use building shall be eligible for NSHP. The entire building is subject to the provisions of the *Building Energy Efficiency Standards* for high-rise residential buildings.
61 Only the portion of a solar energy system serving electrical loads in the high-rise residential occupancy shall be eligible for NSHP. Each occupancy shall meet the provisions of the *Building Energy Efficiency Standards* applicable to that occupancy.

APPENDIX D:
NSHP Forms

NSHP-1	**Reservation Application Form**
NSHP-2	**Payment Claim Form**
NSHP-3	**Ten-Year Warranty Form**

The following forms are not included in the Guidebook and are either produced by the CECPV Calculator or provided by the solar energy system installer or HERS Rater:

NSHP PV-1	**Energy Commission CECPV Calculator Output Form**
NSHP PV-2	**PV Installation Form**
NSHP PV-3	**PV Field Verification and Diagnostic Testing Form**
NSHP EE -3	**Additional Energy Features Checklist**

STATE OF CALIFORNIA CALIFORNIA ENERGY COMMISSION

NSHP-1 (Revised 07/15)

NEW SOLAR HOMES PARTNERSHIP RESERVATION APPLICATION FORM

1. Applicant Name and Contact Information

Homeowner or Builder/Developer Name (Applicant)	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 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 ☐ Multi Family ☐ Mixed-Use ☐ Nonresidential

Project type:
- ☐ Large developments (50 percent or more of the residential dwelling units in a project (minimum of 6 residential dwelling units) will have solar energy systems installed.)
- ☐ 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

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: _____

Building Energy Efficiency Standards: ☐ 2005 ☐ 2008 ☐ 2013

Expected Energy Efficiency Level of Project: ☐ Code-Compliant (for *2013 Building Standards* Only) ☐ Tier 1 ☐ Tier 2

Will your system be Virtual Net Metered (VNM)? ☐ Yes ☐ No

If yes, please provide the system generation allocation percentages:
- ☐ Residential Dwelling Units: _____
- ☐ Affordable Housing Residential Dwelling Units: _____
- ☐ Common Areas: _____

Please note that only large developments, affordable housing, and Virtual Net Metered 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 application for the building permit for the solar energy system shall be submitted to 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

Is your project participating in the electric utility's new construction energy efficiency program? ☐ Yes

Please note that projects participating in the electric utility's new construction energy efficiency program will not need to submit the NSHP energy efficiency documentation.

4. Home Energy Rating System (HERS) Information

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

5. Supporting Documentation Required for Application Submittal

All Projects:

☐ Subdivision Map or Building Permit*

☐ EPBI Documentation

- ☐ NSHP PV-1 form
- ☐ Electronic input files (.emf, .her)

☐ Installation Contract **

☐ Energy Efficiency Documentation

- ☐ CF-1R form
- ☐ Electronic input file (.bld/.mp7, .mp8, .ribd)***
- ☐ Construction plan set***

Additional Requirements for:

Affordable Housing Projects:

☐ Regulatory Agreement

Affordable Housing Projects: TCAC projects have up to 60 days after funding approval to submit the Energy Efficiency Documentation.

**Waived if participating in a utility new construction energy efficiency program that meets or exceeds the NSHP Tier 1 requirements, but must submit the program approval letter.*

***A master equipment purchase and installation agreement may be submitted. Self-installs will submit an equipment purchase agreement in place of the installation contract.*

****Waived if applying for the Code-Compliant Incentive or if the compliance documentation is signed by a 2013 CEA.*

6. Other Terms and Conditions

- Builder/Developer is aware that all NSHP Energy Efficiency verification requirements must be completed for Tier I and Tier II projects in order to receive a full NSHP incentive. Required energy efficiency verifications include:
  - Envelope Assembly (Wall, Roof)
  - Fenestration Surface Details
  - HVAC System Details- Heating and Cooling
  - Water Heating.

7. 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. Systems that are leased or provide electricity under a PPA are subject to special reporting requirements. An annual status report on the operation of the solar energy system must be submitted by the lessor or owner of the solar energy system. If the lease agreement or PPA is terminated and the system is removed from the building upon which it was originally installed within ten years of the system's installation or the start date of the agreement, whichever is later, the lessor or system owner is responsible for the funding repayment.

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,Ninth Edition*, and *Building Energy Efficiency Standards* (Title 24, Part 6) 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 the applicable electric utility servicing the project to verify compliance with NSHP requirements.

Signature, Assignment of Administrative Rights and Incentive Recipient Information

(Optional)
I, the applicant, designate _____ as my authorized representative for the New Solar Homes Partnership program. This party is permitted to sign the NSHP-2(s) for this project on my behalf.

Designated Payee of NSHP Incentive:	_____
Payee's Address:	_____

Homeowner or Builder/Developer Name (Applicant Name):	_____	Date:	_____
Signature:	_____	Title:	_____

STATE OF CALIFORNIA CALIFORNIA ENERGY COMMISSION

NSHP-2 (Revised 07/15)

NEW SOLAR HOMES PARTNERSHIP PAYMENT CLAIM FORM

[CEC use only]		
Partial Payment Request = $_____ Payment Approval Date: _____ Final Partial Payment Request = $_____ Payment Approval Date: _____ Full Payment Request = $_____ Payment Approval Date: _____	***Reservation ID*** ***Project Name*** ***Address or*** ***Site ID*** ***Payment Request***	_____ _____ _____ _____ Circle One: Partial / Final Partial / Full

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 installed prior to submitting the NSHP-2. Failure to meet these requirements will cause the payment of NSHP incentives to be delayed or withheld. The NSHP-2 form must be postmarked by the expiration date and all required supporting documentation must be submitted no later than 3 months or 90 calendar days, whichever is later, after the expiration date or the reservation will expire and the incentive amount will be forfeited. 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: _____

Discounts Received From Other Sources: _____ Solar Permit Cost: _____ New Construction Building Permit Issue Date: _____

Sales Arrangement: ☐ Purchased ☐ Leased ☐ PPA

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

4. PV Modifications

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

_____

_____

5. Energy Efficiency Modifications

Have any of the measures used to meet the *Building Energy Efficiency Standards* or NSHP energy efficiency requirements changed since the reservation was approved? ☐Yes ☐No
If yes, note the changes before claiming payment.

_____

_____

6. Payment Assignment

Is payment assigned to another party?

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

☐ **No (Please skip Section 6 and complete all others.)**

Assignment Request

I, _____, the applicant or authorized representative of the 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. A STD-204 must be submitted for the person/entity receiving the payment, if it is not already on record with the Energy Commission.

Name: _____

Address: _____

_____

Phone Number: _____

As the 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: _____

7. Signature

(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 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, or will receive utilty approval to operate the system as interconnected to the distribution grid no later than 3 months or 90 calendar days, whichever is later, after the reservation expiration date.

(3) The rated electrical output of the generating system, the physical location of the system, and the equipment identified were installed as stated above in Sections 1-4.

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

The undersigned party further acknowledges that he or she is 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, Ninth Edition*,and the *Building Energy Efficiency Standards* (Title 24, Part 6) as a condition to receiving funding under the NSHP. If the system is leased or provides electricity through a power purchase agreement (PPA), an annual status report on the operation of the solar energy system must be submitted by the lessor or owner of the solar energy system. If the lease agreement or PPA is terminated and the system is removed from the building upon which it was originally installed within ten years of the system's installation or the start date of the agreement, whichever is later, the lessor or system owner is responsible for the funding repayment. As specified in the NSHP Guidebook, the undersigned applicant 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 the Energy Commission***
Name: _____ Title: _____ Signature: _____ Date: _____	• Final building permit signoff or occupancy permit (Code-Compliant projects only.) • Final Total System Cost Documentation • Ten-Year Warranty Form (NSHP-3) • Payee Data Record (STD-204) • Lease or Power Purchase Agreement • Utility Approval of Interconnection	• Final EPBI Documentation (NSHP PV-3) • Final NSHP Energy Efficiency Documentation (CF-3R and NSHP EE-3) or utility new construction energy efficiency program payment letter (Tier I or Tier II projects only)

For the latest mailing address information, visit [http://www.gosolarcalifornia.ca.gov/contacts/consumers.php].

STATE OF CALIFORNIA **CALIFORNIA ENERGY COMMISSION**

NSHP-3 (Revised 07/15)

NEW SOLAR HOMES PARTNERSHIP TEN-YEAR WARRANTY FORM

System Information

This warranty applies to the following _____ kW solar electric generating system(s)
Equipment Description: _____
Located at: _____
□Additional addresses covered by this warranty are identified on page 2 of this document.

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, or a host customer, assignee of a power purchase agreement, and a power purchase agreement. This warranty is effective from _____ (date of completion of the system installation). A copy of this warranty is provided to the purchaser of the solar electric generating system.

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:

Printed Name: _____ Phone: ( )

Company: _____ Fax: ( )

Address: _____

Signature of Warrantor's Authorized Representative: _____ Date: _____

Additional System Information

The warranty information on page 1 of this form applies to the following systems in the same project with similar equipment descriptions located at:

1) _____ Warranty Effective Date: _____
2) _____ Warranty Effective Date: _____
3) _____ Warranty Effective Date: _____
4) _____ Warranty Effective Date: _____
5) _____ Warranty Effective Date: _____
6) _____ Warranty Effective Date: _____
7) _____ Warranty Effective Date: _____
8) _____ Warranty Effective Date: _____
9) _____ Warranty Effective Date: _____
10) _____ Warranty Effective Date: _____
11) _____ Warranty Effective Date: _____
12) _____ Warranty Effective Date: _____
13) _____ Warranty Effective Date: _____
14) _____ Warranty Effective Date: _____
15) _____ Warranty Effective Date: _____
16) _____ Warranty Effective Date: _____
17) _____ Warranty Effective Date: _____
18) _____ Warranty Effective Date: _____
19) _____ Warranty Effective Date: _____
20) _____ Warranty Effective Date: _____
21) _____ Warranty Effective Date: _____
22) _____ Warranty Effective Date: _____
23) _____ Warranty Effective Date: _____
24) _____ Warranty Effective Date: _____
25) _____ Warranty Effective Date: _____