

California Energy Commission
STAFF REPORT

New Solar Homes Partnership Market Report

California Energy Commission

Edmund G. Brown Jr., Governor

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ABSTRACT

The New Solar Homes Partnership (NSHP) Program is an integral piece of California's continuing efforts to promote and develop clean, renewable electricity generating resources. The program serves as a bridge for California's zero-net-energy goal for homes, which the California Energy Commission expects to implement in the *2019 Title 24 Building Energy Efficiency Standards*. This report highlights the progress achieved thus far by the New Solar Homes Partnership Program, summarizes the current state of the solar energy market, discusses program successes and benefits, and briefly explores the outlook and uncertainties. The report also discusses the importance of continuing the program without interruption to meet the legislative goals for the program.

Keywords: New Solar Homes Partnership, NSHP, Energy Commission, PV, solar energy system, energy efficiency, Title 24 Part 6, incentive, market report, renewable energy, zero net energy, energy policy

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TABLE OF CONTENTS

	Page
Abstract	i
Table of Contents	iii
List of Figures	v
List of Tables	v
EXECUTIVE SUMMARY.....	1
Increased Program Demand	1
Improved Builder Buy-In	1
Decreased Solar Costs	2
Lower Customer Bills.....	2
Low-Income Community Assistance	2
Innovative Financing Models.....	2
Supporting Zero-Net-Energy Goals	3
Outlook and Uncertainties	3
CHAPTER 1 Program Overview	5
Eligibility	6
Incentives	6
Guidelines	7
CHAPTER 2 Program Statistics.....	8
Cumulative Program Activity.....	8
Program Activity by Year.....	8
Regional Statistics	13
Solar Penetration Rate.....	15
CHAPTER 3 Program Benefits.....	17
Reduced Solar Costs	17
Self-Sustaining Solar Market	18
Promoting Solar on Affordable Housing.....	19
Accommodating New Financing Models	20
Supporting State Clean Energy Goals.....	22
Zero-Net-Energy Residential Buildings by 2020	22
Renewables Portfolio Standard	23
Greenhouse Gas Emission Reductions.....	23
Reduced Water Usage	23
Utility Bills and Property Value	23
Local Outreach.....	24

Educating Consumers.....	24
CHAPTER 4 Future Program Outlook	26
Factors Affecting Program Participation.....	26
Current Housing Market and Policy	26
Expanded Program Eligibility.....	27
The “Glide Path” to Zero-Net-Energy Homes	28
Funding Uncertainty	28
Glossary of Terms.....	31

LIST OF FIGURES

	Page
Figure 1.1: Total Systems and Capacity Installed Annually Through NSHP	1
Figure 1.2: Blackstone Community	5
Figure 2.1: Permits for Single- and Multifamily California Housing Units 2008-2015	9
Figure 2.2: Total Systems and Capacity Installed Annually Through NSHP	10
Figure 2.3: NSHP Funds Paid for Installed Systems by Year	10
Figure 2.4: Investor-Owned Utilities in California.....	13
Figure 2.5: NSHP Systems, Capacity, and Incentives by Region.....	15
Figure 3.1: Declining System Hardware and Rebate Coverage.....	17
Figure 3.2: Spring Lake Community.....	19
Figure 3.3: Affordable Housing Capacity Reserved in NSHP	20
Figure 3.4: NSHP Systems Purchased vs Financed (2013-2015).....	21

LIST OF TABLES

	Page
Table 2.1: Program Activity as of May 2016	8
Table 2.2: Approximate Customer Accounts by Utility	13
Table 2.3: Regional NSHP Statistics.....	14
Table 4.1: NSHP Funding as of May 2016	29

EXECUTIVE SUMMARY

The New Solar Homes Partnership Program is part of the California Solar Initiative established by Senate Bill 1 (Murray, Chapter 132, Statutes of 2006). The goals of the initiative are to install 3,000 megawatts of customer-side solar electricity generating capacity by the end of 2016, place solar on half of new homes by 2020, and make the solar industry self-sufficient within 10 years. As part of achieving the overall goals of the California Solar Initiative, the New Solar Homes Partnership Program has a program-specific goal of adding 360 megawatts of solar generation on new homes built in the service territories of the investor-owned utilities whose customers contributed to funding the program.

Increased Program Demand

The new home market in California is recovering after the most recent recession, with permits for new housing starts increasing steadily from an historical low of 36,209 in 2009 to roughly 98,000 in 2015. This recovery, in combination with program

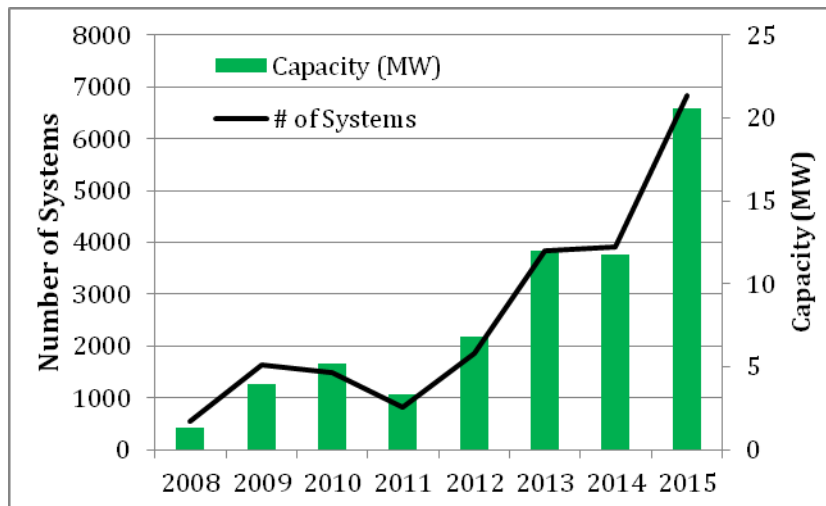
improvement and streamlining efforts

by the California Energy Commission, has contributed to a large upswing in program activity. The number of solar systems installed annually through the program has grown from 1,615 in 2009 to nearly 6,800 in 2015. Similarly, total installed solar generating capacity in 2015 was nearly 20 megawatts, a fivefold increase from 2009 installed capacity, which was just under 4 megawatts.

Improved Builder Buy-In

The dramatic growth in program activity indicates increased commitment from homebuilders to integrate solar into new homes. Leading builders like Lennar and KB Home are including solar as a standard feature in their developments, allowing consumers to avoid the high transaction costs of solar retrofits while optimizing solar performance through proper roof orientation, minimized shading, and reinforced structural support.

Figure 1.1: Total Systems and Capacity Installed Annually Through NSHP



Source: California Energy Commission

Decreased Solar Costs

When the program began in 2007, the average cost of a solar photovoltaic system applying for a program rebate was \$11.36 per watt. By 2015, the cost had dropped to \$5.06 per watt on average. This drop in solar costs, coupled with an increasing commitment by major homebuilders to include solar, shows clear progress toward a self-sustaining solar industry, one of the primary goals of Senate Bill 1.

Lower Customer Bills

The program also helps reduce customers' utility bills. Because the program limits solar rebates to new construction that meet or exceed California's stringent building efficiency standards, utility bills for homes participating in the New Solar Homes Partnership Program can be lower than for the average single-family home featuring only current efficiency standards or a home without a photovoltaic (PV) system.

Low-Income Community Assistance

The program also supports California's commitment to provide equitable access to solar rebate programs in the state's low-income and disadvantaged communities. The program provides higher rebates for affordable housing communities, and as of October 2014, a fourth of the solar capacity installed through the program was in communities with average household incomes below \$50,000. The first certified 100 percent zero-net-energy rental housing community in the United States, the Spring Lake Community in Woodland (Yolo County), has reserved rebate funding from the program for a large solar system to make the community zero net energy.

Innovative Financing Models

The program has also evolved over time to account for new financing models that help make solar more accessible to the average consumer. As a result of the increase in third-party financing options like solar leases and power purchase agreements, the Energy Commission in 2010 began allowing building owners to receive rebates for leased systems and solar power purchase agreements. In the last three years, the program has seen a dramatic increase in the number of installed systems using these financing instruments, which are expected to remain an important factor in helping lower-income consumers take advantage of solar energy.

Supporting Zero-Net-Energy Goals

The New Solar Homes Partnership Program is also a key element in meeting California's zero-net-energy building goals. Using energy efficiency measures and renewable on-site generation, zero-net-energy buildings produce on average as much energy as they use over a year. As the state's building efficiency standards move toward requiring all new homes to be zero net energy by 2020, the program is helping provide a smooth transition, or "glide path," toward achieving that goal by familiarizing builders and homeowners with what is needed to install solar successfully on new construction.

Other clean energy and environmental protection goals supported by the program include reducing environmental impacts from conventional and large-scale power plant generation by offsetting electricity demand from the grid. The program also provides an additional incentive for west-facing systems, which provide generation that coincides with afternoon peak demand, helping reduce the need for "peaker" plants that are typically heavier emitters of greenhouse gas emissions.

Future Outlook and Uncertainties

The Energy Commission expects program participation to continue to increase as the result of the recovery of the housing market; expanded program eligibility for homes that meet, rather than exceed, current building efficiency standards; the extension of the federal Solar Investment Tax Credit; and the California Public Utilities Commission's recent decision that provides more certainty about the state's future net-energy-metering policies.

The program has statutory authority to provide up to \$400 million in rebates but is facing a funding gap due to expiration of the state's public goods charge at the end of 2011, when only \$282 million of the authorized funding had been collected. If the program is fully funded, the Energy Commission is optimistic that the program goal of 360 megawatts could be reached by the expiration date of December 31, 2021, based on the recovering market, expanded eligibility, and the current rate of growth of the program.

The program plays a critical role in maintaining California's leadership in promoting renewable energy and developing an environmentally sustainable future. Solar energy is becoming an increasing part of new housing developments, helping Californians reduce their carbon footprint while supporting statewide clean energy goals.

Despite the rapid growth in solar homes in California and elsewhere, and the solar industry in general, participation in the New Solar Homes Partnership Program is still vulnerable to the same future uncertainties that affect PV adoption overall. Utility companies are increasingly concerned about reduced revenues as more customers invest in solar energy, leaving the costs of maintaining the grid spread among a decreasing pool of customers that do not own solar systems. Builders continue to face

relatively high “soft costs” of solar that include labor, taxes, fees, permitting, inspection, customer acquisition, interconnection, and other nonhardware costs.

As evidenced by recent feedback from major homebuilders, the disruption or elimination of the program at this time due to lack of funding could discourage builders from incorporating solar as a standard feature in future developments. This would subsequently derail efforts to create a self-sustaining solar market and jeopardize the achievement of California’s 2020 zero-net-energy goals. It could also negatively affect efforts to ensure that solar energy is accessible and widely adopted in low-income and disadvantaged communities.

The Energy Commission is working to secure additional funding to bridge the gap between authorized and actual funding. Importantly, the California Public Utilities Commission released a proposed decision on May 2, 2016, that awards funding as requested. A vote to finalize the proposed decision is forthcoming.

CHAPTER 1

Program Overview

In August 2004, to help increase California's energy independence and reduce pollution, Governor Arnold Schwarzenegger announced his Million Solar Roofs initiative - an ambitious statewide effort to dramatically expand the use of rooftop solar systems. Goals of the initiative included a more diverse electricity portfolio, lower electricity costs for consumers and businesses, and reduced air pollutants, including carbon emissions. This effort laid the foundation for the California Solar Initiative (CSI), established by Senate Bill 1 (Murray, Chapter 132, Statutes of 2006) and set goals of (1) installing solar energy systems with a generating capacity equivalent to 3,000 megawatts (MW), (2) establishing a self-sufficient solar industry within 10 years, and (3) placing solar energy systems on 50 percent of new California homes by 2020.

The CSI had three program elements that addressed different market needs. The first element was the California Public Utilities Commission's CSI Program, which provided incentives for rooftop solar photovoltaic (PV) systems in investor-owned utility (IOU) areas for existing residential and existing and new commercial construction. The second element includes solar incentive programs that are administered by the publicly owned utilities (POUs).

This report discusses the third CSI element, the New Solar Homes Partnership (NSHP) Program. SB 1 set a budget of \$400 million for this program to provide incentives for the installation of solar PV systems on new homes in IOU territories and is a follow-up to a program case study published in March 2015¹ by the Clean Energy States Alliance. The report also includes an overview of the current state of the program, progress toward program goals, and the outlook for the future.

Figure 1.2: Blackstone Community



New solar home community in El Dorado Hills.
Photo by California Energy Commission

Launched in January 2007, the NSHP Program provides financial incentives for homeowners, builders, and developers to include solar energy systems on new energy-

¹ Found at <http://www.energy.ca.gov/2015publications/CEC-300-2015-002/CEC-300-2015-002.pdf>.

efficient homes. The program-specific goal is to add 360 MW of solar generating capacity, while contributing to the other overall goals of the CSI. The program has statutory authority to provide up to \$400 million in rebates and is supported by funds originally allocated to the Energy Commission's Emerging Renewables Program (ERP), which was funded through the state's public goods charge to support renewable energy. However, collection of the public goods charge ended on December 31, 2011, leaving only \$282 million of former ERP funds available for the NSHP Program. As of May 2016, funding is needed to fulfill the balance of the program budget established by SB 1 and is discussed in Chapter 4.

The Energy Commission originally administered the NSHP Program but in late 2007 decided to outsource day-to-day administration to the IOUs. During the IOUs' administration of the program, the Energy Commission continued to provide oversight and review for all applications and payment claims to ensure accuracy and consistency with NSHP Program guidelines. In September 2014, the Energy Commission resumed administration of the NSHP Program to reduce program costs, streamline program administration across all service territories, and provide a single point of contact for stakeholders.

Eligibility

Applicants must be an electric service customer of Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), San Diego Gas & Electric Company (SDG&E), or Bear Valley Electric Service (BVES) and commit to installing a solar energy system in conjunction with construction of a new home. Other basic requirements include using new equipment listed on the Energy Commission's SB 1 eligible equipment lists, installing the system at the same site where the customer's demand is, and requiring the system to be covered by a 10-year warranty for equipment and installation. Other requirements are verified during the installation and payment phases, including third-party verification of system installation and performance details.

Incentives

Financial incentives are determined based on the expected performance of the system to encourage high-quality installations of solar energy systems. The NSHP Program offers two incentive structures - one for market rate housing and common areas and another for qualified affordable housing projects. The market-rate housing incentive structure is divided into three incentive levels based on the energy efficiency of the building on which the solar system is installed. The lowest incentive, "Code -Compliant," is available for homes that meet the *2013 Title 24 Building Energy Efficiency Standards* (Title 24 Standards). The next highest incentive is "Tier 1," which is for buildings that exceed the energy efficiency requirements of California's current Title 24 Standards by at least 15 percent. The highest incentive, "Tier 2," is for buildings that exceed overall Title 24 Standards by at least 30 percent and exceed space cooling efficiency by the same margin.

The affordable housing incentive structure is broken into a Code-Compliant rate available only to units meeting 2013 Title 24 Standards, as well as an affordable residential rate for units at least 15 percent above Title 24 Standards. Both incentive rates are higher than market-rate housing rates to encourage the installation of PV systems on affordable housing construction.

These incentives decline over time as capacity goals in 10 “steps” are met. When the cumulative MW capacity of applications submitted under an incentive level equals the amount of MW reserved for that level (step), the incentive drops to the next level. For example, the current incentive level for market-rate housing, step 8, provides between 50 cents and \$1.25 per watt incentive, based on the energy efficiency of the project. When funding reservations reach 60 MW of capacity in step 8, new applicants must apply for funds at step 9, with lower per-watt incentives. Similarly, the incentive rate for qualified affordable housing projects also declines over time and is between \$1.50 and \$1.85 per watt.

To prevent overpayment of funds and discourage oversized systems, the NSHP has certain funding limitations. Incentives are limited to the first 7.5 kilowatts (kW) of a system for residential units and to no more than 75 percent of the total system cost for affordable housing units and 50 percent of total system cost for market-rate housing. In addition, applicants are not allowed to receive incentives from the NSHP if they have received incentives from another CSI program.

Guidelines

NSHP Program eligibility and application requirements are described in the *New Solar Homes Partnership Eligibility Guidebook*, which is in the ninth edition.² Since the program began, the Energy Commission has revised the guidebook regularly to reflect changes in law or market conditions, improve program efficiency, and ensure consumer protection.

Guidebook changes are discussed and adopted in a transparent public forum and are often initiated as a result of collaborative efforts between Energy Commission staff and external stakeholders. Energy Commission staff continuously work with all parties involved to consider requested guidebook revisions, respond to program issues, and make improvements to the program.

² The *NSHP Guidebook* is available at <http://www.gosolarcalifornia.ca.gov/about/nshp.php>

CHAPTER 2

Program Statistics

Cumulative Program Activity

Table 2.1 shows a snapshot of NSHP Program participation as of May 9, 2016, including the total number of applications under review and the number of reservations and installations since the program began. If all projects are completed, projects with active and completed reservations could account for 169 megawatts (MW) of solar generating capacity and \$242 million in incentives.³

Table 2.1: Program Activity as of May 2016

	Applications	Systems	\$ (Millions)	Megawatts
Under Review	167	5,354		
Reserved**	954*	28,823	95.3	97.3
Installed	2,536*	22,973	147.1	71.9
Total	3,657	57,150	242.4	169.2

Source: California Energy Commission, as of 5/9/2016.

* Payment claims are typically submitted for individual systems rather than an entire project so the number of reserved and installed applications may include projects that have not submitted payment claims for all systems within the project.

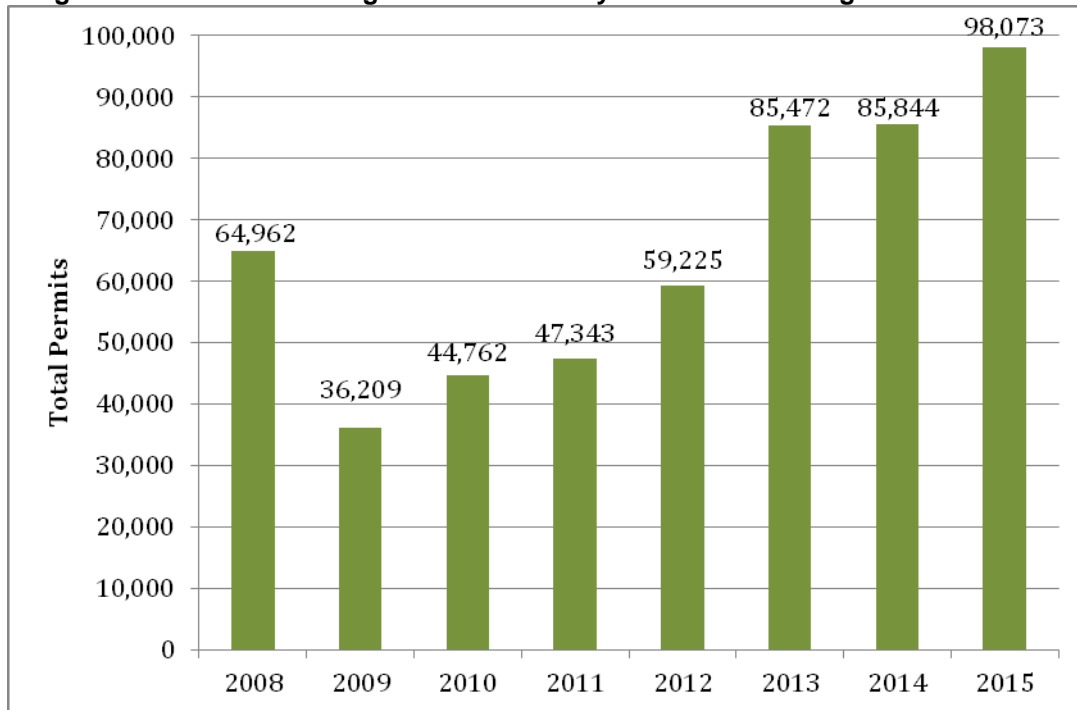
**A reservation application refers to imminent planned development that includes a solar energy system. It does not guarantee that an application will be approved or paid.

Program Activity by Year

One of the major challenges the NSHP Program faced was being launched in 2007 during one of the worst housing markets in California's history. Permits for new housing starts in California were at a historical low during the economic downturn, which reduced applications for NSHP funding.

³ A small portion of projects are never completed for various reasons, including ineligibility, application expiration, failure to reapply, or other circumstances preventing payment.

Figure 2.1: Permits for Single- and Multifamily California Housing Units 2008-2015



Source: California Homebuilding Foundation. Found at

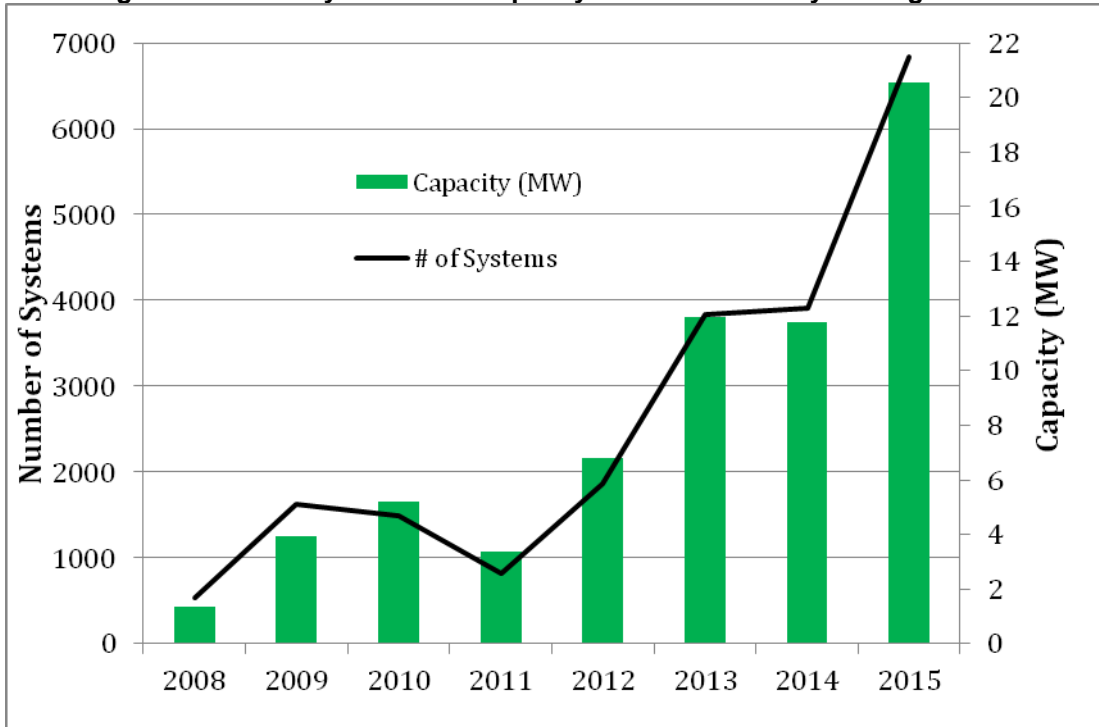
http://www.myCHF.org/uploads/5/1/5/0/51506457/original_historical_data_1954-2015.pdf.

As shown in Figure 2.1, housing starts for new homes have increased steadily since 2009, which was the low point of new home construction since the NSHP Program began.

However, due to general economic factors, including the gradual improvement of the new housing market in California and rising affordability of PV systems, the program has seen a large increase in activity in recent years, particularly since September 2014, when the Energy Commission resumed administration of the program.

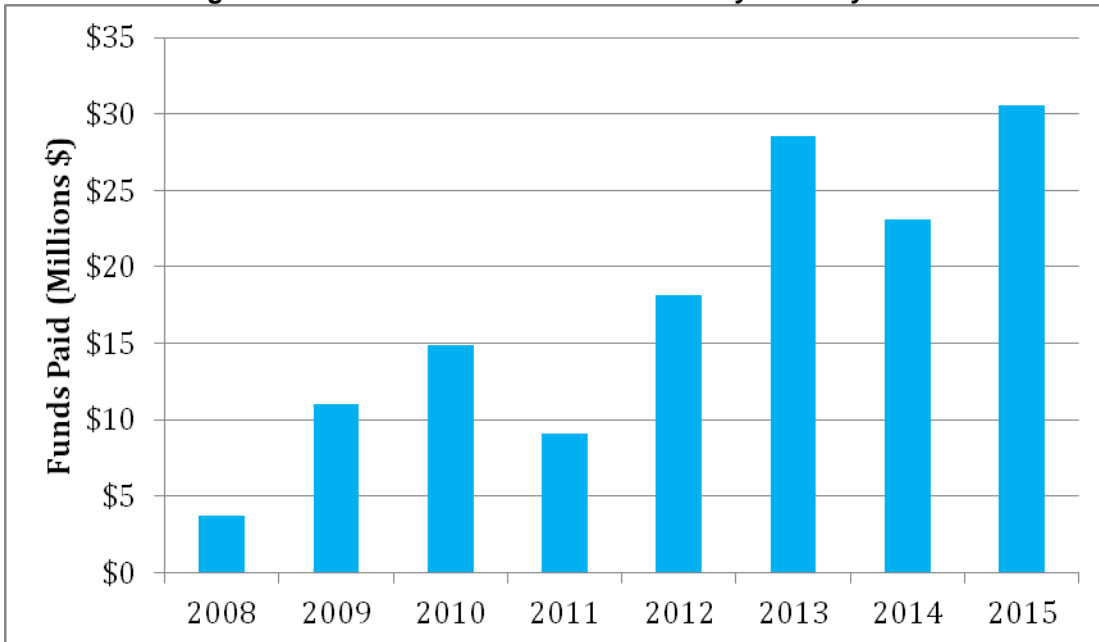
Figures 2.2 and 2.3 (below) illustrate the growth in the number of NSHP installations and corresponding MW capacity since 2011. In addition to a recovering new home market, collaboration between the Energy Commission and stakeholders to continuously improve and streamline the NSHP Program requirements has made the program more attractive.

Figure 2.2: Total Systems and Capacity Installed Annually Through NSHP



Source: California Energy Commission

Figure 2.3: NSHP Funds Paid for Installed Systems by Year



Source: California Energy Commission

Overall program trends and staff interviews with leading NSHP stakeholders indicate an upward trajectory in installations, generation capacity, and program activity. At the current rate of growth, provided the NSHP Program is fully funded, the Energy Commission anticipates a sharp increase in installed capacity to achieve the program goal of 360 MW by the time the program stops accepting new applications.

In addition to the economic recovery, the growth trends seen in the figures above indicate an increased commitment from large production homebuilders to integrate PV systems into new homes. In the early years of the NSHP Program, large production homebuilders were more likely to offer solar PV energy systems only on model homes or as an option. Solar PV-powered new homes are now increasing in popularity, especially in areas with excellent solar resources, which characterizes the majority of California. The homebuilding industry, particularly leading homebuilders like Lennar and KB Home, is starting to embrace solar as a standard feature of a home.⁴ In roughly 100 Lennar subdivisions throughout California, buyers move into a new home with solar panels already installed on the roof. As the nation's second-largest homebuilder, Lennar recently decided to expand that policy outside California into new communities in Colorado.⁵ The company typically retains ownership of the panels and signs 20-year agreements to sell homeowners the power from their rooftop systems at a 20 percent discount from the local utility's prices.⁶ KB Home, another large homebuilder in the United States, has expanded its solar program in Southern California due to the popularity of the program. Offering solar as a standard feature in new homes – similar to common household appliances – creates an opportunity to avoid the high transaction costs of solar retrofits and eliminates the need for homeowners to choose between adding solar versus other upgrades. Furthermore, having a solar PV system installed as part of a new home purchase offers the advantage of amortizing the cost of the system over the life of a home loan, such as a 30-year mortgage.

New homes offer system performance advantages unavailable in other PV market segments. For example, new homes can be designed prior to construction to optimize roof orientation, minimize shading, and reinforce structural support. In large new residential developments, costs can be reduced through bulk purchases and economies of scale in system design and installation.

As the rooftop solar market grows, state policies are increasingly focused on making solar PV accessible to all Californians, including affordable housing and low-income

4 Found at <http://www.planningreport.com/2014/10/08/lennar-and-sunstreet-energy-commit-offering-solar-systems-their-new-homes>.

5 Found at <http://www.planningreport.com/2014/10/08/lennar-and-sunstreet-energy-commit-offering-solar-systems-their-new-homes>.

6 Found at http://www.nytimes.com/2014/09/14/science/earth/sun-and-wind-alter-german-landscape-leaving-utilities-behind.html?_r=0.

communities. As mentioned, the NSHP Program provides higher incentives for eligible affordable-housing communities as part of the effort to build a broad-based, self-sustaining solar market in California. A case study of the NSHP Program by the Clean Energy States Alliance found that as of October 2014, 21 percent of systems and 25 percent of generation capacity were installed in communities with average household incomes below \$50,000.⁷ As of mid-February 2016, 6.22 MW of affordable housing systems have been installed through the NSHP Program, representing 9.2 percent of all installed capacity within the program. Moreover, \$19.1 million in rebates has been paid to these projects, representing 13.5 percent of all NSHP funding dispersed.⁸

⁷ Clean Energy States Alliance. *A Directory of State Clean Energy Programs and Policies for Low-Income Residents*. January 2016. <http://www.cesa.org/assets/Uploads/State-Low-Income-Programs-Dec2015.pdf>.

⁸ Data from California Energy Commission, February 2016.

Regional Statistics

The NSHP Program is available to customers of the four investor-owned utilities (IOUs) in California, including PG&E, SCE, SDG&E, and BVES. The utility service territories are shown in Figure 2.4.

Table 2.2 shows the approximate number of utility customer accounts for each of the four IOUs.

Table 2.3 and Figure 2.5 illustrate the differences between NSHP Program activities in Northern California versus Southern California. Northern California includes applicants that are customers of PG&E, and Southern California includes those that are customers of SCE, SDG&E, and BVES.

Figure 2.4: Investor-Owned Utilities in California



Source: California Energy Commission

Table 2.2: Approximate Customer Accounts by Utility

	PG&E ⁹	SCE ¹⁰	SDG&E ¹¹	BVES ¹²	Total
Northern California	5,400,000	-	-	-	5,400,000
Southern California	-	5,000,000	1,400,000	22,500	6,422,500

Source: Publicly available information from utility websites. See footnotes.

Northern California includes the population centers of the San Francisco Bay Area and the Central Valley region, while Southern California includes the Los Angeles Basin and the greater San Diego Area. Collectively, these regions account for more than 65 percent

9 Pacific Gas and Electric: <http://www.pge.com/en/about/company/profile/index.page>

10 Southern California Edison: http://newsroom.edison.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/166/files/20153/Newsroom%20Fact%20Sheet%2004222015.pdf

11 San Diego Gas & Electric: <http://www.sdge.com/aboutus>

12 Bear Valley Electric Service: <https://www.bves.com/about-us/>

of utility sales in California.¹³ The Sacramento Municipal Utility District and the Los Angeles Department of Water and Power are not eligible for the NSHP Program and serve most of Sacramento and Los Angeles Counties, respectively.

Table 2.3: Regional NSHP Statistics

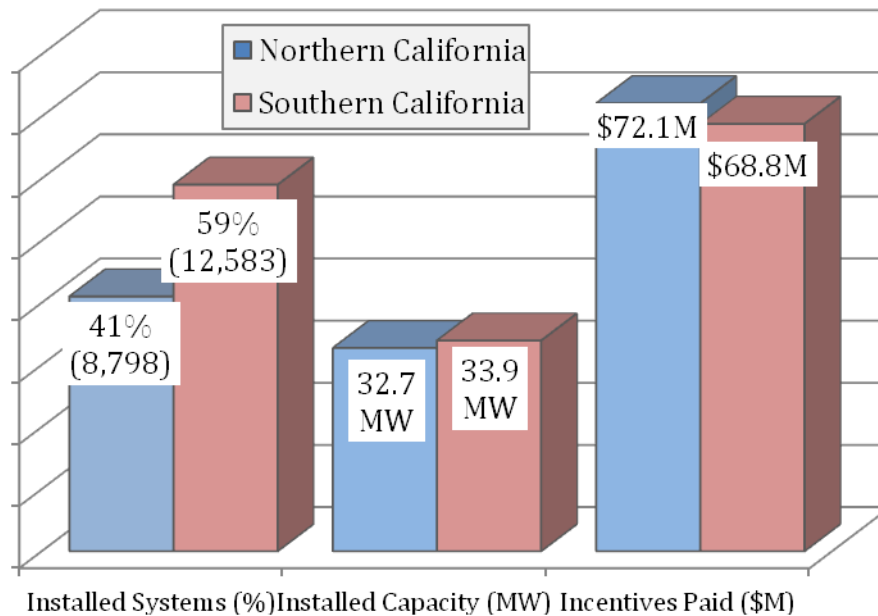
	Mean System Size (kilowatts)	Median System Size	Mean Rebate	Median Rebate
Northern California	3.72	2.33	\$8,200	\$5,303
Southern California	2.69	1.95	\$5,467	\$4,035

Source: California Energy Commission, as of 1/22/2016

The total quantity of PV installations in Southern California is larger than in Northern California due to the larger overall population, number of utility customers, and number of new home developments. However, despite the higher number of installations in Southern California, the generation capacity (and consequently the amount of NSHP funds) per installation is significantly less than in Northern California. As shown in Table 2.3, in Northern California the mean system size is about 1 kW larger than in Southern California, with a mean rebate several thousand dollars higher for the larger systems. The larger average system size is the reason total generation capacity installed is fairly close within the two regions, despite a 3:2 installation ratio in Southern California compared to Northern California.

¹³ Source: California Energy Commission, reflecting IOU utility retail sales in 2014.

Figure 2.5: NSHP Systems, Capacity, and Incentives by Region



Source: California Energy Commission, as of 1/22/2016

There are several factors responsible for the difference in average system size between the two regions. This is partly due to timing, as production builders in Northern California engaged strongly in program participation during the early incentive levels, when incentives were higher and could offset more of the costs of larger systems. As the incentive levels declined, participation among Southern California builders grew significantly, allowing the number of homes and total installed capacity to catch up quickly to those of Northern California, while receiving smaller rebates per site. Furthermore, production homes in Southern California tend to be smaller, which, in turn, results in smaller PV systems. Builders in Southern California are also more likely to use the NSHP Program to offset the cost of installing PV systems on a larger number of homes within each project, while builders in Northern California tend to install large systems on fewer top-tier homes within a subdivision.

Solar Penetration Rate

A recent field study by ConSol¹⁴ attempted to identify the percentage of new homes that are constructed with solar PV systems across California. The data pool featured homes under construction or recently built by the top 10 builders in the top five metropolitan statistical areas (MSAs) in California. The study found that 9.2 percent of homes built by these builders in the five MSAs in the first quarter of 2016 had solar PV systems

¹⁴ Data made available to the Energy Commission from ConSol. Received April 15, 2016, by ConSol.

installed. Moreover, the study found that solar PV systems were offered as an option in 25 percent of subdivisions.

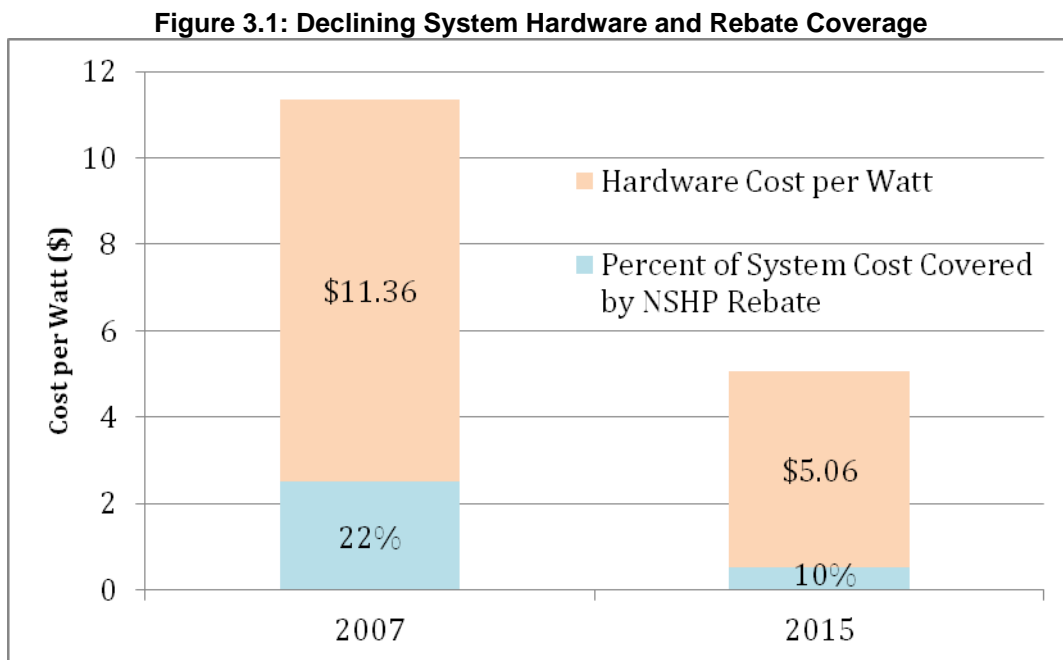
Many subdivision communities that apply for NSHP funds are outside the state's five largest MSAs and are not necessarily built by a top-10 homebuilder. Furthermore, major parts of Sacramento and Los Angeles are covered by electric utilities (municipal) that are not eligible for NSHP funding. Thus, the true solar penetration rate of NSHP-eligible new housing may vary from the reported rate in this study.

CHAPTER 3

Program Benefits

Reduced Solar Costs

To encourage solar cost reductions, the rebates of the NSHP Program decrease gradually in a series of steps once the megawatt (MW) target for each step has been reached. When the NSHP Program was launched in early 2007, applicants could expect to receive a rebate of \$2.50 per watt (step 1) based on system size and expected performance. Today, the rebate level is \$0.50 per watt (step 8). As illustrated in Figure 3.1 below, in 2007, the average gross system installation cost of solar PV installed under the NSHP Program was \$11.36 per watt; but by 2015, the cost had dropped to \$5.06 per watt, a reduction of more than 50 percent. The average percentage of the per-watt cost being covered by the NSHP incentive has also dropped by more than 50 percent, from 22 percent in 2007 to less than 10 percent today.



Source: California Energy Commission

Self-Sustaining Solar Market

One of the key goals of the NSHP Program, identified in SB 1, is a new home construction market in which solar energy systems are routinely installed on at least half of all new homes in the state by 2019. As system costs continue to decline, the decision to install solar energy becomes more economically desirable for homebuilders.

There are signs that momentum toward this goal is building. Lennar Corporation has committed to including solar on every new home in California. David Kaiserman, the president of Lennar and CEO of SunStreet Energy Group (a Lennar subsidiary), addressed the question of how long it will be before California solar incentives will no longer be necessary to encourage solar installations on new homes:

“We are closer today than we’ve ever been. The answer is very straightforward: volume. In order to bring volume up, you need cost-effective channels through which to deploy programs—channels without customer acquisition costs and channels that can scale.... If the production home-building industry were really to harness solar, its impact on the overall solar industry would be game-changing.”¹⁵

Lennar’s commitment to 100 percent solar indicates that although all homebuilders have not yet reached the point at which solar energy can be widely adopted on new homes without incentives, the NSHP Program is a significant factor in the decisions of the major market players.

Maintaining this momentum in the new residential solar market is crucial. Reaching the NSHP Program goal of installing 360 MW of solar generating capacity on new homes will bridge the gap to a self-sustaining solar market for new residential construction. Importantly, Senate Bill 83 (Committee of Fiscal and Budget Review, Chapter 24, Statutes of 2015) extended the life of the NSHP Program so that funds can be encumbered up until June 1, 2018, and payments can be made for installed systems through December 31, 2021. This extension gives builders the time and, assuming the NSHP Program is fully funded, financial support needed to make solar a standard feature in new home construction.

¹⁵ "Lennar and SunStreet Energy Commit to Offering Solar Systems in Their New Homes." Interview by David Kaiserman. *The Planning Report*, Oct. 8, 2014. Oct. 1, 2015. <<http://www.planningreport.com/2014/10/08/lennar-and-sunstreet-energy-commit-offering-solar-systems-their-new-homes>>.

Promoting Solar on Affordable Housing

In addition to supporting the overall new home solar market, the NSHP Program helps install solar on affordable housing projects. Although the cost of installing solar energy continues to decrease, it is still cost-prohibitive for a large segment of the population. California recognizes the importance of ensuring that low-income customers who contribute to the state's ratepayer-funded solar programs have equitable access to those programs. The NSHP Program therefore provides higher incentives for eligible affordable housing projects.

Figure 3.2: Spring Lake Community



ZNE rental community in Woodland
Photo by California Energy Commission

An example of the contribution of the program in this area is the Spring Lake Community in Woodland (Yolo County), an agricultural hub of the Central Valley just northwest of Sacramento. In February 2015, the Mutual Housing at Spring Lake subdivision community officially opened as the nation's first certified 100 percent zero-net-energy (ZNE) rental housing community. It features 62 apartment flats and townhouses, with 61 of the units designated as income-restricted affordable units. These units are targeted toward agricultural

workers and their families, who generally struggle to afford market-rate housing.

The ZNE community includes a 209 kW solar energy system that, as of May 2016, has reserved funds approved from the NSHP Program and has received payment for sites that have been completed. Along with the large PV system, there are other features that contribute toward making this community grid-neutral. Features include advanced energy efficiency devices, as well as water-saving technologies such as low-flow toilets, advanced showerheads that restrict water flow while the water warms to the desired temperature, and drought-tolerant landscaping.¹⁶ The community uses no natural gas, and each unit includes energy monitors that display real-time electricity demand. The community was awarded the 2015 Housing

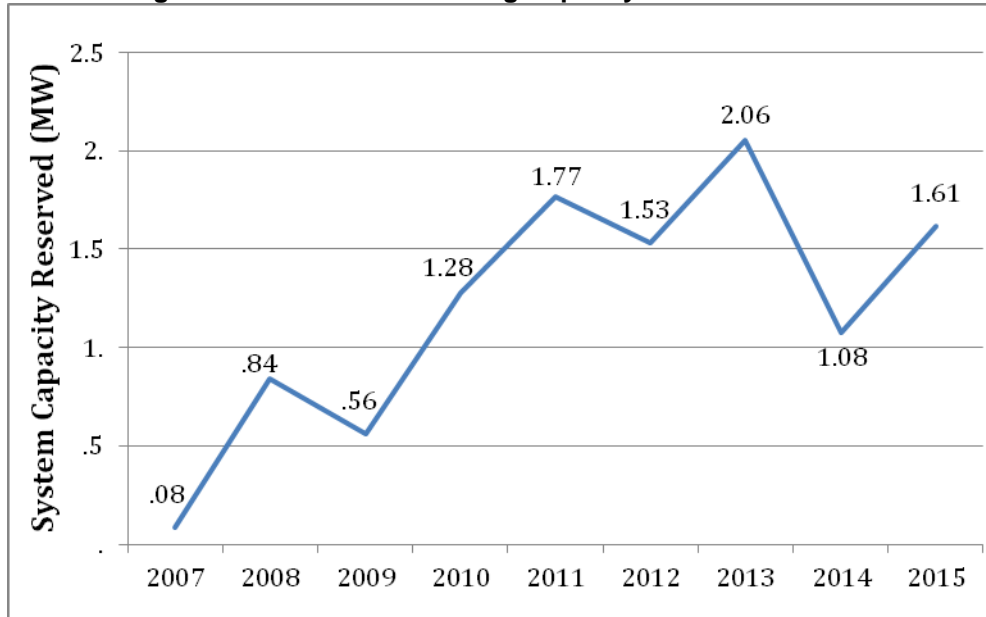
"The Legislature has supported policies such as MASH [Multifamily Affordable Solar Housing] and NSHP because they are designed to give an extra boost to a market that is difficult to transform," said Assemblymember Cristina Garcia (D-Bell Gardens). "These programs also support the financial innovation that must occur in order to ensure that solar is a mainstream alternative for not just a few, but for all communities in California."

– PR Newswire. "SolarCity Introduces New Solar Service for Affordable Housing Communities." CNNMoney. Cable News Network, 24 Sept. 2015

¹⁶ Mutual Housing at Spring Lake. Mutual Housing California. Accessed October 2, 2015. <http://www.mutualhousing.com/yolo-communities/spring-lake/>.

Innovation Award by the U.S. Department of Energy (DOE). While the DOE has certified thousands of energy-efficient homes through the Zero Energy Ready Homes program, this is the first ZNE community entirely for renters.

Figure 3.3: Affordable Housing Capacity Reserved in NSHP



Source: California Energy Commission

Accommodating New Financing Models

California solar incentive programs such as the NSHP Program have helped promote the rapid growth of solar energy, resulting in increased solar business innovation and investments, cost reductions, and technology improvements. While cost declines have made solar energy significantly more accessible to the average consumer, solar remains cost-prohibitive for many customers. There are, however, new alternative financing models that are helping address this challenge.

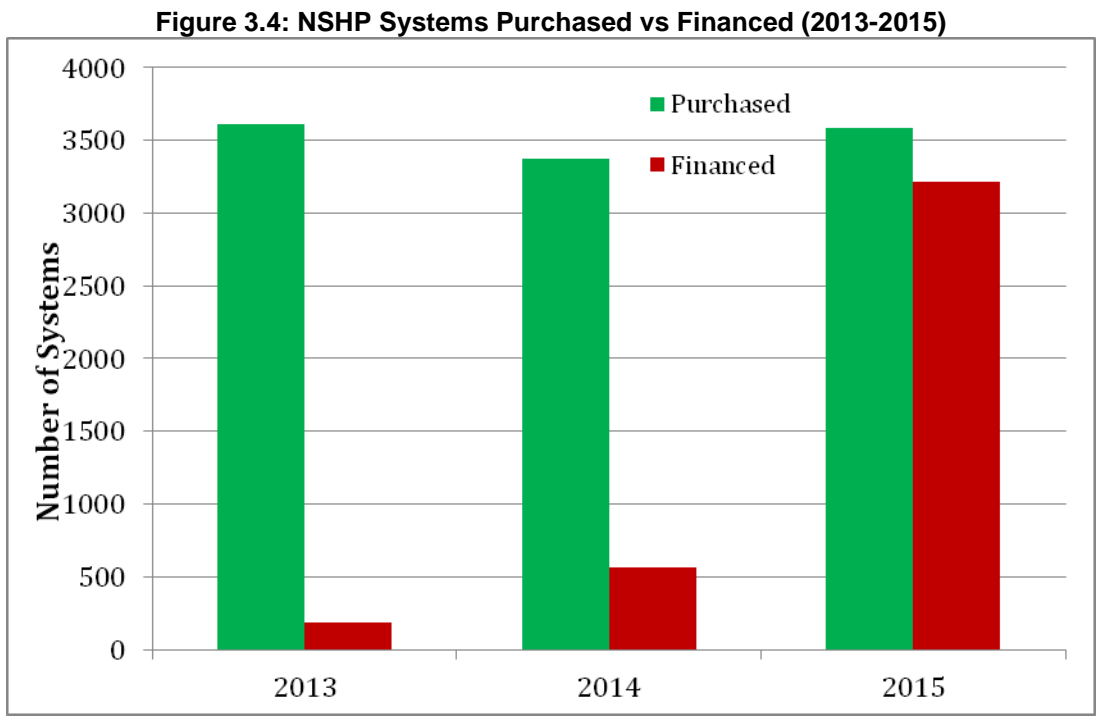
Through the use of leases and power purchase agreements (PPAs),¹⁷ more consumers from diverse economic backgrounds can take advantage of the benefits that solar energy has to offer. Customers can now spread the cost of their solar power system over time, rather than paying for the system up front. This payment option allows customers to install solar for little or no money down while realizing energy savings immediately.

In 2010, as a result of the increase in third-party financing options, the Energy Commission began allowing building owners to receive rebates for leased systems and solar PPAs. Since then, the use of third-party financing for solar energy has soared.

¹⁷ <http://www.seia.org/policy/finance-tax/third-party-financing>.

Figure 3.4 shows the dramatic increase in NSHP systems that used third-party financing (either leases or PPAs) over the last three years. Outright purchases appear to be flat as would-be buyers opt to finance their solar energy system. Ownership still remains an option, with many companies providing the opportunity to purchase the system at a fair market rate following the end of the lease or PPA term.

Property-assessed clean energy (PACE) helps home and business owners finance energy efficiency and renewable energy projects for their property. PACE is a voluntary program in which a home or business owner will receive financing from a local government and repay the upfront cost through a special assessment on his or her property tax over a fixed period.



Source: California Energy Commission

Acquiring a PV system is a long-term investment. With solar energy, there is the expectation for a return on investment from decreased utility bills. There are many factors that determine a break-even point in solar investment including system cost, utility net metering policies, actual system production, realized utility bill savings, and state solar policies. One estimated reported by CSI estimates an average payback period of 6-9 years, depending on the system cost.¹⁸ A solar energy system can also act as a hedge against future electricity rate increases. As a result, the rise of third-party financing is a promising development, especially for lower-income consumers who

¹⁸ Found at <https://energycenter.org/california-solar-initiative/homeowners/cost>.

benefit from the financial savings from installing a solar energy system. With more of these customers able to install PV systems, ideally the rate of solar adoption will continue to increase from the current high level. Furthermore, as research and development efforts continue to bring down the soft costs (that is, installation) of PV systems, the system price will likely continue to drop, allowing even more customers to take advantage of solar. While solar installation costs may continue to drop over time, they still represent a significant upfront acquisition cost. Third-party financing is therefore expected to remain a key factor in the ability for lower-income consumers to take advantage of solar energy.

While third-party financing has expanded consumer access to PV systems, barriers remain for many interested customers. Particularly, those that rent or are limited due to space or shading may be unable to install a rooftop PV system onsite. Fortunately, some programs are being developed to give more customers control over where their electricity is sourced. PG&E, for example, recently launched a community solar program that allows customers to pay a premium guaranteeing that a specified percentage of their electricity is from a nearby PV system.¹⁹ The program is targeted for those without access to PV systems, such as a renter in a high-rise building.

Supporting State Clean Energy Goals

Actions to protect the California lifestyle by reducing greenhouse gas emissions (GHGs) - including aggressive energy efficiency and renewable energy targets - continue to serve as a model for other states. The NSHP Program is one of many programs in the state that support the state's environmental sustainability and clean energy efforts.

Zero Net Energy Residential Buildings by 2020

The NSHP Program supports the state's goal for all new homes to be ZNE by 2020. Using energy efficiency measures and renewable on-site generation, ZNE buildings produce as much energy as they use over a year. California's Title 24 Building Energy Efficiency Standards have been moving toward ZNE requirements for the last two code cycles, allowing builders to become familiar over time with the energy efficiency measures needed in ZNE homes. The NSHP Program provides a similar "glide path" for incorporating solar into ZNE homes by familiarizing builders with the intricacies and challenges of installing solar in new construction and supporting the transition from solar as an option to solar as a requirement, expected to be adopted in the 2019 Title 24 Building Standards.

"KB Home is a leading builder of zero net energy homes in California. This would not be possible without the support of the NSHP Program."

*Jacob Atalla
Vice President, Sustainability
KB Home*

¹⁹ Found at <http://www.greentechmedia.com/articles/read/pge-launches-community-solar-program-enabling-customers-to-go-100-renewable>.

Renewables Portfolio Standard

California's Renewables Portfolio Standard (RPS) requires electricity suppliers to get 33 percent of their retail sales of electricity from renewable resources by 2020 (Senate Bill XI-2, Simitian, Statutes of 2011) and 50 percent by 2030 (Senate Bill 350, De León, Statutes of 2015). PV systems installed through NSHP are complementary to achieving the state's RPS targets. By meeting customers' electricity needs, they can reduce overall retail sales of electricity, thereby reducing the amount of renewable electricity generation needed to reach the 33 percent and 50 percent targets.

Greenhouse Gas Emission Reductions

Under the California Global Warming Solutions Act (AB 32, Núñez, Chapter 488, Statutes of 2006), California must reduce GHG emissions to 1990 levels by 2020. The electricity sector is expected to contribute at least 40 percent of the total statewide GHG reductions.²⁰ In Executive Order B-30-15, Governor Brown established a new target of reducing GHG emissions 40 percent below 1990 levels by 2030 to keep the State on track to achieve its long-term goal of reducing GHG emissions by 80 percent below 1990 levels by 2050.²¹

In the California Air Resources Board's 2008 *Climate Change Scoping Plan*, the NSHP Program is identified as one of the measures to reduce GHG emissions.

Reduced Water Usage

The NSHP Program may indirectly contribute toward reducing the amount of water used to cool conventional power plants by displacing generation from those plants.

Utility Bills and Property Value

An energy-efficient home coupled with a PV system results in a much lower utility bill for the average single-family home. This is especially important for less affluent households that may spend a disproportionate amount of their income on energy bills. In addition, a recent report shows that the risk of mortgage default is 32 percent lower in efficient ENERGY STAR®-rated single-family homes.²² As homebuilders continue to incorporate solar energy systems and move closer to ZNE residential construction, homeowners will likely see increased financial savings from lower energy costs.

In addition to reduced utility bills, a 2013 report by the Berkeley National Laboratory finds that PV systems command a significant premium on property values compared to

20 Found at <http://www.energy.ca.gov/2008publications/CEC-100-2008-007/CEC-100-2008-007-F.PDF>.

21 Found at <https://www.gov.ca.gov/news.php?id=1861>.

22 UNC Center for Community Capital, and Institute for Market Transformation. Home Energy Efficiency and Mortgage Risks. Rep. Institute for Market Transformation, Mar. 2013. Retrieved Oct. 2015.

properties that do not have a PV system installed.²³ Statewide, the report estimates a \$5,911 premium for each additional 1 kW in system size. The report also cites evidence in San Diego of a “green premium,” where the addition of solar increased the value of the home above the amount in energy savings and cost of the system.

Local Outreach

As part of the NSHP Program, the Energy Commission created the Local Government Outreach Program to give cities and counties online tools to encourage homebuilders to install solar PV systems on new homes.²⁴ This outreach has helped raise solar awareness in multiple municipalities and support important actions undertaken by several pioneering cities. In 2013, Lancaster became the first city in the nation to adopt an ordinance to require housing developers to install solar on new home construction,²⁵ with the ultimate goal of becoming the first zero-net-energy²⁶ city in California. Sebastopol followed in Lancaster’s footsteps and went a step further, mandating solar not only for new home construction, but for new commercial construction as well as additions to existing residential and commercial buildings.²⁷ Efforts on a smaller scale include the city of Mission Viejo’s waiver of permit fees for residential solar installations as part of a program to encourage more solar projects.²⁸

Educating Consumers

During the early years of the NSHP Program, many stakeholders expressed interest in a simple way to estimate the value of a solar PV system on new and existing residential construction. In response, the Energy Commission developed the Solar Advantage Value Estimator (SAVE),²⁹ an online tool that allows users to estimate the value of a solar PV system. SAVE estimates the present added value of a solar PV system installed on a residential building, including the estimated value of annual energy savings, based on the location of the home on which the solar PV system is installed. If the user received solar PV incentives from the NSHP (or predecessor, the Emerging Renewables Program), the specifications for the system are already preloaded in the tool. If solar PV system

23 *Exploring California PV Home Premiums*. Lawrence Berkeley National Laboratory, December 2013. Found at https://emp.lbl.gov/sites/all/files/lbnl-6484e_0.pdf.

24 Found at <http://www.energy.ca.gov/2009publications/CEC-180-2009-005/CEC-180-2009-005.PDF>.

25 Found at <https://energycenter.org/case-study-lancasters-zne-goal>.

26 Zero-net-energy (ZNE): A building in which the actual annual delivered electricity is roughly equal to the onsite renewable exported electricity.

27 Found at <http://www.greentechmedia.com/articles/read/solar-mandate-embraced-by-second-california-city>.

28 Found at <http://www.ocregister.com/articles/solar-686007-state-california.html>.

29 See <http://www.gosolarcalifornia.org/tools/save.php>.

information is not already preloaded in SAVE, the user can manually enter the system size (in watts) and approximate age. While several studies have been conducted regarding the “value” of PV on homes, these studies may have limitations since regional real estate markets are unique. The SAVE tool helps address these limitations as it is a portable tool that can be used in any part of the country, allowing the user to enter a custom residential utility rate that would match the given situation.

CHAPTER 4

Future Program Outlook

Maintaining financial support for programs that promote the adoption of clean renewable energy is vital to making solar a mainstream option. Although solar technologies have seen large reductions in hardware costs, California continues to see higher “soft” costs associated with PV installation than many other states. These costs include labor, taxes, fees, permitting, inspection, customer acquisition, interconnection, and other nonhardware costs.³⁰ In addition, despite the benefits of incorporating solar into new home construction, the solar PV market for new homes has seen slow growth because of the downturn in the housing market from 2007 to 2011 and the continued concern from builders about adding costs to the construction process. It is therefore important that programs like the NSHP Program continue to provide financial assistance so that California can achieve its energy and greenhouse gas goals, as well to improve accessibility to low-income communities.

Factors Affecting Program Participation

As interest in solar expands, participation in the NSHP Program is increasing. The Energy Commission expects this trend to continue based on the continued improvement of the housing market, changes to the program to expand eligibility, feedback from the solar industry, and the state’s commitment to ZNE homes. However, uncertainty regarding sufficient program funding could result in reduced program participation and potential stagnation of new home solar adoption.

Current Housing Market and Policy

A May 2015 economic forecast by the Center for Business and Policy Research indicates this housing-start growth trend will continue, with new housing starts estimated to increase by about 38 percent in 2019 compared to housing starts in 2015.³¹ The Energy Commission expects the combination of more new homes being built and increased consumer demand for solar on new homes to result in increased demand for NSHP Program funding as builders seek assistance to offset the upfront cost of incorporating solar as a standard feature in new developments.

Federal and state policies also contribute to current demand for PV systems. Since 2006, the federal government has provided a solar investment tax credit (ITC) to encourage

30 Feldman, David, Galen L. Barbose, Robert Margolis, et al.; *Photovoltaic System Pricing Trends: Historical, Recent, and Near-Term Projections*; August 25, 2015.
https://emp.lbl.gov/sites/all/files/pv_system_pricing_trends_presentation.pdf

31 Center for Business and Policy Research, University of the Pacific, found at <http://www.pacific.edu/About-Pacific/Newsroom/2015/May-Aug-2015/California-and-Metro-Forecast-May-2015.html>

the adoption of residential and commercial solar energy systems. In 2008, the ITC was modified and extended to the end of 2016 with households installing solar able to receive a 30 percent one-time tax credit to offset the cost of the system. In late 2015, the solar ITC was extended to 2021, with the tax credit declining from 30 percent until 2019 to 26 percent in 2020 and 22 percent in 2021.

California's net energy metering (NEM) rules allow eligible residents with rooftop PV systems to receive full retail value credit on their electricity bills for the excess electricity they produce. On January 28, 2016, the California Public Utilities Commission (CPUC) approved in a 3-2 vote a "NEM 2.0" contract or tariff that does not have a capacity limit, supports growth for solar energy, and prevents an unnecessary burden on utility customers that do not have solar energy systems installed. The decision "continues the existing NEM structure while making adjustments to align the costs of NEM successor customers more closely with those of non-NEM customers."³²

Expanded Program Eligibility

Given the increased efficiency achieved under the *2013 Title 24 Building Energy Efficiency Standards* put into effect in January 2014, NSHP Program eligibility expanded to include homes that meet, rather than exceed, the current Title 24 Standards. Before 2014, to be eligible for NSHP Program funding new homes had to exceed the current building efficiency standards by either 15 percent (Tier I) or 30 percent (Tier II). This restricted participation to applicants willing and able to incur the additional costs needed to construct homes significantly beyond the minimum energy efficiency standard.

The availability of the Code-Compliant incentive significantly expands the pool of eligible applicants and is expected to increase program participation. Increased participation will in turn raise solar penetration rates on new homes, which supports the state's goal of solar energy systems on 50 percent of new homes by the end of 2019.

The NSHP Program continues to provide higher incentives for solar projects that meet the Tier I and Tier II requirements to encourage builders to exceed current efficiency standards. Expanding eligibility for NSHP rebates to include homes that comply with rather than exceed the 2013 Title 24 Standards is still consistent with state energy efficiency policy goals, since California has consistently adopted the nation's most stringent efficiency standards, which are generally updated every three years. Since 1978, the building and appliance efficiency standards have saved Californians an estimated \$75 billion in electricity costs through energy-efficient building and appliance standards.³³ The Energy Commission's 2013 Title 24 Standards are roughly 25 percent more efficient than previous standards for residential construction and are expected to

32 California Public Utilities Commission, <http://www.cpuc.ca.gov/General.aspx?id=3934>.

33 Found at http://www.energy.ca.gov/renewables/tracking_progress/documents/energy_efficiency.pdf.

return an average net energy savings of more than \$3,910 per home over 30 years when considering added construction costs and decreased utility bills.³⁴

The “Glide Path” to Zero-Net-Energy Homes

The state’s ZNE goal³⁵ for new homes is being implemented in phases with each update to the Title 24 Building Energy Efficiency Standards, culminating in the release of ZNE requirements in the 2019 Standards that should take effect for new homes around 2020. The process to achieve ZNE homes requires a steep learning curve among homebuilders who must incorporate new technologies and practices that can be used in the construction of these buildings.

Under the current 2013 Title 24 Standards, many builders - especially those in Southern California - are installing solar and relying on the NSHP Program to offset the added costs of meeting minimum energy efficiency requirements.

The Title 24 *2016 Building Energy Efficiency Standards* were approved by the Energy Commission in November 2015 (effective January 1, 2017) and include a PV Offset Credit that helps builders comply by allowing installation of a PV system to offset the mandatory requirement of installing relatively expensive high-performance walls and attics. With the increasing pressure to achieve ZNE in new home construction, incentives from the NSHP Program allow builders to become familiar with the intricacies of solar installations and prepare for the mandatory requirements to come. Because the NSHP Program ends December 31, 2021, the overlap with the expected adoption of ZNE requirements in the *2019 Building Efficiency Standards* will promote a smooth transition for builders from solar as an option to solar as a requirement.

Funding Uncertainty

The NSHP Program funding authorized in statute is \$400 million. However, due to the expiration of the funding source of the program, the public goods charge, at the end of 2011, the program is underfunded. Based on program funding levels and activity as of May 2016, the NSHP Program could exhaust available funding around September 2016.

34 Found at http://www.energy.ca.gov/releases/2012_releases/2012-05-31_energy_commission_approves_more_efficient_buildings_nr.html.

35 Clean Energy Plan: https://www.gov.ca.gov/docs/Clean_Energy_Plan.pdf.

Table 4.1: NSHP Funding as of May 2016

Statutorily authorized funding (SB 1)	\$400 million
Collected monies through RRTF	\$288.22 million
Funding shortage	\$111.78 million
Current unencumbered funding	\$41.7 million
Applications submitted/under review	\$13.5 million
Funding available for new applications	\$28.2 million
Average encumbrances per month	\$5 million
Estimated remaining time before existing funds exhausted	~5 months

Source: California Energy Commission, as of 5/9/2016.³⁶

Insufficient funding will prevent the achievement of the policy and solar capacity goals of the NSHP Program. Uncertainty about the ability to secure this funding may affect builders and developers who are unwilling to plan for and install solar into their new developments without incentive support.

The Energy Commission is working to secure additional funding to bridge the gap between authorized and actual funding. On November 13, 2015, the Energy Commission submitted a request to the CPUC for additional funding to fill the current gap in funding. On May 2, 2016, the CPUC issued a proposed decision approving the request. A vote to approve the proposed decision is forthcoming, and a final decision is expected in June or July.

If additional funding is not secured by the time existing funds are exhausted, the Energy Commission will stop accepting new reservation applications and may consider establishing a waiting list for new applicants if there is a foreseeable path to acquiring new funding.

³⁶ Found at <http://www.gosolarcalifornia.ca.gov/about/nshp.php>.

Glossary of Terms

Affordable housing — housing units that are available on a restricted-income basis, typically a predefined percentage below median income of a local area.

Bear Valley Electric Service (BVES) — an electric utility that serves Big Bear Valley in the San Bernardino Mountains, a subsidiary of American States Water Company.

California Solar Initiative — California's solar rebate program for California consumers that are customers of the investor-owned utilities: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). The initiative also includes rebate programs offered in the dozens of publicly owned utilities throughout the states.

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.

Carbon footprint — the total amount of greenhouse gases produced to directly and indirectly support human activities, usually expressed in equivalent metric tons of carbon dioxide.

Emerging Renewables Program — a California program that provided rebates and production incentives to end-use consumers who purchased and installed renewable energy technologies, specifically small wind systems and fuel cells, for on-site generation. The program closed to new applications on June 27, 2012.

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

ENERGY STAR[®] — a U.S. Environmental Protection Agency voluntary program aimed at helping consumers save money and protect the environment through highly energy-efficient products.

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

Greenhouse gas (GHG) — a gas that traps heat in the atmosphere. Carbon dioxide is the most abundant greenhouse gas in the Earth's atmosphere.

Installed system - For this report, an installed system refers to an approved payment claim application (new home/unit). A system must meet all payment claim requirements to be approved and paid.

Investor-owned utility (IOU) — For this report, refers collectively to Pacific Gas & 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.

Low-income community — a community in which a large number of residents live at or below a defined income level. For the purpose of this report, it is a community in which the average household income is at or below \$50,000 per year.

Mean — the average value of a list of numbers.

Median — the “middle” value in a list of numbers.

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

Net energy 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 — a generator that is located close to the particular load that it is intended to serve.

Peak demand — a period in which electrical power is expected to be provided for a sustained period at a significantly higher than average supply level.

PG&E — Pacific Gas and Electric Company

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

Power purchase agreement — a financial arrangement in which a third-party owns, operates, and maintains the electric generating system, such as a photovoltaic system, and a customer agrees to site the system on its property and purchase the electricity of the system.

Project — “project” refers to all otherwise eligible generating systems installed during the term of the New Solar Homes Partnership Program at one 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.

Public goods charge (PGC) — a surcharge applied to the electric bills of ratepayers used to support energy efficiency, public interest research, development, and demonstration,

and low-income and renewable energy programs and collected under Public Utilities Code Section 399 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.”

Renewables Portfolio Standard (RPS) —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 California 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, and 50 percent no later than December 31, 2030.

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

Solar lease — a financial arrangement in which a homeowner leases solar photovoltaic panels from a third-party provider.

Title 24 Building Energy Efficiency Standards — a set of periodically updated energy efficiency requirements for residential and nonresidential buildings built in California.

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.

Zero net energy (ZNE) — generally defined as a building with zero-net-energy consumption where the total amount of energy used by the building annually is roughly equal to the amount of renewable energy created on the site.