STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

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January 14, 2013

Agenda ID #11855
Quasi-legislative

TO PARTIES OF RECORD IN RULEMAKING 12-11-005

This is the proposed decision of Commissioner Michael R. Peevey. It will not appear on the Commission's agenda sooner than 30 days from the date it is mailed. The Commission may act then, or it may postpone action until later.

When the Commission acts on the proposed decision, it may adopt all or part of it as written, amend or modify it, or set it aside and prepare its own decision. Only when the Commission acts does the decision become binding on the parties.

Parties to the proceeding may file comments on the proposed decision as provided in Article 14 of the Commission's Rules of Practice and Procedure (Rules), accessible on the Commission's website at www.cpuc.ca.gov. Pursuant to Rule 14.3, opening comments shall not exceed 15 pages.

Comments must be filed pursuant to Rule 1.13 either electronically or in hard copy. Comments should be served on parties to this proceeding in accordance with Rules 1.9 and 1.10. Electronic and hard copies of comments should be sent to ALJ Katherine Kwan MacDonald at kk3@cpuc.ca.gov and the assigned Commissioner. The current service list for this proceeding is available on the Commission's website at www.cpuc.ca.gov.

/s/ KAREN V. CLOPTON
Karen V. Clopton, Chief
Administrative Law Judge

KVC:jt2

Attachment

Decision **PROPOSED DECISION OF COMMISSIONER PEEVEY**
(Mailed 1/14/2013)

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 12-11-005 (Filed November 8, 2012)

DECISION TO MODIFY DECISION 10-01-022 TO EXPAND TECHNOLOGIES INCENTIVIZED UNDER THE CALIFORNIA SOLAR INITIATIVE THERMAL PROGRAM

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Appendix A - Table of Changes to CSI-Thermal Program in this Decision

DECISION TO MODIFY DECISION 10-01-022 TO EXPAND TECHNOLOGIES INCENTIVIZED UNDER THE CALIFORNIA SOLAR INITIATIVE THERMAL PROGRAM

1. Summary

This decision modifies the California Solar Initiative (CSI)-Thermal Program to provide incentives to process heat applications, solar cooling technologies, space heating technologies and systems that combine multiple applications. In addition, this decision modifies the way rebates are paid to certain systems under the program by creating a performance-based incentive system that will pay rebates based on actual metered energy delivered to the facility. Specifically:

- *Performance-Based Incentives (PBI): PBI will replace the current 70/30 incentive mechanism adopted in Decision 10-01-022 for larger systems. Rebates will be paid based on metered energy delivered to the end use from the solar thermal system, with payments made quarterly over a two-year time period. Process heat, solar cooling, combination systems and very large systems will be required to take the PBI incentive.*
- *Process Heat: The CSI-Thermal Program will provide incentives to process heat applications via a PBI system that pays the incentive based on metered energy delivered to the facility.*
- *Solar Cooling: The CSI-Thermal Program will provide incentives to solar assisted absorption chillers as a limited pilot program to test this technology's performance, durability and economics. Incentives will be limited to no more than $10 million across the service territories of Pacific Gas & Electric Company, Southern California Edison, San Diego Gas & Electric Company, and Southern California Gas, and will be paid on a PBI basis.*
- *Single-Family Combination Water/Space Heating: The CSI-Thermal Program will offer an incentive to the space heating portion of an OG-300 rated combination system, in addition to the water heating incentive, once these systems are certified by a qualified standards body.*

- *Commercial/Multi-family Combination Systems: Incentives will be paid via a PBI mechanism to commercial/multi-family systems that use OG-100 collectors to provide heat for a combination of any of the following: water heating, space heating, solar cooling, and process heat. Incentives will be paid based on energy actually delivered to the building.*

2. Background

2.1. Creation of the CSI General Market Program

The Commission established the California Solar Initiative (CSI) in 2006, to provide $3.2 billion in incentives and other support for solar photovoltaic (PV) systems with the goal of installing 3,000 megawatts (MW) in the service territories of California's three large investor-owned electric utilities.[1] The Legislature codified the program and adjusted the program's scope and adjusted the Commission's portion of program total cost to $2.17 billion, later that year.[2] The Commission subsequently modified the CSI program to be consistent with Senate Bill 1 (SB1).[3] The program launched to the public on January 1, 2007. To incentivize performance, CSI requires large projects to take a performance-based incentive (PBI) that pays the rebate over five years based on actual system output. Smaller systems may take the incentive in a lump-sum payment based on the system's expected performance.

Although Pub. Util. Code § 2851(b) allows the payment of up to $100.8 million of total CSI incentives "for solar thermal and solar water heating devices," solar water heating (SWH) was initially excluded from the program

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[1] See D.06-01-024.

[2] Senate Bill 1 (Murray, 2006).

[3] D.06-12-033.

pending the results of a $2.6 million SWH pilot program (SWHPP) in the service territory of San Diego Gas and Electric Company (SDG&E).[4]

In addition, the Commission found in D.06-12-033 that natural gas displacing technologies, with the exception of SWHPP participants, should not receive incentives using funds collected from electric ratepayers. As a result, most solar water heating systems are ineligible for CSI general market funds. While non-water heating solar thermal technologies that displace electricity were not prohibited from applying for PBI incentives, there have been no applications for electric-displacing solar thermal projects in the CSI General Market program.

2.2. Creation of the CSI Thermal Program

In October 2007, Governor Schwarzenegger signed Assembly Bill (AB) 1470 (Huffman, 2007), authorizing $250 million in incentives and other market support for SWH systems that displace natural gas, so long as the data collected from the SWHPP showed that such a program would be "cost effective for ratepayers and in the public interest."

In 2009, the Commission's Energy Division analyzed the results of the SWHPP and recommended Commission approval of a statewide SWH incentive program, finding that such a program could be cost effective and in the public interest.[5] In January 2010, the Commission authorized the creation of the CSI-Thermal Program.[6] The CSI Thermal Program combines the $250 million authorized for natural-gas displacing SWH (funded by natural gas ratepayers)

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[4] See D.06-01-024 at 13-14.

[5] Energy Division Staff Proposal for CSI-Thermal Program, July 15, 2009, http://docs.cpuc.ca.gov/efile/RULINGS/104403.pdf.

[6] See D.10-01-022.

with the $100.8 million allowed for electric displacing SWH systems (funded by electric ratepayers and already a part of the CSI general market program).[7]

Seeking to promote administrative simplicity, the Commission directed incentives for gas-displacing and electric-displacing SWH to be administered with a single application process, database, incentive calculator, and other tools, although the incentive amounts differ between the energy types displaced and the funding comes from different ratepayers.[8] Four Program Administrators (PAs) jointly administer the CSI Thermal program, namely Southern California Gas (SCG), California Center for Sustainable Energy (CCSE) in SDG&E's territory, Pacific Gas and Electric (PG&E), and Southern California Edison (SCE).

The incentive budget for the natural gas-displacing portion of the program is available until all the funds have been awarded or until December 31, 2017. The incentive budget for the electric-displacing portion of the program is available until the CSI general market program budget has been exhausted or January 1, 2017, whichever occurs first. A portion of the $250 million collected from natural gas ratepayers is allocated to measurement and evaluation, market facilitation and program administration, leaving $205 million for payment of incentives ($180 million for general market and $25 million for the low income incentive program). $7.5 million has been budgeted for market facilitation and

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[7] The portion of the CSI-Thermal Program that funds incentives for electric displacing systems is subject to the overall budget of the CSI general market program. Once funding is exhausted in the general market program for any sub-program (i.e., any Program Administrator's Residential or Non-Residential program), all new project applications will be placed on a waitlist, with funding to be committed as other projects drop out.

[8] D.10-01-022.

program administration for electric-displacing systems, with an additional amount from the CSI budget for administration.

2.3. CSI-Thermal Rebate Structure for SWH Systems

The CSI-Thermal Program presently accepts applications from single-family and multi-family/commercial customers taking natural gas or electricity service from the four large investor-owned utilities in California. The incentive program divides the available funds between customer classes (i.e., single-family customers and commercial and multifamily customers), and between customers with electric-displacing and natural gas-displacing systems. The incentive levels are structured in four steps, with the highest payments available to customers who participate early in the program. As more systems are installed, the incentive amount decreases.

To qualify for the program, single-family applicants must install a SWH system with an OG-300 rating from the Solar Rating and Certification Corporation (SRCC). Multi-family and commercial applicants must install a SWH system using SRCC OG-100 rated collectors.

Applicants installing systems smaller than 250 kilowatt thermal (kW_{th}) (about 3850 square feet of collector space) are paid incentives in an up-front lump-sum payment after the system has been installed, and inspected if necessary. Incentive rates are set on a dollar-per-therm basis for natural gas displacing systems and a dollar-per-kilowatt hour (kWh) basis for electric-displacing systems. Actual incentives for each individual project are determined by multiplying the system's expected first-year energy displacement by the applicable per-therm or per-kWh incentive level.

For single-family OG-300 rated systems, the expected first-year energy displacement for any unique system is provided by SRCC for each climate zone.

The CSI-Thermal incentive calculator simply uses this estimate and adjusts the incentive to account for shading or sub-optimal orientation.

For multi-family/commercial systems with OG-100 collectors, TRNSYS-based software is used to model each system and determine the expected first-year energy savings.[9] The CSI-Thermal Program has contracted with an independent software developer, TESS, to build and maintain this model.[10] Although many of the most common SWH system configurations are already built into the TRNSYS model, there are many other configurations that are not included and need to be "custom-modeled" by TESS as the need arises.

Because a building's daily hot water load has a very large impact on the energy savings from a SWH system – and thus the incentive amount – the program has struggled with the issue of how to verify the applicant's estimate of typical hot water usage. To mitigate the problem, the CSI-Thermal Program requires multifamily/commercial applicants to meter hot water load for 60 days prior to system installation unless the building type appears on a list of standard hot water load profiles maintained by the American Society of Heating, Refrigeration and Air-Conditioning Engineers.

In order to avoid potential inaccuracies in modeling large systems and to shift the risk of system underperformance to the system owner, SWH systems larger than 250 kW_{th} are required to take the incentive in two parts. The first part of the incentive payment equals 70% of the expected first-year energy savings as

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[9] TRNSYS (Transient System Simulation Tool) is software used to simulate the behavior of energy systems. It is commonly used to predict the energy output of solar thermal systems in a particular geographic location over an average calendar year.

[10] TESS, or Thermal Energy System Specialists, LLC, is a company based in Madison, Wisconsin that specializes in energy modeling and simulation.

calculated by the TRNSYS model. The second part of the incentive payment, paid after the first year of system operation, is equal to the actual first year energy displacement as measured by a revenue grade meter, less the original payment. This incentive system is applied only to very large systems because the additional cost of metering and data transfer as a percentage of total system cost is relatively small for those systems.

2.4. Exclusion of non-SWH Technologies and Process Heat

In creating the CSI Thermal program, the Commission initially excluded non-SWH thermal technologies and process heat applications although they were legally permissible.[11] In comments to D.10-01-022, some parties recommended that the Commission focus initial program startup efforts on traditional solar water heating technology.[12] The Commission agreed. The Commission focused initial program start-up efforts on traditional solar water heating technology and directed the Energy Division to limit incentives initially to water heating technologies that could be paid up-front incentives based on energy displacement that could be estimated using commercially available simulation software.

Furthermore, although D.10-01-022 does not specifically preclude process heat applications from participating in the program, the PAs initially excluded them due to uncertainties in modeling the energy output of those applications for the purpose of paying incentives. Because process heat applications often have variable inlet temperatures and loads that are difficult to characterize, those

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[11] As discussed in Section 2.1 SB 1 and AB 1470 permit incentives for non-water heating solar thermal technologies. See D.10-01-022 at 27.

[12] D.10-01-022 at 23.

types of projects do not lend themselves to easy prediction of energy displacement through modeling software.

The Commission ordered a workshop to explore the issue of the eligibility of non-SWH thermal technologies and how to pay incentives for these technologies.[13] Energy Division staff conducted this workshop on February 23, 2011. In addition to solar cooling, space heating, and combination systems, participants discussed incentives for process heat applications.

2.5. Recent CSI-Thermal Decisions

In 2011 and 2012 the Commission issued several decisions governing the CSI-Thermal Program. In D.12-08-008, the Commission increased the incentive rates available to single-family and multi-family/commercial customers. The Commission also established a low-income program in D.11-10-015, providing $25 million in incentives at a higher incentive rate for single family and multi-family host customers displacing natural gas. In D.11-11-004, the Commission permitted other listing agencies aside from SRCC to provide ratings for equipment used in the program. In D.11-11-005, the Commission allowed incentives to be paid, out of the electric-displacing incentives budgets, for installations that displace propane.

2.6. Non-SWH-Technologies Workshop

As stated earlier, part of the February 23, 2011 Energy Division workshop examined the inclusion of process heat and non-water heating solar thermal technologies. Companies present at the workshop included those producing

[13] D.10-01-022 at Ordering Paragraph 8.

systems for process heat, space heating, combination water and space heating, space cooling (generally through absorption chillers[14]), and pool heating.

First, the workshop addressed the development of technical standards, which are believed necessary to insure that systems are installed properly and to protect consumers. Next, the workshop tackled the issue of incentive payment options in response to concern that the current incentive payment structure might not work with process heat and non-water heating technologies. The Commission asked parties to comment on four possible incentive payment options.[15]

The first incentive payment option discussed was a continuation of the current approach, wherein a standardized TRNSYS model calculates an upfront incentive to be paid to applicants upon system installation. The founder of TESS, the company that supplies the TRNSYS model, averred that this could be done for process heat as well as non-water heating technologies, but noted that load profiles might be difficult to determine for non-water heating systems. In addition, TESS would need to create a number of additional "templates" for different system types at additional cost to the program. As an alternative to using TRNSYS, some parties suggested that installers be given the option of

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[14] An absorption chiller is a refrigerator or chilling device that uses a heat source to provide the energy needed to power a cooling system. Absorption chillers use a refrigerant with a low boiling point. When the refrigerant boils, it takes heat away with it, providing a cooling effect. The gaseous refrigerant is then absorbed or dissolved into another liquid.

[15] See the July 7, 2011 Workshop report that can be found at http://www.cpuc.ca.gov/PUC/energy/Solar/workshops.htm.

using their own estimation tools, which would be stamped by a professional engineer and verified by the PAs.

The second option considered applied only to combination water heating and space heating for single-family residential systems. Here, the OG-300 rating would be used to estimate the energy savings from water heating, and a "kicker" would be added for the energy savings from space heating. Parties did not object to this method.

The third option considered using energy modeling tools that might be more suitable for non-water heating technologies than TRNSYS. However, this option was not discussed because TRNSYS appears to work for all system types.

The final option explored PBIs that pay for actual energy output as measured by a Btu meter over some pre-determined period of time.[16] Parties disagreed on whether PBI would be a desirable way to pay incentives. Some parties felt that PBI would be the best way to pay incentives for cooling and process heat applications. Others thought that the solar thermal industry lacks sufficient access to the capital necessary to make PBI a viable option. Parties generally preferred opt-in PBI to a mandatory PBI system. Some parties also felt that the current 70/30 true-up method should be maintained and applied to new technologies instead of PBI.

Following the workshop, Energy Division requested written comments about specific technologies that might be eligible for incentives. Energy Division also asked parties to comment on the technical barriers that would need to be overcome to allow those technologies into the program. Written comments were

[16] A Btu meter measures the amount of energy delivered in the form of heat.

submitted to Energy Division by Abengoa Solar Inc., Aztec Solar Inc., California Solar Energy Industries Association (CalSEIA), California Solar Thermal, Inc., Chromasun, Inc., Conservation Technology, Division of Ratepayer Advocates (DRA), FAFCO, Heliodyne, Bob Higbie, Johnson Controls, SRCC, Sopogy, SunEarth Inc., and Western Renewables Group. Only FAFCO and Heliodyne submitted comments opposing incentives for process heat and non-water heating thermal technologies. In general, parties provided technical comments on installation standards, methods of payment, system eligibility and other aspects of program design.

Energy Division released a workshop report on July 7, 2011, summarizing the issues discussed in the workshop and parties' post-workshop comments.[17]

2.7. CSI-Thermal Staff Proposal

On January 27, 2012, the assigned ALJ issued a ruling[18] seeking comment on all aspects of the Energy Division Staff Proposal for Program Modification (Staff Proposal)[19] that recommends a new payment structure and the inclusion of new technologies into the program. The Staff Proposal noted that several otherwise qualifying technologies had been excluded from the program due to concerns about how to model expected energy output for the purpose of paying up-front incentives. To alleviate this barrier, staff recommended creation of a new PBI payment structure that would pay applicants based on actual energy

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[17] The workshop agenda, presentations, comments and workshop report can be found at http://www.cpuc.ca.gov/PUC/energy/Solar/workshops.htm.

[18] http://docs.cpuc.ca.gov/PublishedDocs/EFILE/RULINGS/158262.PDF.

[19] http://docs.cpuc.ca.gov/PublishedDocs/EFILE/RULINGS/158263.PDF.

delivered from the solar thermal system to the end-use application, as measured by a Btu meter.

The Staff Proposal recommended offering CSI-Thermal incentives to process heat, solar cooling, space heating and combination systems. Staff proposed that those types of systems be required to take PBI incentives. In addition, staff recommended requiring very large systems (those larger than 250 kW_{th}) to take PBI, replacing the current 70/30 split incentive structure currently required for those systems. The CSI-Thermal PAs and CalSEIA filed comments to the Staff Proposal on February 23, 2012. The PAs filed reply comments on March 5, 2012.

3. Expanding Program Eligibility

The Commission must first address whether it should now expand the CSI-Thermal program to provide incentives to solar thermal systems other than those providing end-use hot water, such as process heat, solar cooling, solar space heating and combination systems. Heliodyne and FAFCO both argue in post-workshop comments that the program should be limited to traditional SWH systems providing hot water for domestic and other end-use purposes. Heliodyne fears that including new technologies would open the program to large-scale, turnkey systems that would quickly exhaust the incentive budget. FAFCO argues that the Commission and Program Administrators should focus on traditional SWH systems until the program gains more momentum. These same parties worry that some of the technologies under consideration may not be at an appropriate stage of development for commercial deployment.

In order to determine which technologies to include in the program, the Commission looks to the statutes to determine whether the Legislature sought to provide incentives to all solar thermal devices that use the heat of the sun to

reduce demand for natural gas or electricity. AB 1470, which established the natural gas portion of the CSI-Thermal Program, defines a "solar water heating system" as "a solar energy device that has the primary purpose of reducing demand for natural gas through water heating, space heating or other methods of capturing energy from the sun to reduce natural gas consumption."[20] In addition, SB 1, which established the CSI program for electric customers allows up to $100.8 million in incentives for "solar thermal and solar water heating devices."[21] Thus, we find that the Legislature clearly intended to provide incentives to all solar thermal devices that used solar energy to reduce demand for natural gas or electricity.

Moreover, expanding the scope of technologies allowed to participate in the program furthers the state's energy policy goals. Providing incentives to these technologies will not only provide significant energy savings, reduce greenhouse gas emissions and lessen dependence on imported fossil fuels; but will also provide much needed data on the performance of these systems, demonstrate the effectiveness of the technology and increase public awareness of the diverse potential benefits of solar thermal technologies.

Finally, we note that participation in the CSI-Thermal Program has been relatively modest to date. We previously determined, in D.12-08-008 that the CSI-Thermal Program would not achieve its goals for systems installed by the statutory deadline of December 31, 2017 at current installation rates. We find that opening the program to additional technologies will foster competition,

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[20] Public Utilities Code Section 2861(h).

[21] Public Utilities Code Section 2851(b).

expand the marketplace and drive increased participation in the program. Thus, we will expand the scope of technologies incentivized by this program, while ensuring that sufficient funding is preserved for the solar water heating technologies that currently qualify for the program.

4. Performance-Based Incentives

4.1. Background

The displacement of fossil fuels, reduction of air pollution, cutting greenhouse gas emissions and improving the environment both locally and globally drive the state's promotion of solar thermal and other renewable technologies. Those goals are maximized when the renewable technologies we deploy operate at their maximum efficiency. Because the maintenance and operation of systems ultimately falls on system owners, paying rebates on the basis of actual system performance over time can act as an incentive for system owner to ensure the system is operating at maximum efficiency.

A competing concern, however, is that the cost of installing metering equipment and providing data necessary to pay on performance can be cost-prohibitive for small systems, where the cost of the metering can be a significant percentage of the overall system cost. In addition, owners of smaller systems might have trouble securing sufficient up-front capital to cover the system cost and might depend on an up-front incentive to defer that initial cost. Due to those cost concerns, in the photovoltaic portion of the CSI program, California required performance-based incentives for all systems larger than 30 kW. Incentive payments are made based on actual metered energy production over five years. Systems smaller than 30 kW may choose an up-front payment based on predicted performance.

One difference between solar thermal systems and solar PV systems, however, is that the energy output of solar thermal systems is a lot more difficult to predict than that of solar PV systems. For systems that provide only solar water heating, a complex computer simulation is required to predict performance with any degree of accuracy. Accurately predicting performance for solar water heating requires knowledge of how much hot water the facility will use over every hour of the year – information that is often unavailable and that needs to be extrapolated from existing data. For systems that provide space heating, process heat, cooling and other services, predicting performance is even more difficult. For that reason, and to incentivize performance, the Commission directed Energy Division to examine whether to institute a PBI payment system.[22]

4.2. Staff Recommendation

The Staff Proposal for Program Modification recommends the CSI-Thermal Program create a PBI system that pays incentives based on energy delivered from the solar thermal system to the site as measured by a Btu meter with payments made at regular intervals over a defined period of time. Under this proposal, process heat, solar cooling, and combination systems of any size (except for single-family), and all systems larger than 250 kW_{th} would be required to take the PBI incentive. Any system not required to take the PBI incentive would be allowed to take PBI as an opt-in. The current 70/30 incentive mechanism adopted in D.10-01-022 and set forth in Section 2.7.3 of the CSI-Thermal Program Handbook would be eliminated and replaced with PBI.

[22] D.10-01-022.

The Staff Proposal recommends making the PBI payments quarterly over a four-year period. Staff reasoned that a four-year period balances the need to provide a relatively short payback to applicants and the desire to capture year-to-year variability in weather than can affect system performance. The Staff Proposal recommends paying incentives quarterly (as opposed to the monthly payments made in the CSI-General Market program) in order to minimize administrative burden on the PAs.

Staff noted the challenges of administering a PBI system to ensure that sufficient funding is set aside in the budget to cover the stream of payments. To solve this problem at reasonable cost, the Staff Proposal recommends that the applicant submit an estimate of energy displacement certified by a professional engineer. The Program Administrators would then reserve sufficient funds to cover 120% of that estimate in order to allow for systems that perform better than expected.

4.3. Comments

At the workshop and in post-workshop comments, many parties expressed support for establishing a PBI payment system. In comments to the ALJ Ruling/Staff Proposal, both CalSEIA and the PAs supported the creation of a PBI system but recommended several changes to the program administration. First, the PAs and CalSEIA recommend that the PBI period be shortened from four years to two years to reduce administrative cost. Next, the PAs recommend that payments be capped at 100% of the estimated amount. The PAs argue that funding should be capped at 100% of the estimated incentive, noting that reserving more money than the system is predicted to displace would arbitrarily tie up funds, which, if unused, would be reallocated back into a lower incentive

level, therefore creating a drain on the upper incentive steps. Finally, the PAs recommend that opt-in PBI should not be adopted, citing administrative costs.

4.4. Discussion

We agree that creation of a PBI payment system would alleviate the problems inherent in accurately predicting load for the purposes of calculating incentives, and PBI would further serve the purpose of incentivizing high-performing systems by putting the risk of system underperformance on the system owner. Therefore, we adopt a PBI incentive payment option that will be required for certain types of systems.

The Commission also agrees that the PAs are in the best position to determine which type of PBI structure would be easiest to administer, and we find reasonable their recommendation to shorten the PBI payment period from four years to two years. Therefore, we will adopt a PBI payment system in which payments are made quarterly over a two-year period.

We also adopt the PA recommendation to cap the total incentive payout at 100% of the estimated amount. Although we wish to incentivize performance to the maximum extent possible, many of the systems that will be taking PBI payments will be larger systems that may be more economical to build and operate than traditional smaller SWH systems. Thus, we conclude that an incentive cap at 100% of the estimate will not deter applicants from installing and maintaining high performing systems. In addition, reserving extra funding for these systems would tie up incentive dollars that would only be released after the two-year PBI period – and potentially at a lower rate if incentive levels decline in that period. We find that this situation would be unfair to smaller systems that are not subject to the PBI payment.

Due to the inherent difficulty and expense of predicting energy output for these new system types, we will require all process heat, solar cooling, and multi-family/commercial combination systems to take the PBI payments. In addition, all systems larger than 250 kW_{th} will be required to take the PBI incentive. The current 70/30 split incentive will be eliminated and replaced with PBI. Finally, in order to reduce administrative costs for the PAs, we will allow the PAs the option to require systems with non-standard load profiles and those not already included in the multi-family/commercial calculator to take PBI.

We decline to adopt the PAs recommendation to prohibit opt-in PBI. Systems not required to take the PBI payments may be paid on a PBI basis if they so desire. Although we recognize there may be added expense in administering the PBI system, a guiding principle of the CSI-Thermal Program is to encourage performance. If a program applicant wishes to be paid based on actual (rather than expected) performance, we should encourage that initiative.

We direct the PAs to modify the Program Handbook to implement the changes directed by this section in accordance with the implementation schedule set forth in Section 9.

5. Process Heat

5.1. Background

The term "process heat" may include a wide variety of applications. In general, process heating applications use heat to produce basic materials and commodities. In the context of a solar water heating system, the main difference between process heat and other types of solar water heating is that in a process heating system, it is the heat that is used, and the water is simply a means to carry that heat. For purposes of this Decision, the term "process heat" shall refer to those applications that do not consume the solar heated water and instead use

the water as a medium to carry heat for the end process.[23] These process heat applications are currently prohibited in the CSI Thermal Program.

The PAs and other parties expressed concerns regarding the difficulties in modeling process heat applications, including variable inlet temperatures and variable loads that may be difficult to predict. The PAs also raised concerns about how to devise installation standards for these technologies. Finally, because Energy Division staff designed the incentive levels using data from the SWH Pilot Program, which did not allow process heating – and because process heating systems tend to be larger than the multi-family/commercial systems currently eligible – staff raised concerns that current incentive levels might be higher than necessary to incentivize the technology.

5.2. Staff Recommendation

The Staff Proposal recommends providing incentives to process heat applications using OG-100 collectors through a PBI program over a pre-determined period of time. To address concerns that current incentive levels may be too high for process heat applications and that those applications could thus consume a disproportionate amount of funding, staff recommends that funding for process heat be limited to no more than $15 million in each of the first two steps of the program. No funding limit is proposed for steps three and four of the program, when incentive levels will be considerably lower.

[23] Although there are some applications considered "process heat" that consume the solar heated water these are not included in the term for purposes of this decision.

5.3. Comments

The PAs urge the Commission to combine the $15 million incentive cap for process heat with the $5 million limit for solar cooling. CalSEIA cautions the Commission against assigning budget limits to certain end-use categories given the modest uptake in the program to date. The PAs also recommend that the Commission specify whether or not systems using process heat to offset electricity usage should be eligible for incentives.

5.4. Discussion

Because process heat meets the definition of "solar water heating system" laid out in Pub. Util. Code § 2861 (h), and because providing incentives to those systems would further California's energy policy goals, allowing process heat systems to qualify for funding under the CSI-Thermal Program is reasonable. Due to the difficulty in predicting energy displacement of these systems, we will require all process heat systems to take the incentive on a PBI basis as described above. We direct the PAs to modify the program handbook in accordance with Section 9 of this Decision to allow process heating systems to apply for incentives and to add to the handbook any installation standards, metering protocols, or other technical specifications they deem necessary to administer the program.

We agree with the PAs conclusion that too many budget caps create administrative confusion. We also agree with CalSEIA that budget caps might artificially constrain the market. In the Staff Proposal, budget limits were proposed on process heat to address concerns raised by some parties that the incentive budgets might be prematurely exhausted by the participation of very large systems. However, the Commission observed very modest program participation since the Staff Proposal was released, indicating a significant likelihood that there may be money left in the budget by 2017 when the program

expires.[24] Thus, the concern that process heat might prematurely exhaust the program budget seems unlikely.

For that reason, and to address concerns regarding administrative complexity and market restriction, we will not impose a funding cap on process heat. Because we decline to impose a cap on process heat, the issue of whether to combine the caps for process heat and solar cooling is moot. We also clarify that electric and propane customers are eligible for process heat incentives. We therefore modify the CSI-Thermal Program to allow process heat systems to qualify for program funding. All process heat systems must take a PBI payment. We direct the CSI-Thermal PAs to develop and include in the handbook any installation standards, metering requirements and other technical specifications necessary to offer incentives to these technologies.

6. Solar Cooling

6.1. Background

Several types of technologies use solar thermal collectors to provide energy for cooling. At a workshop held by the Energy Division, parties identified the most technically feasible technology as a solar-assisted absorption chiller with natural gas backup replacing part of an electric cooling system. CalSEIA commented that these technologies might not be commercially mature and recommended a limited pilot program to test their performance, durability and economics.

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[24] In D.12-08-008, the Commission found that the CSI-Thermal Program would not achieve its goals for systems installed by the statutory deadline of December 31, 2017 at current installation rates.

6.2. Staff Recommendations

The Staff Proposal recommends that incentives be offered on a limited pilot basis. Energy Division explained that incentives should be limited because solar cooling might not yet be a mature technology and because it is prudent to collect more data on the performance, durability, and economics of these systems.

At the workshop, parties generally commented that solar-assisted absorption chillers are the type of solar cooling technology that is in the most mature state of development. The Staff Proposal recommends allowing funding only for solar-assisted absorption chillers that supplement part of an electric cooling system in order to maximize administrative resources. The Staff Proposal further recommends that incentives for this technology not exceed $5 million across all PA territories.

The Staff Proposal recommends drawing the incentives for solar-assisted cooling from the natural gas budget. First, staff reasons that solar-assisted absorption chillers often operate with natural gas backup, so administrative simplicity is created by eliminating the need to convert therms delivered to absorption chiller into kWh of electricity reduced. Second, the budget for electric-displacing CSI-Thermal projects, which are dependent on the availability of CSI General Market funds, is uncertain.

The Staff Proposal recommends deferring to the PAs' technical experts to devise appropriate specifications because the issues related to standards for solar cooling are highly technical. The PAs may wish to rely on local building inspectors to enforce existing standards, or they may wish to establish some minimum standards to which all solar cooling applicants must adhere. The PAs may also convene a technical panel, including experts from industry,

government and academia to develop standards if outside help is deemed necessary.

The Staff Proposal recommends the addition of a new section addressing solar cooling to the Handbook. This section should outline any technical standards the PAs wish to require; the metering specifications for making PBI payments; and any other rules or requirements the PAs wish to impose on these types of applications after consulting with technical experts.

6.3. Comments

With regard to solar cooling, CalSEIA supports a limited pilot program for solar-assisted absorption chillers. However, CalSEIA recommends that the Commission allow incentives be paid for (or on the basis of) the waste heat remaining after the heat from the absorption chiller has been extracted. And CalSEIA recommends the program maintain flexibility to raise the $5 million incentive cap if solar cooling gains market acceptance. In reply comments, the CSI-Thermal PAs caution against providing incentives to secondary heat streams resulting from the absorption cooling process, as the complexity of metering and monitoring would overly burden the program.

6.4. Discussion

Because we wish to ensure that this technology is given an opportunity to be deployed, and because there was no objection to the proposal, we allow solar-assisted absorption chillers to be funded through a limited pilot program out of the gas-displacing budget. These systems will be required to take a PBI payment that pays the incentive based on the amount of energy delivered from the solar collectors to the absorption chiller. We direct the PAs to modify the program handbook in accordance with implementation schedule in Section 9 to allow solar-assisted absorption chillers with natural gas backup to apply for

incentives, and to add to the handbook any installation standards, metering protocols, or other technical specifications they deem necessary to administer the program.

Because of the early developmental phase of this technology, we will cap the pilot program's incentives. We will adopt a cap of $10 million, twice the amount recommended in the Staff Proposal, allocated proportionally among the PAs as shown in Figure 1 to address CalSEIA's concern that we maintain flexibility and not unduly restrict a potentially successful technology.

Figure 1: Maximum Incentives for Solar Cooling Pilot Program by Program Administrator

Program Administrator	Budget Allocation	Incentives ($ million)
PG&E	39%	3.90
SCG	51%	5.10
CCSE	10%	1.00
Total	100%	10.00

We will decline to incentivize heat flows in any secondary loops because of the cost and complexity associated with monitoring and measuring the secondary heat streams resulting from the absorption cooling process.

7. Space Heating and Combination Systems

7.1. Background

Space heating systems use SWH collectors to provide radiant or forced air heating. Although it is possible to install stand-alone solar space heating, it is very rare that the technology would ever be used solely for this purpose. The most common configuration is combination water heating/space heating, wherein the system provides both hot water and space heating. Thus, the term

"combination" system is often used when referring to a system that provides space heating.

7.2. Single-Family Combination Systems

7.2.1. Background

For single-family applications, a common type of combination system is one that provides both domestic hot water and radiant heat. Typically, an extra collector will be added to the SWH system to provide the additional energy for space heating. Because SRCC does not certify configurations designed to provide both water heating and space heating, single-family combination systems will usually not be considered "SRCC Certified." Thus, the Commission must determine whether to make an exception to the OG-300 requirement in cases where additional collectors are added to the system, violating the OG-300 certification. Estimating the energy production of the system for purposes of calculating an incentive presents an additional challenge since SRCC typically provides that calculation or "rating" for its certified systems.

7.2.2. Staff Recommendation

Although providing incentives to single-family systems that produce both domestic hot water and space heating is consistent with program goals, it presents a challenge. Since SRCC does not certify combination systems, a system installed with extra collectors to provide space heat violates the OG-300 certification requirement and, as a result, loses program eligibility.

The Staff Proposal recommends maintaining the current certification requirements for residential combination systems but asks SRCC to develop a new combination system standard to allow increased participation by these systems. If SRCC does not develop this new standard, staff recommends maintaining the current requirement for OG-300 certification, which prohibits

the addition of collectors necessary to create a combination system. Staff takes this position to avoid violating the statutory requirement that all single-family systems have OG-300 certification.

If SRCC develops a performance rating that estimates annual energy savings for the combined water heating and space heating contributions of single-family residential systems, then the Staff Proposal recommends that the CSI-Thermal Program use that rating as the basis for paying incentives. If SRCC does not develop such a rating but merely allows for the over-sizing of systems to provide for space heating, the program would use the "bonus" method described in Appendix A to the Staff Proposal. The "bonus" method was developed by CCSE as a cost-effective way to recognize the extra energy savings that may result from the addition of space heating. Finally, the Staff Proposal recommends maintaining the current per-installation caps for the single-family program.

7.2.3. Comments

In comments to the Staff Proposal, the PAs remind the Commission of the AB 1470 requirement (Pub. Util. Code § 2864(a)) that all single-family installations require OG-300 certification. They urge the Commission to encourage the California Legislature to change the statutory requirement if SRCC has not developed the expected standard by the end of calendar year 2012. The PAs argue against using the "bonus" calculation method, citing the substantial time and funding needed to develop it properly.

CalSEIA notes that, as the bonus methodology would likely represent a very small market, they had no comment on it. They ask the Commission to change the wording of the recommendation to allow standards-writing entities other than SRCC. CalSEIA also recommended that the language in the Staff

Proposal be changed so that recognized standards-writing bodies other than SRCC could submit a combination system standard.

7.2.4. Discussion

Because Pub. Util. Code § 2864(a) only allows incentives for systems with an OG-300 certification, the Commission shall wait for SRCC to develop an OG-300 standard for single-family combination SWH/space heating systems, with the expectation that this standard will provide an energy rating that can be used for calculating incentives. We will not now commit to a course of action in the event that SRCC does not issue such a standard, or if the standard that SRCC issues does not include an energy rating.

Regarding CalSEIA's request to allow non-SRCC entities to develop new standards, we note that D.11-11-004 allowed for listing agencies other than SRCC to certify and to provide ratings for equipment used in the CSI-Thermal Program. However, we also note the distinction between developing a standard, which SRCC alone is authorized to do for the CSI-Thermal Program, and rating and certifying in accordance with that standard, which other approved listing agencies are now authorized to do. There is no basis to allow non-SRCC listing agencies to develop standards for the CSI-Thermal program. Therefore, we do not adopt CALSEIA's proposal to expand the scope of authority of non-SRCC listing agencies.

7.3. Multi-Family/Commercial Combination Systems

7.3.1. Background

Multi-family/commercial systems use hot water from solar collectors for a wide variety of purposes, including domestic water heating, space heating, process heat, and potentially even cooling. Inclusion of such systems in the CSI-Thermal program presents challenges to the Commission. First, design and

installation standards must be developed to ensure that these systems to not suffer from technical deficiencies such as inadequate overheat protection. Second, the difficulty in predicting energy usage patterns when hot water is used for multiple purposes makes it challenging to estimate energy production with any degree of accuracy.

7.3.2. Staff Recommendations

Staff recommends that the CSI-Thermal Program pay incentives to multi-family and commercial combination systems using OG-100 collectors through a PBI process that measures energy delivered to the building. Energy Division does not recommend a separate limit on funding for space heating, although the current $500,000 per-system cap will apply to the system as a whole. Because Energy Division proposes limits on total funding for process heat and solar cooling, the applicant should estimate the contribution to total energy savings of these processes so that incentives can be applied toward those limits.

7.3.3. Comments

The PAs did not comment on the subject of commercial/multi-family combination systems. CalSEIA commented only that no funds should be paid for electricity co-generated by a combination PV/thermal array.

7.3.4. Discussion

The Commission encourages innovation, promotion of economies of scale, and expansion of the types of electric, natural gas and propane-displacing systems eligible for incentives. As a result, it is reasonable to allow commercial/multi-family systems that use OG-100 collectors and include some combination of: end-use hot water, solar space heating, process heat and solar-assisted absorption chillers into the program. The portion of funding

dedicated to an absorption chiller for systems using that technology should be counted against the $10 million funding limit.

We therefore direct the PAs to modify the program handbook in accordance with Section 9 to allow multi-family/commercial combination systems. We further direct the PAs to develop standards, metering protocols, and the other technical specifications they deem necessary to administer the program. We require the PAs to pay incentives to all commercial/multi-family combination systems using the PBI mechanism.

8. Collector Certification Nomenclature

8.1. Comments

In comments, CalSEIA asserts that the phrase "OG-100 collector" does not accurately describe a collector certified to SRCC Standard 100. In reply comments, the CSI-Thermal PAs disagree, stating that the term "OG-100 collector" is the appropriate term "to reference a collector certified by SRCC under any of the underlying test standards."

8.2. Discussion

We agree with the PAs that "OG-100 collector" is the appropriate nomenclature and will retain it for use this Decision and other CSI-Thermal Program documents.

9. Implementation Schedule

9.1. Staff Recommendations

The program changes ordered in this decision will require significant database work and handbook revisions. As a result of these changes, there are a number of logistical issues the PAs must address in addition to implementing the changes proposed here. The Staff Proposal recommends that the PAs be given four months, after issuance of the decision, to file Tier-3 advice letters with

Energy Division to implement the changes made in this Decision. The Staff Proposal recommends that program changes be effective 30 days after advice letter approval.

9.2. Comments

The PAs argue that, because of uncertainties regarding the requirements approved in the advice letters, database modifications cannot actually start until the advice letter is approved. They maintain that database changes will take 60 days instead of the 30 days recommended in the Staff Proposal.

9.3. Discussion

Although CSI-Thermal market participants have been waiting quite some time for the program to allow for the inclusion of new technologies, and the Commission is eager to implement these changes, we recognize that immense workload placed on the PAs. Developing installation standards, metering requirements, and data transmission requirements, changing the database, and performing other technical tasks will take time. Consequently, we grant the PAs' request for an extended period to implement the changes adopted in the advice letters. The PAs will have 120 days after the issuance of this decision to file Tier 3 advice letters implementing the program changes embodied herein. Once those advice letters are approved by the Commission, the associated program changes will go into effect within a period not to exceed 60 days.

10. Comments on Proposed Decision

The proposed decision of the ALJ in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed on _____, and reply comments were filed on _____ by _____.

11. Assignment of Proceeding

Michael R. Peevey is the assigned Commissioner and Katherine Kwan MacDonald is the assigned ALJ in this proceeding.

Findings of Fact

1. The Commission created the California Solar Initiative to provide incentives and other support for solar PV systems in California. The Legislature codified and modified the program in SB 1.

2. The Commission created the CSI Thermal Program in 2009 to offer incentives for qualifying natural-gas displacing SWH.

3. The CSI Thermal program provides incentives in an up-front lump-sum payment to smaller systems of 250 kW_{th}. Systems larger than 250 kW_{th} are required to take the incentive in two parts.

4. In D.10-01-022, the Commission initially limited incentives to traditional solar water heaters and declined to offer incentives to other solar thermal projects, in part because of the difficulty in estimating those technologies' energy displacement.

5. Energy Division conducted a workshop pursuant to D.10-01-022 to consider the eligibility of non-water heating solar thermal technologies for the CSI program and to consider whether incentives should be paid to those technologies on a performance basis.

6. The CSI-Thermal Program will not meet its goals for energy displacement at the current rate of system installation.

7. Providing incentives to solar cooling, solar space heating, solar process heat, and combination systems furthers the state's energy policy goals of reducing greenhouse gas emissions and promoting renewable energy technology.

8. Opening the program to additional technologies beyond those currently eligible will foster competition, expand the marketplace and drive increased participation in the CSI-Thermal Program.

9. Paying incentives on the basis of actual system performance over time can act as a motivation for the system owner to ensure the system is operating at maximum efficiency.

10. The cost of metering equipment necessary to pay on performance may be cost prohibitive for small systems.

11. The current method of paying a private firm to model the predicted energy output of system types that are new to the program imposes a cost on the program budget.

12. A performance-based incentive (PBI) system allows the CSI-Thermal Program to offer incentives to solar cooling, solar space heating, solar process heat, and combination systems without the need for a precise means of estimating the energy displacement of those systems.

13. A PBI payment system in which payments are made quarterly over a two-year period will reduce administrative cost.

14. Solar cooling is not a commercially mature technology. A limited pilot program will allow the Commission to offer incentives and collect more data on the performance, durability and economics of these systems.

15. Reservation of more than 100% of the estimated incentive amount would tie up incentive dollars and be unfair to smaller systems.

16. An incentive cap at 100% of the estimated amount will not deter applicants from installing and maintaining high performing systems.

17. The energy output for process heat, solar cooling, and multi-family/commercial combination systems is inherently difficult and costly to predict.

18. Process heat applications are currently prohibited in the CSI-Thermal Program.

19. Allowing process heat systems to qualify for incentives under the CSI-Thermal Program furthers California's energy policy goals.

20. Based on modest program participation to date, it is unlikely that addition of process heat to the CSI-Thermal Program will prematurely exhaust the program budget.

21. Solar-assisted absorption chillers, with natural gas backup replacing part of an electric cooling system, are the most commercially mature solar cooling technology that is likely to participate in the program.

22. The PAs have the technical expertise to devise appropriate specifications for solar cooling applications.

23. Incentivizing secondary heat streams resulting from the absorption cooling process is cost prohibitive because of the complexity of metering and monitoring that would be required.

24. Space heating systems use SWH collectors to provide radiant or forced air heating. An extra collector is typically added to the SWH system to provide additional energy for space heating.

25. SRCC does not certify configurations designed to provide both water heating and space heating.

26. A system installed with extra collectors to provide space heat violates the OG-300 certification requirement and is therefore not eligible.

27. Multi-family/commercial systems use hot water from solar collectors for a variety of purposes including domestic water heating, space heating, process heat, and potentially cooling.

28. Allowing multi-family/commercial combination systems to participate in the CSI-Thermal Program furthers the Commission's goals of encouraging innovation, promotion of economics of scale, and expansion of the types of electric, natural gas, and propane-displacing systems eligible for incentives.

29. OG-100 collector is the accepted terminology to reference a collector certified by SRCC under any of the underlying test standards.

Conclusions of Law

1. Pub. Util. Code § 2861 establishes eligibility criteria for the types of natural gas-displacing systems eligible to qualify for incentives for under the CSI-Thermal Program.

2. Pub. Util. Code § 2861 (h) allows incentives to solar energy devices that have the primary purpose of reducing demand for natural gas through water heating, space heating or other methods of capturing energy from the sun to reduce natural gas consumption.

3. Pub. Util. Code § 2851 (b) allows the Commission to provide incentives to solar thermal and solar water heating devices that displace the use of electricity.

4. The Legislature intended to provide incentives to all solar thermal devices that use solar energy to reduce demand for natural gas or electricity.

5. The CSI-Thermal Program should now be expanded to offer incentives to solar process heat, solar cooling, solar space heating and combination systems.

6. A Performance-based incentive (PBI) system should be created in order to pay incentives to systems whose energy production cannot easily be modeled.

7. PBI funding should be capped at 100% of the estimated incentive.

8. Solar process heat, solar cooling, solar space heating and multi-family/commercial combination systems should be eligible only for incentives on a PBI basis because of the inherent difficulty and expense of predicting the energy output of these systems.

9. Systems larger than 250 kW_{th} should only be eligible for incentives on a PBI basis, and the 70/30 split incentive mechanism should be eliminated.

10. The CSI-Thermal PAs may require systems with non-standard load profiles and those not already included in the multi-family/commercial calculator to take PBI to reduce the costs of modeling additional system types.

11. Systems not required to take PBI may opt to receive incentives on a PBI basis.

12. The performance-based incentive should be paid quarterly over two years.

13. The CSI-Thermal PAs should be responsible for devising metering standards and data transfer protocols for PBI payments.

14. Program applicants should be responsible for the cost of metering and data transfer associated with PBI payments.

15. The CSI-Thermal Program should accept applications from systems that provide any combination of the following: Water heating, process heat, space heating, and solar-assisted absorption chillers; provided that they use OG-100 collectors and meet other program requirements.

16. There should be no separate limit on the total amount of incentive money provided to solar process heating systems.

17. Process heating systems that offset electricity and propane use should be eligible for the program.

18. Solar assisted absorption chillers with natural gas backup that offset part of an electric cooling system should only be offered incentives on a limited pilot basis with an incentive budget of no more than $10 million.

19. Funding for solar assisted absorption chillers with natural gas backup should be provided from the CSI-Thermal natural gas budget.

20. Solar assisted absorption chillers, solar process heat, solar space heat and all combination systems with the exception of single-family should be required to take the PBI incentive.

21. Although including single-family combination systems would be consistent with CSI-Thermal Program goals, the Commission should not make an exception to the statutory requirement that single-family systems must meet the OG-300 certification requirements.

22. The CSI-Thermal PAs should establish and include in the program handbook any installation standards and technical requirements they deem necessary to include solar process heat, solar assisted absorption chillers, solar space heating, and combination systems into the program.

23. The CSI-Thermal PAs should have 120 days after the issuance of this decision to file Tier 3 Advice letters to revise the CSI Thermal Handbook as directed by this Decision.

24. Upon Commission approval of the Tier 3 Advice letters required by this Decision, the CSI-Thermal PAs shall have a period of 60 days to implement the program changes.

O R D E R

IT IS ORDERED that:

1. Decision 10-01-022, which established the California Solar Initiative Thermal Program, is modified as set forth in Appendix A.

2. Within 120 days of the effective date of this decision, the California Solar Initiative (CSI)-Thermal Program Administrators; namely Pacific Gas and Electric Company, Southern California Gas Company, Southern California Edison Company and the California Center for Sustainable Energy, must submit Tier 3 advice letters with a revised CSI Thermal Program Handbook incorporating the program changes directed by this Decision as set forth in Appendix A.

3. Within 60 days after Commission approval of the Tier 3 advice letters, the California Solar Initiative-Thermal Program Administrators (namely Pacific Gas and Electric Company, Southern California Gas Company, Southern California Edison Company, and the California Center for Sustainable Energy) must implement the program changes directed by this Decision as set forth in Appendix A.

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

5. The utilities shall ensure the California Solar Initiative Thermal Program complies with all applicable Commission rules, decisions, General Orders and statutes, including Public Utilities Code Section 451.

6. Rulemaking 12-11-005 remains open.

This order is effective today.

Dated, _____, at San Francisco, California.

APPENDIX A

Appendix A: Table of Changes to CSI-Thermal Program in this Decision

Issue	Previous Policy Adopted in Decision 10-01-022	New Policy Directed by this Decision
Payment of Incentives	Systems > 250 kW_{th}: 70% is paid up-front based on calculator; balance is paid after 1 year of system performance metering. Systems < 250 kW_{th}: Program provides a lump-sum, up-front based on predicted performance in incentive calculator. ▪ Non-standard system types must meter hot water load for 60 days before applying to justify load profiles.	Systems > 250 kW_{th}: Required to take PBI, paid quarterly over two years. Systems < 250 kW_{th}: Applicants with standard system types and load shapes already included in the multi-family/commercial calculator have the option of taking an up-front incentive or PBI. ▪ The PAs may require that systems types not already built into the incentive calculator must take PBI. ▪ All process heat, solar cooling and combination systems must take PBI.
Process Heat	Process heat systems that do not directly consume the solar heated water but instead use the water as a medium to carry heat for other purposes are not eligible for incentives	▪ All process heat applications are now eligible. ▪ Process heat must take PBI. ▪ There is no limit on the total amount of incentive dollars the program may provide to process heat in any incentive step. ▪ Process heat systems that displace electricity or propane are eligible.
Solar Cooling	No solar cooling systems are eligible for incentives.	▪ Solar assisted absorption chillers with natural gas backup are now eligible for incentives. ▪ Solar cooling systems must take PBI. ▪ Total incentives for cooling limited to $10 million
Residential water/space combination systems.	▪ No incentive is paid for the energy savings from space heating. ▪ The system is disqualified from the program if extra collectors for space heating cause the system to violate OG-300 requirement or system sizing guidelines.	▪ If SRCC or other qualifying standards body certifies SWH systems configured to provide additional space heating, those systems will be eligible for incentives at that time. ▪ If the standards body devises a rating that predicts first-year energy displacement, that rating will be the basis of the incentive payment. ▪ We do not commit to a course of action in the even that combination systems are certified without a performance rating
Commercial combination systems	Systems are eligible, but only for the hot water portion of energy savings.	▪ Additional savings from space heating and cooling would be eligible for incentive payments. ▪ Those systems must take PBI payments.

(END OF APPENDIX A)