

Decision 10-01-022 January 21, 2010

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Policies, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.

Rulemaking 08-03-008
(Filed March 13, 2008)

**DECISION ESTABLISHING THE CALIFORNIA SOLAR
INITIATIVE THERMAL PROGRAM TO PROVIDE
SOLAR WATER HEATING INCENTIVES**

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**DECISION ESTABLISHING THE CALIFORNIA SOLAR
INITIATIVE THERMAL PROGRAM TO PROVIDE
SOLAR WATER HEATING INCENTIVES**

1. Summary

This decision establishes a California Solar Initiative (CSI) Thermal Program to provide incentives to promote the installation of solar water heating systems in the territories of Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E) and Southern California Gas Company (SoCalGas). The CSI Thermal Program will be funded by \$250 million in collections from gas ratepayers, pursuant to Assembly Bill (AB) 1470 (Stats. 2007, Ch. 536), as well as up to \$100.8 million in funds already authorized and currently being collected through the general market CSI photovoltaic program and earmarked in Senate Bill 1 (Stats. 2006, Ch. 132) for solar thermal projects such as solar water heating. Monies collected under AB 1470 from gas ratepayers will fund incentives to solar water heating systems that displace natural gas usage, while funds collected through CSI from electric ratepayers will fund electric displacing solar water heating systems.

The CSI Thermal Program will be administered by PG&E, SCE, SoCalGas, and by the California Center for Sustainable Energy (CCSE) in the SDG&E territory. PG&E and SDG&E, in coordination with its program administrator, CCSE, will disburse incentives to both electric and gas ratepayers who install eligible solar water heating systems in their territories. SCE will disburse incentives through the CSI Thermal Program to customers who install electric displacing solar water heating systems. SoCalGas will disburse incentives to customers in its territory who install gas displacing solar water heating systems.

This decision sets forth the details necessary to implement the CSI Thermal Program, including program goals, technology eligibility, incentive structure, energy efficiency requirements, performance monitoring, program administration, budget and implementation timing.

2. Background

In early 2006, the Commission, in collaboration with the California Energy Commission, established the California Solar Initiative (CSI), a \$2.5 billion incentive program to promote solar development through 2016, to be funded from the distribution rates of gas and electric ratepayers. (See Decision (D.) 06-01-024.) At that time, the Commission stated its intent to consider incentives for solar water heating (SWH) as part of the CSI program, and directed San Diego Gas & Electric Company (SDG&E) to contract with California Center for Sustainable Energy (CCSE) (formerly the San Diego Regional Energy Office) to administer a pilot program for SWH incentives in the SDG&E territory. (*Id.* at 13.)

Subsequently, with the passage of Senate Bill (SB) 1 in August of 2006, funds for CSI were limited to \$2.16 billion and could no longer be collected from gas ratepayers. At the same time, SB 1 included a provision allowing \$100.8 million of total CSI funds to be used for incentives for solar thermal technologies, such as solar water heating. (See Pub. Util. Code § 2851(b).)¹ With CSI funding now limited to collections from electric ratepayers, the Commission concluded in D.06-12-033 that although CSI would include as part of its total budget \$100.8 million for incentives to solar thermal technologies, CSI should

¹ All statutory references are to the Public Utilities Code, unless otherwise noted.

only pay incentives to solar thermal technologies that displace electric usage. (D.06-12-033, Conclusion of Law 19 at 38.) The SWH pilot in the SDG&E territory, budgeted at \$3 million, was allowed to proceed to provide useful information on SWH incentives in general. (*Id.*, Conclusion of Law 20.)

In February 2007, the Commission approved the SWH pilot budget of \$2.59 million and the pilot began operation in the SDG&E territory on July 2, 2007, with a scheduled end date of December 31, 2008.² In D.08-06-029, the Commission made minor modifications to the pilot and allowed it to run until December 31, 2009 or until the budget is exhausted, whichever occurs first.

In late 2007, the Governor signed Assembly Bill (AB) 1470, authorizing the creation of a \$250 million incentive program to promote the installation of 200,000 SWH systems in homes and businesses that displace the use of natural gas by 2017. The statute requires the Commission to evaluate data from the SWH pilot and determine whether an SWH program is “cost effective for ratepayers and in the public interest” before designing and implementing an incentive program for gas customers. (Section 2863(a).)

3. Overview of Staff Proposal

On July 15, 2009, the Administrative Law Judge (ALJ) issued a ruling requesting comments on a proposal by the Commission’s Energy Division staff for an SWH incentive program as envisioned by AB 1470.³ The program would fund gas-displacing SWH systems on new and existing homes and businesses,

² See “Assigned Commissioner[s] and Administrative Law Judge’s Ruling Approving Solar Water Heating Pilot Program,” Rulemaking (R.) 06-03-004, February 15, 2007.

³ “Administrative Law Judge’s Ruling Noticing Workshop and Requesting Comment on Staff Proposal for Solar Water Heating Program,” R.08-03-008, July 15, 2009 (Staff Proposal).

and electric-displacing systems on existing homes and businesses. The Staff Proposal finds that an SWH incentive program can be cost-effective for ratepayers and in the public interest. Based on this finding, staff proposes establishing the CSI Thermal Program, which would provide incentives to both natural gas-displacing and electric-displacing SWH systems. Funding for the CSI Thermal Program would be derived from the \$250 million authorized in AB 1470 to fund gas-displacing systems, and the \$100.8 million for solar thermal incentives set forth in Section 2851(b).

Staff envisions the CSI Thermal Program would begin on January 1, 2010 and run for eight years, until December 31, 2017. This timeframe is in keeping with AB 1470, which focuses on promoting SWH installations by 2017 and contains a sunset provision repealing the statute on August 1, 2018.

(Section 2867.4.)

A workshop to allow interested parties to ask questions about the proposal and generate ideas for further consideration was held on August 3, 2009.

Comments on the Staff Proposal were filed by the Association of California Community and Energy Services (ACCES), CCSE, the California Solar Energy Industries Association (CALSEIA), the Commission's Division of Ratepayer Advocates (DRA), Ecoplexus, Inc., Environment California Research and Policy Center (Environment California), PG&E, SCE, S.O.L.I.D. USA, Inc. dba SOLID Energy (SOLID), Sopogy, Inc., The Utility Reform Network (TURN), and jointly by SDG&E and Southern California Gas Company (SoCalGas).

Reply comments were filed by ACCES, CCSE, CALSEIA, DRA, PG&E, SCE, SOLID, TURN, and jointly by SDG&E/SoCalGas.

In addition to the comments by parties listed above, several interested persons submitted letters to staff and the ALJ on the Staff Proposal, including the

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and the Solar Rating and Certification Corporation (SRCC). These letters were reviewed and placed in the correspondence file of this proceeding.

The Staff Proposal and parties' comments on specific issues within the proposal are discussed by issue in the sections that follow.

4. Cost-Effectiveness

AB 1470 states the Legislature's intent that the SWH incentives created by the act "should be a cost-effective investment by gas customers" and states that "gas customers will recoup the cost of their investment through lower prices as a result of avoiding purchases of natural gas, and benefit from additional system stability and pollution reduction benefits." (Section 2862(l).) The statute added Section 2863, which states in pertinent part that:

The commission shall evaluate the data available from the Solar Water Heating Pilot Project conducted by [CCSE]. If, after a public hearing, the commission determines that a solar water heating program is cost effective for ratepayers and in the public interest, the commission shall ... design and implement a program applicable to the service territories of a gas corporation, to achieve the goal of the Legislature to promote the installation of 200,000 solar water heating systems in homes and businesses throughout the state by 2017.

In the Staff Proposal, staff noted both the AB 1470 requirements and the Commission's prior concerns about the need for SWH incentives. In D.06-01-024, the Commission questioned the need for SWH incentives if SWH systems are already cost-effective for system owners without incentives. Thus, a threshold issue this decision must address is whether a program to provide SWH incentives is cost-effective for either gas or electric-displacing SWH.

In order to provide a recommendation on cost-effectiveness of an SWH incentive program, staff separately considered the cost-effectiveness of gas-displacing and electric-displacing SWH. For gas-displacing SWH, staff relied on the SWH Pilot Program Interim Evaluation Report (January 2009) (Interim Evaluation) prepared by Itron, Inc. for CCSE, and the Addendum (April 2009) to the Interim Evaluation, also prepared by Itron.⁴ The Interim Evaluation and Addendum used a methodology based on a modified version of the California Standard Practice Manual (SPM), which was originally developed for evaluating cost-effectiveness of the Commission's energy efficiency programs. Itron's analysis examined cost-effectiveness from three perspectives - the participating ratepayer (Participant Test), the non-participating ratepayer (Non-Participant or Ratepayer Test), and society as a whole (Societal Test). The Itron analysis also examined four scenarios, each with varying assumptions regarding market characteristics. The scenarios were: Present Day/2008, Business as Usual/2017 (BAU), Moderate Changes/2017 (MOD) and Greenhouse Gas Driven/2017 (GHG). Itron then performed sensitivity analyses involving different allocations of incentive dollars across single-family residential, multifamily, and commercial customer classes.

The Staff Proposal focused on Itron's Societal Test results, concluding the Societal Test is appropriate for determining whether a statewide SWH incentive program is cost-effective for ratepayers and in the public interest, as required by

⁴ The Itron reports are Exhibits 1 and 2 on the record of this proceeding. Both Itron reports can also be found at the following website:
http://energycenter.org/index.php/incentive-programs/solar-water-heating-pilot-program/swhpp-documents/cat_view/55-rebate-programs/172-swhpp/321-cpuc-documents.

Section 2863. As support for this view, the Staff Proposal notes the Commission's use of the Total Resource Cost (TRC) Test (similar to the Societal Test) when evaluating the Commission's energy efficiency programs, and that the Societal Test captures benefits that accrue to ratepayers and society more generally, such as avoided pollution, that are not included in either the Participant or Ratepayer Test.

According to the Staff Proposal, Itron's analysis shows that an SWH incentive program would be cost-effective under the MOD and GHG scenarios, which predict higher gas prices than the BAU scenario. For that reason, staff focused on the BAU scenario as the "worst-case," or most conservative scenario from the perspective of SWH cost-effectiveness. Itron performed a sensitivity analysis using the BAU scenario, which identified SWH system cost reductions as a potential driver of cost-effectiveness. Specifically, a 16% reduction in SWH system costs by 2017 increased the BAU benefit-cost ratio to 1.0 for the Societal Test. In addition, Itron found that, under the Societal Test, offering incentives to a mix of single-family, multifamily, and commercial SWH systems is slightly more cost-effective than offering incentives to only single-family residential customers in the GHG scenario, though slightly less cost effective in the BAU and MOD scenarios. The different customer types face different economics because of the structure of applicable gas and electric tariffs.

The Addendum concluded that the BAU scenario could result in a cost-effective SWH incentive program if the scenario incorporates an assumption of 16% cost reductions. In the Staff Proposal, Energy Division states its view that a 16% cost reduction is a reasonable expectation because it can be achieved through either a significant cost decline in a single cost category or small declines in several categories. To support this view, Energy Division notes that the

Interim Evaluation identified potential cost reduction opportunities in equipment costs, labor costs, marketing, and permitting, as well as citing SWH system cost declines of 30% between 1980 and 1990. Given these observations, the Staff Proposal concludes that it is reasonable to expect a decline of at least half that magnitude over the next decade as the SWH market grows.

The Staff Proposal recommends the Commission adopt Itron's cost-effectiveness analysis, as described in the Interim Evaluation and Addendum, to move forward with an SWH incentive program as set forth in AB 1470.

For electric-displacing SWH, the Staff Proposal analyzes whether solar water heating is cost-effective, without incentives, to replace electric water heating technologies. The Staff Proposal finds that without incentives, SWH is not cost-effective on single-family homes, although it is currently cost-effective in multifamily applications.⁵ Next, the Staff Proposal describes the results of the same Itron analysis applied to an electric-displacing SWH program. The Itron analysis shows an eight-year incentive program is cost-effective when analyzed using the Societal Test and the BAU, MOD, and GHG scenarios. Therefore, the Staff Proposal recommends the Commission adopt a program to offer SWH incentives to technologies that displace electric water heating, funded through the CSI \$100.8 million set aside for solar thermal technologies. Staff recommends the program pay incentives to single-family residential, multifamily, and

⁵ The Staff Proposal does not discuss the cost-effectiveness of replacing electric water heating in commercial applications, presumably because so few commercial customers use electric water heating.

commercial customers because all of these customers pay into CSI through assessments on their electric distribution rates.

4.1 Comments

Environment California, CALSEIA, and CCSE agree with the Staff Proposal's conclusions regarding cost-effectiveness of an SWH incentive program. These parties agree with the use of the Societal Test in the Itron Interim Evaluation.

In contrast, several parties raise issues with the cost-effectiveness analysis that the Staff Proposal relies on. TURN and DRA maintain the Commission should not rely on the analysis in the Staff Proposal because the cost-effectiveness analysis does not use a Commission adopted and publicly vetted methodology. Instead, the Interim Evaluation and Addendum use long-term estimates of costs, policies and market changes that are too uncertain. Moreover, TURN and DRA contend the analysis contains no evidence that prices will decline by the 16% necessary to make the BAU scenario cost-effective, and the MOD and GHG scenarios are unlikely. DRA requests that development of a statewide SWH program be suspended until a publicly vetted cost-effectiveness analysis can be performed. TURN opposes the idea of an SWH incentive program, alleging it represents a wealth transfer program funded by residential and small commercial gas ratepayers and benefitting health clubs, hotels, and restaurants.

The utilities, namely SCE, PG&E, and SDG&E/SoCal, all comment that the Itron analysis in the Staff Proposal is inconsistent with the cost-effectiveness tests used to evaluate energy efficiency programs and with the methodology recently adopted in D.09-08-026 for analysis of distributed generation (DG) programs. Specifically, the utilities criticize the Itron analysis for including

benefits not recognized in other tests such as avoided health costs and job creation, and assigning much higher values to carbon credits than used in other proceedings. PG&E claims the Commission should use the Ratepayer Impact Measure (RIM) Test rather than the Societal Test because the RIM test, by definition, is the appropriate way to measure whether a program meets the requirement in AB 1470 that a program is “cost-effective for ratepayers.”

4.2. Discussion

AB 1470 states the Legislature’s intent to reduce natural gas dependence because this dependence puts a strain on energy supplies and threatens California’s growing population and economy. The legislation notes the pollution and greenhouse gas reduction benefits of SWH, as well as the fact that growing demand for SWH systems can create job growth in California. The Itron report demonstrates the large amounts of gas utilized to heat water in California: 1,862 million therms per year for single-family residential water heating, 778 million therms per year for multi-family water heating, and 279 million therms per year for major sectors of the commercial market. Alternatives to gas and electric water heating can play an important role in achieving California’s aggressive goals to reduce natural gas usage and carbon emissions. Thus, it is clear that the proposed program to promote these alternatives, in order to make them mainstream and transform the market, meets the statutory requirement of being in the public interest.

Turning to cost-effectiveness, TURN, DRA, and the utilities are correct that the methodology used by Itron to examine the cost-effectiveness of an SWH incentive program is not entirely consistent with how we examine cost-effectiveness of our energy efficiency programs or our recently adopted methodology for DG programs. (See D.09-08-026.) Itron has included items as

benefits that have not previously been included when we run TRC or Societal

Tests, and certain inputs, such as carbon price and Market Price Referent (MPR)⁶ assumptions, differ from those used in other programs.

At the same time, AB 1470 charges the Commission with a unique obligation, to evaluate data from the CCSE SWH pilot and determine the cost-effectiveness of a statewide SWH program *prior* to its implementation. We did not make prior findings of cost-effectiveness for our Self-Generation Incentive Program (SGIP) or general market CSI programs. Further, there is no requirement that the Commission apply a specific methodology to meet the cost-effectiveness requirement in the statute.

In addition, it was necessary for Itron to perform its analysis and consider these potential program benefits prior to the issuance of a final decision on a cost-benefit methodology for DG in order for the Commission to consider development of a statewide SWH program in a timely manner and without undue delay. DRA asks us to gather further cost-benefit information, allow further proceedings on the appropriate methodology, and then re-do the cost-benefit analysis of the SWH pilot and a statewide program. This would delay our consideration of a statewide program by six months to one year. Such a delay in implementing a statewide program is, in our view, untenable. AB 1470 envisioned a 10-year SWH program when enacted in 2007, and at this point, only eight years remain for any program to run. We will not delay consideration of this program any longer.

⁶ As required by Section 399.15(c), the Commission adopted a MPR methodology to estimate the long-term market price of electricity for use in evaluating the reasonableness of prices of long-term power purchase agreements for Renewable Portfolio Standard (RPS)-eligible generation. (See D.08-10-026, where the Commission refined the MPR methodology.)

Given the variety of scenarios under which Itron's analysis found the program to be cost-effective, and additional factors that could also significantly improve the cost-effectiveness of the program (such as availability of low cost loans, and likely reductions in the costs of SWH systems), we find the analysis performed by Itron allows us to meet the obligations of AB 1470. The Itron analysis supports the conclusion that a program of SWH incentives will provide societal benefits over the life of the systems installed.

Although Itron uses the Societal Test as opposed to the TRC or RIM Test supported by other parties, we will focus on the Societal Test results because the Societal Test includes pollution and greenhouse gas reduction benefits and considers the other items, such as job growth and market transformation, that are enumerated as benefits in AB 1470.

PG&E states we should rely solely on the RIM Test because the legislation requires a finding of ratepayer benefits and the RIM Test is the appropriate measure of ratepayer impacts. We do not agree with PG&E's narrow interpretation of AB 1470. The bill asks us to determine whether an SWH program is "cost effective for ratepayers *and in the public interest*" and it finds that "gas customers will...*benefit from additional system stability and pollution reduction benefits.*" (Section 2862(l), emphasis added.) Thus, we do not find it appropriate to limit our analysis of cost-effectiveness to the RIM Test. Instead, we will use a test that considers broader societal impacts of a statewide program. As AB 1470 points out, ratepayers will derive benefits from pollution reduction, system stability, job growth, and SWH market transformation. Thus, we find it appropriate to use a test that considers ratepayer impacts as well as broader societal benefits.

Next, we find staff's analysis of the cost-effectiveness of incentives for electric-displacing SWH is reasonable and we will adopt it as well. Few parties commented on this portion of the Staff Proposal. We agree with the Staff Proposal that it is not cost-effective for SWH to replace electric water heating for residential customers without incentives. We also agree that it is reasonable to offer the program to all customer types because all customers pay into CSI through their distribution rates, in order to fund incentives to electric-displacing SWH systems. We agree with staff's assessment that it is unlikely many businesses in California use electric water heating. Thus, we expect commercial participation in the program to be minimal.

5. Goals, Strategy and Program Design Principles

The Staff Proposal suggests four primary goals for the CSI Thermal Program, which are to:

- Significantly increase the size of the SWH market in California by increasing the adoption rate of SWH technologies, including:
 - Achieving the installation of natural gas-displacing systems that displace 585 million therms;
 - Achieving the installation of electric-displacing SWH systems that displace 150 megawatts (MW) by the end of 2017; and
 - Achieve an expansion of the market for other solar thermal technologies that displace natural gas and electricity use, in addition to SWH.
- Support reductions in the cost of SWH systems of at least 16% through a program that increases market size and encourages cost reductions through market efficiency and innovation;
- Increase consumer confidence and understanding of SWH technology and their benefits; and

- Engage in market facilitation activities to reduce market barriers to SWH adoption, such as high permitting costs, lack of access to information, and lack of trained installers.

Although AB 1470 sets a program goal of the installation of 200,000 SWH systems, the Staff Proposal translates this goal into 585 million therms, which is the equivalent natural gas displacement provided by the installation of 200,000 single-family residential systems.⁷ According to staff, this approach is taken because reducing California's dependence on natural gas and displacing fossil energy usage are noted in AB 1470 and are primary program goals. In addition, staff notes that the Interim Evaluation found that paying incentives to larger commercial and multi family SWH projects is more cost-effective than funding only small, residential systems. Staff reasons that setting goals and paying incentives based on energy displacement will promote the deployment of the most cost-effective SWH systems across all customer classes.

For SWH incentives that displace electricity, staff proposes a goal of installing systems with a combined capacity that is equivalent to 150 MW of photovoltaic capacity. This goal is derived by assuming the average single-family SWH system displaces 2735 kilowatt-hours (kWh) of electricity per year. Dividing this quantity of energy by the amount of energy that a kilowatt (kW) of photovoltaic (PV) will produce (1752 kWh per year assuming a 20% capacity factor) equals 1.56. In other words, the typical residential electric-displacing SWH system displaces an amount of electricity that is equivalent to what would be displaced by a 1.56 kW PV system. If we assume an

⁷ Assuming the average residential SWH system displaces 117 therms per year over a 25-year system life, total thermal displacement is calculated as follows:

$$117 \text{ therms/year} \times 25 \text{ year life} \times 200,000 \text{ systems} = 585 \text{ million therms displaced.}$$

average incentive for electric-displacing SWH systems of \$1000, the \$100.8 million budget available for electric-displacing solar thermal technologies can support 100,800 systems. This is equivalent to approximately 157 MW of solar PV,⁸ which the Staff Proposal suggests rounding downwards to a goal of 150 MW.

Next, staff proposes a program strategy and design principles that address the barriers to growth in the SWH market in California, namely installation costs, lack of public knowledge about SWH, permitting costs and requirements, and a potential shortage of experienced installers. The first barrier is addressed through incentives to lower the upfront cost of SWH installation. The latter three barriers can be mitigated by targeted market facilitation and outreach expenditures.

5.1. Comments

In response to the Staff Proposal, SCE and Environment California disagree with a goal based on therms displaced. These parties state that AB 1470 calls for a program to not only reduce demand for natural gas but also to spur a self-sufficient SWH market in California. Both SCE and Environment California urge program goals based on the number of system installations to aim the program at developing a thriving single-family residential SWH market.

In contrast, Sopogy and CALSEIA support a program goal based on total natural gas displaced. CALSEIA suggests the Commission could revisit this goal annually to review whether all market segments are participating in the program and if program adjustments are necessary. Despite its support, CALSEIA cautions that focusing the program on therms displaced and

⁸ 100,800 systems x 1.56 kW = 157,248 kW = 157.2 MW.

rewarding high performance systems may lead to oversized systems, which in turn could lead to overheating and reduced system life. CALSEIA recommends rewarding systems that are “properly sized and installed.”

Regarding electric-displacing SWH incentives, PG&E and CALSEIA agree with the proposed program goal of displacing 150 MW.

TURN provides comments on the overall program design. Instead of an incentive program, TURN urges the Commission order the utilities to fund a revolving fund to provide zero-interest financing for commercial entities, and possibly for residential customers, to install SWH systems as part of an expanded “on-bill financing” program. According to TURN, numerous studies point to upfront costs as a key barrier to SWH installation and a financing program could overcome this hurdle without relying on ratepayer subsidies.

PG&E claims TURN’s suggestion for a loan program is redundant and unnecessary since SWH systems are already eligible for on-bill financing programs approved as part of 2009-2011 energy efficiency programs. SDG&E/SoCalGas oppose on-bill financing, noting the long paybacks of residential equipment are not conducive to on-bill financing as longer loans increase the risk of defaults. CALSEIA disagrees with TURN’s proposal and recommends implementation of an incentive program first, with consideration of a loan program at a later date.

5.2. Discussion

First, with regard to a program goal based on thermal displacement, we agree with the Staff Proposal that a primary goal of the program envisioned by AB 1470 is reduction in natural gas usage. We also note that Section 2863(b)(2) allows the Commission latitude to design a program to reach “the equivalent output of 200,000 [SWH] systems.” Staff’s Proposal explains how displacement

of 585 million therms is the equivalent of 200,000 residential SWH systems. Staff's approach blends efforts to achieve both residential and commercial installations, similar to the program design reviewed by Itron to maximize program cost-effectiveness. If we were to focus exclusively on a residential system installation goal, as SCE and Environment California suggest, we would potentially sacrifice some level of program cost-effectiveness, and fail to stimulate the market for commercial systems. We must balance the multiple goals enumerated in AB 1470 which include spurring installations, developing a thriving SWH market, reducing natural gas demand and the greenhouse gases created by natural gas consumption, and creating a program that is a cost-effective investment for gas customers.

Given the language in Section 2863(b) and our desire to balance all of the program goals enumerated in Section 2862, we find it appropriate to adopt a program goal based on the displacement of natural gas equivalent to 200,000 systems. We will also adopt staff's proposed goal of installing systems with a combined capacity equivalent to 150 MW of PV systems, but we will characterize it in a slightly different way. Specifically, we will set a goal for electric-displacing SWH systems in terms of kWh displacement, as this is more consistent with our thermal displacement goal for gas-displacing SWH systems. If we use the assumption that the \$100.8 million budget can provide an average \$1,000 incentive to 100,800 systems, then collectively, these systems will yield electricity savings of approximately 275.7 million kWh per year.⁹ We therefore adopt an electric-displacing SWH system goal of 275.7 million kWh, which

⁹ 100,800 systems x 2735 kWh per system per year = 275.7 million kWh per year.

represents the amount of electricity that should be displaced on an annual basis by electric-displacing SWH systems by the end of 2017.

Regarding CALSEIA's concern that our goal could lead to oversized systems, we will direct the program administrators (PAs) to propose methods to counteract this incentive as part of the Program Handbook, discussed further in Section 6.2. For example, the PAs could require applicants to provide data on the number of building occupants using hot water, and use that information to properly size SWH systems.

We also adopt the other program goals and design principles enumerated by staff, which were not strongly contested by the parties.

In response to TURN's request for on-bill financing rather than up-front incentives, we agree with CALSEIA that we should establish the incentive program first, and consider financing alternatives at a later date, if they do not materialize on their own. As the Staff Proposal notes, the implementation of this incentive program could help facilitate third-party loan programs, such as the municipal financing programs that have recently developed and work in concert with both our CSI PV incentive program and the energy efficiency programs administered by the IOUs. We agree with TURN that convenient and attractive financing can play an important role in improving the overall cost-effectiveness of solar water heating, as indicated by the Itron Report . Therefore, we encourage parties to evaluate the manner in which AB 811, or Property-Assessed Clean Energy (PACE) municipal financing programs, and other low cost loans can be made available to help support solar water heating deployment. With regard to TURN's on-bill financing proposal specifically, many questions remain about the total costs of these programs, which, rather than guaranteeing to improve the cost-effectiveness of the measures they

support, have their own costs when supported by ratepayer funds. Such proposals need to be assessed with regard to the balance of expenditures for utility-arranged loans versus incentive programs. Furthermore, due to the constraints of federal and state consumer lending laws, on-bill financing programs are available only for non-residential customers at this time. The Commission noted concerns about the need to look at both utility incentive program costs and on-bill financing costs in D. 09-09-047 (p. 289-90). In light of this, we will not pursue on bill financing for solar water heating as an additional element to an incentive program at this time.

6. Technology Eligibility

Pub. Util. Code § 2864 requires that the Commission, in consultation with the California Energy Commission (CEC), shall establish eligibility criteria for SWH systems receiving gas customer funded incentives. According to the code, eligibility criteria should include:

- Energy output or displacement standards. Residential SWH systems shall have Solar Rating and Certification Corporation (SRCC) OG-300 SWH System Certification. Solar collectors used in multifamily residential, commercial, or industrial water heating shall have SRCC OG-100 SWH System Certification;
- Components must be new and unused;
- SWH collectors must have a warranty of not less than 10 years;
- SWH systems must be in buildings connected to a natural gas utility's distribution system;
- SWH systems must have meters or other kilowatt thermal (kWth) measuring devices to monitor and measure system performance and the quantity of energy generated or displaced by the system. Meters are required for systems displacing over 30 kWth; and

- Systems must be installed in conformity with manufacturer's specifications and all applicable codes and standards.

In addition, Pub. Util. Code § 2865 requires the Commission to establish conditions for gas customer funded incentives, including:

- Appropriate siting and installation to maximize performance of the system;
- Appropriate energy efficiency improvements in the home or commercial structure where the SWH system is installed; and
- Rating standards for equipment components and systems.

The Staff Proposal notes these requirements in AB 1470 for systems displacing natural gas, recommends a program that includes all of these requirements, and incorporates these eligibility criteria and conditions into the Program Handbook. Staff recommends that some of these items be further developed by the Program Administrators in the Program Handbook development process, namely siting and installation conditions and energy efficiency improvements. With regard to rating standards for systems and components, staff recommends that systems meet the OG-100 and OG-300 certifications.

For SWH systems that displace electric usage, the Staff Proposal recommends the same requirements apply, except where requirements specific to electric-displacing systems are explicitly discussed.

In addition to these requirements in AB 1470, the Staff Proposal recommends that the CSI Thermal Program provide incentives to other, i.e., non-SWH, solar thermal technologies, such as solar assisted space heating and cooling and solar thermal used for commercial and industrial processes, as long as the customer would otherwise have consumed gas or electricity from the

utility to serve that application. Solar pool heating and passive solar technologies would not be eligible under this program.

Finally, staff notes that if SWH becomes mandatory for new home construction, new homes should not be eligible for incentives under the program.

6.1. Comments

The bulk of the comments did not take issue with the detailed eligibility requirements and conditions in AB 1470. Instead, the comments focused on staff's suggestion to expand the program beyond SWH systems to include non-SWH solar thermal technologies.

CALSEIA recommends the Commission focus its current efforts on implementing incentives for SWH systems for residential and commercial customers that displace natural gas or electricity usage. They note that combination, or "hybrid," systems that provide both SWH and space conditioning or electric generation, would require the Commission to establish criteria for rating system performance and to further examine rebate levels. CALSEIA suggests this is more appropriate for a later phase of this rulemaking, so that incentives for SWH systems can begin immediately.

Similar to CALSEIA, PG&E agrees that the initial program should be limited to SWH systems that displace natural gas and electricity. While PG&E generally agrees that non-SWH gas displacing technologies should be eligible for incentives, it notes that Itron's cost-effectiveness analysis did not include these technologies. On that basis, PG&E recommends these technologies be given incentives only on a pilot basis, subject to an incentive cap. PG&E and ASHRAE both suggest that non-SWH systems should only receive incentives based on actual system performance. SDG&E/SoCalGas note that a cost-sharing

mechanism, such as a co-funding agreements between SoCalGas and SCE, will need to be developed for combination systems that displace both gas and electric usage and are installed by customers in the territories of SoCalGas and SCE.

A letter from ASHRAE confirms that criteria need to be established for defining the non-SWH equipment that might qualify for this program, since OG-100 and OG-300 do not apply to thermal heating or cooling. A letter from SRCC notes that it is in the process of developing a certification standard for concentrating solar collectors. This new certification, SRCC OG-600, should be available by January 2010.

Conversely, CCSE and Sopogy urge the Commission to move forward with providing incentives to non-SWH solar thermal systems. CCSE supports incentives to non-SWH solar thermal technologies, although it notes these technologies do not have SRCC standards, and the SRCC currently has a two-year certification backlog. Therefore, CCSE suggests the Commission establish a Technical Advisory Committee (TAC) to define eligibility standards for these technologies and approve substitution of components such as storage tanks and solar collectors. Sopogy cautions against using OG-100 and OG-300 as eligibility criteria since these standards exclude technologies outside a narrow temperature band suitable for domestic hot water and lower temperature applications. Sopogy suggests other technologies not covered by these criteria have met other performance thresholds and are in use in other countries.

Environment California takes a measured approach, contending the CSI Thermal Program should encourage emerging SWH technologies while at the same time ensuring the majority of funds are spent on technologies that have the greatest potential to be brought to scale and transform the SWH market. To

achieve this, Environment California suggests a cap on new technologies, but does not provide details on how such a cap might work.

6.2. Discussion

There is no dispute that we must incorporate the requirements of Sections 2864 and 2865 into our CSI Thermal Program. Although these requirements pertain to systems displacing gas usage, for ease of implementing our program quickly we will require all systems, both gas-and electric-displacing, to meet the conditions and eligibility criteria in Sections 2864 and 2865. The CSI Thermal program administrators (PAs)¹⁰ shall ensure these requirements are incorporated into the Program Handbook.

We clarify that in order to be eligible for gas-displacing SWH incentives, an applicant must be a gas customer of PG&E, SDG&E or SoCalGas and installing SWH on a new or existing home or business to replace gas water heating.¹¹ To be eligible for electric-displacing SWH incentives, an applicant must be an electric customer of PG&E, SCE, or SDG&E and installing SWH on an existing home or business to replace electric water heating.¹²

We also specify that the PAs must develop appropriate siting, and installation guidelines for Commission approval and inclusion in the CSI Thermal Program Handbook. System type, sizing, and freeze protection standards are critical installation issues that can ensure systems maximize

¹⁰ Program Administration is discussed in detail in Section 9 below.

¹¹ We agree with staff that if SWH becomes mandatory for new home construction, new homes shall not be eligible for gas-displacing incentives.

¹² We will not allow new homes or businesses to be eligible for electric-displacing incentives at this time. The CEC administers electric-displacing solar incentives for new homes.

performance. SRCC suggests the Commission adopt procedures for system type selection based on climate, sizing procedures, and inspection protocol. We agree and will direct the Energy Division to hold a workshop on this topic to assist the PAs in developing these guidelines for incorporation into the CSI Thermal handbook. The PAs should develop procedures specifying that systems be sized with consideration to the solar fraction applicable to the system's climate zone to prevent oversizing and overheating of systems. Freeze protection standards should be climate-zone specific. Single-family residential system tank size should be based on the number of persons in the household, while commercial and multifamily systems should follow ASHRAE guidelines on sizing. System sizing requirements should also consider the impact of appropriate energy efficiency improvements, as discussed in Section 11 below. Moreover, we direct that guidance on system sizing requirements be included in installer training funded through this program.

In comments on the proposed decision, DRA urges the Commission to adopt increased warranty requirements for SWH installations beyond the 10-year warranty on solar collectors required by § 2864. In developing the program handbook, Energy Division may consider applying increased warranty requirements beyond those required by the statute, with consideration given to balancing increased warranty costs with adequate consumer and ratepayer protection for SWH investments.

To ensure that all eligibility criteria and conditions are enforced, we will require the PAs to inspect the first three installations performed by every installer, and random inspections thereafter. The percentage of systems inspected randomly should be determined in consultation with Energy Division as part of the CSI Thermal Program Handbook process.

Another key issue parties raise is whether we should offer incentives to non-SWH solar thermal systems, or combination systems that are not currently SRCC certified, and whether we should consider paying these systems on a performance basis based on actual system output over a longer time period. We agree with CALSEIA and PG&E that our initial focus should be providing incentives for SWH systems that have SRCC OG-100 and OG-300 certification. Indeed, for the portion of the program funded by AB 1470, the statute explicitly requires residential systems to have SRCC OG-300 certification and multifamily residential, commercial, and industrial systems to have SRCC OG-100 certification. Therefore, we will authorize SWH incentives only for electric-and gas-displacing SWH systems that have SRCC certification.

Although CCSE and Sopogy urge us to relax this certification requirement, the statute requires certification for gas-displacing systems, and we will use the same requirements for electric-and gas-displacing systems, at least at the outset. To the extent SRCC adopts certifications for concentrating solar collectors, as its comments suggest, the PAs may request Handbook modifications to include these systems in the program. The Staff Proposal recommendation to provide rebates for non-SWH solar thermal projects will be addressed later in this rulemaking, as will the concept of paying incentives on a performance basis rather than in an up-front lump sum. We will direct our Energy Division to hold a workshop on the issue of eligibility of non-SWH solar thermal technologies that displace gas usage and meet other program requirements such as SRCC certification. A key question for the workshop to address is how to estimate these technologies' thermal displacement for incentive calculation purposes and whether incentives should be paid on a performance basis. Electric-displacing non-PV solar thermal projects may currently apply for

incentives through our general market CSI program. Staff should consider whether lessons learned through CSI can apply to gas-displacing non-SWH solar thermal projects to speed their ability to take part in this program.

7. Incentive Design

The Staff Proposal recommends up front incentives for both gas-and electric-displacing SWH funded through the CSI Thermal Program. Incentives would be calculated based on estimated first-year therm or kWh displacement of the SWH system. According to the proposal, the incentives are set at levels sufficient to offer SWH system owners a reasonable return on their investment. All customer classes would be eligible for incentives, but applicants must be customers of PG&E, SCE, SDG&E, or SoCalGas.

7.1. Gas-Displacing Incentives

For natural gas displacing SWH systems, the proposed incentive rates would decline over the eight years of the program in four steps, as shown in the table below on a per therm basis:

Table 1: Proposed CSI Thermal Natural Gas-Displacing Incentive Structure

Step	Incentive per therm displaced	Incentive for average Residential SWH system ¹³
1	\$12.82	\$1,500
2	\$10.26	\$1,200
3	\$7.69	\$900
4	\$5.13	\$600

The actual incentive paid to any qualified system would be derived by multiplying the system’s estimated first-year thermal displacement based on its

¹³ Staff assumes the average residential gas-displacing system will displace 117 therms per year. The Staff Proposal does not include average incentive projections for commercial systems because commercial systems vary greatly in size and design.

SRCC rating by the incentive rate. (Further details on the incentive calculation are discussed in Section 7.3.) The table also indicates the total incentive payment an average system can expect to receive. According to the Staff Proposal, the incentives represent roughly 30% of installed cost for the average residential system, similar to CSI incentive levels for PV systems.

The Staff Proposal recommends an incentive cap for residential systems of 125% of the average incentive in that step. For example, in Step 1, the incentive cap is 125% of \$1,500, or \$1,875. The cap is based on staff's analysis that the highest performing systems displace 145 therms per year, making them eligible for incentives of \$1,859, or just under a 125% cap. For multifamily and commercial systems, the cap would be \$150,000.

Incentive declines would be triggered by the total installed capacity of confirmed reservations, measured in annual energy displacement, in each utility service territory and for each customer class.¹⁴ Staff further recommends that the natural gas program incentive budget be apportioned 40% for residential customers and 60% for commercial customers. The 40% reserved for residential customers would be further divided so that 10% of the total budget is reserved for single family homes and 30% is reserved for multifamily residential properties.

In regards to gas-displacing incentive design, we must resolve four key issues, namely incentive rate, how the incentives decline, an incentive cap, and whether and how to allocate percentages of the incentive budget for residential and commercial customers. We address each issue in turn below.

¹⁴ See Table 19 of Staff Proposal.

7.1.1. Incentive Rate

CALSEIA recommends increasing the incentive level in Step 1 to \$2000 and eliminating Step 4, to ensure customer interest at the start of the program and to provide a higher initial rebate. SOLID also suggests elimination of the lowest Step 4 incentive. Ecoplexus contends that a minimum of 25% of the budget should be allocated to Step 1 incentives.

We find that the Staff Proposal contains a thorough analysis of the proposed incentive levels, noting that the average incentives paid will represent roughly 30% of the installed cost of a system. We agree with the staff recommendations and will adopt the four incentive rates, although we will make a minor decrease to the incentive level in the last step in order to fund more systems at the Step 1 level while maintaining our overarching thermal displacement goals. We do not want to eliminate the fourth incentive step entirely, because we think the four steps are a key to achieving market transformation. At the same time, we agree with those parties who ask for more incentive dollars in the early stages of the program to generate greater interest and opportunity at the start of the program and thereby potentially “jump start” the SWH market.

Rather than increase the incentive rate in Step 1, as CALSEIA suggests, we will apportion more of the incentive budget to Step 1, decrease the budget allocation in Steps 2 and 3, and decrease the Step 4 incentive level to \$4.70 per therm displaced. Staff had proposed \$30 million at the Step 1 incentive level, which we will increase to \$50 million in order to provide more systems a higher incentive rate. The table below indicates the adopted incentive structure and shows that with this reapportionment, we can still achieve our system equivalent thermal displacement goal.

Table 2: Adopted CSI Thermal Gas- Displacing Incentive Structure

Step	Incentive for Average Residential SWH System	Funding Amount	Incentive per Therm Displaced	Therms Displaced Over System Life ¹⁵
1	\$1,500	\$50,000,000	\$12.82	97,500,000
2	\$1,200	\$45,000,000	\$10.26	109,687,500
3	\$900	\$45,000,000	\$7.69	146,250,000
4	\$550	\$40,000,000	\$4.70	212,727,275
	Total	\$180,000,000		566,164,775¹⁶

7.1.2. Incentive Declines

CALSEIA proposes the Commission adopt a 30-day notice before incentive levels drop to allow the SWH industry time to adjust their marketing in advance of a rebate drop. We will not adopt this suggestion, as we have not used this structure in our other rebate programs such as CSI, where incentives drop based on the demand. We prefer the same structure here, where demand for the incentives drives the decline in the incentive rate. If we provided 30-day notice in advance of incentive declines, that would likely cause a rush of applications prior to the drop and cause us to spend more incentive dollars than budgeted at a given level.

Therefore, we choose not to give 30-day advance notice of incentive declines, but we will require the PAs to use the same process established in the general market CSI program wherein PAs post weekly information on their program websites (as well as the statewide Go Solar California website) about program participation and applications so applicants can gauge whether

¹⁵ This analysis assumes a 25-year system life.

¹⁶ The 566.1 million in total therms displaced is 97% of the 585 million program goal in the Staff Proposal. Additional therms will be displaced by the low income SWH incentive program, when adopted.

incentives may drop soon. In addition, we will require the PAs to provide written notification of incentive reductions by letter to the ALJ, with a copy to the service list of this or any successor proceeding, within five business days following a reduction.

Moreover, we clarify that we adopt the Staff Proposal that step changes will move independently in each service territory and for each class of customer. This will ensure that incentive declines are driven by demand in each customer class, and single-family residential incentives are not driven down by high participation by commercial projects, or vice versa. Therefore, similar to the general market CSI program, incentives for each customer class and program administrator may vary based on demand in that program administrator's territory. For example, residential customers in the SCE territory may be at the Step 1 level, while residential customers of PG&E are in Step 2, and commercial/multifamily customers for both utilities may be in Step 3.

7.1.3. Incentive Caps

Environment California comments that a maximum incentive per installation is reasonable given limited program funds. Further, it suggests the \$150,000 cap for commercial projects decline along with the incentive levels. PG&E supports a cap to protect against a few large systems receiving all the funding and to assist in market transformation.

CALSEIA does not believe an incentive cap is necessary because other program provisions will create a natural cap on system size. Sopogy contends a cap would artificially constrain opportunities to reduce natural gas consumption. CCSE also opposes an incentive cap because it might deter participants from purchasing expensive, higher performing systems. Ecoplexus opposes the \$150,000 cap on commercial and multifamily systems.

We agree with the staff recommendation to cap incentives for residential applicants at 125% of the average residential incentive. As pointed out by SDG&E/SoCalGas, the incentive caps help ensure the program promotes a higher quantity of installations, in keeping with AB 1470. Although SOLID recommends limiting incentives to no more than 50% of capital costs for a single project, with a cap of \$5 million per project, we do not agree with this approach. We had a similar provision at one time in SGIP, and removed it because of concern that projects were inflating capital costs to raise their incentive payment. In addition, a cap of \$5 million for any one project represents too large a share of any one utility's budget for SWH. If a large portion of the incentive budget is absorbed by only a few projects, this will inhibit our efforts to ensure that many installers are able to access the program, promoting competition in the SWH market.

We will, however, raise the incentive cap on commercial systems to \$500,000, to promote participation by larger systems. Despite comments asking for a much larger or no cap on incentives, we prefer to keep a cap of \$500,000 for commercial and multifamily systems until we have explored the application of performance based incentives to pay systems based on their productivity and output rather than an up-front incentive payment based on an estimation of output. Energy Division may review the caps after there is one year of program data or in conjunction with application of performance based incentives, and may propose handbook changes regarding the caps, which would be handled by Commission resolution. Energy Division may alter the maximum incentive per customer, but must do so within the total incentive budget for the program, which only the Commission may modify by considering modification of this decision.

7.1.4. Incentive Budget Allocations

Environment California and CCSE agree with separate funding allocations for single-family and multifamily customers. CCSE and CALSEIA request flexibility to move funds between these two categories, and they suggest that commercial and multifamily allocations can be combined into one category to simplify the program and recognize that commercial and multifamily projects are often similar. TURN contends multifamily should be considered part of the residential customer class.

Environment California objects to the allocation of only 10% of funds for single-family installations based on its contention that residential customers will contribute substantially to the program and this market represents tremendous opportunity for market penetration and renewable energy investment. Therefore, it recommends an equal distribution of funds across the three market sectors, namely single-family, multifamily, and commercial. SOLID disagrees with Environment California's proposal to reserve 33% of funds for the residential market, citing the high up front costs of commercial SWH systems. SOLID suggests a split that is 20% residential, 5% small multifamily/commercial, 15% large multifamily and 60% large commercial.

SDG&E/SoCalGas disagree with specific budgets for each customer class, noting that AB 1470 does not require this. They contend that budget categories could increase administrative costs. If funds are allocated by customer class, they recommend flexibility and fund-shifting rules should funds in one class be exhausted. Likewise, Ecoplexus sees no reason to separate classes, preferring the program dollars be distributed based on actual demand.

PG&E recommends one funding category for all residential and one for all commercial customers. PG&E contends that allocating 40% of the budget to residential customers and 60% to commercial customers is not consistent with the Itron analysis which was 60% residential, 26% multifamily, and 14% commercial. However, PG&E's comparison is flawed, since PG&E refers to the portion of the Itron's analysis involving the percentage of systems installed, not the percentage of the budget allocated to that group.

We agree with the concept in the Staff Proposal to allocate the incentive budget across residential and commercial customer groups, to ensure that funds are reserved for residential projects. While the Itron analysis indicates that commercial projects are expected to be slightly more cost-effective than residential projects, we also note that the residential and multi-family markets are significantly larger than the commercial market, both in number of potential participants and the overall amount of gas and electricity used for water heating purposes. We agree with those who suggest we apportion a larger percent of the incentive funds for single-family residential projects. We will increase the 10% suggested by staff for single-family residential customers to 40% of the total incentive budget, in order to allow greater program participation by residential customers and the installers who serve them.

At the same time, we agree that multifamily projects are more similar to commercial installations, so we will combine our allocation for multifamily with commercial, and allow 60% of the incentive budget for commercial and multifamily projects. While we do not specify percentages for multifamily and commercial within this category, we do expect that not all of these funds will be spent on commercial projects and that a significant portion will be made available to multifamily projects. In addition, we will allow the

PAs the flexibility to move funds from the commercial/multifamily budget to the single-family residential budget, but not vice versa.

Energy Division should monitor program implementation and notify the ALJ and assigned Commissioner if there are great disparities in participation between the residential and commercial/multifamily categories, so the Commission can consider adjusting these budget allocations. If it appears that Step 1 incentives allocated to support single-family residential SWH systems will be exhausted much earlier than those incentives allocated to commercial and multifamily systems, the Commission may consider shifting incentive dollars to allow a greater number of single-family residential systems to be installed at the Step 1 incentive level.

The table below summarizes the incentive structure, namely the incentive rates, the budget allocations in each step for single-family residential and commercial/multifamily projects, the thermal capacity displaced, and the equivalent residential systems that will be installed under each step. Incentives decline when program administrators accept applications and confirm reservations to pay incentives to their qualifying applicants equal to the budget allocation for the customer class in each step.

Table 3: Gas-Displacing Incentive Structure by Customer Class

Step	Customer Class	Incentive per therm displaced	Budget Allocation	Annual Therms Displaced (in thousands of therms)	Equivalent Single-Family Residential Systems
1	Single Family Residential	\$12.82	\$20,000,000	1560	13,334
	Commercial/multifamily		\$30,000,000	2340	20,000
	Subtotal		\$50,000,000	3900	33,334
2	Single Family Residential	\$10.26	\$18,000,000	1755	14,992
	Commercial/multifamily		\$27,000,000	2632	22,493
	Subtotal		\$45,000,000	4387	37,485
3	Single Family Residential	\$7.69	\$18,000,000	2340	20,000
	Commercial/multifamily		\$27,000,000	3510	30,007
	Subtotal		\$45,000,000	5850	50,007
4	Single Family Residential	\$4.70	\$16,000,000	3404	29,094
	Commercial/multifamily		\$24,000,000	5106	43,647
	Subtotal		\$40,000,000	8510	72,741
	Total		\$180,000,000	22,647	193,567

7.2. Electric-Displacing Incentives

For electric-displacing SWH systems, staff proposes incentives calculated based on estimated annual kWh displacement of the SWH system. The proposed incentive rate for all customer classes is 37 cents per kWh displaced in the first year, which is based on an average incentive of \$1,000 per system. A cap of \$1,250 per residential system and \$100,000 per commercial system would also apply.

According to the Staff Proposal, the incentive paid to electric-displacing systems is lower than the incentive to gas-displacing systems because SWH systems that displace electricity are closer to cost-effective for the system owner. The Commission could reconsider the incentive level after two years and consider reducing it based on market growth or SWH prices.

Unlike staff's proposal for gas-displacing SWH incentives, staff recommends that for electric-displacing systems, the incentive rate remain constant over the duration of the program because electric water heating is used

in only about 10% of California homes. Given this small market size, staff claims that incentive declines are unlikely to drive market transformation and are unnecessary. In addition, staff does not suggest designating funds for residential or commercial customer classes, but instead suggests that no more than 80% of total incentive funds can go to multifamily and commercial customers.

However, the Itron analysis and Energy Division report indicate that there is very little commercial electric water heating, and in fact, no analysis of cost-effectiveness was performed for commercial systems given the dearth of such customers. Therefore, we would expect that the majority of the funds for electric-displacement projects will go to residential and multifamily installations. While we do not impose a specific budget allocation between residential and commercial funding at this time, we expect the PAs and Energy Division to monitor the distribution of funds between customer types and advise us if a cap or other limitation appears warranted in the future.

Another key difference in the proposal for electric-displacing SWH incentives involves coordination with the general market CSI program. Because the \$100.8 million to fund electric-displacing SWH systems comes from the general market CSI budget, staff proposes that the CSI Thermal PAs estimate the electricity displacement value of these systems in order to count these non-PV solar technologies towards the MW goals in each general market CSI incentive step level. Staff recommends using the methodology developed in the CSI program to estimate the electricity displacement associated with SWH systems and use that kW capacity value to count the total MWs of SWH installed.

7.2.1. Incentive Rate, Caps and Declines

CALSEIA recommends that SWH systems that displace electricity receive the same incentive level as a gas-displacing system. We do not agree. We find that staff provided a thorough and competent analysis that lower incentive levels are justified when solar is installed to replace electric water heating, given the economics of electric versus natural gas water heating. We will adopt the initial 37¢ per kWh rate proposed by staff.

CALSEIA disagrees with the proposed cap of \$1,250 for residential systems, because the lower rebate level for electric-displacing SWH may cause customers to install larger PV systems to heat water instead. TURN maintains that incentives for electric-displacing systems should decline in the same manner as gas-displacing incentives. PG&E suggests incentive levels decline on a yearly basis, depending on the adoption rate of these technologies. We find that staff’s proposed incentive caps are reasonable, but we agree with TURN that electric incentives should decline in the same manner as gas-displacing incentives, because the systems fundamentally rely on the same technology with the only difference being the fuel they replace. We adopt four declining incentive steps, which decline in the same percentages as the gas-displacing incentives in Table 2 as follows:

Table 4: Electric-Displacing Incentive Structure

Step Level	Electric-Displacing Incentive (\$/kWh)	Incentive for Average Residential System
1	0.37	\$1010
2	0.30	\$820
3	0.22	\$600
4	0.14	\$380

As incentives decline under the gas-displacing program, a corresponding reduction should occur to the electric-displacing incentive. That

is, each PA will offer incentives to electric-displacing systems at the corresponding step level that is offered to gas-displacing systems. For example, if PG&E is offering residential customers Step 2 incentives for gas-displacing systems, it should offer residential customers Step 2 for electric-displacing systems. The cap for residential incentives will also decline and be based on 125% of the average residential incentive in that step, as shown in the table above. For example, the cap in Step 1 is \$1,262.50, or 125% of \$1,010. The cap for commercial systems will be \$250,000.

7.2.2. Counting Electric Displacement

CCSE, CALSEIA, and PG&E recommend that incentives for electric-displacing SWH from CSI funds be counted against the last CSI incentive step to lessen disruption to the CSI PV incentive program. They note that Step 10 of the general market CSI program for PV has the highest target of 350 MW and the lowest incentive level. They contend that counting electric-displacing incentives against this last step will result in greater administrative simplicity.

We agree with these parties and will adopt their proposal to count electric-displacing SWH installations against Step 10 of the general market CSI program to minimize the effect of these installations on incentive levels for PV systems. (See D.06-12-033, Appendix B, Table 2 for current megawatt and budget allocations in each CSI incentive step.) In other words, every dollar of incentive paid to electric-displacing systems will come from Step 10 of the general market CSI program, which is budgeted at \$105 million. If the Step 10 budget is insufficient, the PAs may use funds from Step 9 as well. We note that because electric-displacing SWH systems will be funded using the CSI budget that was allocated to support PV installations in Step 10, a high volume of electric-displacing SWH installations will materially impact the total capacity

that will be installed in Step 10 (and possibly Step 9) of the CSI program, and thus the total capacity of PV that the CSI program will yield overall.

7.3. Incentive Calculator

Staff proposes that the CSI Thermal program administrators should develop an on-line incentive calculation tool to estimate natural gas or electricity displacement for SWH systems based upon system location, design and expected performance. To calculate incentives for single-family residential SWH systems, Energy Division recommends using the SRCC OG-300 estimation of annual energy savings combined with the Solar Orientation Factor (SOF), which is calculated by measuring the tilt and compass orientation, or “azimuth,” of the SWH installation. For commercial and multifamily SWH systems using SRCC OG-100 certified equipment, Energy Division recommends the program administrators build or license an internet-based incentive calculation tool that uses currently available tools, such as F-CHART or TRNSYS software, to estimate annual savings for custom designed systems.

CALSEIA recommends the Commission allow use of other performance modeling tools to estimate system performance, such as T-Sol, Polysun, and Retscreen. In addition, CALSEIA recommends that systems be sized based on actual metered hot water demand. CCSE recommends the Commission form a Technical Advisory Committee (TAC) to decide on the most appropriate software for calculating incentives.

SOLID suggests that production based incentives are critical and recommends using actual first-year useful energy production to calculate incentives paid after one year, rather than an upfront rebate based on a production estimate. In response, CALSEIA contends that performance based

incentives should be considered at a later date so as not to delay the program start date.

SCE urges the Commission to minimize program administration complexity for the electric displacing component of CSI Thermal. SCE notes that solar water heaters have a median installation cost of approximately \$5,600 to \$7,400, and it therefore urges a simplified program design involving a “one step” process and a simplified upfront performance estimation tool that balances simplicity with cost.

We adopt staff’s proposal that single-family residential incentives should be calculated based on the SRCC estimation of annual energy savings combined with the Solar Orientation Factor. Further, we direct the PAs to develop an on-line incentive calculation tool to calculate commercial and multifamily incentives that estimates natural gas or electricity displacement based on system location, design, and expected performance. At the same time, we agree with the parties that suggest the need for further stakeholder input on technical considerations to assist the PAs with this task. We are sympathetic to SCE’s concern for a simplified estimation tool and application process.

Therefore, we will direct our Energy Division to hold a workshop on the subject of the incentive calculator. A primary purpose of the workshop should be to consider the advantages and disadvantages of the various incentive calculation software tools and assist the PAs in developing the incentive calculator in time for the anticipated program start date and inclusion in the Program Handbook.

8. System Performance Monitoring

Section 2864 requires that SWH systems that displace over 30 kWth of natural gas be equipped with meters or other kWhth measuring devices to

monitor and measure the system's performance and the quantity of energy generated or displaced by the system.

The Staff Proposal goes beyond the minimum monitoring required by the statute and recommends that *all* non-residential SWH systems, both electric or natural gas-displacing and regardless of size, include performance monitoring and metering equipment and make performance data available to program evaluation contractors for a minimum of five years. For residential systems, staff suggests that metering equipment be installed on a representative sample of systems for five years to verify expected performance and to provide program evaluation data.

Given the requirement in Section 2864 for monitoring equipment on systems over 30 kWth, we have little room for deviation from the Staff Proposal except for systems under 30 kWth or electric-displacing systems. PG&E comments that monitoring equipment should only be required for very large non-residential systems, but it does not define "very large." CALSEIA asks the Commission to conduct a survey of monitoring equipment availability, costs, and reliability to determine if it can be installed at a reasonable cost. The findings of this survey could help determine if metering and monitoring should be a standard feature on all SWH systems. SDG&E/SoCalGas contend it is more cost-effective to install metering on a random sample of non-residential systems, and that the appropriate sample size should be determined through the measurement and evaluation process. Environment California contends monitoring can be a financial burden for customers. Therefore, it contends monitoring equipment should not be required for smaller systems.

We will modify the Staff Proposal, in part, and require performance monitoring and metering equipment only for SWH installations with a capacity

of displacing over 30 kWth that receive incentives under this program. For systems displacing 30 kWth and below, we adopt the Staff Proposal that metering and monitoring equipment should be installed for program evaluation purposes on a sample of these systems – including residential, commercial, and multifamily properties. The cost for monitoring equipment on this sample will be borne by the PAs through their measurement and evaluation (M&E) budgets. The sample size will be determined through the M&E process, in consultation with Energy Division, and discussed further in Section 13 below. The PAs should identify projects to be monitored as soon as possible in the application process, and the PAs should arrange for the installation of monitoring equipment as close as possible to the installation of the project.

SCE recommends that a meter socket should be required on every solar energy system that is installed so that the PA or utility can perform M&E at any SWH location. A meter socket might also prove useful for advanced metering capability and to comply with future renewable energy market verification standards. CALSEIA opposes SCE's meter socket proposal as complex and costly. We agree with CALSEIA and will not require this extra equipment on every installation at this time. Of course, customers who install SWH systems are free to add the meter socket at their own expense. The PAs should include information about the value of SWH system metering and monitoring in all of their customer education materials.

9. Program Administration

9.1. Administrative Structure

The Staff Proposal recommends a single administrative structure, namely the CSI Thermal Program, to administer all SWH incentives, whether for systems that displace electricity or those that displace natural gas. The

Staff Proposal envisions that the CSI Thermal Program would be administered by the same administrators as the general market CSI program, namely PG&E, SCE, and CCSE in the SDG&E territory. In addition, SoCalGas would administer the CSI Thermal Program in its territory for its gas customers.

Specifically, PG&E and SDG&E, in coordination with its program administrator, CCSE, will disburse incentives to both electric and gas ratepayers who install eligible SWH systems in their territories. SCE will disburse incentives through the CSI Thermal Program to customers who install electric-displacing SWH. SoCalGas will disburse incentives to customers in its territory who install gas-displacing SWH.

In comments on the Staff Proposal, Environment California disagrees with staff's proposal to use the utilities and CCSE, instead recommending that the SWH program should be administered by a single non-profit entity in order to minimize confusion for consumers interested in solar power. PG&E, SCE, and SDG&E/SoCalGas oppose Environment California's suggestion for centralized, third-party administration. PG&E comments it has a proven track record of rolling out incentive programs in its service area in a timely and efficient manner and it can leverage its existing outreach programs for CSI, demand response, and energy efficiency to administer an SWH program. SCE contends that since the four investor-owned utilities (IOUs) and CCSE are successfully implementing the largest and most accomplished statewide Energy Efficiency (EE) and solar programs in the nation, they have the experience and infrastructure to introduce a new SWH program seamlessly. SDG&E/SoCalGas claim that centralizing program administration, as suggested by Environment California, would distance the administrator from customers and could lead to poorer

customer service and more confusion. SDG&E/SoCalGas contend local administration of an SWH program will be more effective.

We will adopt the proposal by staff to use the current CSI administrators plus SoCalGas. We agree with the utilities' comments that they have a proven track record of implementing incentive programs such as CSI, and its subsidiary programs Multifamily Affordable Solar Homes (MASH) and Single-Family Affordable Solar Homes (SASH), and SGIP. We are confident that PG&E, SCE, CCSE, and SoCalGas have the experience from these other incentive programs to initiate the CSI Thermal Program quickly. Plus, customers may be familiar with the programs currently offered by the utilities and CCSE and SWH incentives will simply be a new product offering from a familiar source of information.

Environment California does not convince us that centralized administration will indeed be less confusing to customers. Also, we are concerned that the time to issue a Request for Proposals (RFP) and select a centralized third-party administrator, as suggested by Environment California, will delay the program launch.

9.2. Coordination with Energy Efficiency Program

PG&E, SCE and SDG&E/SoCalGas propose that rather than the administrative structure proposed by staff, which takes the mandate of AB 1470 and creates a stand-alone CSI Thermal program, incentives for SWH should be made available as part of the Commission's EE programs. These parties note that this could be accomplished by eliminating a rule in the EE proceeding requiring SWH to be cost-effective on a stand-alone basis, rather than as part of a portfolio. CCSE, CALSEIA, and SOLID oppose this approach.

SCE requests that SWH incentives be delivered as part of its EE portfolio, consistent with Commission decisions D.05-04-051 and D.07-11-004 which found that SWH is a qualified EE measure. SCE claims that since energy savings from SWH were built into the foundational goals set for SCE and the other IOUs, the Commission should enable the IOUs to include this measure within the EE portfolio. According to SCE, disallowing SWH savings to count toward established EE goals is inconsistent with the precedent set by the Commission and impedes the IOUs' abilities to meet previously established Commission goals.

PG&E essentially agrees with SCE that if SWH is found to be cost-effective using the tools used to evaluate other EE measures, it should be included as an EE program, rather than as a separate CSI program. PG&E endorses a change to the EE Policy Manual so that SWH systems do not have to be cost-effective on a stand-alone basis. Likewise, SDG&E/SoCalGas urge removal of what they consider a barrier to implementation of SWH as an EE measure, i.e., requiring SWH to be cost-effective on a stand-alone basis. They claim the Commission should allow SWH to be treated the same as all other EE measures and included in the EE portfolio. According to SDG&E/SoCalGas, this could create administrative efficiencies and advance the EE Strategic Plan objective of offering a more comprehensive, "whole-house" approach to residential customers.

CCSE, on the other hand, argues that offering SWH incentives through the EE portfolios would be inferior to a stand-alone program as a means of promoting the technology, and could violate AB 1470 requirements to not divert any funds from existing EE programs. CCSE supports creation of a stand-alone solar thermal program because a stand-alone program can encompass all solar

thermal technologies, not just SWH, and best fulfill the intent of AB 1470. CCSE argues that managing incentives for various solar thermal technologies under one program structure will reduce confusion in the marketplace and enable broad participation.

CALSEIA also opposes the IOUs' recommendations to administer SWH incentives through EE programs, stating its belief that that an SWH program is more similar to the general market CSI program than energy efficiency. Nonetheless, it proposes the utilities be allowed to receive credit for SWH installations toward EE program goals. In addition, CALSEIA recommends that the Commission convene a working group of PAs to suggest ways to strengthen linkages and coordination between energy efficiency and solar programs.

TURN agrees with SCE and SDG&E/SoCalGas that the Commission should simply include SWH with the EE portfolios, and that it would be appropriate to eliminate the stand-alone test for SWH only in the case of a "measure" which results in the replacement of electricity or natural gas with a completely renewable fuel used solely for SWH. TURN states that such a change would allow SWH systems to qualify as any other EE measure and facilitate a "whole-house" approach to EE retrofits, resulting in administrative cost savings.

DRA agrees that the Commission consider including SWH in EE programs and consider removal of the stand-alone test for SWH before it qualifies for EE. At the same time, DRA cautions that any change to this requirement should be undertaken in the EE proceeding (Application (A.) 08-07-021 and consolidated cases) and not this proceeding. DRA lists advantages to a "whole-building" approach to EE and SWH to increase the number of installations and minimize duplicative administration costs of separate programs. DRA suggests the Commission determine the best method of

program delivery, and then determine which organization is most capable of delivering the program effectively at the lowest cost.

SOLID opposes the classification of SWH as an EE measure, arguing that SWH systems are not comparable to energy efficiency because they generate energy by producing thermal energy to displace fossil fuel or electricity usage.

While we understand the logic of integrating solar water heating program delivery with EE program administration, we find it more reasonable to establish a stand-alone solar program that can integrate both solar PV and SWH choices faced by end-users. We reach this conclusion for several reasons.

First, we expect that market transformation in the SWH market is most likely to occur when solar solutions providers offer their customers options of both solar PV and SWH. In our view, integrating solar technology options into an already long menu of energy efficiency technologies will dilute the message and could impede solar market transformation.

Second, since both solar PV and SWH systems are commonly installed on rooftops, we think it is important that we foster a market where providers offer both choices and counsel a home or business owner on how to allocate space on their roofs between these two technologies, taking into consideration the relative space needed by each and the economic tradeoffs involved with generating electricity versus heating water.

Third, the stand-alone solar PV program, CSI, has involved program administration costs of no more than 10% of program funds, including application and incentive processing, marketing, and program evaluation. We note from D.09-09-047 in our EE proceeding that the combination of expenditures for these three areas in energy efficiency has typically amounted to approximately 20% of total funds. We find it a better use of ratepayer dollars to

choose a stand-alone program where a higher proportion of funds can be devoted to direct customer incentives and activities that will directly develop the market.

In D.09-09-047 in the EE proceeding, we endorsed the concept of organizing EE programs around whole-house or whole-building retrofit approaches, and we stated our continued support for integrated demand side management solutions. Still, we are persuaded by the counter argument that the SWH industry is more akin to the solar PV industry. We agree with CALSEIA that program coordination between CSI Thermal and EE programs should be possible. Therefore, we direct the staff and PAs to determine convenient ways for customers to make a combined application for efficiency and solar measures, if that is what the customer seeks. However, we clarify that customers cannot receive SWH incentives from a utility energy efficiency program and the CSI Thermal program for the same SWH system.

We also acknowledge that had we chosen to integrate SWH with the utilities' EE programs, this would have meant that SDG&E would be administering the SWH program in the San Diego area, while CCSE would continue to administer the CSI (solar PV) program. This is a suboptimal outcome and we prefer that CCSE administer both solar technology programs in the San Diego area.

With regard to the utilities' requests to change EE policy rules, we reiterate that it is outside the scope of this rulemaking to change the EE policy rules that we established in EE proceedings. Thus, we will not address parties' comments that we reassess the cost-effectiveness threshold necessary for solar water heating technologies to be included in EE program portfolios.

The issue raised by SCE of how our CSI Thermal Program might affect utility energy efficiency goal setting is complex, and is housed in the EE proceeding. We do not have an adequate record on the technical or policy issues in this docket to make a determination as to whether SWH energy benefits were or were not included in the EE proceeding and should or should not be “credited” toward the utility EE goals. Furthermore, we made a deliberate decision in D.09-09-047 to balance the costs of the EE portfolios against the expected EE savings in authorizing a balanced portfolio of programs and ratepayer expenditures for the period 2010-2012. We are not in a position to know how the addition of \$250 million plus in gas expenditures and a reallocation of \$100 million of electric funds now included in the CSI program, along with their estimated energy production levels over the next eight years, would alter the EE portfolio balance and its cost-effectiveness.

It is plausible that some amount of EE savings may have been expected to come from water heating, either from SWH systems themselves, or from efficiency measures applied to the water heating process. These savings might no longer be available at all or in the same quantities if SWH systems are installed. This issue is more appropriately considered in the EE proceeding (A.08-07-021 and consolidated cases). We defer to that assigned Commissioner and ALJ to determine whether and how to either give the utilities “credit” for solar water heating benefits, and/or if it is not appropriate to consider such “credit,” to consider modifying the EE goals to reflect the reduced potential for EE as the solar water heating market develops.

9.3. Other Administrative Issues

The Staff Proposal recommends the CSI Thermal Program administrators submit detailed budget estimates in advance of the launch of the

CSI Thermal Program, and submit semi-annual expense reports on February 15th and August 15th of each year, that include data through December 31st and June 30th of each year. The expense reports should include disclosure of expenditures separated by direct and indirect expenses, labor and non-labor, for all of the major categories: including administration, market facilitation, evaluation, and incentives. We agree with this element of the Staff Proposal and adopt it. In order to launch this program in early 2010, the PAs shall each submit their first year administrative budget estimates to Energy Division with their Program Handbook advice letter, as discussed further in Section 14.

The Staff Proposal recommends quarterly forums to obtain input from the public and interested parties on how the program is operating. CALSEIA supports this idea, but recommends these forums be coordinated with forums in the general market CSI program. We agree and direct the PAs to coordinate the forums.

PG&E asks for a mechanism to recover program development costs to meet the January 1, 2010 program launch timeline. We discuss the program implementation timeline in more detail in Section 14 below. As to PG&E's request, we will not approve a specific cost recovery mechanism, preferring that any program implementation costs are absorbed within the \$15 million administrative budget we have set for the program. This approach has worked in implementing the general market CSI, and the MASH and SASH programs within CSI, and is appropriate here as well.

10. Budget

The CSI Thermal Program would be funded from \$250 million to be collected from gas ratepayers, as described in AB 1470, and those monies would go to fund incentives to gas-displacing SWH. In addition, CSI Thermal would

include \$100.8 million in solar thermal funds collected from electric ratepayers through the general market CSI program, which would fund incentives to electric-displacing SWH.

10.1. Gas-Displacing Budget

The Staff Proposal recommends collection of the \$250 million from the three gas utilities based on the percentages the utilities use to collect the natural gas Public Goods Charge from gas customers, which are as follows:

Table 5: Proposed Budget Allocation

Utility	Budget Allocation	Total Program Collections (in millions)
PG&E	39%	\$97.5
SDG&E	10%	\$25
SoCalGas	51%	\$127.5
Total	100%	\$250 million

PG&E disagrees that its share of the total budget should be 39%. PG&E notes that under SGIP, PG&E receives 44% of funds and its allocation under this program should be the same. Although PG&E disagrees with the allocation percentages, we agree with staff’s usage of an allocator based on gas revenues since this is a program that will benefit gas customers. We will adopt the percentage allocations proposed by staff.

According to the Staff Proposal, rate collections for the gas-displacing portion of CSI Thermal would be spread evenly over eight years, beginning in January 2010 and continuing through December 31, 2017. In comments on the proposed decision, TURN requests that to avoid unnecessary overcollections, the Commission should authorize the utilities to establish memorandum accounts to track actual projects costs and then amortize these account balances in rates on an annual basis to collect the funds actually spent. We agree with TURN’s proposal and will adopt it.

Therefore, we will require PG&E, SCE, SDG&E, and SoCalGas to each file an advice letter to establish a CSI Thermal memorandum account for expenditures under the gas-displacing program beginning with the effective date of this decision through December 31, 2017. On an annual basis, each utility would file in its appropriate ratemaking proceeding for collection of the prior year's balance in the memorandum account from its gas customers on an equal cents per therm basis, with total expenditures over the program duration not to exceed the amounts in Table 5. We also note that pursuant to Section 2863(b)(3), customers participating in the California Alternate Rates for Energy (CARE) or Family Electric Rate Assistance (FERA) programs shall be exempt from this surcharge. With this exception, all gas customers who currently fund the SGIP shall fund the gas-displacing portion of CSI Thermal.

The Commission has already established how the three electric utilities would collect the \$100.8 million from electric ratepayers for solar thermal within the CSI. The most current revenue requirement for the CSI was adopted in D.08-12-044 and we make no changes to the CSI revenue requirement in this decision. Each utility shall separately track its expenditures for electric-displacing SWH incentives in its existing CSI memorandum account established in D.06-08-028.

Staff proposes a CSI Thermal Gas-Displacing Program Budget as follows:

Table 6: Proposed CSI Thermal Gas-Displacing Program Budget

CSI Thermal Program Elements	CSI Thermal Program Sub-Elements	Budget
Incentives 80%	General Market Incentive Component	\$180,000,000
	Low-Income Incentive Component (10% of incentive funds)	\$20,000,000
	<i>Subtotal</i>	\$200,000,000
Market Facilitation 10%	Marketing & Outreach, including training, consumer education, and other market facilitation activities such as engaging with permitting offices or financing providers.	\$25,000,000
	<i>Subtotal</i>	\$25,000,000
Program Administration 10%	Application/incentive processing, General Administration, and System Inspection	\$15,000,000
	Measurement and Evaluation	\$10,000,000
	<i>Subtotal</i>	\$25,000,000
Total		\$250,000,000

As shown in the table above, staff recommends setting aside 10% of the \$200 million in incentive funds for low-income SWH incentives to comply with the Section 2866 requirement that “not less than 10% of the overall funds for installation of [SWH] systems” be provided to low-income residential housing. Environment California and ACCES contend the Staff Proposal errs in setting aside 10% of the \$200 million incentive budget for low-income SWH incentives, rather than 10% of the total \$250 million budget. TURN suggests that the Commission should budget \$40 million for low-income SWH incentives, which is 20% of the \$200 million incentive budget.

We agree with those parties who ask for an increase in the low-income SWH incentive budget to 10% of the total funds for this program. We will increase the budget for a low-income SWH incentive program to \$25 million. This will require a corresponding reduction to another element of the program budget. We find it sufficient to allocate \$5 million for M&E, rather than the \$10 million proposed by staff.

With regard to the other budget categories, there was little dispute. CALSEIA generally agrees with the proposed budget. It supports allocating 20%

of the total budget, or \$50 million, for administration and market facilitation activities based on its contention that market facilitation is critical to accelerating market transformation of the SWH market. Environment California also agrees with the set-aside of funds for market facilitation. CCSE claims that because its budget is only 10% of the total funds, it will have only \$187,500 for administration activities. According to CCSE, this amount will be insufficient for its administration duties, and it requests it be allowed to use 20% of its budget for administration.

We will adopt the market facilitation and administrative budget proposed by staff, along with our minor M&E reduction. We agree with CALSEIA that market facilitation and outreach activities are a critical element of the program to ensure market transformation. In response to CCSE's concern that its administrative budget is insufficient, we note that under the pilot program that it administered, it budgeted and we approved \$224,000 per year for administration. We will allow CCSE the flexibility to move no more than an additional \$50,000 per year from its market facilitation budget to cover additional administrative expenses, as necessary. CCSE may not exceed its total budget allocation of \$4.5 million for administration, market facilitation, and M&E combined.

Therefore, as discussed above, we will adopt an adjusted natural gas-displacing program budget as follows:

Table 7: Adopted CSI Thermal Gas-Displacing Program Budget

CSI Thermal Program Elements	CSI Thermal Program Sub-Elements	Budget
Incentives 82%	General Market Incentive Component	\$180,000,000
	Low-Income Incentive Component (10% of total funds)	\$25,000,000
	<i>Subtotal</i>	\$205,000,000
Market Facilitation 10%	Marketing & Outreach, including training, consumer education, and other market facilitation activities such as engaging with permitting offices or financing providers.	\$25,000,000
	<i>Subtotal</i>	\$25,000,000
Program Administration 8%	Application/incentive processing, General Administration, and System Inspection	\$15,000,000
	Measurement and Evaluation	\$5,000,000
	<i>Subtotal</i>	\$20,000,000
Total		\$250,000,000

10.2. Electric-Displacing Budget

Staff proposes a CSI Thermal electric-displacing program budget that assumes the entire \$100.8 million can be used for SWH incentives. Any costs for application and incentive processing, general administrative activities and system inspections would be funded from the CSI program administration budget, which was set in D.06-08-028 and limited to 10% of total CSI funds. An additional \$17.5 million for marketing and outreach and measurement and evaluation costs would also be drawn from the general market CSI program administration budget.

Table 8: Proposed CSI Thermal Electric-Displacing Program Budget

CSI Thermal Program Elements	CSI Thermal Program Sub-Elements	Budget
Incentive Program Component	General Market Incentive Component	\$100,800,000
	Low-Income Incentive Component	\$0
	<i>Subtotal</i>	\$100,800,000
Market Facilitation Program Component	Marketing & Outreach, including training, consumer education, and other market facilitation activities such as engaging with permitting offices or financing providers.	\$12,500,000
	<i>Subtotal</i>	\$12,500,000
Program Administration	Application/incentive processing, General Administration, and System Inspection	Subject to the overall CSI budget, but tracked separately
	Measurement and Evaluation	\$5,000,000
	<i>Subtotal</i>	\$5,000,000
Total		\$118,300,000 + CSI Admin Budget Costs

Staff does not recommend any funding for electric-displacing low-income SWH incentives due to the Itron Interim Evaluation finding that only 10% of households, or roughly one million customers, use electric water heating in California. We agree this is not necessary at this time given the relatively low percentage of households in California that use electric water heating, and the fact that we offer other low-income energy assistance through our energy efficiency and CSI programs.

According to TURN, the \$100.8 million budget for electric-displacing SWH incentives should be reduced because of the low market share of these systems. TURN contends it is not reasonable to allocate one-third of all incentive dollars (i.e., \$100.8 million of \$300.8 million) to electric-displacing systems. CCSE notes that one-third of the M&E budget will be funded from the electric-displacing program, while electric-displacing SWH systems are approximately 10% of the total SWH market. Thus, CCSE suggests the Commission reduce the funding allocation for M&E from the electric-displacing program budget.

In response to TURN, we note that 10% of residential customers using electricity to heat water translates into roughly 1,000,000 households. While this is a relatively small percentage of the total number of households, it is nonetheless a large market for SWH systems. Indeed, if the \$100.8 million is spent entirely on residential SWH systems and assuming an average incentive or \$1,000 per system, only about 100,000 residential installations would be made, resulting in approximately 10% market penetration of those customers using electricity to heat water. The Itron analysis also indicates that electric displacement is more cost-effective than the gas displacement, due to the relatively high cost of electricity compared to gas. Thus, it is reasonable to allow up to the full \$100.8 million to be allocated to electric-displacing systems.

We also note that since gas is used to produce a significant amount of the electricity used in California, electric-displacing systems also meet the goals of AB 1470 in reducing gas usage and carbon emissions. In fact, depending on the exact mix of resources used to provide electricity, electric-displacing systems may provide greater gas and carbon reductions than gas-displacing systems.

Given the greater cost effectiveness of electric-displacing systems and the potential for greater gas and carbon reduction benefits, it may be worthwhile to allocate greater funding to these systems. However, AB 1470 defines a solar water heating system as a device that has the primary purpose of reducing demand for natural gas, not electricity, and funds the program with a surcharge on natural gas customers. Moreover, SWH systems must be in buildings connected to the natural gas distribution system to be eligible for incentives under AB 1470. We note that one major group of gas customers paying into the gas program will be utility electric generation departments for the gas used to operate their power plant. Those costs are ultimately borne by electric

ratepayers. Thus, on an economic, environmental and equity basis it may be reasonable to consider shifting some funding from the gas-displacing program to the electric-displacing program. We direct Energy Division, in reviewing this program, to consider whether the Commission has or should seek the flexibility to use funds collected under AB 1470 for incentives to electric-displacing SWH systems.

In addition, although the Staff Proposal assumes up to \$100.8 million in funding for incentives to SWH that displaces electricity, electric-displacing SWH must compete for the \$100.8 million in CSI funding with other non-PV solar thermal technologies that may participate in CSI, as allowed in D.06-12-033. We clarify that up to \$100.8 million could be used for incentives to electric-displacing SWH, but the actual amount will depend on the participation in CSI by other forms of electric-displacing non-PV solar thermal.

We will, however, reduce the electric-displacing SWH budget for M&E and market facilitation because we do not expect the full \$100.8 million to fund SWH. We agree with CCSE that since electric SWH systems have a small market share, we should devote less of our budget to electric-displacing marketing and M&E. We will budget \$6.25 million for market facilitation and \$1.25 million for M&E, which is one-fourth the amount we have budgeted for these activities in the gas-displacing portion of this program.

The Staff Proposal recognizes that marketing and M&E activities for gas-displacing and electric-displacing will be performed together and recommends the PAs should draw funds from both the natural gas- and electric-displacing budgets to fund these activities. The Staff Proposal suggests that costs be split on a ratio of 2:1, where every \$2 spent by the natural gas displacing budget, will be matched with \$1 from the electric-displacing budget.

Because we adopt a lower budget for electric displacing market facilitation and M&E that is one-fourth the budget for gas-displacing market facilitation and M&E, we will direct that PAs fund these activities on a 4:1 ratio instead.

The adopted electric-displacing program budget is shown in the table below.

Table 9: Adopted CSI Thermal Electric-Displacing Program Budget

CSI Thermal Program Elements	CSI Thermal Program Sub-Elements	Budget
Incentive Program Component	General Market Incentive Component	No more than \$100,800,000
	Low-Income Incentive Component	\$0
	<i>Subtotal</i>	\$100,800,000
Market Facilitation Program Component	Marketing & Outreach, including training, consumer education, and other market facilitation activities such as engaging with permitting offices or financing providers.	\$6,250,000
	<i>Subtotal</i>	\$6,250,000
Program Administration	Application/incentive processing, General Administration, and System Inspection	Subject to the overall CSI budget, but tracked separately
	Measurement and Evaluation	\$1,250,000
	<i>Subtotal</i>	\$1,250,000
Total		\$108,300,000 + CSI Admin Budget Costs

11. Energy Efficiency Requirements

Section 2865 requires that the Commission establish conditions on gas-displacing SWH systems that receive incentives, including “appropriate energy efficiency improvements in the new or existing home or commercial structure where the [SWH] system is installed.” The Staff Proposal notes this requirement, and states that energy efficiency requirements will be specified in the CSI Thermal Handbook.

SOLID contends undue energy efficiency requirements could hamper the program. SOLID and CALSEIA agree that if any EE is required, it should only be required for items tied to the SWH system.

PG&E recommends the Commission adopt energy efficiency requirements for customers participating in the SWH program that are consistent with requirements for the general market CSI program. At present, only an energy audit is required for CSI. The Commission may want to consider additional efficiency measures that save energy and water, such as low flow showerheads, faucet aerators, and pipe insulation for residential customers. PG&E suggests that savings from installation of these measures for which the customer receives an energy efficiency rebate should be credited to energy efficiency programs.

Similar to PG&E, DRA maintains the if the Commission implements an SWH incentive program, customers should have an EE audit, and then install all feasible cost-effective EE measures that reduce water heating costs before any SWH system is sized and incentives paid. TURN suggests that PG&E and SCE include SWH in their energy efficiency program portfolios. For CCSE, TURN proposes it administer an SWH program in coordination with SDG&E so that any premise applying for SWH rebates first obtain the relevant EE measures.

We have previously stated our commitment to whole-house or whole-building approaches that maximize energy efficiency improvements, integrate our various programs, and facilitate customers' adoption of energy efficiency, demand response, solar, and distributed generation options as a planned package of actions customized to meet the needs, priorities and values of each customer. It makes sense for customers to consider a bundle of water-heating related energy efficiency measures as part of any SWH installation, given that there may be energy efficiency measures that a customer could deploy, at relatively little cost, that would reduce their water heating demand significantly, and thereby reduce the size of SWH system and corresponding incentives. Moreover, we expect that such energy efficiency

measures could be easily installed by the SWH system installer at the time of system installation.

At the same time, we recognize that requiring program participants to install specific energy efficiency measures can increase up-front costs and add to the administrative complexity of this program if such requirements are not implemented thoughtfully. We herein specify that “appropriate energy efficiency improvements” shall be ones that are broadly applicable, do not require SWH system installers to develop new competencies, do not significantly increase project cost or delay installation, are easily validated on system inspection, and are likely to be retained once a customer has received their incentives. We recognize that if this program is to succeed, any additional requirements cannot unduly impede the ability of customers to move forward with the installation of SWH systems.

Therefore, we agree with and adopt DRA’s recommendation to require an energy audit as a condition of participating in this program, as well as the requirement that customers deploy cost-effective and feasible EE measures that reduce water heating costs and meet our definition of “appropriate energy efficiency improvements” to qualify for incentives. Systems should also be sized taking into consideration the impacts of appropriate energy efficiency improvements. We will not, at this point, require that customers deploy *all* cost-effective and feasible measures, because we are concerned that such a requirement could impede the willingness and ability of customers to install SWH systems.

We direct our Energy Division to hold a workshop within 30 days of this decision to determine what measures meet our definition of “appropriate energy efficiency improvements” and should be required to be installed as a condition

of receiving incentives under this program. Following the workshop, the PAs shall jointly develop a list of measures that shall be required as a condition of receiving incentives under this program, as well as how this requirement shall be implemented and enforced, and submit this information in their Program Handbook Advice Letter for Commission approval.

12. Market Facilitation, Marketing and Outreach

The Staff Proposal recommends that CSI Thermal incentives be combined with focused market facilitation activities to collectively reduce the up-front costs of installing SWH systems. To reduce the identified barriers to SWH, which include a lack of public knowledge of the technology and a shortage of experienced SWH installers, staff recommends a market facilitation budget of \$37.5 million, \$25 million from the gas-displacing budget and \$12.5 million from the electric-displacing budget.¹⁷ We have already discussed in Section 10.2 above that we will reduce the portion funded by the electric-displacing program to \$6.25 million, which reduces the total budget to \$31.25 million.

Staff suggests that the PAs spend 40% of these monies in the first two years of the program. Environment California suggests that an even higher percentage of the market facilitation budget be spent in the early years of the program. We find it reasonable to allocate 40% of the budget for the program's first two years. We adopt a more detailed market facilitation budget as set forth in the table below.

¹⁷ The total market facilitation budget is allocated across the various utilities based on the same percentages used to allocate the gas-displacing and electric-displacing program budgets. (See Table 10 below.)

Table 10: Adopted Market Facilitation Budget

Budget Year			2010	2011	2012-2017
			20%	20%	10% per year
Natural Gas Displacing Program					
PG&E	39%	\$9,750,000	\$1,950,000	\$1,950,000	\$975,000
CCSE/SDG&E	10%	\$2,500,000	\$500,000	\$500,000	\$250,000
SoCalGas	51%	\$12,750,000	\$2,550,000	\$2,550,000	\$1,275,000
SCE	0%	\$0	\$0	\$0	\$0
Total		\$25,000,000	\$5,000,000	\$5,000,000	\$2,500,000
Electric Displacing Program					
PG&E	43.7%	\$2,731,250	\$546,250	\$546,250	\$273,125
CCSE/SDG&E	10.3%	\$643,750	\$128,750	\$128,750	\$64,375
SoCalGas	0%	\$0	\$0	\$0	\$0
SCE	46%	\$2,875,000	\$575,000	\$575,000	\$287,500
Total		\$6,250,000	\$1,250,000	\$1,250,000	\$625,000
Combined CSI-Thermal					
PG&E	39.9%	\$12,481,250	\$2,496,250	\$2,496,250	\$1,248,125
CCSE/SDG&E	10.1%	\$3,143,750	\$628,750	\$628,750	\$314,375
SoCalGas	40.8%	\$12,750,000	\$2,550,000	\$2,550,000	\$1,275,000
SCE	9.2%	\$2,875,000	\$575,000	\$575,000	\$287,500
Total		\$31,250,000	\$6,250,000	\$6,250,000	\$3,125,000

The Staff Proposal contains a lengthy list of possible market facilitation activities, including consumer education and outreach, installer training, development of financing programs and equipment standards, and permit streamlining. According to the Proposal, the PAs would submit annual advice letters to Energy Division with their proposed market facilitation budgets and activities for each calendar year, no later than October 1 of the preceding calendar year.

Many parties provided detailed comments with suggested market facilitation activities. For example, CCSE suggests statewide installer training efforts and a development of a technical design manual. PG&E recommends installer certification by a non-utility organization, and CALSEIA supports this proposal.

We will not mandate the exact market facilitation activities at this time, as we prefer to allow further comment and consideration of these activities through the advice letter process set forth in the Staff Proposal. We expect that the PAs will jointly market the CSI Thermal Program with the general market CSI Program, including incorporating the CSI Thermal Program into the Go Solar California website and related outreach efforts. The specific marketing activities and annual authorized funding will be determined upon submittal, review, and approval of an Annual Market Facilitation Plan by each program administrator by advice letter. The Annual Market Facilitation Plans should address each of the potential activities identified in Appendix A, as well as propose additional activities in response to market conditions. In addition, we consider the initial two years of the program as critical and we demand careful crafting of marketing and outreach strategies and tactics, with input from knowledgeable solar industry, marketing and training experts, who may not necessarily be parties to this proceeding. We direct the PAs to hold at least one public workshop in advance of their advice letter filing to obtain input from such key industry and expert sources.

13. Measurement and Evaluation

The Staff Proposal recommends allocation of \$15 million for the M&E of the CSI Thermal Program, with \$10 million funded from the gas-displacing program budget, and \$5 million funded from general market CSI administration funds. As described above in Section 10, we have reduced the M&E budget to \$5 million from the gas-displacing budget and \$1.25 million from the general market CSI funds.

Staff recommends that M&E studies be jointly funded by the four program administrators. We agree, although we adopt a slight modification to the

allocation for M&E funding. The allocation we adopt will be the same percentages as shown in Table 10 representing the combined CSI Thermal budget allocation for the four utilities, and shown in the table below.

Table 11: Budget Allocation for M&E Studies

Utility	Allocation	M&E Budget
PG&E	39.9%	\$2,493,750
SCE	9.2%	\$575,000
SDG&E/CCSE	10.1%	\$631,250
SoCalGas	40.8%	\$2,550,000
Total	100%	\$6,250,000

Moreover, staff recommends that the CSI Thermal Program work closely with the ongoing M&E in the general market CSI Program to coordinate M&E efforts between the CSI program and the CSI Thermal Program. CALSEIA supports this recommendation and so do we. We direct Energy Division to oversee the M&E work in the CSI Thermal Program and ensure it is coordinated with the general market CSI M&E work. The Energy Division shall issue an RFP for an independent entity to perform the M&E work, and select the evaluation contractor. The utilities shall reimburse Energy Division for this contract according to the percentages set forth above.

Energy Division should consult with the assigned Commissioner to finalize the M&E reports that will be undertaken, and the schedule for these reports. The M&E reports may include the following:

- Market Baseline Studies – to provide a basis for assessing program progress toward achieving program goals.
- Program Impact Evaluation – to assess the impact of the program on electricity and natural gas demand, assess the number of systems installed, assess the greenhouse gas emission reductions achieved by the program, collect and analyze actual performance data of installed systems, compare the performance data to the expected performance of those systems, and make that information

readily and transparently available to consumers and policy makers.

- Program Process Evaluation – to assess the program operations and make recommendations for improving the program’s effectiveness.
- Cost-Benefit Studies – to provide a periodic check on the costs and benefits of the program, and to evaluate the program’s cost-effectiveness on an updated basis.
- Technology Evaluation – to assess SWH, other (non-SWH) solar thermal technologies and their ability to support the state’s goals for reducing energy demand.
- Market Surveys – to periodically assess the market, and how the market intervention is affecting technology deployment.
- Other Evaluation Studies – to serve the ongoing program management and evaluation needs.

The Energy Division will obtain parties’ input and work in consultation with the assigned Commissioner to establish the CSI Thermal M&E budget and scoping plan through an assigned Commissioner’s Ruling, which will serve as the basis for conducting M&E Studies. The M&E Studies will be made publicly available, and the results of the M&E studies will form the basis of program modifications, as necessary.

The CSI Thermal PAs will be responsible for ensuring that program participants provide the program with performance data, as necessary, to evaluate the program.

In addition, we adopt the recommendation from the Staff Proposal that the CSI Thermal PAs will be jointly responsible for design and maintenance of a statewide program database that facilitates application processing, public program data, and program evaluation. The database should include all installation performance design characteristics and other application data.

Energy Division shall oversee the other details of the database and provide direction to the PAs in establishing the database.

Finally, the CSI Thermal PAs will be responsible for quarterly progress reports that provide a snapshot of application and installation data, as well as other information on the implementation and administration of the program. The PAs will also be responsible for submitting semi-annual expense reports on all aspects of the program budget.

14. Implementation Timing and Program Handbook

The Staff Proposal recommends that the CSI Thermal Program Administrators use a public process to develop a CSI Thermal Program Handbook within 30 days of the Commission adopting the program. Ultimately, staff suggests the CSI Thermal Program Handbook would become a section within the general market CSI Handbook, and future modification to it would be submitted to the Energy Division via Advice Letter. Further, staff proposes the PAs host quarterly meetings with stakeholders to entertain CSI Thermal Program modification suggestions.

Staff proposes that the CSI Thermal Program begin accepting applications for incentives on January 1, 2010. In addition, staff suggests that in order to prevent a stall in activity in the SWH market after release of the Staff Proposal in mid-2009, where potential customers might forestall installation decisions in the hopes of qualifying for an incentive in 2010, any qualifying SWH systems installed after the July 15, 2009 release of the Staff Proposal should be eligible to apply for incentives.

14.1. Comments

CALSEIA and Environment California strongly support a program launch date no later than January 1, 2010 and agree with the Staff Proposal to

make rebates retroactive to the release of the Staff Proposal on July 15, 2009. Several parties, namely CALSEIA, SOLID, and PG&E suggest a phased approach, wherein the Commission would first implement incentives for either natural gas- or electric-displacing solar water heating, and follow afterward with other program elements such as combined systems. SOLID suggests segmented start dates of January 1, 2010 for residential SWH incentives and April 1, 2010 for commercial/industrial SWH incentives. PG&E proposes phased deadlines for the PAs to submit marketing and outreach plans, handbook amendments, and SWH applications for residential and commercial customers.

CCSE contends that the 30 days envisioned by the Staff Proposal for the development of the CSI Thermal Handbook is insufficient. CCSE recommends a minimum of 60 days for Handbook development. SCE recommends that the program implementation be postponed to six months after the Commission's final decision on the program, or approximately June 1, 2010.

14.2. Discussion

We acknowledge there are many parties who want an immediate start to this program. Ideally, we would have liked to see the CSI Thermal Program begin accepting applications on January 1, 2010. At the same time, we realize there are a number of administrative and implementation issues that the PAs need time to resolve, such as drafting of the Program Handbook with appropriate siting, installation, system sizing and energy efficiency guidelines and an incentive calculator. We have directed Energy Division to hold workshops on these issues, to aid the PAs in development of the Program Handbook. Thus, we agree with CCSE that 30 days may be insufficient for Program Handbook development.

Therefore, we will adopt a phased approach, as suggested by several parties. We do not agree with SCE to delay implementation six months. We conclude that a phased approach is reasonable, particularly because we are using the same PAs from the general market CSI program who can apply the lessons learned in implementing that program to speed implementation of CSI Thermal.

Rather, we will give the PAs until April 1, 2010 to jointly submit the CSI Thermal Program Handbook by advice letter to Energy Division. The PAs are directed to use the CSI Thermal Program Handbook outline set forth in Appendix A as the basis for developing the handbook, which should be a subset, or chapter within, the general market CSI Handbook. To facilitate development of the handbook and the incentive calculation tool, Energy Division shall hold workshops, as described in this decision, within 60 days of this order.

We adopt a phased implementation of this program as follows:

- Within 60 days from the effective date of this decision, Energy Division shall hold workshops to assist the PAs in developing siting, installation, freeze protection and system sizing requirements to guard against oversizing of systems, appropriate energy efficiency improvements that meet the criteria specified in this decision, and an incentive calculation tool.
- By April 1, 2010, the PAs shall complete development of the on-line incentive calculation tool and provide it to Energy Division for review prior to program implementation.
- By April, 2010, the PAs shall complete drafting of the single-family residential customer portion of the CSI Thermal Program Handbook, which shall be a subset of the general market CSI Handbook, containing program rules and specifications applicable to residential customers, and submit it through an Advice Letter, with

the goal of accepting applications from single-family residential customers on May 1, 2010.

- By April 1, 2010, each PA shall submit a separate Advice Letter that includes: a) a detailed estimate of its program budget for the first year of program implementation, indicating direct and indirect expenses, labor and non-labor, for incentives, administration, market facilitation, and measurement and evaluation; and b) its proposed market facilitation strategic plan and detailed budget for the first two years of program implementation.
- By May 1, 2010, the PAs shall complete drafting of the commercial/multifamily portion of the CSI Thermal Program Handbook, which shall be a subset of the general market CSI Handbook, and submit it as an Advice Letter, with the goal of accepting applications from these customers on June 1, 2010.
- Within 180 days from the effective date of this decision, Energy Division shall hold a workshop on the issue of the eligibility of non-solar water heating solar thermal technologies that displace gas usage and meet all other program requirements. The workshop should address how to estimate these technologies thermal displacement for incentive calculation purposes and whether performance-based incentives might be appropriate for these technologies. Following the workshop, Energy Division should provide a workshop report to the service list of this proceeding, or its successor proceeding, and the Administrative Law Judge.
- Within 90 days of this decision, PG&E, SCE, SDG&E and SoCalGas shall each file an advice letter to amend their preliminary statements and establish a memorandum account to track actual annual expenditures for the gas-displacing CSI Thermal program, beginning on the effective date of this decision through December 31, 2017.

- On an ongoing basis, in response to program experience and evaluation, or when a Commission decision or statutory change requires handbook updates, the PAs shall submit CSI Thermal Program Handbook changes through the advice letter process.

Although applications will not be accepted until May 2010 for single-family residential customers and June 1, 2010 for commercial customers, we hope to reduce any potential disruption in the SWH market by adopting staff's proposal to allow systems installed after the July 15, 2009 release of the Staff Proposal to be eligible for incentives if they meet all program eligibility requirements set forth in this decision. CALSEIA requests clarification that a system installed in 2009 could qualify if it meets all program eligibility criteria and obtained a building permit after July 15, 2009. We agree with this clarification and will adopt it.

CCSE notes the potential overlap of its SWH pilot with eligibility for incentives under a statewide program as early as July 15, 2009. CCSE proposes the Commission allow customers who apply for incentives from the SWH Pilot Program between July 15, 2009 and December 31, 2009 to receive any higher incentive offered by the CSI Thermal Program when incentives become available after January 2010. We agree with this approach and will adopt it.

15. Low-Income CSI Thermal

AB 1470 requires the Commission to provide not less than 10% of the overall program funds for installation of SWH systems on low-income residential housing, as defined in the statute. (Section 2866.) This decision sets aside \$25 million for this purpose. In order to implement the CSI Thermal Program in early 2010, the Commission will address the detailed comments by parties on the design of a low-income CSI Thermal Program in a separate decision.

16. Comments on Proposed Decision

The proposed decision of Commissioner Michael R. Peevey in this matter was mailed to the parties in accordance with Section 311 and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed by Abengoa Solar, CALSEIA, CCSE, DRA, Harpiris Energy, PG&E, SCE, SDG&E/SoCalGas, SOLID, and TURN. Reply comments were filed by CALSEIA, CCSE, DRA, PG&E, SCE, and Sopogy. Where the comments suggested minor adjustments or clarifications to the decision, these changes have been incorporated throughout the decision. Where comments reargued earlier positions or attempted to present new arguments or facts, they were not considered.

A few comments merit discussion. Several parties, namely DRA, SOLID, and Abengoa Solar, commented that the Commission should consider performance-based incentives for the CSI Thermal program rather than lump sum incentives paid up-front, particularly for large commercial SWH systems. These parties also requested that we eliminate caps on incentives to these larger systems. Abengoa Solar comments that the incentive cap could severely restrict installations at commercial and industrial facilities. Moreover, Harpiris Energy, SOLID, and Abengoa Solar commented that we should eliminate the requirement that commercial systems have OG-100 certification. They contend that SRCC ratings are mainly applicable to small-scale residential systems, while equipment used for large-scale applications is engineered for a given application. Harpiris Energy claims it will be shut-out of its largest market sector due to this certification requirement.

We will proceed with implementation of the CSI Thermal with up-front incentives, based on estimated annual thermal or kWh displacement, and with

the incentive caps set forth in this decision. While we are intrigued by the concept of performance-based incentives, and agree it might be optimal for larger systems, there are myriad issues surrounding performance-based incentives that we need to consider such as the incentive rate, how output would be measured, and how elimination of incentive caps might affect the program budget. The decision is modified to include the topic of performance-based incentives in the workshop that Energy Division will hold in upcoming months on non-solar water heating solar thermal technologies, so that we might explore shifting to a performance-based incentive design at a future date. Regarding certification requirements, we reiterate that we cannot deviate from the statute's requirement that all systems have either OG-300 or OG-100 certification to be eligible for incentives funded by the gas-displacing portion of CSI Thermal.

PG&E and SDG&E/SoCalGas comment that the decision requires clarification on cost recovery issues, such as which customers will pay for CSI Thermal and how the utilities will ensure the appropriate program costs are placed into rates. TURN comments that the utilities should only collect what they actually spend in each year for CSI Thermal, rather than collecting the funds equally over eight years. In response to these comments, the decision has been modified to direct the utilities to establish a CSI Thermal memorandum account to track actual annual expenditures, and each utility may seek annual recovery of its memorandum account balance in its appropriate ratemaking proceeding. We therefore adopt TURN's suggestion that the utilities only place actual program costs into rates.

DRA suggests expanded warranty requirements beyond the 10-year warranty on solar collectors required by the statute. We have modified the decision to allow Energy Division to consider increased warranty requirements

as it works to develop the CSI Thermal Handbook along with the parties, with consideration to balancing warranty cost against adequate consumer and ratepayer protection. In addition, the decision has been modified to include language to address freeze protection requirements specific to climate zone and additional direction on marketing facilitation strategic plans, as suggested by DRA.

17. Assignment of Proceeding

Michael R. Peevey is the assigned Commissioner and Dorothy J. Duda is the assigned ALJ in this proceeding.

Findings of Fact

1. AB 1470 authorizes the creation of a \$250 million incentive program to promote the installation of solar water heating systems in homes and businesses to displace natural gas usage by 2017.

2. SB 1 added Section 2851(b) allowing \$100.8 million of total CSI funds to be used for incentives to solar thermal technologies such as solar water heating.

3. Section 2862(l) states the Commission shall evaluate data from the SWH Pilot Project and determine whether an SWH program is cost-effective for ratepayers and in the public interest before designing and implementing an SWH incentive program.

4. The Itron analysis indicates the large amounts of gas and electricity used to heat water in California, and the need to reduce this usage to meet California's goals of reducing carbon emissions.

5. The Societal Test of cost-effectiveness used in the Itron analysis captures benefits that accrue to society, including ratepayers, such as avoided pollution, greenhouse gas reduction benefits, job growth and market transformation benefits.

6. Itron's analysis of cost-effectiveness includes a "business as usual" scenario that concludes an SWH incentive program will be cost effective if there is a 16% reduction in SWH system costs by 2017, as well as several other scenarios under which an SWH incentive program is cost effective.

7. SWH system costs declined 30% between 1980 and 1990. System cost reductions can be achieved through reductions in equipment costs, labor costs, marketing, and permitting.

8. A 16% system cost reduction, as used in the Itron analysis, is a reasonable expectation.

9. Further proceedings to reexamine SWH cost-effectiveness will delay consideration of a statewide program by six months to one year.

10. The Itron analysis of the cost-effectiveness of a statewide SWH program, to displace both electric and gas water heating, indicates that the program will provide societal benefits over the life of the systems installed, and that a number of factors could further improve the cost effectiveness of these programs, such as the availability of low cost loans.

11. The Itron analysis indicates that it is not cost-effective for SWH to displace electric water heating on single family homes without incentives, but an eight-year incentive program is cost-effective using the Societal Test.

12. A primary goal of AB 1470 is reduction in natural gas usage.

13. Section 2863(b)(2) describes the goal of installing 200,000 SWH systems, "or the equivalent output of 200,000 [SWH] systems...."

14. The natural gas displacement of 200,000 residential SWH systems is equivalent to 585 million therms.

15. The electric displacement of 100,800 SWH systems is 275.7 million kWh per year of electricity.

16. Sections 2864 and 2865 establish criteria for SWH systems receiving SWH incentives, including SRCC certification, warranty, metering and installation requirements and conditions involving siting, performance, energy efficiency, and rating standards.

17. Section 2864 requires meters or other kWhth measuring devices to monitor and measure system performance for systems over 30 kWth.

18. The four IOUs and CCSE have experience implementing energy efficiency, distributed generation, and CSI programs.

19. Section 2866 requires not less than 10% of the overall funds for installation of SWH systems be provided to low-income residential housing.

20. The \$100.8 million set aside for solar thermal in CSI may fund both electric-displacing SWH systems and other non-PV solar thermal technologies that displace electricity usage.

21. Section 2865 requires “appropriate energy efficiency improvements” in homes or businesses where SWH is installed.

22. Bundling water heating related energy efficiency measures with an SWH installation can reduce water heating demand and SWH system size.

Conclusions of Law

1. Based on Itron’s analysis an SWH program can play an important role in developing water heating alternatives and can help California to meet its carbon reduction goals and is in the public interest.

2. Based on Itron’s analysis, which incorporates system cost reductions over the program’s duration, and contains several scenarios under which SWH is cost-effective, an SWH program is cost-effective for ratepayers and in the public interest and should be adopted.

3. A program goal of displacing 585 million therms of natural gas usage is reasonable given Section 2863(b)(2), which allows the Commission latitude to design a program to reach the equivalent output of 200,000 systems.

4. A goal of displacing 275.7 million kWh of electricity per year is reasonable and should be adopted.

5. The requirements of Sections 2864 and 2865 should be incorporated into the Program Handbook and apply to all systems, both gas- and electric-displacing.

6. The PAs should develop siting and installation guidelines and methods, including system sizing and climate-zone specific freeze protection requirements, to prevent oversizing of systems, and include these in the Program Handbook.

7. In developing the CSI Thermal Program Handbook, Energy Division shall consider increased warranty requirements while balancing warranty costs with adequate consumer and ratepayer protection.

8. To ensure eligibility criteria and conditions are met, the PAs should inspect the first three installations by every installer, and random inspections thereafter.

9. The gas-displacing incentive levels proposed by staff are reasonable and should be adopted, with a minor decrease in the Step 4 rate to fund additional systems at the Step 1 level.

10. The PAs should post weekly information on their program websites and the Go Solar California website regarding participation and incentive levels.

11. The PAs should provide written notification of incentive reductions by letter to the ALJ, with a copy to the service list of this or any successor proceeding.

12. Gas-displacing SWH incentives shall decline when PAs accept applications and confirm reservations to pay incentives equal to the budget allocation for the customer class in each step.

13. Gas-displacing SWH incentives shall move independently in each service territory and for each customer class, namely single-family residential or commercial/multifamily.

14. Incentive caps are reasonable to ensure the program promotes a sufficient quantity of installations.

15. We should allocate 40% of the gas-displacing incentive budget to single-family residential customers, and allow the remaining 60% of the incentive budget for commercial and/or multifamily projects.

16. SWH to displace electric usage should receive lower incentives given the economics of electric versus natural gas water heating.

17. Incentives to electric-displacing SWH systems should decline using the same percentages as gas-displacing incentives.

18. When gas displacing incentives drop to a lower step level, electric-displacing incentives should also drop to the next level.

19. The PAs should count the megawatts of electric-displacing SWH installed as part of Step 10 of the general market CSI program, and Step 9 if needed, to minimize the effect of these installations on incentive levels for PV systems.

20. Single-family residential incentives should be calculated based on the SRCC estimation of annual energy savings combined with the Solar Orientation Factor.

21. The PAs should develop an on-line incentive calculation tool that estimates natural gas or electricity displacement based on system location, design, and expected performance.

22. Performance metering and monitoring equipment should be installed for program evaluation purposes on a sample of systems with a capacity for displacing 30 kWth and below, with the cost borne by PAs through their M&E budgets.

23. The current CSI administrators and SoCalGas should administer the CSI Thermal Program given their experience implementing other Commission mandated incentive programs.

24. The CSI Thermal Program should be implemented separately from utility energy efficiency programs, to better integrate solar PV and SWH choices by end users, although the PAs should determine convenient ways to customers to make combined applications for energy efficiency and solar incentives.

25. Customers may not receive SWH incentives from both a utility energy efficiency program and CSI Thermal for the same SWH system.

26. The gas-displacing program budget should be allocated across the utilities based on the percentages used to collect the natural gas Public Goods Charge.

27. It is reasonable to allocate \$25 million for a low-income SWH incentive program, which is 10% of the \$250 million total program budget.

28. To the extent a PA performs marketing and M&E activities jointly for gas and electric-displacing systems, it should fund these activities on a 4:1 ratio such that every dollar spent from the electric-displacing budget is matched with \$4 from the gas-displacing budget.

29. Appropriate energy efficiency improvements that reduce water heating demand under this program should be ones that are broadly applicable, do not require SWH installers to develop new skills, do not significantly increase project cost or delay installation, are easily validated, and are likely to be retained by the customer.

30. Energy Division should hold a workshop to assist the PAs in determining the energy efficiency measures that meet our criteria for appropriate energy efficiency improvements under this program.

31. To receive incentives, customers should obtain an energy audit and deploy cost-effective and feasible energy efficiency measures that reduce water heating demand and meet our definition of appropriate energy efficiency improvements, as specified in the Program Handbook.

32. SWH systems should be sized based on the reduced hot water use that will result from energy efficiency improvements.

33. To reduce barriers to SWH, we direct the PAs to budget 40% of market facilitation funds in the first two years of the program.

34. Market facilitation activities and budgets will be determined by Energy Division through an annual advice letter process. The first market facilitation advice letter should include a strategic plan and detailed budget for specific short-term and mid-term activities to achieve a self-sustaining SWH market by 2018.

35. The PAs should coordinate M&E activities for CSI Thermal with M&E for the general market CSI program.

36. The PAs should jointly design and maintain a statewide program database and ensure that program participants provide performance data, as necessary, to evaluate the program.

37. To reduce disruption in the SWH market, SWH systems installed after July 15, 2009 or that obtained a building permit after July 15, 2009 should be eligible for incentives through CSI Thermal if they meet all other program eligibility criteria.

38. Customers in the SDG&E area who apply for incentives from the SWH Pilot Program between July 15, 2009 and December 31, 2009 may apply for and receive any higher incentive offered through the CSI Thermal program, if they meet all program eligibility criteria.

O R D E R

IT IS ORDERED that:

1. The California Solar Initiative Thermal Program set forth in Appendix A is adopted and shall be administered by Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy (collectively, the California Solar Initiative Thermal Program Administrators).

2. Within 60 days of this order, San Diego Gas & Electric Company shall revise its contract with the California Center for Sustainable Energy to specify that California Center for Sustainable Energy will act as Program Administrator for the California Solar Initiative Thermal Program in the San Diego Gas & Electric Company territory.

3. Within 60 days of this order, the Commission's Energy Division shall hold workshops regarding:

- a) Development of siting, installation, freeze protection, and system sizing requirements to maximize solar water heating system performance and guard against oversizing of systems;
- b) Development of an on-line incentive calculation tool that estimates natural gas or electricity displacement based on solar water heating system location, design, and expected performance; and
- c) Development of appropriate energy efficiency improvements that reduce water heating demand and that

are broadly applicable, do not require solar water heating system installer to develop new competencies, do not significantly increase project cost or delay installation, are easily validated on system inspection, and are likely to be retained by the system owner.

4. By April 1, 2010, the California Solar Initiative Thermal Program Administrators, namely Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy, shall complete development of the on-line incentive calculation tool and provide it to Energy Division for review.

5. By April 1, 2010, the California Solar Initiative Thermal Program Administrators, namely Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy, shall complete drafting of the single-family residential customer portion of the California Solar Initiative Thermal Program Handbook, which shall be a subset of the general market California Solar Initiative Handbook, and jointly submit it as an Advice Letter in order to begin accepting solar water heating incentive applications from single-family residential customers on May 1, 2010.

6. By April 1, 2010, each California Solar Initiative Thermal Program Administrator, namely Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy, shall submit a separate Advice Letter that includes: a) a detailed estimate of its program budget for the first year of program implementation, indicating direct and indirect expenses, labor and non-labor, for incentives, administration, market facilitation, and measurement and evaluation;

and b) its proposed market facilitation strategic plan and detailed budget for the first two years of program implementation.

7. By May 1, 2010, the California Solar Initiative Thermal Program Administrators, namely Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy, shall complete drafting of the commercial and multifamily project portion of the California Solar Initiative Thermal Program Handbook, which shall be a subset of the general market California Solar Initiative Handbook, and submit it as an Advice Letter in order to begin accepting incentive applications for commercial and multifamily projects on June 1, 2010.

8. Within 180 days of this order, the Energy Division shall hold a workshop on the issue of the eligibility of non-solar water heating solar thermal technologies that displace gas usage and meet all other program requirements, including certification from the Solar Rating and Certification Corporation. The workshop should address how to estimate these technologies thermal displacement for incentive calculation purposes and whether performance-based incentives are appropriate for these systems. Following the workshop, Energy Division should provide a workshop report to the service list of this proceeding, or its successor proceeding, and the Administrative Law Judge.

9. The California Solar Initiative Thermal Program Administrators, namely Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy, may file advice letters to modify the California Solar Initiative Thermal Program Handbook and expand program eligibility if the Solar Rating and

Certification Corporation adopts certifications for additional solar thermal technologies such as concentrating solar collectors.

10. The Energy Division shall monitor implementation of the California Solar Initiative Thermal Program and notify the Administrative Law Judge and assigned Commissioner if there are great disparities in participation between the single-family residential, commercial, and multifamily budget categories.

11. The Energy Division shall obtain parties' input and consult with the assigned Commissioner to establish the California Solar Initiative Thermal Measurement and Evaluation budget and scoping plan through an assigned Commissioner's Ruling.

12. The Energy Division shall issue a Request for Proposals for an independent entity to perform the measurement and evaluation work, as set forth in the assigned Commissioner's Ruling, select the measurement and evaluation contractor, and oversee the measurement and evaluation work. Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, and Southern California Gas Company shall reimburse the Commission for this measurement and evaluation contract according to the percentages set forth in Appendix A.

13. In administering the California Solar Initiative Thermal Program, the California Solar Initiative Thermal Program Administrators, namely Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and the California Center for Sustainable Energy, shall perform all duties specified in Appendix A, including but not limited to the following:

- a) Separately submit semi-annual expense reports to the Energy Division as a subset of and along with general market California Solar Initiative expense reports;

- b) Separately submit an Advice Letter with proposed California Solar Initiative Thermal market facilitation budgets and activities for each calendar year, which addresses the activities identified in Appendix A, no later than October 1 of the preceding year;
- c) Separately submit quarterly progress reports to the Energy Division;
- d) Jointly host quarterly forums, in coordination with forums in the general market California Solar Initiative program, to obtain input from the public and interested parties on the program status;
- e) Jointly ensure development and maintenance of a statewide program database as directed by Energy Division, and ensure program participants provide system data for the database, application processing, and program evaluation purposes;
- f) Determine convenient ways for customers to make a combined application for energy efficiency and solar incentives, although customers may not receive incentives from both programs for the same solar water heating system;
- g) Post weekly information on their program websites and the statewide Go Solar California website regarding participation and incentive levels;
- h) Provide written notification of incentive reductions to the Administrative Law Judge, with a copy to the service list of this or any successor proceeding, within five business days following a reduction;
- i) Perform system inspections; and
- j) Coordinate measurement and evaluation activities with the general market California Solar Initiative program.

14. Energy Division shall monitor incentive caps under this program and may propose Program Handbook changes to adjust the caps by Commission resolution.

15. The California Center for Sustainable Energy may move no more than \$50,000 annually from its market facilitation budget to cover administrative expenses.

16. Within 90 days of this order, Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas and Electric Company, and Southern California Gas Company shall each file an advice letter to amend their preliminary statements and establish a memorandum account to track actual annual expenditures for the gas-displacing California Solar Initiative Thermal program, beginning on the effective date of this decision through December 31, 2017. On an annual basis, each utility may, in its appropriate ratemaking proceeding, seek recovery from its gas customers on an equal cents per therm basis of the prior year's memorandum account balance, excluding customers participating in the California Alternate Rates for Energy Program, the Family Electric Rate Assistance Program, and any customers who are currently exempt from funding the Self Generation Incentive Program. Total expenditures by each utility over the duration of the California Solar Initiative Thermal Program may not exceed the amounts in Table 5 of this decision.

17. The Administrative Law Judge may modify the dates set forth in this order as needed and for good cause to ensure effective program implementation.

18. Rulemaking 08-03-008 shall remain open.

This order is effective today.

Dated January 21, 2010, at San Francisco, California.

MICHAEL R. PEEVEY

President

DIAN M. GRUENEICH

JOHN A. BOHN

TIMOTHY ALAN SIMON

Commissioners

Appendix A

California Solar Initiative Thermal Program

The California Solar Initiative (CSI) Thermal Program offers rebates for solar water heating (SWH) installations on new and existing homes and businesses. The program will pay incentives towards SWH systems that displace natural gas water heating on new¹ and existing homes and businesses of gas customers of Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric Company (SDG&E) and Southern California Gas Company (SoCalGas). The program will also pay incentives towards SWH systems that displace electric water heating on existing² homes and businesses of electric customers of PG&E, SDG&E and Southern California Edison (SCE).

The program will begin on or after January 1, 2010 and run for 8 years, until December 31, 2017 or until the program funds are exhausted, whichever occurs first.

Program Goals and Design Principles

The goals of the CSI Thermal Program are to:

- Significantly increase the size of the SWH market in California by increasing the adoption rate of SWH technologies, including:
 - Achieving the installation of natural gas-displacing systems that displace 585 million therms
 - Achieving the installation of electric-displacing SWH systems that displace 275.7 million kilowatt hours per year³ of electricity by the end of 2017

¹ If SWH becomes mandatory for new home construction, new homes shall not be eligible for incentives under CSI Thermal.

² SWH systems that displace electric usage on new homes and businesses are not eligible for CSI Thermal. New homes considering electric-displacing SWH may fall within the California Energy Commission's (CEC's) New Solar Homes Partnership Program.

³ 100,800 systems x 2735 kWh per system per year = 275.7 million kWh per year.

- Achieve an expansion of the market for other solar thermal technologies that displace natural gas and electricity use, in addition to SWH
- Support reductions in the cost of SWH systems of at least 16% through a program that increases market size and encourages cost reductions through market efficiency and innovation
- Increase consumer confidence and understanding of SWH technology and their benefits
- Engage in market facilitation activities to reduce market barriers to SWH adoption, such as high permitting costs, lack of access to information, and lack of trained installers.

The CSI Thermal Program shall follow these design principles:

- Build upon the existing general market CSI Program, as well as the existing statewide effort under the umbrella of the Go Solar California campaign and brand.
- Provide a long-term commitment to offer incentives for SWH installations over 8 years from 2010 to 2017.
- Provide incentives to SWH systems based on the performance of those systems, in order to promote the adoption of high-performing systems.
- Encourage SWH component manufacturers and system integrators to commit to high performance, lower-cost designs. Incentives will be reduced over time to reflect these performance gains and expected cost reductions.
- Regularly review incentive levels to ensure that ratepayers do not over-pay for the level of SWH adoption the Commission seeks.
- Work to remove structural barriers to the deployment of SWH technologies through marketing, outreach and training.
- Provide consumers with useful information about SWH technology ratings, performance, and costs.
- Rely upon the lessons learned from the California Center for Sustainable Energy (CCSE) SWH Pilot Program to design a program that supports the creation of a stable SWH industry.

- Encourage customers to consider not only SWH applications, but also energy efficiency measures that offer attractive economic returns and other benefits such as comfort or convenience.

- **Eligibility**

To be eligible for incentives under CSI Thermal, SWH systems must meet the following criteria:

- Energy output or displacement standards. Residential SWH systems shall have Solar Rating and Certification Corporation (SRCC) OG-300 SWH System Certification. Solar collectors used in multifamily residential, commercial, or industrial water heating shall have SRCC OG-100 SWH System Certification.
- Components must be new and unused.
- SWH collectors must have a warranty of not less than 10 years.¹⁸
- SWH systems must be in buildings connected to a natural gas utility's distribution system.
- SWH systems must have meters or other kilowatt thermal (kWth) measuring devices to monitor and measure system performance and the quantity of energy generated or displaced by the system. Meters are required for all systems displacing over 30 kWth.
- Systems must be installed in conformity with manufacturers' specifications and all applicable codes and standards.

In addition, the Program Administrators (PAs) shall establish conditions for program eligibility, which shall be enumerated in the Program Handbook, for the following:

- Appropriate siting, installation, and climate-zone specific freeze protection requirements to maximize performance of the system, and system sizing procedures to prevent oversizing and overheating of systems. Single-family residential system tank size should be based on the number of persons in the household, while commercial and multifamily systems should follow American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) guidelines on sizing. System sizing should consider the impact of appropriate energy efficiency improvements.
- Appropriate energy efficiency improvements that reduce water heating demand in the home or commercial structure where the SWH system is installed.

¹⁸ Energy Division may consider expanded warranty requirements in the CSI Thermal Handbook, balancing warranty costs with adequate consumer and ratepayer protection.

- Rating standards for equipment components and systems.

All systems, both gas and electric displacing, must meet the eligibility criteria and conditions described above to receive incentives under CSI Thermal. Solar pool heating and passive solar technologies are not eligible under this program.

PAs shall inspect the first three installations performed by every installer, and random inspections thereafter, as directed by Energy Division.

CSI Thermal shall only pay incentives to SWH systems that displace gas or electricity usage. The Commission may, at a future date, consider allowing incentives to non-SWH solar thermal systems that displace gas usage and meet all other program requirements. Electric-displacing solar thermal projects may apply for incentives through the general market CSI program or the CEC's New Solar Homes Partnership program.

SWH systems that meet the above requirements shall be eligible for incentives if they were installed after July 15, 2009 or obtained a building permit after July 15, 2009. Customers who apply for incentives from the CCSE SWH Pilot Program between July 15, 2009 and December 31, 2009 may apply for and receive any supplemental incentive through the statewide CSI Thermal program, if they meet CSI Thermal eligibility criteria.

Incentive Design

Incentives are paid up front, and are calculated based on estimated first year therm or kilowatt hour (kWh) displacements of the SWH system.

Gas Displacing Incentives

Incentive rates will decline over the duration of the program in four steps:

Table 1: Adopted CSI Thermal Gas Displacing Incentive Structure

Step	Incentive for Average Residential SWH System	Funding Amount	Incentive per Therm Displaced	Therms Displaced Over System Life ⁴
1	\$1,500	\$50,000,000	\$12.82	97,500,000
2	\$1,200	\$45,000,000	\$10.26	109,687,500
3	\$900	\$45,000,000	\$7.69	146,250,000
4	\$550	\$40,000,000	\$4.70	212,727,275
	Total	\$180,000,000		566,164,775 ⁵

The actual incentive paid to any qualified system would be derived by multiplying the system's estimated first-year thermal displacement based on its SRCC rating, by the incentive rate. For single-family residential systems, incentives are calculated using the SRCC OG-300 estimation of annual energy savings combined with the Solar Orientation Factor (SOF), which is calculated by measuring the tilt and compass orientation, or azimuth, of the SWH installation. For commercial and multifamily SWH systems, incentives are calculated using an on-line incentive calculation tool as described in the Program Handbook.

Incentives are capped for single-family residential systems at 125% of the average residential incentive in that step. Incentives for commercial and multifamily systems are capped at \$500,000 per SWH system. Energy Division may review the caps upon considering one year of program data, and may propose handbook changes regarding the caps through a Commission resolution.

Incentives shall decline from step to step when PAs accept applications and confirm reservations to pay incentives to their qualifying applicants equal to the budget allocation for the customer class in each step. SWH incentives shall move independently in each service territory and for each class of customer. For example, residential customers in the SCE territory may be at Step 1, while

⁴ This analysis assumes a 25 year system life.

⁵ The 566.1 million in total therms displaced is 97% of the 585 million program goal in the Staff Proposal. Additional therms will be displaced by the low income SWH incentive program, when adopted.

residential customers of PG&E are in Step 2, and commercial/multifamily customers for both utilities may be in Step 3.

The PAs shall post weekly information on their program websites and the statewide Go Solar California website about program participation and applications so applicants can gauge whether incentives may drop soon. The PAs will provide written notification of incentive reductions by letter to the Administrative Law Judge, with a copy to the service list of Rulemaking 08-03-008, or any successor proceeding.

Incentive dollars will be allocated between single-family residential and commercial and multifamily customers as follows:

- 40% of the total incentive budget is reserved for single-family residential customer SWH systems.
- 60% of funds may be used for incentives to commercial or multifamily SWH systems.

The PAs may move funds from the commercial/multifamily budget to the single-family residential budget, but not vice versa. Energy Division shall monitor program implementation and notify the ALJ and Assigned Commissioner if there are great disparities in participation between the residential and commercial/multifamily categories, so the Commission can consider adjusting these budget allocations. If it appears that Step 1 incentives allocated to support single-family residential SWH systems will be exhausted much earlier than those incentives allocated to commercial and multifamily systems, the Commission may consider shifting incentive dollars to allow a greater number of single-family residential systems to be installed at the Step 1 incentive level.

The table below summarizes the incentive budget allocations, by step.

Table 2: Gas Displacing Incentive Structure by Customer Class

Step	Customer Class	Incentive per therm displaced	Budget Allocation	Annual Therms Displaced (in thousands of therms)	Equivalent Single-Family Residential Systems ⁶
1	Single-Family Residential	\$12.82	\$20,000,000	1560	13,334
	Commercial/Multifamily		\$30,000,000	2340	20,000
	Subtotal		\$50,000,000	3900	33,334
2	Single-Family Residential	\$10.26	\$18,000,000	1755	14,99
	Commercial/Multifamily		\$27,000,000	2632	22,493
	Subtotal		\$45,000,000	4387	37,485
3	Single-Family Residential	\$7.69	\$18,000,000	2340	20,000
	Commercial/Multifamily		\$27,000,000	3510	30,007
	Subtotal		\$45,000,000	5850	50,007
4	Single-Family Residential	\$4.70	\$16,000,000	3404	29,094
	Commercial/Multifamily		\$24,000,000	5106	43,647
	Subtotal		\$40,000,000	8510	72,741
	Total		\$180,000,000	22,647	193,567

Electric Displacing Incentives

Incentive rates for electric-displacing SWH systems are as follows:

Table 3: Electric Displacing Incentive Structure

Step Level	Electric Displacing Incentive (\$/kWh)	Incentive for Average Residential System
1	0.37	\$1010
2	0.30	\$820
3	0.22	\$600
4	0.14	\$380

As incentives decline under the gas-displacing program, a corresponding reduction should occur to the electric-displacing incentive. That is, each PA will offer incentives to electric displacing systems at the corresponding step level that

⁶ The annual therm displacement in each step is converted to an equivalent number of residential SWH systems based on the assumption an average residential system displaces 117 therms per year.

is offered to gas-displacing systems. For example, if PG&E is offering residential customers Step 2 incentives for gas-displacing systems, it should offer residential customers Step 2 for electric-displacing systems.

Incentives for single-family residential systems are capped at 125% of the average residential incentive in that step, and are capped at \$250,000 per commercial system. Energy Division may review the caps after there is one year of program data, and may propose handbook changes regarding the caps, which would be handled by Commission resolution.

The PAs shall count the capacity of electric-displacing SWH installations against Step 10 of the general market CSI program, and Step 9 if needed.

Program Handbook

The PAs shall develop the CSI Thermal Program Handbook as a section within the general market CSI Program Handbook. The CSI Thermal Program Handbook shall contain all program rules and technical specifications. The PAs shall submit, no later than April 1, 2010, the first edition of this Program Handbook to Energy Division through an Advice Letter, which shall pertain at a minimum to the single-family residential portion of the program. If a second edition of the handbook is necessary to adopt rules and specifications applicable to the commercial/multifamily market segments, that edition shall be submitted through an Advice Letter no later than May 1, 2010. The CSI-Thermal PAs should use the outline below, which was included in the Staff Proposal, as a basis for creating the CSI Thermal Program Handbook, in consultation with Energy Division.

1. Introduction to CSI-Thermal Program
 - 1.1 Program Background
 - 1.2 Program Budget
 - 1.3 Program Goals
 - 1.4 Incentive Structure
2. Program Eligibility Criteria and Requirements
 - 2.1 Participants in the CSI-Thermal Program
 - 2.1.1. Natural Gas Displacing SWH -- Customer
 - 2.1.2. Natural Gas Displacing SWH -- Contractor
 - 2.1.2.1. Installation Quality Assurance
 - 2.1.2.2. Insurance Requirements
 - 2.1.3. Electric Displacing SWH - Customer

- 2.1.4. Electric Displacing SWH – Contractor
 - 2.1.4.1. Installation Quality Assurance
 - 2.1.4.2. Insurance Requirements
- 2.1.5. Equipment Sellers
- 2.1.6. Site Definition
- 2.2 Equipment Eligibility and Requirements
 - 2.2.1. Eligible Equipment
 - 2.2.2. Required Freeze and Scald Protection
 - 2.2.3. Shading
 - 2.2.4. System Sizing
 - 2.2.5. Ineligible Equipment and System Applications
- 2.3 Warranty Requirements
- 2.4 Metering Requirements
 - 2.4.1. Small Systems (under 30 kWth)
 - 2.4.2. Large Systems (over 30 kWth)
- 2.5 Owner’s Manual
- 2.6 Inspection Requirements
 - 2.6.1. Failed Inspections
 - 2.6.2. Owner’s Manual
- 3. CSI-Thermal Program Incentive Structure
 - 3.1 Natural Gas Component
 - 3.1.1. Single-Family
 - 3.1.2. Multi-Family
 - 3.1.3. Commercial
 - 3.2 Electric Component
 - 3.2.1. Single-Family
- 4. CSI-Thermal Program Incentive Calculator
 - 4.1 OG-300
 - 4.2 OG-100
- 5. Incentive Application Process for CSI-Thermal Program
 - 5.1 Requesting an Incentive Reservation
 - 5.1.1. Incentive Reservation for Third Party Purchases
 - 5.2 Incentive Reservation Approval
 - 5.3 Changes to Reservations
 - 5.3.1. Installed Equipment
 - 5.3.2. Extending the Reservation Expiration Date
 - 5.4 Incentive Payment Request Process
 - 5.4.1. Requirements for Incentive Payment
 - 5.5 Incentive Payment Approval

6. Self-Installation
7. Technical Requirements
 - 7.1 Design and Installation Criteria
 - 7.2 Freeze Protection
 - 7.2.1. Recirculation
 - 7.2.2. Drainback
 - 7.2.3. Closed Loop Glycol
 - 7.2.4. Integrated Collector and Storage
 - 7.3 Shade
 - 7.4 Scalding
 - 7.5 Stagnation
 - 7.6 Roof Loading
 - 7.7 System Sizing
8. Definitions and Glossary
9. Program Contact Information
10. Appendices
 - 10.1 Appendix A: Incentive Descriptions
 - 10.2 Appendix B: Incentive Calculator
 - 10.3 Appendix B: Solar Orientation Factor Chart
 - 10.4 Appendix C: Program Forms
 - 10.5 Appendix D: Authorization to Act on a Customer's Behalf

Incentive Calculator

The PAs shall develop an online incentive calculation tool to estimate natural gas or electricity displacement for SWH systems based upon system location, design and expected performance. To calculate incentives for single-family residential SWH systems, the calculator should use the SRCC OG-300 estimation of annual energy savings combined with the Solar Orientation Factor (SOF), which is calculated by measuring the tilt and compass orientation, or "azimuth," of the SWH installation. For commercial and multifamily SWH systems using SRCC OG-100 certified equipment, the PAs shall build or license an internet-based incentive calculation tool that uses currently available software, to estimate annual energy savings for custom designed systems.

In order to assist the PAs with development of the CSI Thermal Program Handbook and incentive calculator, Energy Division shall hold a public workshop or workshops within 60 days of the effective date of this Decision that will allow for further stakeholder input on technical considerations related to

R.08-03-008 COM/MP1/avs

development of these products.

System Monitoring

All SWH systems that displace over 30 kWth of natural gas must be equipped with meters or other kWth measuring devices to monitor and measure the system's performance and the quantity of energy generated or displaced by the system for five years. For systems displacing 30 kWth and below, the PAs will ensure that metering and monitoring equipment is installed for program evaluation purposes on a sample of these systems – including residential, commercial and multifamily properties – at the time of system installation. The cost for monitoring equipment on this sample will be borne by the PAs through their measurement and evaluation (M&E) budgets. The sample size will be determined through the M&E process, in consultation with Energy Division.

Program Administration

PG&E and SDG&E, in coordination with its program administrator, CCSE, will disburse incentives to both electric and gas ratepayers who install eligible solar water heating systems in their territories. SCE will disburse incentives through the CSI Thermal Program to customers who install electric displacing solar water heating systems. SoCalGas will disburse incentives to customers in its territory who install gas displacing solar water heating systems.

The CSI Thermal program will be a stand-alone program, distinct from utility energy efficiency programs. Nevertheless, PAs shall determine convenient ways for customers to make a combined application for efficiency and solar measures, if that is what the customer seeks. Customers may not receive SWH incentives from both a utility energy efficiency program and CSI Thermal for the same SWH system.

In administering CSI Thermal, the PAs shall perform the following:

- Each PA shall submit to Energy Division a semi-annual expense report on Feb. 15 and Aug. 15 of each year as a subset of its general market CSI expense report, that includes data through either December 31st or June 30th as appropriate. The expense reports should include disclosure of expenditures separated by direct and indirect expenses, labor and non-labor, for all of the major categories, including administration, market facilitation, evaluation, and incentives.
- Each PA shall submit a quarterly progress report to the Energy Division that includes application and installation data for the preceding quarter.
- Jointly host quarterly forums to obtain input from the public and interested parties on the operation of the CSI Thermal Program. The PAs shall coordinate the forums with the CSI Program forums held for the general market CSI program.
- Each PA shall submit an annual advice letter to Energy Division with its proposed market facilitation budget and activities for each calendar year, no later than October 1 of the preceding year.
- Ensure development and maintenance of a program database, and ensure program participants provide system data for the database and program evaluation purposes.

Budget

The CSI Thermal Program will be funded by \$250 million in collections from gas ratepayers, pursuant to Assembly Bill (AB) 1470 (Statutes of 2007, Chapter 536), as well as up to \$100.8 million in funds already authorized and collected through the general market CSI photovoltaic program and earmarked in Senate Bill (SB) 1 (Statutes of 2006, Chapter 132) for solar thermal projects such as solar water heating. Monies collected under AB 1470 will fund incentives to solar water heating systems that displace natural gas usage, while funds collected through CSI will fund electric displacing solar water heating systems.

For the natural gas displacing portion of the program, the \$250 million program budget will be collected by the three gas utilities based on the percentages below.

Table 4: Adopted Gas Displacing Budget Allocation

Utility	Budget Allocation	Total Program Collections (in millions)
PG&E	39%	\$97.5
SDG&E	10%	\$25
SoCalGas	51%	\$127.5
Total	100%	\$250 million

Each utility shall establish a memorandum account to track its actual program expenditures beginning with the effective date of this decision through December 31, 2017, and seek recovery of the annual memorandum account balance through gas distribution rates on an equal cents per therm basis in its appropriate ratemaking proceeding the following year. Customers participating in the California Alternate Rates for Energy or the Family Electric Rate Assistance programs shall be exempt from this surcharge, as well as any customers who are currently exempt from funding the Self Generation Incentive Program.

The gas-displacing program budget shall be divided as follows:

Table 5: Adopted CSI Thermal Gas Displacing Program Budget

CSI Thermal Program Elements	CSI Thermal Program Sub-Elements	Budget
Incentives 82%	General Market Incentive Component	\$180,000,000
	Low-Income Incentive Component (10% of total funds) ⁷	\$25,000,000
	<i>Subtotal</i>	\$205,000,000
Market Facilitation 10%	Marketing & Outreach, including training, consumer education, and other market facilitation activities such as engaging with permitting offices or financing providers.	\$25,000,000
	<i>Subtotal</i>	\$25,000,000
Program Administration 8%	Application/incentive processing, General Administration, and System Inspection	\$15,000,000
	Measurement and Evaluation	\$5,000,000
	<i>Subtotal</i>	\$20,000,000
Total		\$250,000,000

CCSE may move no more than an additional \$50,000 per year from its market facilitation budget to cover administrative expenses, as necessary, as long as it does not exceed its total budget allocation of \$4.5 million for administration, market facilitation, and measurement and evaluation.

For the electric-displacing portion of the program, the Commission established the revenue requirement for collection of the general market CSI budget, including \$100.8 million for solar thermal, in D.08-12-044. The electric-displacing program budget shall be allocated as follows:

⁷ Details of SWH incentives to qualifying low income residential housing shall be set forth by the Commission at a later date.

Table 6: Adopted CSI Thermal Electric Displacing Program Budget

CSI Thermal Program Elements	CSI Thermal Program Sub-Elements	Budget
Incentive Program Component	General Market Incentive Component	No more than \$100,800,000
	Low-Income Incentive Component	\$0
	<i>Subtotal</i>	\$100,800,000
Market Facilitation Program Component	Marketing & Outreach, including training, consumer education, and other market facilitation activities such as engaging with permitting offices or financing providers.	\$6,250,000
	<i>Subtotal</i>	\$6,250,000
Program Administration	Application/incentive processing, General Administration, and System Inspection	Subject to the overall CSI budget, but tracked separately
	Measurement and Evaluation	\$1,250,000
	<i>Subtotal</i>	\$1,250,000
Total		\$108,300,000 + CSI Admin Budget Costs

The PAs may perform marketing and M&E activities in a combined fashion for all SWH systems, whether they displace gas or electricity. The PAs may fund these activities on a 4:1 ratio, so that for every \$4 spent from the gas-displacing budget, \$1 is spent from the electric-displacing budget.

Energy Efficiency Requirements

Customers seeking incentives through CSI Thermal shall obtain an energy efficiency audit and deploy appropriate energy efficiency improvements that reduce water heating demand in the home or commercial structure where the SWH system is installed. Appropriate energy efficiency improvements shall be ones that are broadly applicable, do not require SWH system installers to develop new competencies, do not significantly increase project cost or delay installation, are easily validated on system inspection, and are likely to be retained once a customer has received their incentives.

Market Facilitation

The PAs shall conduct market facilitation activities for CSI Thermal according to the following budget:

Table 7: Adopted Market Facilitation Budget

Budget Year			2010	2011	2012-2017
			20%	20%	10% per year
Natural Gas Displacing Program					
PG&E	39%	\$9,750,000	\$1,950,000	\$1,950,000	\$975,000
CCSE/SDG&E	10%	\$2,500,000	\$500,000	\$500,000	\$250,000
SCG	51%	\$12,750,000	\$2,550,000	\$2,550,000	\$1,275,000
SCE	0%	\$0	\$0	\$0	\$0
Total		\$25,000,000	\$5,000,000	\$5,000,000	\$2,500,000
Electric Displacing Program					
PG&E	43.7%	\$2,731,250	\$546,250	\$546,250	\$273,125
CCSE/SDG&E	10.3%	\$643,750	\$128,750	\$128,750	\$64,375
SCG	0%	\$0	\$0	\$0	\$0
SCE	46%	\$2,875,000	\$575,000	\$575,000	\$287,500
Total		\$6,250,000	\$1,250,000	\$1,250,000	\$625,000
Combined CSI-Thermal					
PG&E	39.9%	\$12,481,250	\$2,496,250	\$2,496,250	\$1,248,125
CCSE/SDG&E	10.1%	\$3,143,750	\$628,750	\$628,750	\$314,375
SCG	40.8%	\$12,750,000	\$2,550,000	\$2,550,000	\$1,275,000
SCE	9.2%	\$2,875,000	\$575,000	\$575,000	\$287,500
Total		\$31,250,000	\$6,250,000	\$6,250,000	\$3,125,000

The PAs shall each submit annual advice letters to Energy Division with their proposed market facilitation budgets and activities for each calendar year, no later than October 1 of the preceding year. The first market facilitation advice letter should include a strategic plan and detailed budget for specific short-term and mid-term activities to achieve a self-sustaining SWH market by 2018. Prior to filing this first advice letter, the CSI Thermal program administrators shall hold a public workshop to obtain input from key industry and expert sources. The specific market facilitation activities will be determined by the Commission in acting on the advice letters. The PAs shall incorporate installer training, which includes training on system sizing requirements, as part of their market facilitation activities funded through this program.

The PAs' annual market facilitation plans should address how the PAs will jointly market the CSI-Thermal Program with the general market CSI-PV Program, including incorporating information about the CSI-Thermal Program into the Go Solar California website and jointly marketing the program under the Go Solar California campaign.

The Annual Market Facilitation Plans shall include, but are not limited to, activities in the following areas.

- Activities to Address Public Knowledge about SWH
 - Consumer Education and Outreach related to the CSI-Thermal program
 - Brochures, websites and other informational tools
 - Consumer decision making tools to aid in the purchasing decision of SWH products
 - Participation in local and regional events targeted at potential SWH consumers
 - Participation in SWH trade and industry events to promote understanding of the CSI-Thermal Program
 - Information on financing SWH systems
 - Build transparency and understanding in the market
 - Proactive press, communications, or marketing & outreach strategies
- Activities to Address Lack of Knowledge about SWH among Local Building Officials
 - Training building officials and outreach on permitting of SWH
 - Encouraging local jurisdictions to adopt streamlined permitting processes and minimum appropriate fees
 - Addressing concerns of local officials with respect to system safety, including weight loading or fire safety.
- Activities to Address Shortage of Experienced SWH Installers
 - Training on the CSI-Thermal Program
 - Installer Training
 - Supporting high quality permit building inspection processes
 - Support for job training or workforce development programs related to solar hot water, such as coordination on curriculum development
- Other Market Facilitation Activities
 - Participation in equipment eligibility and standards development
 - Program Reporting targeted at consumers to learn about technology costs, choosing a solar contractor
 - Support for or coordination with the development of programs related to financing solar hot water systems (working with municipalities and other entities that wish to offer up-front financing for SWH through AB 811¹⁹ or via private loans)

¹⁹ AB 811 (Levine, 2008) authorizes all cities and counties in California to allow homeowners to opt in to an assessment district for the purposes of financing the

Footnote continued on next page

Measurement and Evaluation (M&E)

M&E studies shall be jointly funded by the four program administrators based on the following budget allocation:

Table 8: Budget Allocation for M&E Studies

Utility	Allocation	M&E Budget
PG&E	39.9%	\$2,493,750
SCE	9.2%	\$575,000
SDG&E/CCSE	10.1%	\$631,250
SCG	40.8%	\$2,550,000
Total	100%	\$6,250,000

The PAs shall coordinate CSI Thermal M&E with ongoing M&E in the general market CSI Program. Energy Division shall oversee the M&E work in the CSI Thermal program and ensure it is coordinated with the general market CSI M&E work.

The Energy Division shall issue a Request for Proposal (RFP) for an independent entity to perform the M&E work, and select the evaluation contractor. The utilities shall reimburse Energy Division for this contract according to the percentages set forth above.

Energy Division should consult with the Assigned Commissioner to finalize the M&E reports that will be undertaken, and the schedule for these reports. The M&E reports may include the following:

- Market Baseline Studies -to provide a basis for assessing program progress toward achieving program goals.
- Program Impact Evaluation - to assess the impact of the program on electricity and natural gas demand, assess the number of systems installed, assess the greenhouse gas emission reductions achieved by the program, collect and analyze actual performance data of installed systems, compare the performance data to the expected performance of those systems, and

upfront installation costs of solar and energy efficiency improvements. This law enables property owners in a participating city or county to finance solar systems and energy efficiency upgrades via a municipal bond that can be repaid through property tax assessments over a period of 20 years.

make that information readily and transparently available to consumers and policy makers.

- Program Process Evaluation – to assess the program operations and make recommendations for improving the program's effectiveness.
- Cost-Benefit Studies –to provide a periodic check on the costs and benefits of the program, and to evaluate the program's cost-effectiveness on an updated basis.
- Technology Evaluation – to assess SWH, other (non-SWH) solar thermal technologies and their ability to support the state's goals for reducing energy demand.
- Market Surveys – to periodically assess the market, and how the market intervention is affecting technology deployment.
- Other Evaluation Studies – to serve the ongoing program management and evaluation needs.

The Energy Division will obtain parties' input and work in consultation with the Assigned Commissioner to establish the CSI Thermal M&E budget and scoping plan through an Assigned Commissioner's Ruling, which will serve as the basis for conducting M&E Studies. The M&E Studies will be made publicly available, and the results of the M&E studies will form the basis of program modifications, as necessary.

The CSI-Thermal PAs will be responsible for ensuring that program participants provide the program with performance data, as necessary, to evaluate the program. Larger systems are required to provide the program with project performance data for five years.

The CSI-Thermal PAs will be responsible for design and maintenance of a statewide program database that facilitates application processing, public program data, and program evaluation. The database should include all installation performance design characteristics and other application data. Energy Division shall oversee the other details of the database and provide direction to the program administrators in establishing the database.

The CSI-Thermal PAs will be responsible for quarterly progress reports that provide a snapshot of application and installation data, as well as other information on the implementation and administration of the program. The PAs will also be responsible for submitting semi-annual expense reports to Energy

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Division as a subset of general market CSI expense reporting, and these reports shall include all aspects of the program budget.

