STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CA 94102-3298

January 16, 2008 Advice Letter 2130-E

Akbar Jazayeri
Vice President, Regulatory Operations
Southern California Edison Company
P O Box 800
Rosemead, CA 91770

Subject: Proposed Modification to the CSI Handbook for Non-PV Solar Thermal Applications

Dear Mr. Jazayeri:

Advice Letter 2130-E is effective December 20, 2007.

Sincerely,

Sean H. Gallagher, Director
Energy Division

ADVICE LETTER (AL) SUSPENSION NOTICE
ENERGY DIVISION

Utility Name: Southern California Edison
Utility No./Type: U 388-E
Advice Letter No. 2130-E
Date AL filed: June 1, 2007
Utility Contact Person: James Yee
Utility Phone No. 626-302-2509

Date Utility Notified: 06/27/07 by email
[x] E-Mail to: James.Yee@sce.com
[ ] Fax No.:
ED Staff Analyst/Supv: Nicolas Chaset/Judith Ikle

For Internal Purposes Only:
Date Calendar Clerk Notified _____/_____/_____
Date Commissioners/Advisors Notified ___/___/___

[x] INITIAL SUSPENSION (up to 120 DAYS)

This is to notify that the above-indicated AL is suspended for up to 120 days beginning for the following reason(s) below. If the AL requires a commission resolution and the Commission's deliberation on the resolution prepared by energy Division extends beyond the expiration of the initial suspension period, the advice letter will be automatically suspended for up to 180 days beyond the initial suspension period.

[ ] Section 455 Hearing is Required. A Commission order may be required to address the advice letter.

[ ] Advice Letter Requests A Commission Order

[X] Advice Letter Requires Staff Review

Expected duration of initial suspension period: 120 days

[ ] FURTHER SUSPENSION (up to 180 DAYS beyond initial suspension period)

The AL requires a Commission resolution and the Commission's deliberation on the resolution prepared by Energy Division has extended beyond the expiration of the initial suspension period. The advice letter is suspended for up to 180 days beyond the initial suspension period.

If you have any questions regarding this matter, please contact Nicolas Chaset at (415) 703-1184 or via e-mail at : nlc@cpuc.ca.gov

cc: Division Director / Program Manager
Maria Salinas
Honesto Gatchalian

* Note: reference – Decision D.02-02-049, dated February 21, 2002

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Akbar Jazayeri
Vice President, Revenue and Tariffs

June 1, 2007

SCE ADVICE 2130-E
(U 338-E)

PG&E ADVICE 3060-E
(U 39-E)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA
ENERGY DIVISION

SUBJECT: Proposed Modification to the CSI Handbook for Non-PV Solar Thermal Applications

PURPOSE

In compliance with the California Public Utilities Commission (Commission or CPUC) Decision (D.) 06-12-033, Southern California Edison Company (SCE), on behalf of the California Solar Initiative (CSI) Program Administrators (PAs), submits proposed CSI Handbook revisions designed to allow non-photovoltaic (PV) solar thermal technologies to participate in the CSI program. The CSI PAs are comprised of Pacific Gas and Electric Company (PG&E), SCE, and the California Center for Sustainable Energy (CCSE).

BACKGROUND

In D.06-01-024, the Commission stated its intent that all solar technologies should qualify for incentives, including solar PV, solar thermal, solar water heating, solar heating and air conditioning, and concentrating solar technologies.[1] In D.06-12-033, the Commission directed the CSI PAs to assign or hire technical experts to address estimation, measurement and metering of non-PV solar projects that displace electricity. The CSI PAs directed Alternative Energy Systems Consulting, Inc. (AESC) to assemble a team of experts in the field of solar thermal heating, cooling, and electric generating technologies. AESC assembled experts from the Florida Solar Energy Center (Robert M. Reedy, Director - Solar Energy Division), Sandia National Laboratories (Greg Kolb, Systems Engineer) and the National Renewable Energy Laboratory (Tim Merrigan, Senior Program Manager).

[1] The Commission noted the need for further workshops and comments to obtain further information about the non-PV solar technologies before committing to provide incentives to them.

Presentations were made by solar thermal heating, cooling, and electric generation technology developers and providers at the March 15, 2007 CSI PAs working group meeting and again at a non-PV technology workshop held in San Diego on April 13, 2007. The presenters included: Serge Adamian, President, SunChiller, Inc.; Deris Jeannette, CEO/Designer, ClearDome Solar Thermal, LLC; Barry Butler, PhD, Butler Solar Solutions; Lori A. Glover & John Ellers, Co-CEOs, S.O.L.I.D. USA, Inc.; and David Townley of Townley Tech representing Infinia Corporation.

NON-PV TECHNOLOGY SCOPE

Eligible non-PV technologies, which displace customer electric purchases from the grid and were evaluated for purposes of this study, include:

- Solar water heating,[2]
- Solar space and process heating,
- Solar driven cooling (absorption and adsorption chillers, desiccant systems, etc.), and
- Concentrating solar heating and electric generators (trough, dish and lens; Rankine and Stirling, etc.)

Non-PV technologies will be allowed to participate in the CSI program beginning July 1, 2007, at the PV incentive step currently in effect for PAs on that date. Non-PV technology project capacities will be recorded into the Trigger Tracker along with PV capacities and will follow the same incentive step schedule as PV, but will be limited to a $100.8 million budget cap. The $100.8 million non-PV budget cap as stated in the Decision is allocated from the $2.6 billion CSI budget; it is not a separate set-aside budget. No additional funds will be added to the CSI program. Concentrating PV is not included under the $100.8 million budget cap for non-PV technologies.

PROPOSED CSI HANDBOOK CHANGES

The CSI handbook sections containing major revisions to accommodate participation by non-PV technologies are listed below:

Sections:	1.8	Non-PV Systems
	2.2.3	Eligibility of non-PV Systems
	2.2.5.1	Non-PV System Capacity Rating
	2.9	Metering Requirements
	3.2	Expected Performance-Based Buydown (EPBB) Incentives
	3.3.1	PBI for non-PV Thermal Systems

[2] Per D.06-12-033, page 24, the Commission noted “we will include solar thermal and solar water heating in our CSI incentive program, but only those solar thermal technologies that displace electric usage.” Also, D.06-12-033, Conclusions of Law, #19, page 38.

3.3.1.1 Non-PV Thermal System PBI Metering

Appendix B: Metering Requirements (*Additional metering requirements may be required and will be determined by the metering subcommittee after review)*

Appendix D: California IOU SPC Tables

Appendix E: Commercial BTU Meter Accuracy Requirements

Appendix F: Surface Orientation Factors for California Locations

Appendix G: Example CEC-AC Rating for Glazed Solar Collector

Included as attachments to this filing are; the draft CSI Handbook with proposed revisions for non-PV technologies (*Attachment A)*, and the study group's white paper on non-PV technologies (*See Attachment B: California Solar Initiative Program Measurement & Metering Methodology for Non-Photovoltaic Technologies)*.

In support of the changes included herein for participation of non-PV technologies in the CSI program, the PAs have requested that the study team (AESC, NREL, SNL, and FSEC) develop a draft proposed approach to handle both PV and non-PV tracking systems for CSI and that the CSI Metering Subcommittee review and draft modifications to the CSI metering requirements to accommodate non-PV technologies.

No cost information is required for this advice filing.

This advice filing will not increase any rate or charge, cause the withdrawal of service, or conflict with any other schedule or rule.

EFFECTIVE DATE

This advice filing will become effective on July 1, 2007, the 30th calendar day after the date filed.

NOTICE

Anyone wishing to protest this advice filing may do so by letter via U.S. Mail, facsimile, or electronically, any of which must be received no later than 20 days after the date of this advice filing. Protests should be mailed to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, California 94102
E-mail: jnj@cpuc.ca.gov and mas@cpuc.ca.gov

Copies should also be mailed to the attention of the Director, Energy Division, Room 4004 (same address above).

In addition, protests and all other correspondence regarding this advice letter should also be sent by letter and transmitted via facsimile or electronically to the attention of:

Akbar Jazayeri
Vice President, Revenue and Tariffs
Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, California 91770
Facsimile: (626) 302-4829
E-mail: AdviceTariffManager@sce.com

Bruce Foster
Senior Vice President of Regulatory Operations
c/o Karyn Gansecki
Southern California Edison Company
601 Van Ness Avenue, Suite 2040
San Francisco, California 94102
Facsimile: (415) 673-1116
E-mail: Karyn.Gansecki@sce.com

There are no restrictions on who may file a protest, but the protest shall set forth specifically the grounds upon which it is based and shall be submitted expeditiously.

In accordance with Section III, Paragraph G, of General Order No. 96-A, SCE is serving copies of this advice filing to the interested parties shown on the attached GO 96-A service list and R.06-03-004. Address change requests to the GO 96-A service list should be directed by electronic mail to AdviceTariffManager@sce.com or at (626) 302-2930. For changes to all other service lists, please contact the Commission's Process Office at (415) 703-2021 or by electronic mail at Process_Office@cpuc.ca.gov.

Further, in accordance with Public Utilities Code Section 491, notice to the public is hereby given by filing and keeping the advice filing at SCE's corporate headquarters. To view other SCE advice letters filed with the Commission, log on to SCE's web site at http://www.sce.com/AboutSCE/Regulatory/adviceletters/.

For questions, please contact Howard Green at (626) 633-3012 or by electronic mail at Howard.Green@sce.com.

Southern California Edison Company

Akbar Jazayeri

AJ:hg:sq
Enclosures

CALIFORNIA PUBLIC UTILITIES COMMISSION

ADVICE LETTER FILING SUMMARY
ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Southern California Edison Company (U 338-E)

Utility type:
☑ ELC ☐ GAS
☐ PLC ☐ HEAT ☐ WATER

Contact Person: James Yee
Phone #: (626) 302-2509
E-mail: James.Yee@sce.com

EXPLANATION OF UTILITY TYPE
ELC = Electric GAS = Gas
PLC = Pipeline HEAT = Heat WATER = Water

(Date Filed/ Received Stamp by CPUC)

Advice Letter (AL) #: SCE Advice 2130-E/PG&E Advice 3060-E

Subject of AL: Proposed Modification to the CSI Handbook for Non-PV Solar Thermal Applications

Keywords (choose from CPUC listing): Compliance

AL filing type: ☐ Monthly ☐ Quarterly ☐ Annual ☑ One-Time ☐ Other

If AL filed in compliance with a Commission order, indicate relevant Decision/Resolution #:

D.06-12-033

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL:

Summarize differences between the AL and the prior withdrawn or rejected AL[1]:

Resolution Required? ☐ Yes ☑ No

Requested effective date: 7/1/07 No. of tariff sheets: -0-

Estimated system annual revenue effect: (%):

Estimated system average rate effect (%):

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: None

Service affected and changes proposed[1]:

Pending advice letters that revise the same tariff sheets:

[1] Discuss in AL if more space is needed.

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this filing, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Ave.,
San Francisco, CA 94102
jnj@cpuc.ca.gov and mas@cpuc.ca.gov

Akbar Jazayeri
Vice President, Revenue and Tariffs
Southern California Edison Company
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Bruce Foster
Senior Vice President of Regulatory Operations
c/o Karyn Gansecki
Southern California Edison Company
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San Francisco, California 94102
Facsimile: (415) 673-1116
E-mail: Karyn.Gansecki@sce.com

Attachment A

CSI Handbook
(With Proposed Non-PV Technology Edits)

CALIFORNIA
PUBLIC UTILITIES
COMMISSION

CALIFORNIA SOLAR INITIATIVE

FINAL HANDBOOK
WITH PROPOSED NON-PV TECHNOLOGY EDITS

JUNE 2007

Deleted: APRIL

Pacific Gas and Electric Company

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

San Diego REGIONAL ENERGY OFFICE

SDGE
A Sempra Energy company

Arnold Schwarzenegger, *Governor*

The California Public Utilities Commission (CPUC) prohibits discrimination in employment, its regulatory programs, and activities on the basis of race, national origin, color, creed, religion, sex, age, disability, veteran status, sexual orientation, gender identity, or associational preference. The CPUC also affirms its commitment to providing equal opportunities and equal access to CPUC regulated facilities and programs. For additional information or to file a complaint, contact the State Personnel Board, Office of Civil Rights, Discrimination Complaint Monitoring and Analysis, Kristen Trimarche (916) 653-1621.

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1. Introduction: California Solar Initiative Program

This California Solar Initiative (CSI) Program Handbook is designed to describe the requirements for receiving funding for the installation and operation of solar photovoltaic (PV) projects for the California Public Utilities Commission (CPUC or Commission)-managed incentives. As authorized by the CPUC and Senate Bill 1 (SB 1), the CPUC CSI program has a total budget of $2.167[1] billion to be used over 10 years.[2] As noted in Section 1.1, the California Energy Commission manages a separate incentive program for new homes and maintains a separate program Guidebook.

Beginning on January 1, 2007, the CSI program will pay performance-based incentives (PBI) for solar projects equal to or greater than 100 kilowatts (kW[3]), with monthly payments based on recorded kW hours (kWh) of solar power produced over a 5-year period. These PBI will be a flat per-kWh payment for PV system output. The CSI program will pay incentives to solar projects less than 100 kW through an up-front incentive, known as an expected performance-based buydown (EPBB). EPBB is based on an estimate of the system's future performance. These expected-performance incentives combine the benefits of rewarding performance of the PV system with the administrative simplicity of a one-time incentive paid at the time of project installation.

The solar project's Site must be within the service territory of and receive retail level electric service from Pacific Gas and Electric (PG&E), Southern California Edison (SCE), or San Diego Gas & Electric (SDG&E). Municipal electric utility customers are not eligible to receive incentives from the designated Program Administrators.

Responsibility for administration of the CSI program is shared by the following three Program Administrators:

- PG&E—PG&E customers
- SCE—SCE customers
- San Diego Regional Energy Office (SDREO)—as a contractor to SDG&E for its customers.

Other notable CSI program features include:

- A statewide on-line application process and database
- An open process to draft initial and future CSI Program Handbooks
- A CSI Program Forum to provide a process for stakeholder involvement in the on-going implementation of the CSI program.

1 CPUC Decision 06-12-033

2 CPUC Decision 06-08-028, August 24, 2006.

3 Throughout this Handbook, the use of kW refers to the CEC-AC wattage ratings of kW alternating current inverter output.

1.1 Program Background

In Decision (D.) 06-01-024, the CPUC, in collaboration with the California Energy Commission (Energy Commission), established the California Solar Initiative program, an ambitious incentive program with the goal of ensuring that 3,000 MW of new solar facilities are installed in homes and businesses in California by 2017.[4] In D.06-08-028, the CPUC established implementation details for its portion of the CSI program, particularly the adoption of the PBI incentive structure. On August 21, 2006, the Governor signed SB 1, which directs the CPUC and the Energy Commission to implement the CSI program consistent with specific requirements and budget limits set forth in the legislation. On December 14, 2006, the CPUC adopted Decision 06-12-033, which reconciled its previous decisions with the requirements contained within SB1. Please note that the following areas which are highlighted in yellow have changed from the December 19, 2006 CSI handbook due to Decision D.06-12-033 and other factors.

The Energy Commission will administer a separate, but coordinated program, the New Solar Homes Partnership (NSHP), that will offer financial incentives for solar PV systems installed on new homes. Information regarding the NSHP and CSI programs can be found on www.GoSolarCalifornia.ca.gov.

To be clear, the CEC manages incentives for all new residential construction. Explicitly, this means:

1. new production single family housing
2. new production multi-family housing
3. the residential portion of *new* residential/nonresidential mixed use buildings
4. new in-fill housing (single or multi-family)
5. the residential portion of *new* residential/nonresidential mixed use in-fill buildings
6. new custom speculative houses
7. new owner/builder houses
8. new affordable housing (single family construction
9. new affordable housing (multi-family construction, including the common and service areas associated with the residential units)
10. the residential portion of new affordable multi-family residential/nonresidential mixed use buildings (including the common and service areas association with the residential units)

The CPUC manages incentives for:

1. all existing housing (i.e., housing that has received a Permit of Occupancy from the Building Department before applying for CSI incentives)
2. all new commercial building types
3. all existing commercial building types
4. the commercial portion of any *new* residential/nonresidential mixed use building
5. the commercial portion of any *new* affordable housing residential/nonresidential mixed-use building

4 The Energy Commission collaborated with the CPUC in the creation of CSI by this Commission order.

For mixed use buildings in both affordable housing and market rate settings, where the property contains commercial and residential uses, the CEC will manage incentives for the new residential portion and the CPUC will offer incentives for the nonresidential or existing residential portion. The applicant must submit separate applications to the CEC and CPUC programs. According to CPUC requirements, the PV systems must be separate between residential and commercial. Where there is uncertainty over the scope, the Program Administrator will use its discretion in working with the applicant.

1.2 CSI Program Budget

This section provides an overview of the CSI program budget as authorized by the CPUC and reviews the megawatt (MW) targets for the program.

The CSI program budget for each Program Administrator is as shown in Table 1.

Table 1
CSI Program Budget by Program Administrator

Utility	% of Total Budget	Budget (in millions)
PG&E	43.7%	$ 946
SCE	46%	$ 996
SDG&E/SDREO[5]	10.3%	$ 223
Total	100%	$ 2,165

All customer segments are eligible for the CSI program. Table 2 demonstrates the MW expected to be accounted for by customer segments in the CSI program.

Table 2
CSI MW Allocations by Customer Sector

Customer Sector	MW	Percent
Residential	577.50	33%
Non-Residential	1172.50	67%
Total	1,750.00	100%

1.2.1 Special Funding for Affordable Housing Projects

The CPUC has allocated 10 percent of the overall CSI program budget, or $216 million, to affordable housing/low-income projects. More details will become available through Phase II of the CSI proceeding at the CPUC and on the CPUC CSI website.

5 SDREO is administering the program on behalf of SDG&E.

1.2.2 Special Funding for Non-PV Technologies

Non-photovoltaic (non-PV) technologies include but are not limited to dish Stirling, solar trough, solar cooling, and solar forced air heating. The CPUC has included the budget for non-PV technologies within the overall CSI budget, but capped the budget for non-PV technologies at $100.8 million. Any MW from non-PV technologies will be counted toward and paid at the current MW trigger level.

1.3 MW Targets and Step Triggers for CSI Program

The incentive levels for the CSI program will be automatically reduced over the duration of the program based on the volume of MW of solar reservations issued. Projects are counted toward the MW trigger once they are deemed eligible, have paid an application fee (if applicable), and have received a confirmed reservation. The solar incentive levels may vary by Program Administrator service territory, depending on the pace of solar demand. Additionally, incentive levels may differ for residential and Non-Residential customer sectors based on the demand for those customer segments. Table 3 displays the MW targets by Program Administrator service territory and customer class.

Table 3
CSI MW Targets by Program Administrator and Customer Class

		PG&E (MW)		SCE (MW)		SDG&E/SDREO (MW)	
Step	MW in Step	Res	Non-Res	Res	Non-Res	Res	Non-Res
1	50	-	-	-	-	-	-
2	70	10.1	20.5	10.6	21.6	2.4	4.8
3	100	14.4	29.3	15.2	30.8	3.4	6.9
4	130	18.7	38.1	19.7	40.1	4.4	9.0
5	160	23.1	46.8	24.3	49.3	5.4	11.1
6	190	27.4	55.6	28.8	58.6	6.5	13.1
7	215	31.0	62.9	32.6	66.3	7.3	14.8
8	250	36.1	73.2	38.0	77.1	8.5	17.3
9	285	41.1	83.4	43.3	87.8	9.7	19.7
10	350	50.5	102.5	53.1	107.9	11.9	24.2
Total	**1750**	**252.4**	**512.3**	**265.6**	**539.5**	**59.5**	**120.8**
Total by Utility		764.8		805.0		180.3	
Percent		43.7%		46.0%		10.3%	

1.4 Incentive Structure

The program will offer two types of incentives: EPBB and PBI. The EPBB incentives will be paid based on verified characteristics such as location, system size, shading, and orientation. The PBI incentive will be a flat cents-per-kWh payment for all output from a solar system over its

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initial 5 years. The incentive payment levels will automatically be reduced over the duration of the CSI program in 10 steps, based on the volume of MW of solar reservations issued. The EPBB and PBI levels are directly tied to the 10 MW steps as outlined in Table 4.

Table 4
PBI and EPBB Payment Amounts by Step

		EBPP Payments (per watt)			PBI Payments (per kWh)		
MW Step	Statewide MW in Step	Residential	Commercial	Gov't/ Nonprofit	Residential	Commercial	Gov't/ Nonprofit
1	50[6]	n/a	n/a	n/a	n/a	n/a	n/a
2	70	$ 2.50	$ 2.50	$ 3.25	$ 0.39	$ 0.39	$ 0.50
3	100	$ 2.20	$ 2.20	$ 2.95	$ 0.34	$ 0.34	$ 0.46
4	130	$ 1.90	$ 1.90	$ 2.65	$ 0.26	$ 0.26	$ 0.37
5	160	$ 1.55	$ 1.55	$ 2.30	$ 0.22	$ 0.22	$ 0.32
6	190	$ 1.10	$ 1.10	$ 1.85	$ 0.15	$ 0.15	$ 0.26
7	215	$ 0.65	$ 0.65	$ 1.40	$ 0.09	$ 0.09	$ 0.19
8	250	$ 0.35	$ 0.35	$ 1.10	$ 0.05	$ 0.05	$ 0.15
9	285	$ 0.25	$ 0.25	$ 0.90	$ 0.03	$ 0.03	$ 0.12
10	350	$ 0.20	$ 0.20	$ 0.70	$ 0.03	$ 0.03	$ 0.10

As of January 1, 2007, incentives for residential, commercial, Government and Non-Profit entities will be set at Step 2 levels under the CSI program. For the purpose of the CSI program, commercial sectors include agricultural and industrial customers.

Pending a CPUC decision, mixed-use property (properties with both commercial and residential units) may be eligible for the CSI program.

1.4.1 Expected Performance Based Buydown (EPBB) Incentives

The EPBB pays a one-time up-front incentive ($/W) based on a system's estimated future performance. The Program Administrators will use the Energy Commission's CEC-AC method to determine the system's capacity rating. The system rating will be multiplied by a design factor that will consider certain factors (i.e., location, orientation, and shading) that have an influence on system performance.

1.4.2 Performance Based Incentives (PBI)

The CSI program will apply a PBI structure to all systems equal to or greater than 100 kW CEC-AC beginning on January 1, 2007, although any other size system may also opt into the PBI structure. On January 1, 2008, PBI will apply to systems equal to or greater than 50 kW CEC-AC. Beginning in January 2010, systems equal to or greater than 30 kW CEC-AC must take the PBI incentive structure. The PBI payments will be made over a 5-year period following system installation, submission, and approval of incentive claim materials. Payments will be made on a

Deleted: (for PV systems) and 100 KW Thermal (or whatever the appropriate metric is)

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6 The first 50 MW are allocated under the 2006 Self-Generation Incentive Program (SGIP) and are not pro-rated by customer class or service territory. In 2006, most residential systems participated in the Energy Commission's Emerging Renewables Program (ERP).

monthly basis. These payments will be based on the per-kWh incentive rate and the actual energy (kWh) produced in that time period.

The Program Administrator for each utility shall estimate the total 5-year PBI payments for completed projects and deposit this amount in an interest-bearing balancing account to ensure fund security over the period of the expected PBI payments.

1.4.2.1 PBI for Building Integrated Photovoltaic (BIPV) Systems on New Construction Non-Residential Projects

For projects that have installed building integrated PV systems (BIPV), even those on new construction projects, the CPUC requires the CSI incentives to be paid through a PBI structure.

1.5 CSI Program Forum

CPUC D. 06-08-028 directed that a CSI Program Forum should "provide a public venue for interested parties to identify and discuss ongoing issues related to CSI administration and implementation." The Forum will be used to explore needed updates to this Handbook, as well as substantive program modifications that should be considered, including incentives for non-PV solar projects and energy efficiency requirements. Forum meetings will provide the opportunity for CSI stakeholders to develop consensus-based revisions to the CSI Program Handbook and to the CSI program itself. Beginning in the first quarter of 2007, the Program Administrators and the CPUC Energy Division will convene, facilitate, and develop the agenda for regular public meetings of the Forum. It is anticipated that the meetings will be held at least quarterly, with more frequent meetings as needed during the initial phase of implementing the program.

If the Forum results in consensus on revisions to the CSI Program Handbook, the CPUC has invited the Forum to designate one of its members to file a proposed Handbook revision by Advice Letter with the Energy Division. If the group achieves consensus for more substantive program modifications that go beyond the level of the Program Handbook, the Forum may designate a member to file a petition to modify a Commission order relating to the CSI program.[7]

1.6 Transition Issues Related to the Emerging Renewables Program and Self Generation Incentive Programs

1.6.1 Emerging Renewables Program (ERP)

The Energy Commission administered the ERP to provide consumers with financial incentives to install renewable energy systems on their property. The ERP provided incentives for the eligible renewable generating technologies.

7 The CSI Program Forum is described in detail on pages 65-67 of D. 06-08-028.

As of January 1, 2007, the CSI program and the NSHP programs will replace the ERP program to offer monetary incentives for solar PV systems under 1 MW. The ERP will remain in effect to provide financial incentives for qualifying non-PV self-generation equipment.

ERP applications received by the Energy Commission prior to December 31, 2006 will remain under the oversight of the Energy Commission's ERP program, regardless of whether the project will be completed after January 1, 2007. Current ERP applicants with reservations for PV systems may opt to withdraw their ERP program application and apply for the CSI program or NSHP program after January 1, 2007, provided that the project meets the eligibility requirements of the respective programs. Rules governing the withdrawal or cancellation of the ERP project will apply.

1.6.2 Self-Generation Incentive Program (SGIP)

The Self-Generation Incentive Program (SGIP) provides incentives for the installation of new, qualifying self-generation equipment installed to meet all or a portion of the electric energy needs of a site. The SGIP complements the ERP by providing incentive funding to larger renewable and nonrenewable self-generation units up to the first 1 MW in capacity.

As of January 1, 2007, the CSI program and the NSHP will replace the SGIP's prior monetary incentives for solar PV systems under 1 MW that displace electricity. The SGIP will remain in effect to provide financial incentives for qualifying non-PV self-generation equipment.

SGIP applications received prior to December 31, 2006 will remain under the oversight of the SGIP Program Administrators, regardless of whether the project will be completed after January 1, 2007, provided that all program requirements and guidelines are met. Current SGIP applicants with reservations for PV systems may opt to withdraw their program application and apply for either the CSI program or NSHP program after January 1, 2007, provided that the project meets the eligibility requirements of the respective programs. Rules governing the withdrawal or cancellation of the SGIP project will apply.

Applicants who have up to 1 MW of solar installed or approved through the SGIP program may be eligible for an additional 1 MW CEC-AC of new generation under the CSI program. Additionally, the CSI program will accept applications up to 5 MW with incentives being paid only on the first MW installed under the program.

Incentives for electric-displacing water heaters will be eligible under the CSI pending resolution of non-PV estimation, metering, and measurement guidelines, as described in CPUC Decision 06-12-033.

Gas-displacing technologies are not eligible for CSI incentives, but they may become eligible in the future under SGIP.

1.7 Future Program Modifications

Future CSI program features could include non-PV solar projects and energy efficiency requirements. The following modifications to the CSI program are also anticipated:

- PBI will be applied to all systems over 30 kW beginning in 2010.
- The default capacity factor will increase from 18 to 20 percent, beginning with Step 4 of the Incentive Adjustment Mechanism.
- Time-differentiated PBI may be investigated for later stages of the program.
- On or before January 1, 2008, the warranty requirements will be increased to a minimum of 5 years for meters.

1.8 Non-PV Systems

In D.06-01-024, the Commission stated its intent that all solar technologies should qualify for incentives, including solar PV, solar thermal, solar water heating, solar heating and air conditioning, and concentrating solar technologies.[8] In D.06-12-033, the Commission directed the CSI program administrators to assign or hire technical experts to address estimation, measurement and metering of non-PV solar projects that displace electricity.

Non-PV system eligibility details were added to the CSI Handbook on June 1, 2007. Non-PV systems are eligible to apply for CSI funding beginning July 1, 2007.

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[8] The Commission noted the need for further workshops and comments to obtain further information about the non-PV solar technologies before committing to provide incentives to them.

2. Program Eligibility Criteria and Requirements

The California Solar Initiative (CSI) program offers monetary incentives for eligible solar systems up to the first 1,000 kW (1 MW) CEC-AC of generating capacity or displaced grid electric load. To qualify for incentives, all CSI program eligibility criteria must be satisfied. The effective dates for the CSI program are January 1, 2007 through December 31, 2016, or until the CSI program budget has been fully reserved for each Program Administrator. Program Administrators will begin to accept applications to the CSI program on January 1, 2007.

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2.1 The Participants in the CSI Program

Any retail electric distribution customer of Pacific Gas and Electric (PG&E), Southern California Edison (SCE), or San Diego Gas & Electric (SDG&E) is eligible to install a solar project and receive incentives from the CSI program. Within the nomenclature of the CSI program, the person who applies for an incentive will be referred to as an Applicant, a Host Customer, and/or a System Owner.

2.1.1 Host Customer

Any retail electric distribution customer of PG&E, SCE or SDG&E is eligible to install a solar project and receive incentives from the CSI program and can, therefore, be a Host Customer.

The Host Customer must be the utility customer of record at the location where the generating equipment will be located. Any class of customer (industrial, agricultural, commercial, or residential) is eligible to be a Host Customer. The project's Site must be within the service territory of, and receive retail level electric service[9] from, PG&E, SCE, or SDG&E. Municipal electric utility customers are not eligible to receive incentives from the designated Program Administrators. If a host customer ceases to be a retail level electric distribution customer of PG&E, SCE, or SDG&E, they will not be eligible to receive any remaining unpaid PBI payments.

The Host Customer becomes the incentive reservation holder. The Host Customer may act as the Applicant and/or System Owner. The Host Customer alone will retain sole rights to the incentive reservation and corresponding incentive reservation number. A reservation for a specific Site is not transferable. The Host Customer has the right to designate the Applicant, energy services provider, and/or system installer to act on their behalf. However, the Host Customer shall be party to the CSI program contract.

For solar electric generators, to be eligible for an incentive, the Host Customer or Applicant must receive a confirmed reservation notice letter from the Program Administrator prior to the Applicant receiving final interconnection authorization from their utility to operate the project in parallel with the grid. If a project cancels due to not meeting the reservation period, they must reapply to the CSI program prior to receiving a final interconnection authorization from their utility to operate the project in parallel with the grid.

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9 "…retail level electric service…" means that the Host Customer pays for and receives distribution services, as defined by their respective utility rate schedule.

The following are *not* eligible for incentives under the CSI program:

- Customers who have entered into utility contracts for distributed generation (DG) services (e.g., DG installed as a distribution upgrade or replacement deferral) and who are receiving payment for those services. This does not include third-party ownership arrangements, i.e., power purchase agreements, which are allowed.
- Customers who have entered into agreements that entail the export and sale of electricity from the Host Customer Site. This does not include net energy metering agreements, which are allowed.
- Any portion of customer load that is committed to electric utility interruptible, curtailable rate schedules, programs, or any other state agency-sponsored interruptible, curtailable, or demand-response programs. For electric utility customers who are on an interruptible rate, only the portion of their electric load that is designated as firm service is eligible for the CSI program. Customers must agree to maintain the firm service level at or above capacity of the proposed solar system for the duration of the required applicable warranty period (see Section 2.5). Customers may submit a letter requesting an exemption to the firm service rule if they plan to terminate or reduce a portion of their interruptible load.
- Publicly owned or investor-owned gas, electricity distribution utilities or any electrical corporation (ref. Public Utility Code 218) that generates or purchases electricity or natural gas for wholesale or retail sales.
- Residential new construction systems are not eligible for the CSI program and should apply to the California Energy Commission's New Solar Homes Partnership Program.

2.1.2 System Owner

The System Owner is the owner of the generating equipment at the time the incentive is paid. For example, when a vendor sells a turnkey system to a Host Customer, the Host Customer is the System Owner. In the case of a third-party-owned system (or leased system, for example), the third party (or lessor) is the System Owner.

The System Owner should be designated on the Reservation Request Form, if known at that time, and on the Incentive Claim Form. If different from the Host Customer, the System Owner shall also be a party to the CSI program contract. The Program Administrator may require documentation substantiating equipment ownership.

2.1.3 Applicant

The Applicant is the entity that completes and submits the CSI program application and serves as the main contact person for the CSI Program Administrator throughout the application process. Host Customers may act as the Applicant or they may designate a third party to act as the Applicant on their behalf. Applicants may be third parties (e.g., a party other than the Program Administrator or the utility customer) such as, but not limited to, engineering firms,

installation contractors, equipment distributors, energy service companies (ESCO) and equipment lessors.

2.1.4 Installer

All systems must be installed by appropriately licensed California contractors in accordance with rules and regulations adopted by the State of California Contractors State Licensing Board (CSLB). Installation contractors must have an active A, B, or C-10 license, or a C-46 license for photovoltaic (PV) systems.

Although not required, installation contractors are encouraged to become certified by the North American Board of Certified Energy Practitioners (NABCEP). For additional information on NABCEP, go to www.nabcep.org.

In all cases, systems must be installed in conformance with the manufacturers' specifications and with all applicable electrical and building codes and standards.

To participate in the CSI program, eligible companies that install system equipment must be listed with the Program Administrator. The Program Administrator will request the following information:

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

This information must be submitted to the Program Administrator before a company can become eligible to participate in the CSI program. To remain eligible, a company must resubmit this information annually by March 31**.** This annual submittal is required even if the information identified in the company's prior submittal has not changed. In addition, a company must submit updated information any time its reported information has changed. The updated information must be submitted to the Program Administrator within 30 days of the change of any reported information.

The above information must be listed before the Applicant can receive any reservation confirmation or payment. The Program Administrator will compile the information and make it available to consumers to assist them in making purchase decisions and taking any remedial action on their systems. Information about listed installers is posted on the Program Administrator's websites.

2.1.5 Equipment Sellers

To participate in the CSI program, companies that sell system equipment must be certified by the Energy Commission. The Energy Commission requests the following information on their form NSHP-4:

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

This information must be submitted to the Energy Commission before a company can become eligible to participate in the CSI program. To remain eligible, a company must resubmit this information annually by March 31**.** This annual submittal is required even if the information identified in the company's prior submittal has not changed. In addition, a company must submit updated information any time its reported information has changed. The updated information must be submitted to the Program Administrator within 30 days of the change of any reported information.

The above information must be certified before the applicant can receive any reservation confirmation or payment. The Energy Commission will compile the information and make it available to consumers to assist them in making purchase decisions and taking any remedial action on their systems. Information about registered equipment sellers is posted on the Energy Commission's website, www.energy.ca.gov.

See Appendix C for the Energy Commission's NSHP-4 seller registration form.

2.2 Generator System Equipment Eligibility

Although PV systems (i.e., systems that cause direct conversion of sunlight to electricity) are expected to be the common technology to receive incentives from the CSI program, the CSI program accepts non-PV solar thermal and solar water heating applications in the future so long as it can be demonstrated that they will displace electric usage and meet the parameters of the CSI program. Guidelines for non-PV technologies (including estimation, measurement and metering) are included in this CSI Handbook revision.

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Details of the eligibility requirements for generation system equipment follow.

2.2.1 New Equipment, Not Pilot or Demonstration Systems

All major system components (panels and inverters) must be new and must not have been previously placed in service in any other location or for any other application. Rebuilt,

refurbished, or relocated equipment is not eligible to receive CSI program incentives, save in rare relocation exceptions (see Sections 2.5 and 2.10).

Components that are critical to the solar systems must have at least 1 year of documented commercial availability to be eligible. Commercially available means that the major solar system components are acquired through conventional procurement channels, installed and operational at a Site. Commercially available does not include field demonstrations for proof-of-concept operation of experimental or non-conventional systems partially or completely paid for by research and development funds. Components that are enhancements to existing products and new models of existing product lines do not have to meet the commercial availability requirement as long as they are UL-certified and performance data exists to allow the Program Administrators to estimate their expected performance.

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An alternative method of seeking eligibility for solar systems that use new technologies is to obtain certification from a nationally recognized testing laboratory indicating that the technology meets the safety and/or performance requirements of a nationally recognized standard. System component ratings must also be certified by the CEC as described in section 2.2.4.

As an exception, the Applicant may specify equipment that has not yet received CEC certification, but the equipment must be certified prior to the first incentive payment.

2.2.2 Eligibility of Replacement PV Systems

Any replacement solar systems must meet the criteria for new systems and are eligible for the CSI program only if the removed system did not previously receive an incentive through the CSI program, the Self-Generating Incentive Program, the Energy Commission's Emerging Renewables Program, or Rebuild a Greener San Diego Photovoltaic Incentive Program.

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2.2.3 Eligibility of Non-PV Systems

Eligible non-PV technologies, that displace customer electric purchases from the grid, include –

- Solar water heating[10]
- Solar space & process heating
- Solar driven cooling (absorption & adsorption chillers, desiccant systems, etc.)
- Concentrating solar heating and electric generators (trough, dish and lens; Rankine and Stirling, etc.)

Note that the measurement & metering methods discussed in this document are not applicable to solar water heating systems eligible for SDREO's solar hot water heating pilot program.[11]

[10] Per D.06-12-033, page 24, the Commission noted "we will include solar thermal and solar water heating in our CSI incentive program, but only those solar thermal technologies that displace electric usage." Also, D.06-12-033, Conclusions of Law, #19, page 38.

2.2.4 Equipment Must Serve On-Site Electrical Load

To be eligible, the system must be sized so that the amount of electricity produced by the system primarily offsets part or all of the customer's electrical needs at the Site of installation. The expected production of electricity by the system may not exceed the actual energy consumed during the previous 12 months at the Site, as calculated per the following formula:

Maximum System Capacity (kW) = 12-months previous energy usage (kWh) / (0.18 x 8760 hours/year)

The Applicant must show evidence of the system sizing with the submittal of the initial application.

2.2.5 Equipment Certifications and Rating Criteria

PV system components must be certified through the Energy Commission's program that certifies major components of PV systems and provides lists of eligible equipment. The list of the currently certified equipment is available through:

- The California Energy Commission: www.energy.ca.gov
- California Energy Commission Call Center: (800) 555-7794

The Program Administrators will confirm that equipment identified in a reservation application meets eligibility requirements prior to providing a confirmed reservation notice letter. As described in Section 2.2.1, one exception would be for new equipment that has not yet received certification but for which the process has been initiated. Equipment is periodically added and removed from the lists of eligible equipment so Applicants should confirm that the components purchased for a system are eligible prior to installing them.

The Energy Commission certifies modules, inverters, and system performance meters. The system must be interconnected to the grid. Inverters and modules must each carry a 10-year warranty, and meters a one-year warranty, in 2007. Eligibility requirements for components are summarized below:

- PV modules must be certified to UL 1703 by a nationally recognized testing laboratory (NRTL).
- Performance meters must measure kWh (or Watt hours) with a manufacturer's uncertainty of ±2 or ±5 percent (depending on rating size and incentive), retain data in the event of a power outage, and be easy to read for the customer's benefit. See Section 11.1.2.

[11] Per D.06-01-024 SDREO has proposed a solar hot water heating pilot program. In that order, the Commission directed SDREO to draft and file a plan for a solar water heating pilot program in the SDG&E territory.

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- Inverters must be certified to UL 1741 by a NRTL. They also must have completed the Energy Commission's required weighted efficiency testing.

Non-PV electric generators and thermal systems must be safety and performance certified by a NRTL.

2.2.5.1 Non-PV System Capacity Rating

The CEC-AC capacity rating for non-PV electric generators must be established at PTC by an NRTL.[12] [13]

Non-PV thermal systems output must be rated by an NRTL at PTC. However, the Non-PV thermal capacity must be converted into an electric capacity representing the potential electric displacement. For non-PV thermal systems a Performance Ratio (P_R) is used to convert non-PV system thermal capacity to electric capacity. The Performance Ratio is the heating or cooling energy output of the conventional electric heating or cooling system being displaced divided by its electric energy input at rated conditions.

The Performance Ratio may be calculated one of the following two ways –

1) From the minimum efficiency standards for the type and size of the conventional electric heating or cooling system being displaced. The minimum efficiency standards for these equipment are found in the statewide Standard Performance Contract program (Appendix D) and the California Appliance Efficiency Regulations[14]. For electric resistive heating systems, the Performance Ratio will be assumed to be 1.0. Integrated Part-Load Value (IPLV), ratings will be used for systems that modulate capacity. Energy Efficiency Ratio (EER), Seasonal Energy Efficiency Ratio (SEER), Heating Seasonal Performance Factor (HSPF) or Coefficient of Performance (COP) ratings will be used for systems that do not modulate capacity. The conversion of IPLV, EER, SEER, HSPF and COP to the dimensionless Performance Ratio is accomplished as follows -

For IPLV: P_R = IPLV / 3.412

For SEER: P_R = SEER / 3.412

For HSPF: P_R = HSPF / 3.412

For EER: P_R = EER / 3.412

For COP: P_R = COP

2) An engineering model of the facility's heating or cooling load resulting in the electric consumption and output of the conventional electric heating or cooling system being displaced, assuming an minimum efficiency rating for the conventional system. The Performance Ratio is

[12] Example of qualified NRTL's include but are not limited to the Solar Rating and Certification Company and Sandia National Laboratories.

[13] The PTC (PVUSA Test Conditions) rating is based upon 1,000 Watt/m2 solar irradiance, 20 °Celsius ambient temperature, and 1 meter/second wind speed. PTC ratings for non-PV systems should be established by a Nationally Recognized Testing Laboratory (Solar Rating and Certification Company "SRCC), National Renewable Energy Laboratory "NREL", Sandia National Laboratories or others). An example CEC-AC rating using the SRCC OG100 efficiency equation for a glazed solar collector can be found in Appendix G.

[14] Appliance Efficiency Regulations, California Energy Commission, CEC-400-2006-002, December 2006.

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then calculated by dividing the modeled annual output by the electric input and converting to dimensionless units.

For non-PV solar electric generators, the system rating (CEC-AC) is the net electric power output of the system at PTC.

CEC-AC = E_{PTC}

Where;

CEC-AC = System electric rating at PTC.

"E_{PTC}" = Net electric output of the non-PV system at PTC.

For solar thermal systems that displace electric load the system rating (CEC-AC) is the rated thermal output at PTC, divided by the Performance Ratio of the electric equipment being displaced, less any solar thermal system ancillary loads at rated conditions.

CEC-AC = (T_{PTC} / P_R) – E_{AUX}

Where;

CEC-AC = System displaced electric rating at PTC.

"T_{PTC}" = Thermal output (cooling or heating) of the non-PV system in kilowatts thermal (kW_T) at PTC and the operating temperature of the solar collector. If the system includes an absorption chiller or other heat driven cooling system, the system thermal rated output is either the PTC rated thermal output of the panels multiplied by the rated COP[15] of the absorption chiller, or the rated capacity of the absorption chiller, which ever is less.

"P_R" = Dimensionless Performance Ratio of the conventional electric heating or cooling system calculated by the heating or cooling energy output of the system divided by its electric energy input.

"E_{AUX}" = The load of the non-PV system ancillary electric equipment (e.g. pumps, etc.), at rated conditions, used for the solar thermal system operation. Ancillary electric loads may be ignored if the load magnitude is less than 5% of the gross system capacity.

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2.2.6 System Size

The minimum system size eligible for an incentive is 1 kW. The maximum incentive provided for a Host Customer Site under the CSI program is 1,000 kW (1 MW) CEC-AC; however, a Host Customer Site may elect to install up to 5 MW of generation.[16] If an Applicant has already received 1 MW of funding from another solar incentive program (such as the SGIP or ERP), they can apply for up to another 1 MW of new generation under the CSI program on the same site as long as they can demonstrate that the electricity produced by the combined system sizes

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[15] "COP" is the Coefficient of Performance of a cooling system. It is the dimensionless ratio of the cooling output divided by the heat input. Absorption chiller COP runs in the range of 0.6 to 1.2 depending on the size the chiller, whether the condenser is water or air cooled and if it is single or double effect.

16 Because the CSI Program and statutes only allow for customers to receive incentives up to the first MW, PBI payments for energy output on systems larger than 1 MW will be prorated based on the ratio of 1 MW to the entire size of the site. See Section 3.3 for further detail.

do not exceed the actual energy consumed during the previous 12 months at the Site, based on the process provided in Section 2.2.3.

Program Administrators will use the CEC-AC rating, but not a Design Factor, to determine eligibility according to these minimum and maximum sizes. Program Administrators will also use the CEC-AC rating without a Design Factor to determine eligibility for the EPBB or PBI incentive.

The system size must be calculated using the CEC-AC rating standards,[17] including inverter DC-to-AC losses. To calculate the CEC-AC rating, the following formula should be used:

System Size Rating (kilowatts) = Quantity x CEC Rating of Photovoltaic Modules x CEC Inverter Efficiency Rating/ 1000 (watts/kilowatt)

However, for the Program Administrators to allocate applications against their MW in step (Section 1.3), the Program Administrators will multiply the system size rating by a design factor that reflects the system's "effective capacity."

For systems that participate under the EPBB, this is relatively straightforward, since this ratio is equal to the design factor generated by the EPBB calculator. Thus for EPBB systems, system size is equal to the system size rating times the design factor generated by the EPBB calculator for that system.

For PBI systems, the program administrators will need to derive a design factor based on the following calculations:

For Crystalline Cells & Non-PV Systems:

1. Divide the estimated annual kWh that the system is expected to produce[18] by (8760 x CEC-AC rating). This is the estimated capacity factor of the applicant system.
2. Divide the capacity factor from #1 by the prevailing capacity factor assumed for a given step[19] to get a proxy Design Factor.
3. Find the system size (kW) by multiplying the Design Factor from #2 times the CEC-AC size above

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For Non-Crystalline Cells:

1. Find the estimated annual kWh by: [(Annual kWh estimate)[20] / (system STC rating)] x (system PTC rating) x 1.12

17 The CEC-AC rating standards are based upon 1,000 Watt/m2 solar irradiance, 20 °Celsius ambient temperature, and 1 meter/second wind speed. The CEC-AC Watt rating is lower than the Standard Test Conditions (STC), a Watt rating used by manufacturers.

18 Derived from PV Watts and found in the EPBB Calculator results.

19 This equals .18 for steps 2 and 3, and .20 for steps 4-10.

20 Derived from PV Watts and found in the EPBB Calculator results.

2. Divide the new estimated annual kWh by (8760 x CEC-AC rating) to find the capacity factor.
3. Divide the capacity factor from #2 by the prevailing capacity factor assumed for a given step to get a proxy Design Factor.
4. Find the system size (kW) by multiplying the Design Factor from #3 times the CEC-AC size above

This calculation would allow the Program Administrators to estimate annual production from the EPBB Calculator that adjusts for performance of non-crystalline PV technology.

2.2.6.1 System Sizing Based on Future Load Growth

In the case of Applicants with new or expanded sites where no electric bill or where the existing electric bill does not reflect the Applicant's expected expanded consumption, the Applicant must include an engineering estimate. The engineering estimate must include the appropriate substantiation of the forecast of the Host Customer Site's annual energy use (in kWh) if the generating system size is based on future load growth, including new construction, load growth due to site expansion or other load growth circumstances. Suggested methods of demonstrating load growth include Application for Service with corresponding equipment schedules and single line diagram; building simulation program reports such as eQUEST, EnergyPro, DOE-2, and VisualDOE; or detailed engineering calculations. The Program Administrator will verify the load growth predicted before moving forward with the Confirmed Reservation Notice.

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2.3 Energy-Efficiency Requirements

Beginning January 1, 2007 all existing residential and commercial customers will be required to have an energy efficiency audit conducted of their existing home or building if they chose to apply for a solar incentive. The acceptable audit protocols will consist of an on-line audit or telephone audit provided by the Utilities. The Utilities may also provide additional audit tools available for customers in addition to the on-line and phone audits. Customers will be responsible for submitting a copy of a completed energy efficiency audit to the Utility with their solar incentive application.

Non- Utility Providers:

Non-utility entities may also provide audits at the expense of the customer. At a minimum, the provider must perform an online or phone audit.

Audit Exemptions:

An existing home or building may be exempt from the audit requirement if it meets one of the following circumstances and a copy of the documentation must be submitted with the customer's solar incentive application:

1. Having an acceptable energy audit report during the past three years

- Examples of acceptable energy audit reports: Copy of energy audit report summary completed through a customer's local utility company, home inspection report from an independent vendor or consultant, Home Energy Rating Summary (HERS) from a certified HERS rater, etc.

2. Proof of Title 24 energy efficiency compliance within the past three years

Title 24 Certificate of Compliance Forms:

- Residential: CF-1R which was used to demonstrate Title 24 Compliance of the 2001 or 2005 Energy Efficiency Standards and was generated on or after January 1, 2003.
- Commercial: One or more of the Certificates of Compliance forms listed below which were used to demonstrate Title 24 Compliance of the 2001 or 2005 Energy Efficiency Standards and was generated on or after January 1, 2003.

Envelope	Mechanical	Lighting	Outdoor Lighting
ENV-1-C	MECH- 1-C	LTG-1-C	OLTG-1-C

Only compliance documents completed by persons who are Certified Energy Plans Examiners (CEPE) by the California Association of Building Energy Consultants (CABEC) will be accepted. More information about this certification process can be found at: http://www.cabec.org. The above compliance documents must also be generated by one of the Energy Commission's approved Title 24 software programs: Micropas or Energy Pro.

3. Having one of two national certifications of energy efficiency:
   - LEED or
   - Energy Star

Customer must submit a copy of a certificate or other documentation from LEED or Energy Star which contains the building address and date of certification.

New Construction:

Commercial New Construction:

- Commercial New Construction project participants in the solar incentive program must submit copies of their current Title 24 documentation. Participants can use one or more of the Certificates of Compliance forms listed below that demonstrate Title 24 Compliance 2005 Energy Efficiency Standards in effect as of October 1, 2005.
-

Envelope	Mechanical	Lighting	Outdoor Lighting
ENV-1-C	MECH- 1-C	LTG-1-C	OLTG-1-C

Only compliance documents completed by persons who are Certified Energy Plans Examiners (CEPE) by the California Association of Building Energy Consultants (CABEC) will be accepted. The above compliance documents must also be generated by one of the Energy Commission's approved Title 24 software programs: Micropas or Energy Pro.

Residential New Construction:

- Residential New Construction projects (single family home, custom homes and multifamily buildings) are currently handled by the California Energy Commission (CEC) under the New Solar Homes Partnership. Please contact the CEC for applications and program requirements at www.GoSolarCalifornia.ca.gov.

2.4 Warranty Requirements

In 2007, all systems must have a minimum 10-year warranty provided in combination by the manufacturer and installer to protect the purchaser against defective workmanship, system or component breakdown, or degradation in electrical output of more than fifteen percent from their originally rated electrical output during the ten-year period. The warranty must cover the solar generating system only, including PV modules (panels), inverters, solar collectors, tracking mechanisms, heat exchangers, pumps, heat driven cooling system associated with the solar system, and provide for no-cost repair or replacement of the system or system components, including any associated labor during the warranty period.

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Self-installed systems must have a minimum 10-year warranty on the equipment to be installed to protect the purchaser against breakdown or electrical output degradation of major system components. In this case, the warranty need not cover the labor costs associated with removing or replacing major components because any repairs would be done by the self-installer or at the self-installer's expense.

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For the 2007 program year, meters must have a one-year warranty to protect against defective workmanship, system or component breakdown, or degradation in electrical output of more than fifteen percent from their originally rated electrical output during the warranty period. On or before January 1, 2008, the warranty requirements will be increased to a minimum of 5 years for meters, unless the CEC establishes alternate requirements.

2.5 Performance and Permanency Requirements

Equipment installed under the CSI program is intended to be in place for the duration of its useful life. Only permanently installed systems are eligible for incentives. This means that the solar system must demonstrate to the satisfaction of the Program Administrator adequate assurances of both physical and contractual permanence prior to receiving an incentive.

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Physical permanence is to be demonstrated in accordance with industry practice for permanently installed equipment. Equipment must be secured to a permanent surface. Any indication of portability, including but not limited to temporary structures, quick disconnects, unsecured equipment, wheels, carrying handles, dolly, trailer, or platform, will deem the system ineligible.

In rare occasions, there may be extenuating circumstances that warrant equipment relocation. The Program Administrators will use their discretion whether to allow the relocation to continue to receive program incentives. Contractual permanence, corresponding to a time period of 10 years, is to be demonstrated as follows:

- All agreements involving the generation system receiving an incentive are to be provided to the Program Administrator for review as soon as they become available (e.g., at the proof-of-project milestones stage or the incentive-claim stage at the latest). These agreements include, but are not limited to, system purchase and installation agreements, warranties, leases, energy or solar

services agreements, energy savings guarantees, and system performance guarantees.

- The System Owner agrees to notify the Program Administrator in writing a minimum of 60 days prior to any change in either the site location of the solar system or change in ownership of the generation system if the change(s) takes place within the applicable warranty period. The warranty period for the CSI program is 10 years.
- If the solar system is removed prior to end of the 10 year warranty period, either:
  - The solar system may be installed at another site within the Program Administrator service territory within 6 months. The system installed at the alternate site would not be eligible for an additional CSI EPBB incentive; or
  - The System Owner would be unable to participate in the CSI program for any additional installations under the CSI program, including any active reservations that have not yet been paid.
- If the house or business is sold, the new owners can continue to receive the Performance-Based Incentives (PBI) and be eligible to receive future CSI program incentives if they complete a new interconnection agreement. If the sellers remove the panels, they can continue to receive the incentive payments and be eligible to receive future CSI program incentives if the panels they removed are installed within the same service territory within 6 months, and they complete an interconnection agreement at the new address. PBI recipients will receive a full five year PBI payment period (not including the period between removing and reinstalling the system), as long as they reinstall their systems within the specified timeframe.

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2.6 Insurance Requirements

The Program Administrators require insurance as a condition for receiving a CSI program incentive because, through the CSI program incentive, the utilities (and SDREO) become part of the customer's decision (and extended process) to install a solar energy system. Consequently, it is appropriate for the Program Administrators and the Commission to impose insurance requirements that will provide protection to those involved in the project and that limit the risk to the Program Administrator (and thus the ratepayers) who fund these projects.

2.6.1 Insurance Requirements for Host Customer and System Owner of Systems

All systems ≥ 30 kW receiving a CSI program incentive will require that the Host Customer and System Owner have the following minimum level of homeowner liability insurance or commercial general liability insurance for the term of the CSI program contract:

- $2,000,000 for each occurrence if the system rating is greater than 100 kW
- $1,000,000 for each occurrence if the system rating is greater than or equal to 30 kW and less than or equal to 100 kW

Non residential projects must also fulfill the following general insurance requirements:

Workers' Compensation: Workers' Compensation insurance or self-insurance indicating compliance with any applicable labor codes, laws or statutes, state or federal, at the Site where Host Customer or System Owner performs work.

Business Auto: Auto coverage shall be at least as broad as the Insurance Services Office California Business Auto Coverage Form (CA 00 01 03 06) covering Automobile Liability symbols 7, 8, and 9. Specifically described autos shall include any and all autos that will be used in connection with the project. The limit shall be not less than $1,000,000 each accident for bodily injury and property damage.

Additional insurance requirements and terms are included in the CSI program contract.

Insurance requirements for systems < 30 kW will be equivalent to what is currently required for interconnection to the utility grid.

2.6.2 Insurance Requirements for Installers

Installation contractors must have valid workers compensation, business auto and commercial general liability insurance. Commercial general liability insurance must be in the following amounts:

- $1,000,000 for each occurrence and $2,000,000 aggregate.
- Workers compensation insurance or self-insurance indicating compliance with any applicable labor codes, laws or statutes, state or federal, where Installer performs work.
- Auto coverage shall be at least as broad as the Insurance Services Office California Business Auto Coverage Form (CA 00 01 03 06) covering Automobile Liability symbols 7, 8, and 9. Specifically described autos shall include any and all autos that will be used in connection with the project. The limit shall be not less than $1,000,000 each accident for bodily injury and property damage.

2.6.3 Insurance Requirements for Government

The Program Administrators recognize that some Government entities are self-insured and/or have blanket coverage. The Program Administrators will accept proof of that coverage as long as the Government entity can show that they meet the level of insurance required by the CSI program.

2.7 Interconnection to the Electric Utility Distribution System

Eligible solar electric energy systems must be permanently interconnected to the electrical distribution grid of the utility serving the customer's electrical load. Portable systems are not eligible. The system interconnection must comply with applicable electrical codes and utility interconnection requirements.

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The Host Customer, or designate, must also submit an application and enter into an interconnection agreement with their local electric utility for connection to the electrical distribution grid. Proof of interconnection and parallel operation is required prior to receiving an incentive payment.

2.8 Time of Use Rates

In order to provide additional incentives for customers to install solar systems that coincide with California's peak electricity demand, CSI Applicants are required under state law (SB1) and CPUC D. 06-12-033 to take their electric service under applicable Time-Of-Use (TOU) tariffs. Check with the Program Administrator to understand what TOU rates are applicable.

2.9 Metering Requirements

The CSI program requires accurate solar production meters for all projects that receive CSI program incentives. Accurate measurement of solar output is of paramount importance to ensure optimum value for both solar owners and ratepayers. For solar electric generating systems with a system rating of less than 10 kW, a basic meter with accuracy of ±5 percent is required. For systems with a system rating of 10 kW and greater, an interval data meter with accuracy of ±2 percent is required. An extensive discussion on metering is contained in Appendix B.

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For non-PV thermal systems, the output must be measured with a Btu meter with a combined accuracy of +/- 5 percent or better, taking into consideration differential temperature, flow and computational errors (see Appendix E for further details)

EPBB program participants must provide Program Administrators or their authorized agents with physical access to the meter for testing or inspection, and if applicable, data gathering. If the customer's meter is located in a place that is not readily accessible, such access will be by appointment. To avoid inconvenience to customers, installers are encouraged to locate meters in areas that are easily accessible.

PBI customers must provide Program Administrators or their authorized agents with physical access to the meter at all times.

2.10 Inspection Requirements

It is the intent of the CSI program to provide incentives for reliable, permanent, safe systems that are professionally installed, and comply with all applicable federal, state, and local regulations. Program Administrators will conduct a system inspection visit for every system rated from 30 kW up to 100 kW that have not opted to receive PBI incentive payments in order to verify that the project is installed as represented in the application, is operational, interconnected and conforms to the eligibility criteria of the CSI program. Program Administrators will perform random field inspections to verify system characteristics for systems less than 30 kW. These inspections will reflect a statistically reasonable random sample. Systems receiving a PBI may still be required to have a field inspection.

A mandatory site inspection is required for all relocated equipment. System Owners that have received an EPBB incentive and have relocated their system must orient their relocated equipment to produce at least the same generation as their initial incentive payment was based upon.

2.10.1 Systems that Fail Inspections

If a system fails a field inspection, the Program Administrator will notify the Applicant, Host Customer, and System Owner with the reasons for the field inspection failure. Such reasons for failure may include but are not limited to the following:

- Material mechanical failure: A failure that results in a decline in the expected performance of the system (e.g., one or more of the system components is not operating properly).
- Immaterial mechanical failure: minor failures that have no impact on the expected performance of the system and can be corrected within 60 days.
- Material compliance failure: the system as verified does not match the application's stated system and/or the system does not meet the CSI program eligibility requirements (e.g., the EPBB characteristics are incorrect, the system components or number of components are incorrect, etc.).
- Immaterial compliance failure: failures that have no impact on the expected performance of the system and can be corrected within 60 days (e.g. submission of erroneous system data).

The Program Administrators will exercise their judgment in assessing the materiality of non-compliance. For either mechanical or compliance failures: If a material failure occurs due to gross negligence or intentional submission of inaccurate system information in an attempt to collect more incentive dollars, the responsible party will be immediately prohibited from participating in the program.

If there is a failed inspection for *mechanical* failures, the Applicant, Host Customer, and/or System Owner will have 60 calendar days to bring the system into compliance after a failed inspection. A subsequent inspection visit will be conducted to determine final approval and will be subject to a re-inspection fee. If the Applicant, Host Customer, and System Owner fail to resolve the failure within the 60 days, or the failed inspection is due to a Material Mechanical Failure, the application will be cancelled, determined to be a failed inspection, and a strike will be imposed. The failure will constitute a strike against the Installer, Applicant, seller, or other responsible party. The field inspector and/or the Program Administrator will be authorized to identify the responsible party, based on available information obtained during the inspection and from applicable forms. However, this designation will be considered preliminary and is subject to revision upon receipt of additional information or on appeal.

If there is a failed inspection because the verified system is not in *compliance* with the stated system as stated on the project application, the Applicant, Host Customer, and/or System Owner will have 60 calendar days to bring the system into compliance. If the Applicant, Host Customer, and System Owner fail to bring the system into full eligibility within 60 days, or the

failed inspection is due to a Material Compliance Failure, the application will be cancelled, determined to be a failed inspection, and constitute a strike. The strike will be imposed on the entity that signed and submitted the erroneous information on the project application and/or subsequent incentive claim form, unless the Installer or Applicant can demonstrate that another party, such as a seller or consultant, is responsible. The field inspector and the Program Administrator will be authorized to identify the responsible party, based on available information obtained during the inspection and from applicable forms. However, this designation will be considered preliminary and is subject to revision upon receipt of additional information or on appeal.

Project Installers, Applicants, and/or sellers that fail two inspections will be on probation, wherein every project will be inspected. If the entity fails a third inspection, the entity will be disqualified from participating in the CSI program for one year, except in cases of fraud.

For high volume installers (those that install more than 200 systems per year), if the installer accumulates two strikes, the entity will be placed on probation. If no additional strikes are accumulated within the first year that the initial strike was acquired, their first strike is removed and they continue on probation until the second strike's probation year ends as determined from the date the second strike is acquired. If they acquire no additional strikes within this time, the second strike is removed, and they will be restored to a zero-strike status. However, if they acquire an additional strike after the first strike is removed, an additional probation period begins from the date of the last strike. If they accumulate three strikes, they will be disqualified from participating in the program for one year.

If an Installer or Applicant disputes the failed inspection or disqualification, he or she may appeal in writing within 30 days of notification of the failed inspection via US certified mail to the Program Administrator. A panel of all of the Program Administrators and a representative from the Energy Division of the California Public Utilities Commission will review the appeal. Written appeals should substantiate any reasons he or she believes warrant reconsideration of the failure or disqualification. The appealing party may request an audience with the panel. The panel may also request additional information to substantiate the written appeal. The final decision will be provided to the Applicant or Installer within 60 days of receipt of the written appeal and the appeal decision of the panel shall be final.

2.10.2 Inspector Training Criteria

The CPUC requires that all system inspection visits must be performed by trained personnel, whether the inspection is performed by utility interconnection inspectors, other utility personnel, or contractors. The Program Administrators will develop and submit a consistent statewide site inspectors' training plan to the CPUC Energy Division by January 2007.

3. California Solar Initiative Incentive Structure

This section provides a general overview of the California Solar Initiative (CSI) Incentive structure. The CSI program offers two types of incentives: PBI and EPBB. Table 5 provides an overview of the two incentive structures under the CSI program. For the purpose of the CSI program, commercial sectors include agricultural and industrial customers. Typically, the incentive structure is determined by the size of the system installed. However, customers installing smaller systems have the option to choose the PBI structure regardless of the size of their system.

Table 5
CSI Incentive Structures

Type of CSI Incentive	Size Category	Payment Structure	Customers Eligible	Notes
Performance Based Incentive (PBI)	≥ 100 kW	Payments based on $/kWh produced over 5 year term	Residential, Commercial, Government and Nonprofit	❖ Smaller systems may Opt into PBI ❖ PBI is required for Building Integrated PV (BIPV) Systems
Expected Performance Based Buydown (EPBB)	< 100 kW	1 lump sum based on $/watt	Residential, Commercial, Government and Nonprofit	❖ Residential New Construction projects are funded through the Energy Commission's New Solar Homes Partnership (not CSI)

Both PBI and EPBB incentives are available for residential and Non-Residential customers as displayed in Table 6.

Table 6
Type of CSI Incentive by Customer Sector

Type of CSI Incentive	Size Category	Residential[21]	Commercial	Gov't and Nonprofit
Performance Based Incentive (PBI)	≥ 100 kW[22]	√	√	√
Expected Performance Based Buydown (EPBB)	< 100 kW	√	√	√

21 Residential installations on existing structures. New residential construction projects will be funded through the Energy Commission's New Solar Homes Partnership.

22 Smaller systems may opt-in to receive a PBI incentive rather than the EPBB incentive.

3.1 CSI Program Incentive Trigger Mechanism

The incentive payment levels will automatically be reduced over the duration of the CSI program in 10 steps, based on the volume of MW of confirmed reservations issued within each utility service territory.[23] On average, the CSI incentives are projected to decline at a rate of 7 percent each year following the start of implementation in 2007. The incentives will gradually phase out over the 10 steps. Table 7 outlines the 10 steps for the incentive levels for the CSI Program.

Table 7
PBI and EPBB Payment Amounts by Step

		EBPP Payments (per watt)			PBI Payments (per kWh)		
MW Step	Statewide MW in Step	Residential	Commercial	Gov't/ Nonprofit	Residential	Commercial	Gov't/ Nonprofit
1	50	n/a	n/a	n/a	n/a	n/a	n/a
2	70	$ 2.50	$ 2.50	$ 3.25	$ 0.39	$ 0.39	$ 0.50
3	100	$ 2.20	$ 2.20	$ 2.95	$ 0.34	$ 0.34	$ 0.46
4	130	$ 1.90	$ 1.90	$ 2.65	$ 0.26	$ 0.26	$ 0.37
5	160	$ 1.55	$ 1.55	$ 2.30	$ 0.22	$ 0.22	$ 0.32
6	190	$ 1.10	$ 1.10	$ 1.85	$ 0.15	$ 0.15	$ 0.26
7	215	$ 0.65	$ 0.65	$ 1.40	$ 0.09	$ 0.09	$ 0.19
8	250	$ 0.35	$ 0.35	$ 1.10	$ 0.05	$ 0.05	$ 0.15
9	285	$ 0.25	$ 0.25	$ 0.90	$ 0.03	$ 0.03	$ 0.12
10	350	$ 0.20	$ 0.20	$ 0.70	$ 0.03	$ 0.03	$ 0.10

The duration of that phase-out will be dependent on: (1) whether the incentive budgets are depleted; (2) when the Program Administrators reach their MW goal; or (3) by the end of the program or 2016, whichever comes first. Table 8 displays the MW targets by Program Administrator service territory and customer class.

23 Investor-owned utility service territories only (PG&E, SCE, SDG&E)

Table 8
CSI MW Targets by Program Administrator and Customer Class

		PG&E (MW)		SCE (MW)		SDG&E/SDREO (MW)	
Step	MW in Step	Res	Non-Res	Res	Non-Res	Res	Non-Res
1	50	-	-	-	-	-	-
2	70	10.1	20.5	10.6	21.6	2.4	4.8
3	100	14.4	29.3	15.2	30.8	3.4	6.9
4	130	18.7	38.1	19.7	40.1	4.4	9.0
5	160	23.1	46.8	24.3	49.3	5.4	11.1
6	190	27.4	55.6	28.8	58.6	6.5	13.1
7	215	31.0	62.9	32.6	66.3	7.3	14.8
8	250	36.1	73.2	38.0	77.1	8.5	17.3
9	285	41.1	83.4	43.3	87.8	9.7	19.7
10	350	50.5	102.5	53.1	107.9	11.9	24.2
Total	**1750**	**252.4**	**512.3**	**265.6**	**539.5**	**59.5**	**120.8**
Total by Utility		764.8		805.0		180.3	
Percent		43.7%		46.0%		10.3%	

PENDING COMMENT:

Program Administrators will count an application's size towards their step goals using a design factor as described in detail in Section 2.2.5.

Projects are counted toward the MW trigger once they are deemed eligible, have paid an application fee (if applicable), and have been issued a confirmed reservation. As the number of MW allocated through the confirmed reservations reaches its maximum within any particular step, the Program Administrators will move to the next step.

If there are any MW that remain unused in a previous step due to events such as Applicants dropping out of the process, those MW will be added to the current step under which Program Administrators are issuing reservations and incentives, increasing the number in that step and ensuring that no MW are left outstanding. Any rearrangement of MWs from a higher step to a lower step can take place as long as reallocations conform to the one-third/two-thirds allocation for residential and non-residential applications. Reallocations from Step 1 may be assigned to either residential or non-residential applicants, at the discretion of the Program Administrators. The Program Administrators will provide weekly updates to their solar application website to indicate the total MWs available for incentives at each step, including those MWs newly available due to applications that have dropped out.

The CSI program incentive levels may vary by service area, depending on the pace of solar demand in each Program Administrator's territory. Additionally, the CSI program incentive levels may differ based on demand in the residential and non-residential customer sectors. Refer to the Program Administrator's website to determine the step and incentive rate that is currently applicable to each customer sector in that utility's service territory. The Program Administrators will include on their websites an indication of the MW of Confirmed Reservations in each customer sector that is as close as possible to real time.

3.2 Expected Performance Based Buydown (EPBB) Incentives

The CSI program will pay incentives to solar projects with system ratings of less than 100 kW CEC-AC through an up-front incentive known as an EPBB. These EPBB incentives are based on an estimate of the system's future performance. EPBB incentives combine the benefits of rewarding performance with the administrative simplicity of a one-time incentive paid at the time of project completion.

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The Program Administrators will use the Energy Commission's CEC-AC method to determine the system rating. In addition, the EPBB program will apply to all new construction other than building integrated systems (BIVP), regardless of size.

The following formula determines the EPBB incentive:

EPBB Incentive Payment = Reserved Incentive Rate x System Rating[24] x Design Factor

The design factor is a ratio comparing a proposed system to a reference system. Very simply, it reflects:

$$\text{Design Factor} = \frac{\text{Proposed System}}{\text{Reference System}}$$

More specifically, the Design Factor is calculated as follows:

24 CEC-AC System Rating (kilowatts) = Quantity of Modules x CEC Rating of Photovoltaic Modules x CEC Inverter Efficiency Rating / 1000 (watts/kilowatt)

DF = Dcorr * Gcorr

Dcorr (Design Correction) = $S_{s,p,p}$ / $S_{s,p,o}$

$S_{s,p,p}$ = The system's estimated summer kWh output at the proposed location, with proposed tilt & azimuth

$S_{s,p,o}$ = The system's estimated summer kWh output at the proposed location, with summer optimized tilt & azimuth allowing for equal treatment of proposed systems oriented from South to West (i.e. the optimized system's orientation shall be the same as the proposed system for orientations due south to due west).

Gcorr (Geographic Correction) = $A_{s,p,o}$ / $A_{s,r,o}$

$A_{s,p,o}$ = The system's estimated annual kWh output at the proposed location, with summer optimized tilt & south azimuth

$A_{s,r,o}$ = The system's estimated annual kWh output at the reference location, with summer optimized tilt & south azimuth

In sum, the design factor for EBPP will:

- Treat all systems oriented between 180° and 270° equally
- Assign optimal orientation tilt for each compass direction in range of 180° and 270°, optimized for summer production
- Include location-specific criteria to account for weather variation and shading
- Be based on an optimal reference system and location
- Determine optimal reference latitude tilt that relates to local latitude.

Please refer to the EPBB User Guide for more detailed explanation of the calculator's methodology and instructions, at www.csi-epbb.com.

For non-PV thermal systems, the Design Factor is the Surface Orientation Factor (SOF)[25,26]. The SOF is determined by reading the value from the chart Surface Orientation Factor for the location, tilt and azimuth of the system. Charts of SOF for various California locations may be found in Appendix C. The chart for the closest location to the system's location should be

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[25] The "Surface Orientation Factor" and how it is calculated is detailed in "Effects of Tilt and Azimuth on Annual Incident Solar Radiation for United States Locations", Proceedings of Solar Forum 2001, April 21-25, Washington D.C

[26] SOF charts for various California locations may be found in Appendix F of this paper.

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chosen and the SOF determined by reading it off of the chart using the system's tilt and azimuth.

Note that the described EPBB methodology is appropriate for solar systems displacing only electric load. For solar systems designed to displace both gas and electric loads, the solar energy displacing the electric load must be metered under a PBI arrangement described in Section 3.3.1.

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PENDING COMMENT: The CPUC and its Program Administrators will develop an EPBB calculator that helps applicants determine the EPBB incentive level. As it gains experience with the EPBB and the performance of the California Solar Initiative, the CPUC reserves the right to modify the calculator at any time without advance notice to applicants.

If the calculator is revised between the time an applicant submits an application and the Program Administrator's Pending Payment stage, the Program Administrator (PA) will notify the applicant by letter (PA notification letter).

If the Applicant received a Reservation Confirmation letter *before* such a calculator revision, s/he can either:

(A) resubmit the application using the new calculator (If the applicant chooses to resubmit, s/he will not lose his/her place in the queue or application fee); or

(B) notify the PA that s/he wishes to remain at the incentive level calculated in the existing application (even if the incentive would drop under the new calculator).

In both cases, the applicant must notify the PA of his/her intent, in writing, within 30 days of the date of the PA notification letter. If the applicant does not notify the PA of his/her intent within 30 days of the date of the PA notification letter, the application will remain in the queue at the level projected under the calculator used in the initial application process.

If the applicant has *not* received a Reservation Confirmation letter before such a calculator revision, s/he:

(A) *must* resubmit the application using the new calculator (If the applicant chooses to resubmit, s/he will not lose his/her place in the queue or application fee); or

(B) may withdraw the application (If the applicant chooses to withdraw the application, the PA will reimburse the application fee).

In both cases, the applicant must notify the PA of his/her intent, in writing, within 30 days of the date of the PA notification letter. If the applicant does not resubmit or withdraw his/her application within 30 days of the date of the PA notification letter, the Program Administrator will cancel the application, and the applicant will lose both his/her application fee and place in the queue.

3.2.1 Incentives for Residential Installations

Residential installations will be provided a one-time payment under the EPBB program to help reduce the cost of installation provided the system size is less than 100 kW CEC-AC. The amount of the EPBB incentive payment is as calculated pursuant to the formula in Section 3.2, with the incentive rate portion of the formula determined as shown by Table 9.

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Table 9
Residential EPBB Incentive Levels by MW Steps and Service Territory

Step	Residential EPBB ($/watt)	PG&E Res (MW)	SCE Res (MW)	SDG&E/SDREO Res (MW)
1	n/a	-	-	-
2	$ 2.50	10.1	10.6	2.4
3	$ 2.20	14.4	15.2	3.4
4	$ 1.90	18.7	19.7	4.4
5	$ 1.55	23.1	24.3	5.4
6	$ 1.10	27.4	28.8	6.5
7	$ 0.65	31.0	32.6	7.3
8	$ 0.35	36.1	38.0	5.5
9	$ 0.25	41.1	43.3	9.7
10	$ 0.20	50.5	53.1	11.9
Total		**252.4**	**265.6**	**59.5**

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The CSI program incentive levels may vary by utility service area, depending on the pace of solar demand in each utility's territory. Refer to the Program Administrator's website to determine the currently-effective step and incentive rate.

Incentives for residential new construction projects will be funded through the Energy Commission's New Solar Homes Partnership program.

3.2.2 Incentives for Non-Residential Installations

Non-Residential installations will be provided a one-time payment under the EPBB program to help reduce the cost of installation provided the system size is less than 100 kW CEC-AC. There are different incentive rates for System Owners who are commercial entities or Government or Non-Profit entities. If a Government or Non-Profit entity is not the System Owner, the incentive amount will be determined by the tax status of the System Owner. The amount of the EPBB incentive payment is as calculated pursuant to the formula in Section 3.2, with the incentive rate portion of the formula determined as shown in Table 10.

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Table 10
Non-Residential EPBB Incentive levels by MW Step and Service Territory

Step	Commercial EPBB ($/watt)	Gov't/ Non-Profit EPBB ($/watt)	PG&E Non Res (MW)	SCE Non Res (MW)	SDG&E Non Res (MW)
1	n/a	n/a	-	-	-
2	$ 2.50	$ 3.25	20.5	21.6	4.8
3	$ 2.20	$ 2.95	29.3	30.8	6.9
4	$ 1.90	$ 2.65	38.1	40.1	9
5	$ 1.55	$ 2.30	46.8	49.3	11
6	$ 1.10	$ 1.85	55.6	58.6	13.1
7	$ 0.65	$ 1.40	62.9	66.3	14.8
8	$ 0.35	$ 1.10	73.2	77.1	17.3
9	$ 0.25	$ 0.90	83.4	87.8	19.7
10	$ 0.20	$ 0.70	102.5	107.9	24.2
Total			**512.3**	**539.5**	**120.8**

Government and non-profit entities will be required to submit verification of their tax-exempt status to receive this incentive amount. Additionally, Government and Non-Profit entities must include a certification under penalty of perjury from their chief financial officer or equivalent that they are a Government or Non-Profit entity and that the system is not receiving and will not in the future receive federal tax benefits through financial arrangements for the entire warranty period of the system (i.e., the System Owner if a third-party, which will be receiving tax benefits from the system).

The CSI program incentive levels may vary by utility service area, depending on the pace of solar demand in each utility's territory. Refer to the Program Administrator's website to determine the currently effective step and incentive rate.

3.3 Performance Based Incentives (PBI)

The CSI program will pay PBI for solar projects with systems equal to or greater than 100 kilowatts (kW) CEC-AC, with monthly payments based on recorded kilowatt hours (kWh) of solar power produced over a 5-year period, provided the Host Customer remains a retail level electric distribution customer of PG&E, SCE, or SDG&E. The Commission has determined that customers who receive incentives under a performance-based approach will be motivated to focus on proper installation, maintenance, and performance of their systems. Therefore, systems equal to or greater than 100 kW are required to participate in the PBI program. In addition, building integrated systems (BIPV), regardless of size, are required to participate in the PBI program. Furthermore, systems of any size may elect to opt into the PBI program.

Once the PBI incentive rate has been determined and a confirmed reservation issued, the $/kWh incentive rate will remain constant for the 5-year term. PBI payments shall be made on a monthly basis after commissioning of the system.

PBI payments will be calculated for solar energy systems that exceed 1 MW in size by prorating the energy output based on the ratio of 1 MW to the size of the site. Thus, if a customer has installed a 5 MW system, the customer would receive PBI payments for 1/5 of the output of the system. As an alternative, and if possible, the customer may, at its election and cost, separately meter a 1 MW element of a larger system.

3.3.1 PBI for Non-PV Thermal Systems

For non-PV thermal systems, the thermal output of the system serving the customer's thermal load must be metered, divided by the Performance Ratio for the backup, displaced or replaced electric heating or cooling system. The location of the metering is critical for correct assessment of the useful thermal output of the non-PV system. Metering should be placed in the process such that the thermal energy delivered (or removed in the case of cooling) to the customer's thermal load is accurately measured.

Note that hot air solar systems will be paid incentives based on the EPBB method described in Section 3.2.[27]

Ancillary electric loads for solar thermal heating and cooling systems, under PBI, will be measured and subtracted from the calculated gross avoided electric consumption. However, ancillary load measurements will be required only if the ancillary rated load is ≥ 5% (i.e., within the uncertainty of the thermal measurement) of the gross avoided electric load potential.

The avoided monthly electric energy (kWh/month) will be calculated by dividing the measured delivered cooling or heating (in equivalent electric thermal) by the appropriate Performance Ratio and, if required, subtracting the system's measured ancillary load (kWh/month). The incentive payment is then determined by multiplying the net avoided electric load with the incentive rate ($/kWh).

Example #1 – Solar Space Cooling System

$$E_{DE} = ((T_{NPV} / 3{,}412) / P_R) - E_{AUX}$$

$$\$_{PBI} = E_{DE} \times \$_{Erate}$$

Where:

"E_{DE}" = Displaced electricity from the grid.

"T_{NPV}" = Measured thermal (heating or cooling) output of the non-PV system (which may include an absorption chiller or other heat driven cooling system) in Btu/month.

"P_R" = Dimensionless Performance Ratio of the conventional electric heating or cooling system calculated by the heating or cooling energy output of the system divided by its electric energy input. In this example, the conventional cooling system is a 20 Ton (240 kBtu/hr) air cooled packaged chiller with a standard IPLV of 9.2. The Performance Ratio for this system is 2.7.

"E_{AUX}" = Ancillary electric equipment (e.g. pumps, etc.) used for the solar thermal system operation.

[27] Metering the thermal output of solar hot air systems, within reasonable accuracy and cost is difficult.

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"$\$_{PBI}$" = Monthly PBI incentive payment.

"$\$_{Erate}$" = Current step PBI incentive rate (e.g. $0.34/kWh)

3.3.1.1 Non-PV Thermal System PBI Metering

For hydronic solar heating and cooling systems, the BTU meter specifications shall be as follows –

- Provides totalizing outputs in BTUs per period.
- Capable of remote communications.
- Monthly totalizing accuracy of ≤ 5%.[28]
- Flow meter and temperature sensor accuracy is National Institute of Standards and Technology (NIST) traceable.

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3.3.2 PBI for Residential Projects

Monthly payments will be made based on actual electricity generated in kWh as per the monthly reading of the meter. The residential PBI incentive rate ($/kWh) shall be in accordance with Table 11.

Table 11
Residential PBI Incentive Levels by MW Steps and Service Territory

Step	Residential PBI ($/kWh)	PG&E Res (MW)	SCE Res (MW)	SDG&E/SDREO Res (MW)
1	**n/a**	-	-	-
2	**$ 0.39**	10.1	10.6	2.4
3	**$ 0.34**	14.4	15.2	3.4
4	**$ 0.26**	18.7	19.7	4.4
5	**$ 0.22**	23.1	24.3	5.4
6	**$ 0.15**	27.4	28.8	6.5
7	**$ 0.09**	31.0	32.6	7.3
8	**$ 0.05**	36.1	38.0	8.5
9	**$ 0.03**	41.1	43.3	9.7
10	**$ 0.03**	50.5	53.1	11.9
Total		**252.4**	**265.6**	**59.5**

[28] At least one BTU meter supplier has provided information showing that 5% accuracy is achievable. See Appendix B for an example Btu meter accuracy calculation.

The PBI incentive levels may vary by utility service area, depending on the pace of solar demand in each utility's territory. Refer to the Program Administrator's website to determine the currently effective step and incentive rate.

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3.3.3 PBI for Non-Residential Projects

There are different incentive rates for commercial entities and for Government or Non-Profit entities that are the System Owners. If a Government or Non-Profit entity is not the System Owner, the incentive amount will be determined by the tax status of the System Owner. The Program Administrators will make the monthly payments based on actual electricity generated in kWh as per the monthly reading of the meter. The incentive amount ($/kWh) will be in accordance with Table 12.

Table 12
Non-Residential PBI Incentive levels by MW Step and Service Territory

Step	Commercial PBI ($/watt)	Gov't/ Non-profit PBI ($/watt)	PG&E Non Res (MW)	SCE Non Res (MW)	SDG&E Non Res (MW)
1	n/a	n/a	-	-	-
2	**$ 0.39**	**$ 0.50**	20.5	21.6	4.8
3	**$ 0.34**	**$ 0.46**	29.3	30.8	6.9
4	**$ 0.26**	**$ 0.37**	38.1	40.1	9.0
5	**$ 0.22**	**$ 0.32**	46.8	49.3	11.0
6	**$ 0.15**	**$ 0.26**	55.6	58.6	13.1
7	**$ 0.09**	**$ 0.19**	62.9	66.3	14.8
8	**$ 0.05**	**$ 0.15**	73.2	77.1	17.3
9	**$ 0.03**	**$ 0.12**	83.4	87.8	19.7
10	**$ 0.03**	**$ 0.10**	102.5	107.9	24.2
Total			**512.3**	**539.5**	**120.8**

The PBI incentive levels may vary by the Program Administrators' territory, depending on the pace of solar demand in each territory. Refer to the Program Administrator's website to determine the currently effective step and incentive rate.

Government and Non-Profit entities will be required to submit verification of their tax-exempt status to receive this incentive amount. Additionally, Government and Non-Profit entities must include a certification under penalty of perjury from their chief financial officer or equivalent that they are a Government or Non-Profit entity and that the system is not receiving and will not in the future receive federal tax benefits through financial arrangements for the entire warranty period of the system (i.e., the System Owner if a third-party, which will be receiving tax benefits from the system). This certification must be renewed annually if receiving PBI payments.

3.4 Incentive Limitations

Incentive amounts and project eligibility for the CSI program are limited by a number of factors, including:

- Total eligible project costs
- Other incentives or rebates received
- Project size and Host Customer Site limitations.

3.4.1 Total Eligible Project Costs

No project can receive total incentives (incentives from the CSI program combined with other programs) that exceed total eligible project costs. The Applicant must submit project cost details to report total eligible project costs and to ensure that total incentives do not exceed out-of-pocket expenses for the System Owner. See Appendix A for eligible cost items. Total eligible project costs cover the solar system and its ancillary equipment. Equipment and other costs outside of the project envelope defined in Appendix A are considered ineligible project costs but also must be reported. For large, multifaceted projects where the solar system costs are embedded, applications must include a prorated estimate of the total eligible costs for the solar system. Applications must include the project cost breakdown worksheet available from the Program Administrators' websites.

3.4.2 Other Incentives or Rebates

Customers may not receive CSI program incentives for the same self-generation equipment from more than one Program Administrator (e.g., PG&E, SCE, and SDREO). For projects receiving incentives under other programs, the CSI program incentive may be reduced, depending on the source of the other incentive. For projects that receive "other incentives" for the same generating equipment that are funded by California investor-owned utility ratepayers (e.g., utility or Energy Commission public goods charge programs, etc.), the CSI program incentive is discounted by the amount of the other incentive. For projects that receive "other incentives" funded from other sources than utility ratepayers (federal and state grants, air district grants, tax credits, etc.) no adjustment is made to the CSI incentive, except where a CSI incentive would otherwise cause total incentives to exceed total costs.

In no event may the combined incentives received from CSI program and other funding sources exceed the total eligible project cost. Host Customers, Applicants and System Owners are required to disclose information about all other incentives, including incentives for equipment or systems ancillary to the solar system, post-installation performance payments, or additional incentives. Program Administrators will enter applications into a statewide database that will permit universal tracking of applications for this and other programs.

3.4.3 Right to Audit Final Project Costs

The Program Administrators reserve the right to conduct spot checks to verify that payments were made as identified in the final invoices or agreements provided by equipment sellers

and/or installers. As part of these spot checks, the Program Administrators will require Applicants to submit copies of cancelled checks, credit card statements, or equivalent documentation to substantiate payments made to the equipment seller and/or installer. When submitting this documentation, Applicants are encouraged to remove their personal account numbers or other sensitive information identified in the documentation. Applicants must explain the difference if the final amount paid by the Applicant is different from the amount of the purchase or installation shown in any agreement or invoice or in the previously submitted Reservation Request.

If selected for a random audit, Applicants must submit final system cost documentation clearly identifying the final amount paid or legally incurred to purchase the system and the final amount paid to install the system. The cost documentation must provide proof of the final amount paid or legally incurred by the System Owner to the equipment seller and/or installer and provide sufficient information to clearly identify the equipment purchased and the labor paid. The final amount paid or legally incurred to the equipment seller and/or the final amount paid to the installer must match the cost information identified in the Reservation Confirmation and Incentive Payment Claim Form. To meet this requirement, the System Owner must submit final invoices and/or a copy of the final agreement. The actual amount paid or legally incurred by the purchaser to the equipment seller and/or the actual amount paid to the installer must be clearly indicated. If there is no direct proof of actual payment from the System Owner to an appropriately licensed installer or seller, the incentive will be cancelled or reduced.

In addition, the final invoices or agreements should clearly indicate the extent to which the California Solar Initiative program incentive lowered the cost of the system to the System Owner. If the System Owner has entered into an agreement to pay the equipment seller over time rather than in lump sum, the final agreement must indicate the terms of payment and the amount of any deposits or payments paid by Applicant to the equipment seller to date. The System Owner must pay the cost of any system installation prior to submitting a payment request to the Program Administrator.

3.4.4 Site and Host Customer Limitations

There are restrictions on the amount of incentive funding a Host Customer can reserve and receive. Host Customers can reserve up to 1 MW of maximum incentive funding from the CSI program for a single Site for the duration of the CSI program.

3.5 CSI Program Database

One of the notable features of the CSI program is the on-line database. The Program Administrators will establish and maintain an up-to-date database on their websites that will list information on the progress of the CSI program. The Program Administrators will show detailed information on the number of PV systems and confirmed reservations, systems installed from January 2007 forward with links to the archived database of all systems installed under the Energy Commission's Emerging Renewables Program, Self-Generation Incentive Program, and Rebuild a Greener San Diego Photovoltaic Incentive Program.

The information will include the following data from each project:

- Installer
- Seller
- City
- ZIP code
- Utility name
- Technology
- Size (Watts)
- Installed price approval
- PV manufacturer
- PV model
- Inverter manufacturer
- Inverter model
- Date completed
- Date of approved reservation.

Initially, program data will be updated quarterly. It is anticipated that once fully developed, the database will provide program data on a real-time basis.

4. Application Process for California Solar Initiative Projects

Through the California Solar Initiative (CSI) program, funding may be reserved for Applicants who have committed to purchase and install an eligible photovoltaic (PV) system at a given Site. A funding reservation provides the purchaser assurance that the reserved funds will be available when the payment claim is made.

Table 13 describes various situations and identifies the subsections that provide details on how to apply for funding.

Table 13
Summary of Application Procedures by Track

Track	Sector	Application Fee	System Size	Reservation Period	Relevant Section
1	All Residential	**No**	All	12 months	**Section 4.1**
1	Commercial	**No**	Less than 10 kW	*12 months for retrofit *18 months for new construction projects	**Section 4.1**
1	Government, Non-profit, Public Entities (small projects)	**No**	Less than10 kW	12 months	**Section 4.1**
2	Commercial	**Yes**	Greater than or equal to 10 kW	*12 months for retrofit projects *18 months for new construction projects	**Section 4.2 Section 4.2.1**
2	Government, Non-profit, Public Entities	**Yes**	Greater than or equal to 10 kW	18 months	**Section 4.2 Section 4.2.2**

4.1 Residential (All) and Small Non-Residential Projects (< 10 kW)

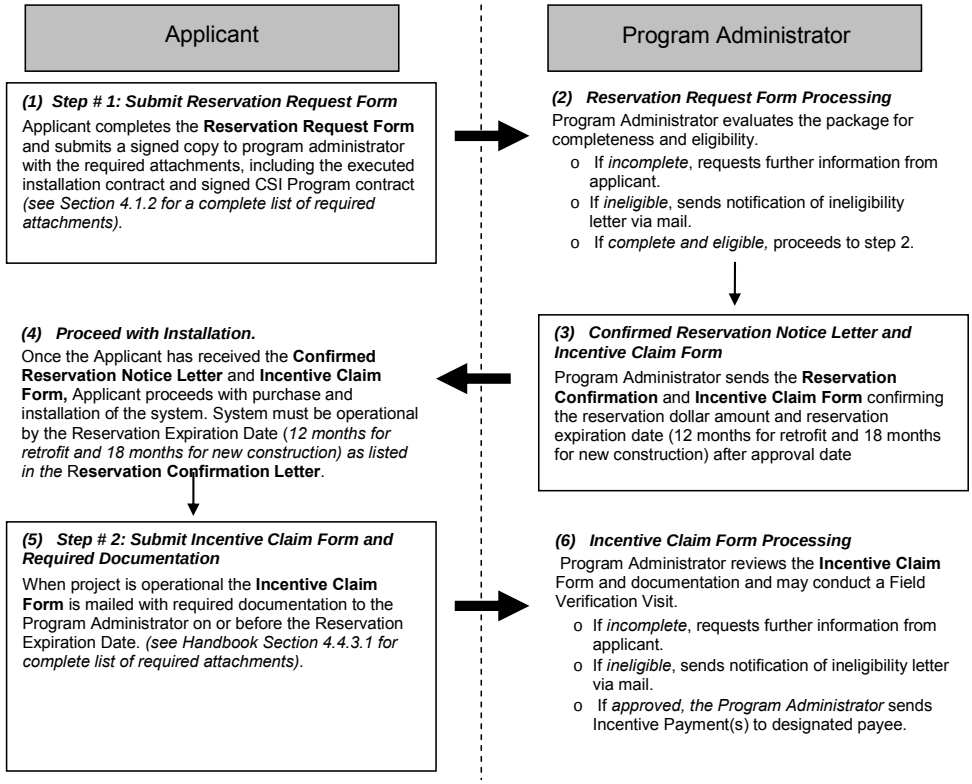
This section describes the application process for all projects installed on a residential Host Customer Site as well as projects less than 10 kW installed on Non-Residential Host Customer Sites. All residential and small projects are eligible to receive a lump sum EPBB incentive payment. However, there is an option to opt in to receive PBI based on $/kWh produced.

The CSI program will use an on-line application tool to simplify the application process and confirm the rebate amount reserved, contingent on receiving all documents. Section 12 will

include a blank copy of the Reservation Request Form and accompanying instructions. To obtain additional blank forms, the forms may be downloaded from the Program Administrators' website.

Figure 1 outlines the application process for residential and small projects less than 10 kW.

Figure 1
Residential (all) and Small Project Application Process Flow Chart



4.1.1 Two-Step Process for Residential and Small Non-Residential Applicants

There are two primary steps for residential and small Non-Residential Applicants as follows:

1. Complete and submit an Application (on line or available at the Program Administrator's website) and Reservation Application Package
   a. Include copy of executed contract for solar system purchase and installation
   b. See Section 4.7 for a list of required documentation

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2. Complete and submit the Incentive Claim Form
    a. See Section 4.7 for a list of required documentation.

Table 14 details the application forms and documentation requirements for the two-step application process.

Table 14
Two-Step Application Process – Forms and Documentation Requirements

Step 1: Reservation Request
Completed Reservation Request Application with Original Signature on CSI program Contract
Proof of Electric Utility Service for Site
System Description Worksheet
Electrical System Sizing Documentation (new/expanded load only)
Certification of tax-exempt status and AB1407 compliance (Gov't and Nonprofit only)
Documentation of an Energy Efficiency Audit (if you have not met Title 24 or other exemptions)
Printout of EPBB Tool Calculation (www.csi-epbb.com) (for solar thermal a copy of the SOF chart marking the correct data point)
Copy of Executed Agreement of Solar System Purchase and Installation
Copy of Executed Alternative System Ownership Agreement (If System Owner is Different from Host Customer)
Copy of Application for Interconnection Agreement
Step 2: Reservation Confirmation and Claim
Complete Incentive Claim Form with Original Signatures
Proof of Authorization to Interconnect
Copy of Building Permit and Final Inspection sign-off
Proof of Warranty
Final Project Cost Breakdown Worksheet
Final Project Cost Affidavit

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4.1.2 Step # 1: Submit Reservation Request Application Package

Once the customer has decided to install a solar system and has an executed contract with their system installer, an Application (on-line or available at the Program Administrator's website) and Reservation Request Application Package are submitted in the first step of the application process.

The Reservation Request Form must have original signatures of Applicant and Host Customer and should be submitted with the following documentation:

1. Completed Reservation Request Application with Original Signature on CSI program Contract
2. Proof of Electric Utility Service for Site

3. System Description Worksheet
4. Electrical System Sizing Documentation (new/expanded load only)
5. Certification of tax-exempt status and AB1407 compliance (Gov't and Nonprofit only)
6. Documentation of an Energy Efficiency Audit (if you have not met Title 24 or other exemptions)
7. Printout of EPBB Tool Calculation (www.csi-epbb.com) (for solar thermal a copy of the SOF chart marking the correct data point)
8. Copy of Executed Agreement of Solar System Purchase and Installation
9. Copy of Executed Alternative System Ownership Agreement (If System Owner is Different from Host Customer)
10. Copy of Application for Interconnection Agreement

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Refer to Section 4.7 for more information on the above-referenced forms and documents.

Detailed instructions are included with the Reservation Request Form. Appendix C includes a blank copy of the Reservation Request Form and accompanying instructions. To obtain additional blank forms, download the forms on line from the Program Administrator's website.

The Host Customer and System Owner must sign the Reservation Request Form.

4.1.3 Incomplete Reservation Requests

If an application is found to require clarification, the Program Administrator will request additional information. Applicants have 20 calendar days to respond to the clarification request with the necessary information. If after 20 calendar days the Applicant has not submitted the requested information, the application will be canceled. Resubmitted application packages will be treated as new applications (i.e., all required documents must be resubmitted) and processed in sequence along with other new applications.

Incentive funds are not reserved until the Program Administrator receives all information and documentation required for the Reservation Request and the project is approved.

4.1.4 Approval of Reservation Request

Once received, the Program Administrator will review the application package for incompleteness and determine eligibility. Applications will also be screened to ensure that the project has not applied for incentives through other Program Administrators or other state- or government-sponsored incentive programs.

Once the Program Administrator approves the reservation request, the Program Administrator will issue a Confirmed Reservation Notice Letter that confirms that a specific incentive amount is reserved for the project. This confirmation notice will also include an Incentive Payment Claim Form.

The system must be purchased, installed, and put into operation by the Reservation Expiration Date (see Section 4.1.4.1 for length of reservation) as listed in the Confirmation Reservation Notice Letter. The Incentive Payment Claim Form will list the specific reservation dollar amount and the Reservation Expiration Date. For more information on the Incentive Claim Form package, refer to Section 4.7.

4.1.4.1 Reservation Period

Incentives can be reserved for up to 12 months for residential retrofit projects and commercial retrofit projects. Incentives can be reserved for up to 18 months for government, non-profits and public entities and also for new construction projects.

4.1.5 Step # 2: Submit Incentive Claim Form Package

After the solar system is purchased, installed, and put into operation, the Applicant should submit the Incentive Claim Form and the required supporting documentation.

The Incentive Claim Form Package must have original signatures of Applicant and Host Customer and should be submitted with the following documentation:

1. Incentive Claim Form with Original Signatures
2. Proof of Authorization to Interconnect
3. Copy of Building Permit and Final Inspection sign-off
4. Proof of Warranty
5. Final Project Cost Breakdown Worksheet
6. Final Project Cost Affidavit

For more detailed information on submitting the Incentive Claim Form package, refer to Section 4.7.3.

4.2 Non-Residential Projects (≥10 kW) and PBI Projects

This section describes the application process for all Non-Residential projects ≥10 kW for commercial and industrial, Government, Non-Profit, and Public Entities and for any project receiving payment under a PBI structure.

Please note that Non-Residential projects (≥10kW) may opt into the two-step process if they would like to, but are still subject to the eligibility requirements based on their system size and type. See section 4.1.1 for required timelines and paperwork.

The Applicant can expedite the three step process by providing the requisite information to the program administrators in two steps. Non-residential projects (≥10 kW) are still subject to the

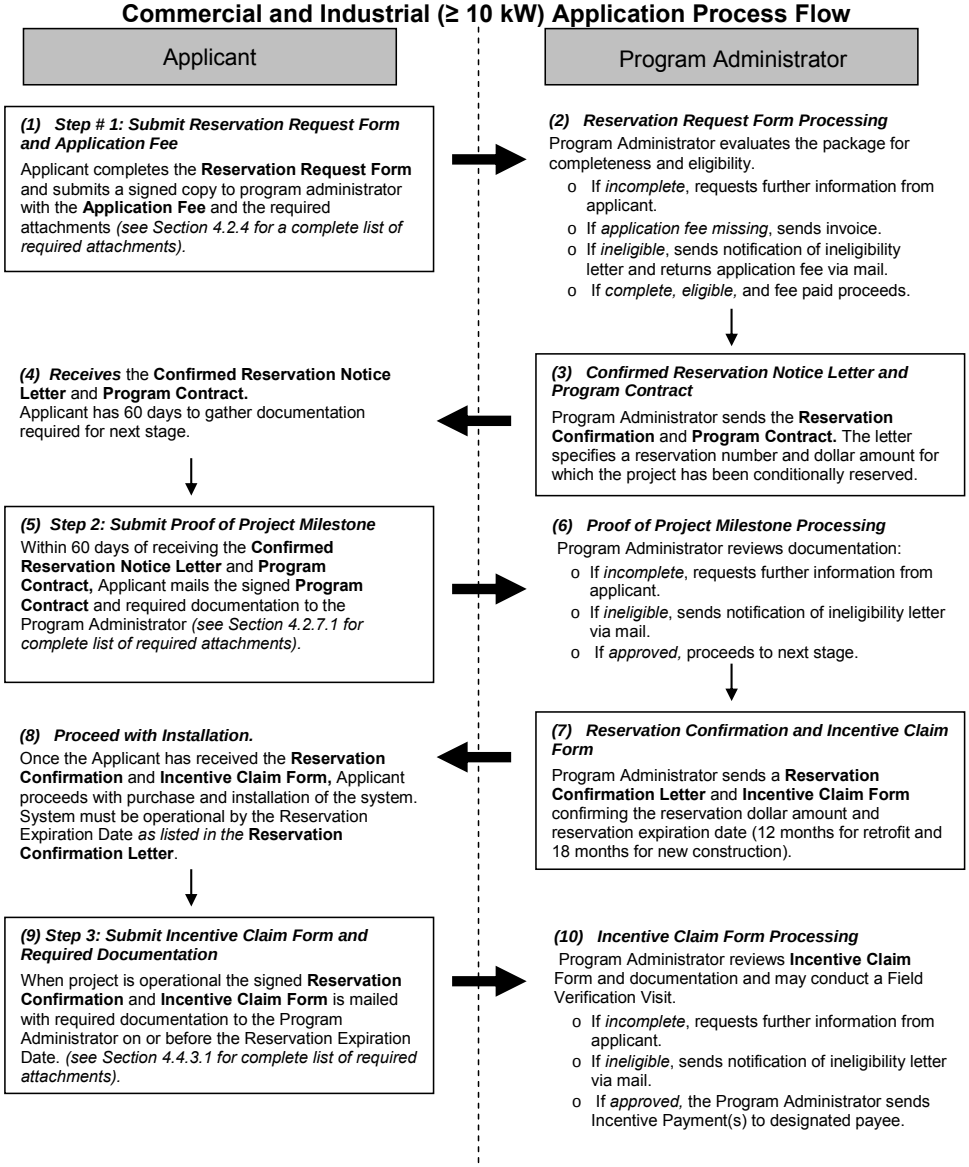
eligibility requirements based on their system size and type, including the submission of any required application fees. See section 4.2.3 for required timelines and paperwork.

The CSI program anticipates an on-line application tool to simplify the application process.

4.2.1 Application Process Flow Chart for Commercial Industrial Applicants (≥10 kW)

Figure 2 documents the application process for commercial and industrial customers.

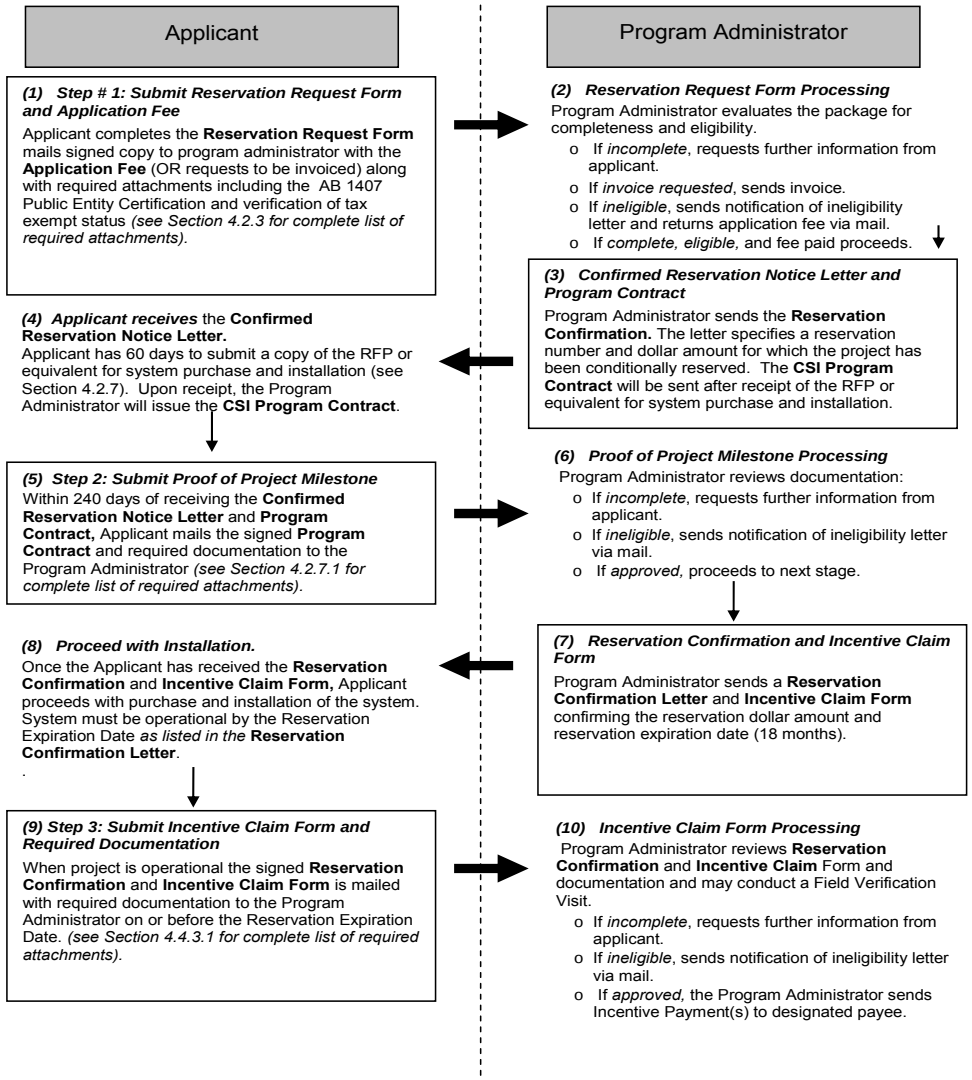
Figure 2
Commercial and Industrial (≥ 10 kW) Application Process Flow



4.2.2 Application Process Flow Chart for Government, Non-Profit, and Public Entities (≥10 kW)

Figure 3 documents the application process for Government, Non-Profit, and Public Entities.

Figure 3
Government, Non-Profit, and Public Entities (≥ 10 kW) Application Process Flow Chart



4.2.3 Three-Step Process for Non-Residential Applicants (≥ 10 kW)

There are three primary steps for Non-Residential Applicants with systems larger than or equal to 10 kW as follows:

1. Complete and submit the Reservation Application Package (on line or available at the Program Administrator's website) and Application fee
    a. See Section 4.2.5 for a list of supporting documentation required
2. Complete and submit the Proof of Project Milestone Package
    a. Refer to Section 4.7.2 for list of supporting documentation required
3. Complete and submit an Incentive Claim Form Package
    a. See Section 4.7.3 for list of supporting documentation required.

Table 15 details the application forms and documentation requirements for the three-step application process.

Please note that Non-Residential projects (≥10kW) may opt into the two-step process if they would like to, but are still subject to the eligibility requirements based on their system size and type. See section 4.1.1 for required timelines and paperwork.

The Applicant can expedite the three-step process by providing the requisite information to the program administrators in two steps. Non-residential projects (≥10 kW) are still subject to the eligibility requirements based on their system size and type, including the submission of any required application fees. See section 4.2.3 for required timelines and paperwork.

Table 15
Three-Step Application Process – Forms and Documentation Requirements

Step 1: Reservation Request
Completed Reservation Request Application with Original Signature
Proof of Electric Utility Service for Site
System Description Worksheet
Electrical System Sizing Documentation (new/expanded load only)
Application Fee (1% of Requested CSI Incentive)
Certification of tax-exempt status and AB1407 compliance (Gov't and Nonprofit only)
Documentation of an Energy Efficiency Audit (if you have not met Title 24 or other exemptions)
Printout of EPBB Tool Calculation (www.csi-epbb.com) (for solar thermal a copy of the SOF chart marking the correct data point)
Step 2: Proof of Project Milestone
Completed Proof of Project Milestone Checklist
Host Customer Certificate of Insurance
System Owner Certificate of Insurance (if different than Host Customer)
Copy of Completed Interconnection Application
Copy of executed contract for system purchase and installation
Copy of executed alternative System Ownership agreement (if System Owner is different than Host Customer)
Project Cost Breakdown Worksheet
Revised System Sizing Calculations (If applicable)
Revised Incentive Calculation Worksheet (If applicable)
CSI Program Contract with Original Signature
Copy of RFP or solicitation (Government, Non-profit, and Public Entities only)
Step 3: Incentive Form Package
Complete Incentive Claim Form with Original Signatures
Proof of Authorization to Interconnect
Copy of Building Permit and Final Inspection sign-off
Proof of Warranty
Final Project Cost Breakdown Worksheet
Final Project Cost Affidavit

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4.2.4 Step # 1: Request to Reserve Funding

This subsection applies to all Non-Residential Applicants with solar systems larger than or equal to 10 kW, regardless of whether the Applicant is a private or public entity. To reserve a specified incentive amount, Applicants must submit the Reservation Request Form, Application Fee, and all required documentation attachments. The Reservation Request Form and instructions can be downloaded from the local Program Administrator's website.

Section 12 includes a blank copy of the Reservation Request Form and accompanying instructions. The System Owner and Host Customer must always sign the Reservation Request Application. In addition, all Applicants applying for incentives must provide the following:

1. Completed Reservation Request Application with Original Signature
2. Proof of Electric Utility Service for Site
3. System Description Worksheet
4. Electrical System Sizing Documentation (new/expanded load only)
5. Application Fee (1% of Requested CSI Incentive)
6. Certification of tax-exempt status and AB1407 compliance (Gov't and Nonprofit only)
7. Documentation of an Energy Efficiency Audit (if you have not met Title 24 or other exemptions)
8. Printout of EPBB Tool Calculation (www.csi-epbb.com) (for solar thermal a copy of the SOF chart marking the correct data point)

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For more information on the above referenced forms and documents, go to Section 4.7.

4.2.5 Application Fee Process

In addition to the Reservation Request Form and Required Attachments, Applicants will also be required to submit an application fee. Applicants with projects that are residential, or less than 10 kW, need not pay an application fee.

The application fee is 1 percent of the unadjusted requested CSI program incentive amount. Application fees will be rounded to the nearest dollar amount. The formula for the EPBB or PBI fee is as follows:

Application Fee = (System Size Rating x current applicable/equivalent EPBB incentive rate) x 1%

- Applicants may submit the application fee with the Reservation Request Application with original signatures. If the application fee is not received with the Reservation Request Application, the Program Administrators will invoice the Host Customer (utility customer of record) after review of the Reservation Request Application package.
- The Host Customer will have 30 days to submit payment for the application fee in order to activate the Reservation Request. The payment must reference the project (by invoice number, facility address, and/or application number).
- Program Administrators will accept payments from either the Applicant or a third party on behalf of the Host Customer for a particular project; however, a returned application fee shall only be paid to the Host Customer.
- Program Administrators will only accept application fees in the form of a check. Cash, credit cards, money orders, promissory notes, etc. will not be accepted.
- Application fees will be linked to reservation numbers, not to the project sites; therefore, the project must be completed under the same reservation number as the one linked to the application fee.
- Upon verification of the installed CSI project and initial incentive payment, the application fee will be returned in full to the Host Customer.

- No interest shall be paid on application fees.

4.2.5.1 Failure to Submit Application Fee

- Returned checks will result in the Program Administrator rejecting the Reservation Request Application.
- Failure to submit payment within 30 days will result in the cancellation of the Reservation Request Application.

4.2.5.2 Return of Application Fee

- If upon eligibility screening the project does not qualify for the CSI program, the application fee will be returned in full to the Host Customer.
- If a project that has received an Incentive Claim Form from the Program Administrator is withdrawn due to extenuating circumstances beyond the Applicant's control, the application fee may be returned pending discussion and agreement of the Program Administrators. This will be determined on a case-by-case basis.

4.2.5.3 Forfeit of Application Fee

- Once a confirmed reservation is granted and the project is cancelled or withdrawn by the Applicant and/or Host Customer, the application fee will be forfeited.
- Once a confirmed reservation is granted and the Program Administrator rejects the project for failing to meet adequate proof of project milestone or reservation expiration date requirements, the application fee will be forfeited.
- If a project reservation is allowed to lapse and the project is later built under a new reservation, the application fee for the previous reservation will be forfeited.

All forfeited application fees will be re-allocated to the Program Administrator's incentive budget.

4.2.5.4 Effect of Change of System Change on Application Fee

- If a confirmed reservation is granted and the incentive level has been reduced (due to Commission directive, moving to the next step , etc.), the Applicant and Host Customer will be notified and given 20 calendar days to submit in writing a request to withdraw their reservation request without losing their application fee. Upon receipt of a request to withdraw, the application fee shall be returned to the Host Customer. If the Applicant fails to withdraw the reservation request within 20 calendar days, the application will be processed at the new, lower incentive level. If the application is not withdrawn within the 20-day period, the Applicant will forfeit the application fee if it subsequently withdraws or fails to pursue its project.

- Application fees will be retained until the completion of the proposed CSI project and will not be adjusted downward due to changes in system size or incentive amount.

4.2.6 Approval of Reservation Request

Once received, the Program Administrator will review the application package for completeness and determine eligibility. Applications will also be screened to ensure that the project has not applied for incentives through other Program Administrators or other state- or government-sponsored incentive programs.

4.2.6.1 Incomplete Reservation Requests

Incentive funds are not reserved until the Program Administrator receives all information and documentation required for the Reservation Request Form Package, the application fee and the project is approved.

If an application is found to require clarification, the Program Administrator will request the information necessary to process that application further. Applicants have 20 calendar days to respond to the requested clarification with the necessary information. If after 20 calendar days, the Applicant has not submitted the requested information the applications will be canceled. Application packages that are resubmitted after such a cancellation will be treated as a new application (i.e., all required documents must be resubmitted) and processed in sequence along with other new applications.

4.2.6.2 Approval of Reservation Request

Once a Reservation Request Form package is determined to be complete and eligible, the Program Administrator will reserve a specific dollar amount for a specified system size. The Program Administrator will send a Confirmed Reservation Notice Letter to the Applicant.

The Confirmed Reservation Notice Letter documents that a specific incentive amount has been reserved for a project. The letter will list, at a minimum, the approved incentive amount and the date that the Proof of Project Milestone package must be submitted. The Confirmed Reservation Notice Letter also will list the required information that Applicants must submit by the Proof of Project Milestone.

Once the application documentation has successfully fulfilled the Proof of Project Milestone documentation, the Program Administrator will issue an Incentive Claim Form with a Reservation Expiration Date of 12 months for commercial retrofit projects, 18 months for commercial new construction projects, and 18 months for Governmental, Non-Profit, and Public Entities from the date of the initial Confirmed Reservation Notice Letter.

Refer to Section 4.2.7 for more information on the Proof of Project Milestone requirements.

4.2.6.3 Reservation Period

The initial reservation is valid only until the Proof of Project Milestone Date. The Proof of Project Milestone Date will be 60 calendar days after the date of the Confirmed Reservation Notice Letter for residential and commercial projects. Within noted calendar days of the date the Confirmed Reservation Letter, the Applicant must submit to their Program Administrator the Proof of Project Milestone package. All project advancement criteria, including returning a signed CSI program contract, must be satisfied. Once the Applicant has sufficiently demonstrated that the project is advancing, the Program Administrator will issue an Incentive Claim Form. The Applicant will have 12 months to complete the project from the date that the Confirmed Reservation Notice Letter is issued for retrofit projects and 18 months for new construction projects.

4.2.6.4 Reservation Period for Government, Non-Profit and Public Entity Projects

The initial reservation is only valid for until the Proof of Project Milestone date. Within 60 days after the Confirmed Reservation Notice letter, Government, Non-Profit and public entities must turn in the Proof of Project Milestone checklist and a copy of the RFP or other solicitation for the installation of the project. Then, Government, Non-Profit, and Public Entities will have an additional 180 days to provide the entire Proof of Project Milestone package. All project advancement criteria, including returning a signed CSI program contract, must be satisfied. Once the Applicant has sufficiently demonstrated that the project is advancing, the Program Administrator will issue an Incentive Claim Form. The Applicant will have 18 months to complete the project from the date that the Confirmed Reservation Notice Letter is issued.

4.2.7 Step # 2: Submit Proof of Project Milestone Package

Within 60 calendar days (240 days for Governmental entities) of the date on the Confirmed Reservation Letter, the Proof of Project Milestone package with all supporting documentation must be submitted to demonstrate to the Program Administrator that the project is progressing and that there is a sustained commitment to complete the project within the allowed timeline. The specific requirements by sector are as follows:

- Non-Residential projects greater than or equal to 10 kW and projects that are receiving a PBI payment within 60 days of the Confirmed Reservation Notice Letter must submit a Proof of Project Milestone package, including all required documentation.
- Government, Non-profit, and Public Entities, within 60 calendar days of the date of the Confirmed Reservation Letter, must submit a copy of the issued request for proposal (RFP or equivalent) for purchase or installation of the solar system. Within 240 calendar days of the date of the Confirmed Reservation Letter, they must satisfy all proof of project milestone criteria, including all required documentation.

Once the Applicant has successfully met Proof of Project Milestone requirements, the Program Administrator will issue an Incentive Claim Form with a Reservation Expiration Date of 12 months from the date of the initial Confirmed Reservation Notice Letter for commercial retrofit projects, 18 months for commercial new construction projects, and 18 months from the date of the initial Confirmed Reservation Notice Letter for Governmental, Non-Profit, and Public Entities.

4.2.7.1 Required Attachments to Demonstrate Project Milestone

The following documentation must be submitted on or before the Proof of Project Milestone date indicated in the Confirmed Reservation Letter.

1. Completed Proof of Project Milestone Checklist
2. Host Customer Certificate of Insurance (if system greater than or equal to 30 kW)
3. System Owner Certificate of Insurance (if system greater than or equal to 30 kW)
4. Copy of Completed Interconnection Application
5. Evidence of Executed Agreement of System Purchase and Installation
6. Copy of Executed Alternative System Ownership Agreement (if System Owner is different than Host Customer)
7. Project Cost Breakdown Worksheet
8. Revised Electric System Sizing Calculations (if applicable)
9. Revised Incentive Calculation Worksheet and EPBB Documentation (if applicable).
10. CSI Program Contract with original signatures
11. Copy of RFP or Solicitation (Government, Non-Profit, and Public Entities only)

For more information on the above-referenced forms, go to Section 4.7.

4.2.7.2 Incomplete Proof of Project Milestone

If submitted Proof of Project Milestone documentation is received by the Proof of Project Milestone Date but requires clarification, the Program Administrator will request the information necessary to process that application further. Applicants have 20 calendar days to respond with the necessary information. If, after 20 calendar days, the Applicant has not submitted the requested information, the applications will be canceled.

4.2.7.3 Proof of Project Milestone Extensions

In general, no extensions to the Proof of Project Milestone date are permitted.

4.2.7.4 Submitting Proof of Project Milestone

Once the Proof of Project Milestone package is complete and all the required attachments are secured, Applicants must submit their application package to the Program Administrator for review. To ensure confirmation of receipt, it is recommended that documentation is to be

delivered to the appropriate Program Administrator by certified or overnight mail. No faxes or hand deliveries will be accepted.

4.2.7.5 Approval of Proof of Project Milestone

Once Applicants have successfully met the Proof of Project Milestones requirements, the Program Administrator will issue an Incentive Claim Form. This form will list the specific reservation dollar amount and the Reservation Expiration Date. Upon project completion and prior to the Reservation Expiration Date, Applicants must submit a completed Incentive Claim Form along with all of the necessary documentation to request an incentive payment.

For more information on how to submit an Incentive Claim, refer to Section 4.4.3.

4.2.8 Step # 3: Submit Incentive Claim Form Package

Refer to Section 4.7.3 for more information about the requirements associated with submitting the Incentive Claim Form package.

4.3 Changes to Reservations

4.3.1 Extending the Reservation Expiration Date

A request to extend the Reservation Expiration Date is limited to a maximum of 180 calendar days of additional time. Any request must include a written explanation of why the extension is required and how much additional time is needed. Approval of a request for a change in Reservation Expiration Date will not change or modify any other reservation condition. Failure to submit the Incentive Claim Form package by the original or extended Reservation Expiration Date will result in a cancellation of the application. The Applicant should submit a time extension in writing to the Program Administrators. In describing the reason for the time extension request, the Applicant should provide information on the following to aid the Program Administrators in their decision to grant an extension:

1. Circumstances were beyond the control of the reservation holder that prevented the system from being installed as described in the reservation request. Describe the need and reasons for the request.
2. If there was a problem in the permitting process and it was the cause of delay, provide documentation, such as any correspondence with the building department, to support this explanation.
3. Cost documentation must demonstrate that the system purchaser has incurred at least 50 percent of the reserved system's total purchase price. However, in cases where this amount exceeds the purchaser's contribution then the purchaser may still retain 10 percent of the total system cost and meet this cost documentation requirement. Attach copies of paid invoices, checks or other verifying documentation to the Request for Project Extension Form.
4. Documentation of any equipment installed at the site.

In order for any project to receive an extension, the Applicant must show documentation of a purchase order or commitment from a PV panel manufacturer to supply the necessary equipment.

The Program Administrator reserves the right to perform a Site inspection to verify the status of the project installation prior to granting the request for extension. If required, the Program Administrator shall notify the Applicant and schedule the Site visit within 10 days of notification.

4.4 Incentive Payment Process

Once a system is completed, Applicants may request payment of the incentive amount listed on their Incentive Payment Claim Form. A project is considered completed when it is completely installed, interconnected, permitted, paid for, and capable of producing electricity in the manner and in the amounts for which it was designed.

To receive the incentive, all CSI program requirements must be met and a complete Incentive Claim Form package is submitted prior to the Reservation Expiration Date.

The Program Administrator reserves the right to withhold final incentive payment pending review and approval of the incentive claim documentation and field inspection results if that project is determined to require a field inspection.

4.4.1 Requesting an Incentive Payment

After an eligible solar system is completed, Applicants may request payment of the incentive amount listed on their Incentive Claim Form. Payment will be disbursed once the Program Administrator verifies that the solar system is completed and meets all the eligibility requirements of the CSI.

To request an incentive payment, the Applicant completes and submits the Incentive Claim Form. Both Host Customer and System Owner must sign the Claim Form.

Please note that no incentive payment will be made until the Program Administrator has inspected and found that the system is operational and interconnected if that project is determined to require a field inspection. For further information regarding field inspections, refer to Section 4.6.

The completed Incentive Claim Form must be submitted to the Program Administrator on or before the Reservation Expiration Date, together with all required attachments described below.

4.4.2 Assignment of Incentive Payment to Third Party

The designated payee of the incentive payment may assign his or her right to receive the payment to a third party by completing the Payment Assignment Form and submitting it with the Incentive Payment Claim Form. The Payment Assignment Form may not be submitted by fax as original signatures are required to process the assignment.

4.4.3 Incentive Payment Claim Form Package

The Applicant must submit the Incentive Claim Form package, complete with all required attachments, to the Program Administrator prior to the Reservation Expiration Date. The Host Customer and System Owner must read, sign, and date the Incentive Payment Claim Form. This form must be returned to the Program Administrator by mail, as original signatures are required to process a payment.

4.4.3.1 Required Documents for Incentive Claim Form Package

In addition to the completed Incentive Claim Form, Applicants must submit the following documents when requesting an incentive payment:

1. Incentive Claim Form with Original Signatures
2. Proof of Authorization to Interconnect
3. Copy of Building Permit and Final Inspection sign-off
4. Proof of Warranty
5. Final Project Cost Breakdown Worksheet
6. Final Project Cost Affidavit

For more information on the above-referenced forms, go to Section 4.7.

4.4.4 Submitting an Incentive Claim Form Package

Once the Incentive Claim Form package is complete and all the required attachments are secured, Applicants must submit their application package to the Program Administrator for review. To ensure confirmation of receipt, it is recommended that documentation be delivered to the appropriate Program Administrator by certified or overnight mail. No faxes or hand deliveries will be accepted.

Applicants are advised to keep a copy of the Incentive Claim Form package along with all required documentation for their records.

4.4.4.1 Incomplete Incentive Claim Form Packages

If an incentive claim form package is incomplete or is found to require clarification, the Program Administrator will request the information necessary to process that application further. Applicants have 20 calendar days to respond to the requested clarification with the necessary information.

If after 20 calendar days, the Applicant has not submitted the requested information, the request for payment may be denied.

If an Incentive Claim Form package is not received by the expiration date of the Incentive Claim Form, or the Incentive Claim Form package indicates that the project is otherwise ineligible, the Program Administrator will send a written notice stating the reasons why the project is ineligible and the project will be rejected. If this is the case, the Applicant or Host Customer may reapply

for a incentive reservation but will be subject to the eligibility requirements, incentive levels, and funding available at that time of reapplication.

4.4.5 Incentive Check Payment and Terms

Upon final approval of the incentive claim form documentation and completed field verification visit, the Program Administrator will issue the incentive in approximately 30 days for EPBB incentive payments. For PBI payments, the Program Administrator will issue the first incentive payment within 30 days of the first scheduled performance output meter read. Payment will be made to the Host Customer or a third party (as designated), as indicated on the Incentive Claim Form, and will be mailed to the address provided. As the reservation holder, the Host Customer may assign payment to a third party by submitting a completed payment assignment form to the Program Administrator with the Incentive Claim Form. A payment assignment form can be requested from the Program Administrator or downloaded from the Program Administrator website.

4.4.5.1 Expected Performance Based Buydown (EPBB) Incentive Payment Terms

Most residential systems will receive an EPBB incentive. The EPBB incentive will be a one-time lump sum payment to help reduce the cost of installing a residential solar system. Upon final approval of the incentive claim form package and completed field inspection visit, if applicable, the Program Administrator will issue the incentive in approximately 30 days.

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The EPBB payment shall be calculated according to Section 3.2 and noted on the Incentive Claim Form, provided no adjustments to the system size or estimated output are warranted after system inspection.

Please review Section 4.5 for system size changes affecting the incentive amount.

The lump sum EPBB incentive payment issued constitutes final and complete payment.

4.4.5.2 Performance Based Incentive Payment Terms

Incentives for systems equal to or greater than 100 kW, building integrated PV systems, or systems less than 100 kW who elect to opt in, will receive the performance based incentive (PBI) payments. PBI will be paid based on the actual kWh output of the system.

PBI payments will be made monthly and paid out over a 5-year period. The monthly PBI payment shall be calculated as follows:

Solar Electric Monthly PBI Incentive Payment = Reserved Incentive Rate x Measured kWh Output[29]

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Solar Thermal Monthly PBI Incentive Payment = Reserved Incentive Rate x Measured kWh-equivalent displacement.

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29 Because the CSI Program and statutes only allow for customers to receive incentives up to the first MW, PBI payments for energy output on systems larger than 1 MW will be prorated based on the ratio of 1 MW to the entire size of the site. See Section 3.3 for further detail.

Upon final approval of the incentive claim form documentation and completed field verification visit, if applicable, the Program Administrator will issue the first PBI incentive payment approximately 30 days after the first scheduled performance output meter read. PBI payments will continue to be paid on a monthly basis for the next 60 months (5 years).

Payments will be made to the Applicant, Host Customer, or a third party (as designated), as indicated on the Incentive Payment Claim Form. At the discretion of Program Administrators, payments may either be mailed to the address provided or paid via credits on the utility bill. The Host Customer may assign payment to a third party by submitting a completed payment assignment form to the Program Administrator with the Incentive Claim Form. A payment assignment form can be requested from the Program Administrator or downloaded from the Program Administrator's website.

If a monthly payment is determined to be incorrect due to a faulty meter read, the correction will be made in the next available payment period.

If a Host Customer moves during the 5-year period, they must notify the Program Administrator, who may make subsequent adjustments to the CSI program.

The 60th monthly PBI incentive payment constitutes final and complete payment.

4.5 System Changes Affecting Incentive Amount

The Program Administrator will expect a system to be installed as described in the Reservation Request Form. However, it is recognized that changes may occur during installation and that changes may be necessary in some circumstances.

If the installed system is smaller in output than specified in the Reservation Request Form or subsequent updates, the incentive amount will be calculated using the installed system size. If the installed system is larger than that originally in the Reservation Request Form or subsequent updates, the incentive will be recalculated based upon the installed system size, with the incremental addition to the system receiving the current level of incentive. If the size of the increase moves the system from the EPBB structure to the PBI structure, the entire system will receive the PBI based upon the current incentive level.

If the increase in size occurs after the expiration date of the Confirmed Reservation, the incremental addition will be considered a new project and must submit a Reservation Request with its required documentation.

If the entire available budget for a Program Administrator is reserved for other projects and there is no available funding, the Program Administrator cannot increase the reserved incentive amount.

Please also review Section 3.2 pending language that describes the application process should the calculator change.

4.6 Field Inspection

4.6.1 Field Inspections

Program Administrators will conduct field inspection visits on a statistically reasonable random sample of projects less than 30 kW. Upon receipt of a complete Incentive Payment Claim Form package, the Applicant's project may be randomly selected for a field inspection visit to verify that the system is installed as represented in the application, is operational, is interconnected and conforms to the eligibility criteria of the CSI program. All projects between 30 kW and 100 kW in system size are required to receive a field inspection to verify the accuracy of system data submitted in the original CSI program incentive application. Projects equal to or over 100 kW, or who have opted into PBI, may also be randomly selected for field verification visits.

If randomly selected or required, the field inspection visit will be scheduled within 15 calendar days of receipt of the completed Incentive Claim Form package. Field inspections will be conducted concurrent with review and approval of the incentive payment. Incentive payments will be contingent on the field inspection visit and may be adjusted depending on the results of the field inspection.

4.6.2 Trained Inspectors

Field inspections shall be performed by trained personnel certified to perform CSI program system inspections. The Program Administrators will develop and submit a consistent statewide site inspectors training plan to the CPUC Energy Division by January 2007.

4.6.3 Failed Field Inspection

If the field inspection determines that the installed system varies from the documentation, it will result in a failed field inspection. If a system fails a field inspection, the Program Administrator will notify the Applicant, Host Customer, and System Owner with the reasons for the field inspection failure.

Please refer to Section 2.10.1 for more information regarding situations that constitute a failure.

4.7 Application Forms and Documentation

The following section discusses each of the forms and documentation requirements listed in the subsections above. Refer to the subsection describing the process for your application type to determine which of the following documents are required for your situation.

4.7.1 Reservation Request Package and Required Documentation

4.7.1.1 Reservation Request Application Form with Original Signature

To reserve a specified incentive amount, a Reservation Request Form must be submitted with all required documentation attached. All forms are available from the Program Administrators' website. The seller, installer, and any other third party providing service related to a system

installation should be identified on the application form, together with a description of the generation site, equipment information and project incentive calculation. Reservation Request Forms for projects that are residential or less than 10 kW will include the CSI Contract.

4.7.1.2 Proof of Electric Utility Service for the Site

Eligibility requirements restrict participation in the CSI program to customers who are located in PG&E, SCE, or SDG&E service territories and physically connected to the electric utility transmission and distribution system. All applications must include a copy of a recent electric utility bill that shows the service address of the installation Site, the name of the Host Customer, and electric energy usage for the Site. All pages of a utility bill should be submitted to ensure that this information is provided. The utility bill should be no older than 6 months from the date of application. For new construction, the Applicant must receive confirmation from the serving utility.

4.7.1.3 System Description Worksheet

All Applicants are required to complete and submit a System Description Worksheet.

4.7.1.4 Electrical System Sizing Documentation (New or expanded load only)

To confirm that participating distributed generation systems will not exceed the capacity of the Host Customer's previous 12-month historical usage, all Applicants for projects at new construction must submit a copy of the data and calculations used to determine electrical system size. Please refer to Section 2.2.3 for more details.

4.7.1.5 Application Fee

The application fee is 1 percent of the unadjusted requested CSI program incentive amount. Application fees will be rounded to the nearest dollar amount. The formula for the EPBB or PBI fee is as follows:

Application Fee = (System Size Rating x current applicable/equivalent EPBB incentive rate) x 1%

4.7.1.6 Documentation of an Energy Efficiency Audit (for non-exempted applicants)

See Section 2.3 for more information about energy efficiency audits.

4.7.1.7 Printout of EPBB Tool Calculation

The EPBB Tool calculates the CSI EPBB design factor in order to determine the CSI system size. Printouts of EPBB Tool Calculation can be obtained from www.csi-epbb.com. Not required for solar thermal projects. Instead a copy of the SOF chart and marked data point.

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4.7.1.8 Additional Requirements for Residential and Small Non-Residential Projects (< 10 kW)

4.7.1.8.1 Copy of Executed Agreement of Solar System Purchase and Installation

For residential and small Non-Residential (<10 kW) applications, the Applicant must submit a copy of an executed agreement to purchase and install the solar system at the time of submitting the Reservation Request Application Form.

4.7.1.8.2 Copy of Executed Alternative System Ownership Agreement (If System Owner is Different from Host Customer)

4.7.1.8.3 For residential and small Non-residential (<10 kW) applications, if the system owner is not the host customer, applicant must submit a copy of Executed Alternative System Ownership agreement with the Reservation Request Form.

4.7.1.8.4 Copy of Application for Interconnection Agreement

For residential and small Non-Residential (<10 kW) projects, Applicants must submit a copy of the Application for Interconnection to the local utility grid. This final Interconnection Agreement will be a legal contract between the Host Customer and the electric utility. Because the power from the solar system housed on the Host Customer's Site will likely be exported to the grid, it is critical that the utility be confident that the system is operating safely and in parallel with the grid, which helps to assure the safety and reliability of the electric distribution and transmission system.

4.7.1.9 Additional Requirements for Government and Non-profit projects

4.7.1.9.1 Certification of tax-exempt status and AB1407 compliance

Any Government and Non-Profit entities must include a certification under penalty of perjury from their chief financial officer or equivalent that they are a Government or Non-Profit entity and that the system is not receiving, and will not in the future receive, federal tax benefits through financial arrangements (i.e., the System Owner if a third-party, which will be receiving tax benefits from the system). This certification must be renewed annually if receiving PBI payments.

Additionally, any public entity applying for CSI program incentives must certify that it has voided any existing law, under its authority, that prohibits or restricts the installation or use of a solar energy system in accordance with the requirements set forth in AB 1407.

4.7.2 Proof of Project Milestone Package (for Projects on a Three-Step Process)

4.7.2.1 Completed Proof of Project Milestone Checklist

All Proof of Project Milestone submittals must be accompanied by a completed and signed checklist.

4.7.2.2 Host Customer Certificate of Insurance

For systems greater than or equal to 30 kW, all Applicants must provide Host Customer proof of insurance in accordance with the CSI Program Contract. Section 2.6 provides details on the minimum insurance requirements.

4.7.2.3 System Owner Certificate of Insurance (if different than Host Customer)

For systems greater than or equal to 30 kW, all Applicants must provide System Owner proof of insurance (if different than Host Customer) in accordance with Section 2.6's details on the minimum insurance requirements.

4.7.2.4 Copy of Completed Interconnection Application

Customers must submit a copy of the Application for Interconnection to the local utility grid. This final Interconnection Agreement will be a legal contract between the Host Customer and the electric utility. Because the power from the solar system housed on the Host Customer's Site will likely be exported to the grid, it is critical that the utility be confident that the system is operating safely and in parallel with the grid, which helps to ensure the safety and reliability of the electric distribution and transmission system.

4.7.2.5 Copy of Executed Contract for System Purchase and Installation

Applicants must submit a copy of executed contract for purchase and installation of the system, and/or alternative System Ownership agreement. Agreements must be legally binding and clearly spell out the scope of work, terms, price, solar system components to be installed. Agreements must be signed by appropriate parties (supplier/installer, Host Customer, Applicant and/or System Owner).

In the case of alternate System Ownership arrangements, the System Owner must provide a copy of their agreement(s) to purchase and install a system.

The Applicant must provide copies of executed purchase and/or installation agreements with the Reservation Request, and the information must be internally consistent and must be consistent with the Reservation Form. Agreements for the purchase of a system or system equipment must be in writing and must include, at a minimum, the following information:

- The quantity, make and model number (as shown on the Energy Commission lists of eligible equipment) for the PV modules, inverters, and system performance meters
- The total purchase price of the system before applying the incentive
- Language indicating the purchaser's commitment to buy the system
- Printed names and signatures of the purchaser and equipment seller's authorized representative.

Installation contracts must comply with the Contractors State License Board (CSLB) requirements. In addition, these contracts must contain the following information:

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

Please refer to the CSLB website for more information on CSLB guidelines at www.cslb.ca.gov.

Entities without a valid A, B, C-10 or C-46 contractor's license may not offer installation services or charge for installation in any agreement.

The above requirements are sufficient evidence of an agreement to purchase and install a system for cases where a contractor sells and installs the system.

4.7.2.6 Project Cost Breakdown Worksheet

All Applicants, including for turnkey and lease projects, must submit a breakdown of known and estimated project cost. For a list of total eligible project cost elements to be reported, see Appendix A. Applicants are required to use the Project Cost Breakdown worksheet (spreadsheet), available from the Program Administrator's website or by e-mail request. The Program Administrator reserves the right to revise Confirmed Reservation amount pending a review and approval of total eligible project cost and incentive amounts applied for or received.

4.7.2.7 Revised Electric System Sizing Calculations (If applicable)

When applicable, the Applicant must submit a thorough description of any changes that have occurred in the system design affecting size or incentive amount subsequent to the initial application submittal.

4.7.2.8 Revised Incentive Calculation Worksheet (If applicable)

When applicable, all Applicants are required to complete and submit a revised Incentive Calculation Worksheet if system or project changes have resulted in a change to the incentive

amount. The Incentive Calculation Worksheet calculates the incentive and adjusts for other incentives and project cost.

4.7.2.9 CSI Program Contract with Original Signature

All Proof of Project Milestone submittals for non-residential systems 10 kW or greater must include an executed CSI Program Contract with original signatures. The Host Customer and System Owner must sign the CSI Program Contract.

4.7.2.10 Copy of RFP or solicitation (Government, Non-profit, and Public Entities only)

Within 60 days after the Confirmed Reservation Notice letter, Government, Non-Profit, and Public Entities must submit a copy of the RFP, Notice to Invite Bids, or similar solicitation issued for the installation, lease, and/or purchase of the system proposed for the project. The RFP must include sufficient documentation details including the scope of work, schedule, terms, budget, and system components to be installed.

For Government, Non-Profit, and Public Entities not issuing an RFP for the project, all Proof of Project Milestone documentation listed in Section 4.7.2 must be submitted within Proof of Project Milestone Date.

4.7.3 Incentive Claim Form Package

4.7.3.1 Complete Incentive Claim Form with Original Signatures

A completed Incentive Claim Form must be submitted. It must be read, completed, and signed by both the Host Customer and System Owner (if different). The installer's name, telephone number and contractor license number must be included with the completed Incentive Claim Form. It must be confirmed on-site and requires original signatures from the CSI approved listed Seller/Installer confirming the as-built quantity and model numbers of inverters, meters, and modules, as well as tilt, orientation, shading, etc. as required for final calculation of the EPBB rebate. Only applications with original signatures on a single form will be accepted. Any changes in the system upon completion of the project must include supporting documentation and a recalculated incentive.

4.7.3.2 Proof of Authorization to Interconnect and Final Interconnection Agreement

For solar electric systems, the Applicant must demonstrate that the system is interconnected to the utility distribution grid and that the utility has approved this interconnection for the system's operation at the Site of installation. The Applicant must demonstrate this by submitting a copy of the signed letter from their electric utility granting the permission to interconnect and operate in parallel with the local grid. A copy of the final interconnection agreement must also be submitted.

Note that solar thermal systems do not require proof of authorization to interconnect.

For questions on the interconnection process, see Section 5.1.

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4.7.3.3 Copy of Building Permit and Final Inspection Sign Off

A copy of the final building inspection report must be submitted to demonstrate that the project meets all codes and standards of the permitting jurisdiction. The name and address on the final building permit and final inspection signoff must match the name and address shown on the Incentive Payment Claim Form.

Contact your local permitting jurisdiction to learn about permitting requirements.

Note, that if a home does not have a Permit of Occupancy at the time of application, the application will be returned to the applicant for submission to the Energy Commission's New Solar Homes Partnership.

4.7.3.4 Proof of Warranty

A Proof of Warranty Form, providing evidence of a 10-year warranty on system installation must be completed and signed by the appropriate party(ies) and given to the System Owner. See Section 2.4 for details.

4.7.3.5 Final Project Cost Breakdown Worksheet

A final project cost breakdown worksheet must be submitted substantiating the claimed eligible project cost. The Program Administrator reserves the right to withhold final incentive payment pending review and approval of project cost and receipt of supporting documentation. For a list of total eligible project costs, see Appendix A. The Program Administrator reserves the right to periodically audit Applicant's and Host Customer's records, see the CSI program contract.

4.7.3.6 Final Project Cost Affidavit

An affidavit signed by the System Owner or purchaser of the system (if other than the System Owner) must be submitted substantiating that the claimed eligible project cost is correct and has been paid in full.

5. Other Installation Requirements and Continuing Site Access Requirements

5.1 Connection to the Utility Distribution System

All solar electric systems receiving incentives under the California Solar Initiative (CSI) program must be connected to the local electric utility's distribution system. The interconnection, operation, and metering requirements for solar systems shall be in accordance with the local electric utility rules for customer generating facility interconnections. To connect a solar system to the utility distribution system, Host Customers, and/or System Owners will be required to execute certain documents such as, but not limited to, an Application to Interconnect a Generating Facility and a Generating Facility Interconnection Agreement or Net Energy Metering Agreement with the local electric utility.

A copy of Generating Facility Interconnection Agreement or Net Energy Metering Agreement also must be submitted with the utility's written letter authorizing parallel operation to the Program Administrator prior to the reservation expiration date.

Applicants, Host Customers, and System Owners are solely responsible to submit interconnection applications to the appropriate electric utility interconnection department as soon as the information to do so is available to prevent any delays in system parallel operation.

5.1.1 How to Apply For Interconnection of CSI Projects

For more information on electric grid interconnections, please contact your local utility (investor-owned utilities are listed below). It is the sole responsibility of the CSI program System Owner and Host Customer to seek and obtain approval to interconnect the solar electric system to a utility's electric distribution system. System Owners and Host Customers participating in the CSI program should immediately contact the utility to seek guidance on how to apply for interconnection. Contact information is listed below.

5.1.1.1 Pacific Gas & Electric (PG&E)

Website: www.pge.com/gen
Email: gen@pge.com
Phone: (415) 972-5676 (PG&E Generation Interconnection Hotline)

5.1.1.2 San Diego Gas & Electric (SDG&E)

Website: www.sdge.com/business/self_generation.shtml

Contact information for photovoltaics and wind systems:	
Net Metering Team San Diego Gas & Electric PO Box 129831, CP52F San Diego, CA 92123-9749 Phone: (858) 636-5585 Email: netmetering@semprautilities.com	**Ken Parks** San Diego Gas & Electric PO Box 129831, CP52F San Diego, CA 92123-9749 Phone: (858) 636-5581 Email: kparks@semprautilities.com

5.1.1.3 Southern California Edison (SCE)

NEM Program Administrator
Southern California Edison
6042A Irwindale Avenue
Irwindale, California 91702
Phone: (626) 302-9680
Fax: (626) 571-4277 or (626) 302-1103
E-mail solarNEM@sce.com

6. Additional Information

6.1 Circumstances Requiring Additional Documentation

6.1.1 Owner or Self-Installed System

In situations where the System Owner installs the system, the Applicant must provide the following information during the first or second stage of the application process:

- An equipment purchase agreement as described above, or
- In cases where there is not a signed agreement to purchase equipment the purchaser may provide invoices or receipts showing that at least 10 percent of the system equipment purchase price (generating equipment and inverters) has been paid to the seller(s).[30]

6.1.2 Contractor-Installed System with Separate Seller and Installer

In situations where the owner is purchasing the system from one company and hiring a separate company (licensed contractor) for installation, the owner must obtain proof of his or her commitment to purchase and install the system in separate documents as follows:

- An equipment purchase agreement as described above, or
- In cases where there is not a signed purchase agreement the owner may provide invoices or receipts showing that at least 10 percent of the system equipment purchase price (generating equipment and inverters) has been paid to the seller(s), and
- An installation contract from the second company as described above.

30 An example of this situation is where the purchaser buys new equipment via the Internet or mail order.

7. Measurement and Evaluation Requirements

To be eligible for CSI incentives, all Applicants, Host Customers, and System Owners must agree to comply with the terms and requirements of the measurement and evaluation program. This includes providing access to the Program Administrators and/or third-parties contracted by the California Public Utilities Commission and/or Program Administrator access to the site and any available data and information collected on the system.

8. Definitions and Glossary

This section provides a list of acronyms used and definitions of key concepts in this handbook.

8.1 Acronyms

AB (as in AB 1407): Assembly Bill

AC: Alternating Current

AMI: Advanced Metering Infrastructure

BIPV: Building Integrated Photovoltaic

BTU: British Thermal Unit

CEC: California Energy Commission

CEC-AC: California Energy Commission Alternating Current, refers to inverter efficiency rating

CPUC: California Public Utilities Commission

CSI: California Solar Initiative

CSLB: Contractors State License Board

DC: Direct Current

ERP: Emerging Renewables Program

EPBB: Expected Performance-Based Buydown

ESCO: Energy Service Company

IDR: Interval Data Recorder

IOU: Investor-Owned Utility

KW: Kilowatt

KWH: Kilowatt-hour

M&E: Measurement and Evaluation

M&V: Measurement and Verification

MW: Megawatt

NABCEP: North American Board of Certified Energy Practitioners

NRTL: Nationally Recognized Testing Laboratory

NSHP: New Solar Homes Partnership

PBI: Performance-Based Incentives

PG&E: Pacific Gas and Electric Company

PIER: Public Interest Energy Research

PMRS: Performance Monitoring and Reporting Service

PTC: PVUSA Test Conditions

PV: Photovoltaic

PY: Program Year

SB (as in SB 1): Senate Bill

SCE: Southern California Edison Company

SDG&E: San Diego Gas & Electric Company

SDREO: San Diego Regional Energy Office

SGIP: Self Generation Incentive Program

SOF: Surface Orientation Factor

STC: Standard Test Conditions

UL (as in UL 1703): Underwriters Laboratories, Inc.

8.2 Definitions

AB 1407:
Assembly Bill 1407, codified as California Civil Code section 714, was signed by Governor Davis on September 3, 2003. Among other things, this legislation voids and makes unenforceable any existing covenant, restriction, or condition contained in any deed, contract, security instrument, or other instrument affecting real property, as specified, that prohibits or restricts the installation or use of a solar energy system, excepting provisions that impose reasonable restrictions on solar energy systems. This statute also mandates that whenever approval is required for the installation or use of a solar energy system, that such approval be processed in the same manner as approval of an architectural modification, and not be willfully avoided or delayed. Any Public Entity (see definition) may not receive funds from a state-sponsored grant or loan program, including the CSI, for solar energy if it fails to comply with these requirements. A Public Entity must certify that it is meeting these requirements when applying for these grants or loans. Please see California Civil Code section 714 for full statutory requirements and further detail.

Affidavit:
An affidavit is a written statement in writing, sworn to before a notary public or other approved officer. In the CSI program, the Final Project Cost Breakdown and Affidavit includes the final Project cost breakdown worksheet, along with a signed affidavit substantiating the claimed eligible Project cost.

Alternating Current (AC):
Electric current that reverses direction, usually many times per second. Opposite of direct current (DC). Most electrical generators produce alternating current. Under the CSI program, PV electric output calculations must always be made using the CEC-AC rating standards which include inverter DC to AC conversion losses.

Applicant:
The entity, either the Host Customer, System Owner, or third party designated by the Host Customer, that is responsible for the development and submission of the CSI application materials and the main point of communication between the CSI Program Administrator for a specific CSI Application.

Application Fee:
An Application Fee is required once the Reservation Request has been submitted for all Non-Residential projects greater than or equal to 10 kW. Where applicable, the Application Fee is 1% of unadjusted requested CSI incentive and is refundable, in general, when the Project is completed and the incentive is paid, anytime before the application receives a Confirmed Reservation, or after that time, so long as the project is withdrawn due to extenuating circumstances beyond the Host Customer's control. Application fees are also refunded anytime before the application receives a Conditional Reservation, or after that time, so long as the project is withdrawn due to extenuating circumstances beyond the Host Customer's control.

Azimuth Orientation:
Azimuth is the horizontal angular distance between the vertical plane containing a point in the sky and true south. To qualify for incentives in the CSI program, all PV systems with an azimuth orientation between 180 degrees and 270 degrees, facing south, southwest and west, will be treated equally.

Backup Generators:
Backup generators operate as short-term temporary replacement for electrical power during periods of utility power outages. In addition to emergency operation they ordinarily operate for testing and maintenance. Backup generators do not produce enough power to be sold or otherwise supplied to the grid or provide power to loads that are simultaneously serviced by a utility electric grid. Backup generators only service customer loads that are isolated from the grid either by design or by manual or automatic transfer switch.

British Thermal Unit (BTU):
The amount of heat required to raise the temperature of 1 pound of water 1 ºF.

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Building Integrated Photovoltaic (BIPV):
Building integrated PV systems are solar electric systems in which the PV panels constitute part of the building's roof or facade, replacing conventional building materials. For example, solar shingles may replace conventional asphalt shingles, providing roof protection while producing electricity.

Calendar Days:
All dates and schedules in the CSI are measured in calendar days, which include all days of the week.

California Energy Commission (CEC):
California's primary energy policy and planning agency. Created in 1974 and headquartered in Sacramento, the Commission has responsibility for activities that include forecasting future energy needs, promoting energy efficiency through appliance and building standards, and supporting renewable energy technologies. On August 21, 2006, the Governor signed Senate Bill (SB 1) which directs the CPUC and the CEC to implement the CSI program consistent with specific requirements and budget limits set forth in the legislation.

California Public Utilities Commission (CPUC):
The CPUC regulates a number of industries including the electric utility industry that impact public well-being. Among other activities, the CPUC establishes service standards and safety rules and authorizes rate changes. The CPUC, in conjunction Senate Bill 1 (SB 1), has authorized the California Solar Initiative (CSI). In CPUC Decision (D.) 06-01-024, the California Public Utilities Commission (CPUC) established the CSI program. In D.06-08-028, the CPUC established implementation details for the CSI program.

California Solar Initiative (CSI):
The California Solar Initiative program pays incentives to solar photovoltaic (PV) projects in the three California IOU service territories. This Handbook is designed to describe the requirements for receiving funding under the CSI. The program was authorized by the California Public Utilities Commission (CPUC) and Senate Bill 1 (SB 1). Responsibility for administration of the

CSI Program is shared by Pacific Gas and Electric Company – PG&E customers; Southern California Edison Company – SCE customers; and San Diego Regional Energy Office (SDREO) – SDG&E customers.

Capacity Factor:
The ratio of the electrical energy produced by the generating system during a specific period, to the electrical energy the generating system could have produced if it had operated at full capacity rating during the same period.

Capacity Rating:
The capacity rating is a load that a power generation unit, such as a photovoltaic system, is rated by the manufacturer to be able to meet or supply. The Program Administrator will verify system capacity rating to confirm the final incentive amount.

CEC-AC Rating:
The CSI Program Administrators will use the California Energy Commission's CEC-AC method to measure nominal output power of photovoltaic cells or modules to determine the system's rating in order to calculate the appropriate incentive level. The CEC-AC rating standards are based upon 1,000 Watt/m^2 solar irradiance, 20 degree Celsius ambient temperature, and 1 meter/second wind speed. The CEC-AC Watt rating is lower than the Standard Test Conditions (STC).

Commercial:
Commercial entities are defined as non-manufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, and for-profit health, social, and educational institutions. For the purpose of CSI, commercial sectors include agricultural and industrial customers.

Contractor:
A person or business entity who contracts to erect buildings, or portions of buildings, or systems within buildings. Under the CSI program, all systems must be installed by appropriately licensed California contractors in accordance with rules and regulations adopted by the State of California Contractors State Licensing Board.

Contractors State License Board (CSLB):
Installation contracts for photovoltaic systems installed under the CSI program must comply with the Contractors State License Board (CSLB) requirements. Please refer to the CSLB website for more information on CSLB guidelines at: www.cslb.ca.gov.

CSI Program Forum:
The CSI Program Forum was established in CPUC D.06-08-028 to provide a public venue for interested parties to identify and discuss ongoing issues related to CSI administration and implementation. The forum will be used to provide input on any needed updates to this Handbook and future more substantive program modifications that may be considered. For more information on the CSI Program Forum, refer to Section 1.5.

Curtailable Rate Schedule:
Also referred to as an interruptible rate schedule. A type of rate schedule that allows the transmission provider to interrupt all or part of a transmission service under specified terms due to constraints that reduce the capability of the transmission network to provide that service. Under the CSI program, generation which serves any portion of a customer's load that is committed to curtailable rate schedules, programs or any other such state agency-sponsored demand-response programs is not eligible for incentives.

Demand-Response:
Demand response refers to the reduction of customer energy usage at times of peak usage. Demand response programs may include dynamic pricing/tariffs, price-responsive demand bidding, contractually obligated and voluntary curtailment, and direct load control/cycling. Under the CSI program any generation serving a portion of customer load that is committed to demand-response programs or on curtailable rate schedules is not eligible for incentives.

Design Factor:
The Design Factor is a ratio comparing a proposed system's expected generation output with that of a baseline system. The Design Factor is used in calculating the EPBB incentive (it is multiplied by the system rating and the incentive rate to determine EPBB incentives). A Design Factor is also used by Program Administrators to allocate applications against their MW in step (Section 2.2.5).

Direct Current (DC):
Electric current in which electrons are flowing in one direction only; which is the opposite of alternating current (AC). Under the CSI program, photovoltaic electric output calculations must always be made using the CEC-AC rating standards which include inverter DC to AC conversion losses.

Electric Utility:
The Host Customer's local electric transmission and distribution service provider for their Site.

Electrical Distribution Grid:
A network of power stations transmission circuits, and substations conducting electricity. Under the CSI program, eligible renewable energy systems must be permanently interconnected and operating parallel to the electrical distribution grid of the utility serving the customer's electrical load.

Emerging Renewables Program (ERP):
The ERP is an Energy Commission program offering cash rebates on eligible grid-connected renewable energy electric-generating systems.

Energy Service Company (ESCO):
A business entity that designs, builds, develops, owns, operates or any combination thereof self-generation Projects for the sake of providing energy or energy services to a Host Customer.

Energy Service Provider (ESP):
An entity that provides electric power and ancillary services (including but not limited to aggregators, brokers, and marketers, but excluding utilities) to an end use customer. Also referred to as an Electric Service Provider.

Expected Performance Based Buydown (EPBB):
The EPBB incentive methodology pays an up-front incentive to participants installing systems less than 100 kW in size that is based on a system's expected future performance. EPBB incentives combine the performance benefits of PBI with the administrative simplicity of a one-time incentive paid at the time of project installation. The EPBB Incentive will be calculated by multiplying the incentive rate by the system rating by the design factor.

Firm Service Level:
Power supplies that are guaranteed to be delivered under terms defined by contract. For electric utility customers who are on an interruptible or curtailable rate, only generation that serves the portion of their electric load that is designated as firm service is eligible for CSI incentives. Under the CSI program, Customers must agree to maintain the firm service level at or above capacity of the proposed generating system for the duration of the required applicable warranty period. Customers may submit a letter requesting an exemption to the firm service rule if they plan to terminate or reduce a portion of their available load.

Government:
A Government entity is any federal, state, or local government agency. Federal government entities include the Air Force, Army, Navy, Marines, Postal Service, General Services Administration, and all other Federal agencies or departments. State government entities include the University of California, California State University, Department of Corrections, Department of General Services, the combination of the Department of Developmental Services and CalTrans, the combination of the California Youth Authority and the Department of Mental Health, and all other state agencies and departments. Local government entities include cities, counties, school districts, and water districts.

Host Customer:
An individual or entity that meets all of the following criteria: 1) has legal rights to occupy the Site, 2) receives retail level electric service from PG&E, SCE, or SDG&E, 3) is the utility customer of record at the Site 4) is connected to the electric grid, and 5) is the recipient of the net electricity generated from the solar equipment.

Hybrid System:
A self-generation system that combines more than one type of distributed generation technology and is located behind a single Electric Utility service meter.

Incentive Adjustment Mechanism:
A mechanism for solar incentives to automatically decline each year based upon MW reserved over the 10 years of the CSI. The adjustment mechanism reduces the statewide incentive level when specified MW levels, or "triggers," of solar installations are achieved. See Section 3.1.

Interconnection Agreement:
A legal document authorizing the flow of electricity between the facilities of two electric systems. Under the CSI program, eligible renewable energy systems must be permanently interconnected and operating in parallel to the electrical distribution grid of the utility serving the customer's electrical load. Portable systems are not eligible. Proof of interconnection and parallel operation is required prior to receiving an incentive payment.

Interruptible Rate Schedule:
The right of a utility to interrupt all or part of electric service due to system or generation constraints. May also be called a Curtailable Rate Schedule. Under the CSI program, generation which serves any portion of customer load that is committed to such rate schedules or any other state agency-sponsored curtailable or demand-response program is not eligible for incentives.

Interval Data Recorder (IDR):
IDR is a metering device capable of recording minimum data required. Minimum data requirements include (a) hourly data required for the Direct Access settlement process; and (b) data required to bill the utility's distribution tariffs including 15-minute demand data--also referred to as Hourly Metering.

Inverter:
An electric conversion device that converts direct current (DC) electricity into alternating current (AC) electricity.

Inverter Efficiency:
The AC power output of the inverter divided by the DC power input.

Investor Owned Utility (IOU):
For purposes of the CSI, this refers to Pacific Gas & Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company.

Kilowatt (kW):
A unit of electrical power equal to 1,000 watts, which constitutes the basic unit of electrical demand. The watt is a metric measurement of power (not energy) and is the rate (not the duration over which) electricity is used. 1,000 kW is equal to 1 megawatt (MW). Throughout this Handbook, the use of kW refers to the CEC-AC wattage ratings of kW alternating current inverter output.

Kilowatt Hour (kWh):
The use of 1,000 watts of electricity for one full hour. Unlike kW, kWh is a measure of energy, not power, and is the unit on which the price of electrical energy is based. Electricity rates are most commonly expressed in cents per kilowatt hour.

Lessor:
A person or entity who rents property to another under a lease. Under the CSI program, in the case of a third-party owned system (or leased system, for example), the lessor is classified as the System Owner.

Load:
Either the device or appliance which consumes electric power, or the amount of electric power drawn at a specific time from an electrical system, or the total power drawn from the system. Peak load is the amount of power drawn at the time of highest demand.

Maximum Site Electric Load:
The peak (maximum) kW demand at the Site, regardless if served by the existing generator, the local utility or a combination of the two.

Measurement and Evaluation (M&E):
A process or protocol to evaluate the performance of an energy system. As a condition of receiving incentive payments under the CSI program, System Owners and Host Customers agree to participate in Measurement and Evaluation (M&E) activities as required by the CPUC. M&E activities will be performed by the Program Administrator or the Program Administrator's independent third-party consultant and include but are not limited to, periodic telephone interviews, on-site visits, development of a M&E Monitoring Plan, access for installation of metering equipment, collection and transfer of data from installed system monitoring equipment, whether installed by Host Customer, System Owner, a third party, or the Program Administrator.

Measurement and Verification (M&V):
A process or protocol to confirm the actual energy savings realized from a project once the project is implemented and operating.

Megawatt (MW):
Unit of electrical power equal to one million watts; also equals 1,000 kW.

Meter:
A device used to measure and record the amount of electricity used or generated by a consumer. The CSI program requires accurate solar production meters for all solar projects that receive incentives. Systems under 10 kW require a meter accurate to within 5%, while systems 10 kW and larger require a more precise meter accurate to within 2%.

Modules:
Under the CSI program, a module is the smallest complete environmentally protected assembly of interconnected photovoltaic cells. Modules are typically rated between 50 and 200 W.

Nationally Recognized Testing Laboratory (NRTL):
The Occupational Safety and Health Administration's (OSHA) Directorate of Science, Technology, and Medicine operates a program that certifies private sector organizations as NRTLs, which subsequently judges that specific equipment and materials ("products") meet consensus-based standards of safety for use in the U.S. workplace. Under the CSI program, PV Modules must be certified to UL 1703 by a Nationally Recognized Testing Laboratory (NRTL). Inverters must be certified to UL 1741 by a NRTL.

Net Energy Metering Agreement:
An agreement with the local utility which allows customers to reduce their electric bill by exchanging surplus electricity generated by certain renewable energy systems such as the PV systems the CSI subsidizes. Under net metering, the electric meter runs backwards as the

customer-generator feeds extra electricity back to the utility. The CSI program permits net energy metering agreements.

New Construction:
New construction is defined as the construction of new buildings. Residential new construction systems are not eligible for the CSI program, and should apply to the California Energy Commission's New Solar Homes Partnership Program. A residence is considered "new" if it does not yet have a Permit of Occupancy from the relevant Building Department.

New Solar Homes Partnership (NSHP):
A California Energy Commission program offered as of January 1, 2007 that works with home builders and the building industry to accelerate the growth of PV in residential new construction.

Non Profit:
A Non-Profit institution is an entity not conducted or maintained for the purpose of making a profit, and is registered as a 501(c)3 corporation. No part of the net earnings of such entity accrues or may lawfully accrue to the benefit of any private shareholder or individual.

North American Board of Certified Energy Practitioners (NABCEP):
A professional association developing a voluntary national certification program for solar practitioners. Although not required by the CSI program, installation contractors are encouraged to become certified by the NABCEP.

Pacific Gas & Electric Company (PG&E):
An investor owned utility (IOU). The utility that provides natural gas and electricity to most of Northern California.

Parallel Operation:
The simultaneous operation of a self-generator with power delivered or received by the electrical utility while interconnected to the grid. Parallel Operation includes only those PV systems that are interconnected with the Electric Utility distribution system for more than 60 cycles.

Performance Based Incentives (PBI):
The CSI program will pay Performance Based Incentives (PBI) for solar projects equal to or larger than 100 kilowatts (kW), with monthly payments based on recorded kilowatt hours (kWh) of solar power produced over a five-year period. Solar projects receiving PBI incentives will be paid a flat per kWh payment monthly for PV system output that is serving on Site load. The monthly PBI incentive payment is calculated by multiplying the incentive rate by the measure kWh output.

Photovoltaic (PV):
A technology that uses a semiconductor to convert light directly into electricity.

Power Purchase Agreements:
An agreement for the sale of electricity from one party to another, where the electricity is generated and consumed on the Host Customer Site. Agreements that entail the export and

sale of electricity from the Host Customer Site do not constitute on-site use of the generated electricity and therefore are ineligible for the CSI.

Program Administrator (PA):
For purposes of the CSI program, PG&E, SCE & SDREO (which administers the program on behalf of SDG&E).

Program Year (PY):
January 1 through December 31.

Proof of Project Milestone Date:
The Proof of Project Milestone Date is the date when required information to demonstrate that a Project seeking CSI incentives is moving forward is due.

Project:
For purposes of the CSI, the "Project" is the installation and operation of the proposed eligible PV system, as described by the submitted Reservation Request documentation.

Public Entity:
Includes the United States, the state and any county, city, public corporation, or public district of the state, and any department, entity, agency, or authority of any thereof.[31]

Rebuild A Greener San Diego Photovoltaic Incentive Program:
San Diego area program authorized by the CPUC Resolution E-3860, created to provide incentives to homeowners rebuilding homes affected by the October 2003 wildfires. The Rebuild a Greener San Diego Photovoltaic Incentive Program accepted applications from April 1, 2006 through May 31, 2006.

Renewable:
Electricity supplied by energy sources that are naturally and continually replenished, such as wind, solar power, geothermal, small hydropower, and various forms of biomass.

Reservation Expiration Date:
The Reservation Expiration Date is the date up to when the project is active in the CSI program.

Residential:
Residential entities are private household establishments that consume energy primarily for space heating, water heating, air conditioning, lighting, refrigeration, cooking, and clothes drying. The classification of an individual consumer's account, where the use is both residential and commercial, is based on principal use.

Retrofit:
A retrofit is a modification of an existing building or facility to include new systems or components.

31 Source: CALIFORNIA CODES - PUBLIC CONTRACT CODE, SECTION 21611

San Diego Gas & Electric Company (SDG&E):
One of California's four investor-owned utilities (IOU's). SDG&E provides natural gas and electricity to San Diego County and southern Orange County in southern California. It is owned by Sempra Energy. The CSI program is available to customers of PG&E, SCE and SDG&E.

San Diego Regional Energy Office (SDREO):
A Non-Profit 501(c)3 corporation that implements the CSI program on behalf of SDG&E.

Self Generation Incentive Program (SGIP):
The SGIP, created pursuant to California Assembly Bill 970, provided financial incentives for business and residential customers who install up to 5.0 MW of "clean" distributed generation equipment onsite. The current program runs through December 31, 2007. The SGIP was extended in modified form for certain technologies through AB 1685.

Seller:
Any person or business entity that transfers property or property rights by sale in commerce. To participate in the CSI program, companies who sell system equipment must be certified by the CEC or some approved third party.

Senate Bill 1 (SB 1):
This Senate Bill establishes the goals of installing 3,000 MW of solar generation capacity in the state of California, establishing a self-sufficient solar industry, and placing photovoltaic systems on 50 percent of new California homes within 13 years. The bill was signed into law on August 21, 2006, and it became effective on January 1, 2007. SB 1 requires the CPUC, in implementing the California Solar Initiative (CSI) to adopt performance-based subsidies (e.g. subsidies that pay based on the amount of electricity produced) by January 1, 2008 where 100% of incentives are based on performance for all PV systems 100 kW and larger, and 50% of incentives are based on performance for systems 30 kW and larger. Performance-based subsidies are encouraged, but not required, for smaller systems. Moreover, SB 1 authorizes the CPUC to award $101 million in subsidies for solar thermal systems and authorizes the CPUC to award $50 million for solar research and development. The bill requires municipal utilities to establish solar energy programs in support of the 3,000 MW goal and raises the net metering cap from 0.5 percent to 2.5 percent.

Site:
The Host Customer's premises, consisting of all the real property and apparatus employed in a single enterprise on an integral parcel of land undivided, excepting in the case of industrial, agricultural, oil field, resort enterprises, and public or quasi-public institutions divided by a dedicated street, highway or other public thoroughfare or railway. Automobile parking lots constituting a part of and adjacent to a single enterprise may be separated by an alley from the remainder of the premises served. Separate business enterprises or homes on single parcel of land undivided by a highway, public road, and thoroughfare or railroad would be considered for purposes of CSI as separate Sites. Each individual Site must be able to substantiate sufficient electrical load to support the proposed system size.

Solar Irradiance:
Radiant energy emitted by the sun, particularly electromagnetic energy. In the CSI program the CEC-AC rating standards are based upon 1,000 Watt/m^2 solar irradiance, 20 degree Celsius

ambient temperature, and 1 meter/second wind speed. The CEC-AC watt rating is lower than the Standard Test Conditions (STC), a watt rating used by manufacturers.

Southern California Edison Company (SCE):
An investor owned utility (IOU) that provides electricity in a 50,000-square mile service territory in Southern California.

Standard Test Conditions (STC):
A watt rating used by manufacturers of photovoltaic cells or modules. The CEC-AC watt rating used in the CSI is lower than the Standard Test Conditions.

Surface Orientation Factor (SOF):
The ratio of the annual incident solar radiation on a surface for a specific tilt and orientation (MJ/m^2/year) divided by the annual incident solar radiation on a surface for a south-facing surface with optimal tilt (MJ/m^2/year).

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System Installer:
The System Installer is responsible for installing for the Host Customer the photovoltaic system that will be eligible to receive CSI program incentives. A qualified solar system installer should be able to evaluate factors that will affect photovoltaic system performance, such as the orientation (tilt and direction) of the system, wire length and size, shading, module output mismatch, inverter efficiency, module cleanliness, and other factors.

System Owner:
The owner of the PV system at the time the incentive is paid. For example, in the case when a vendor sells a turnkey system to a Host Customer, the Host Customer is the System Owner. In the case of a leased system, the lessor is the System Owner.

System Size:
Generally, under the CSI, system size is defined as the capacity of a given photovoltaic system based upon CEC-AC rating standards. Under the CSI program, the incentive is determined based on the expected production of electricity by the system, which may not exceed the actual energy consumed during the previous 12 months at the Site (see Section 2.2.3). However, for purposes of determining the capacity a given project contributes to a given step in the incentive schedule, system size is defined as the system size rating times a design factor (see Section 2.2.5).

Time of Use Rates:
Electricity prices that vary depending on the time periods in which the energy is consumed. In a time-of-use rate structure, higher prices are charged during utility peak-load times. Such rates can provide an incentive for consumers to curb power use during peak time.

UL Listed:
Tested and listed by the Underwriters Laboratories, Inc. In the CSI program, PV modules must be certified to UL 1703 by a Nationally Recognized Testing Laboratory (NRTL). Inverters must be certified to UL 1741 by a NRTL.

Vendor:
A seller of property, goods, or services. According to the CSI program, in cases when a vendor sells a PV system to a Host Customer, the Host Customer is the System Owner.

Warranty:
A promise, either written or implied, that the material and workmanship of a product are without defect or will meet a specified level of performance over a specified period of time. In the CSI program, inverters and modules must each carry a 10 year warranty, and meters a one-year warranty. The warranty may be provided in combination by the manufacturer and installer. On January 1, 2008, the warranty requirements will be increased to a minimum of five years for meters.

9. Program Administrator Contact Information

Potential Host Customers and their Applicant s can receive more information and apply for incentive funding through the following Program Administrators:

9.1 Pacific Gas & Electric (PG&E)

Website: www.pge.com/csi
Email Address: solar@pge.com
Contact Person: Program Manager, California Solar Initiative Program
Telephone: (800) 743-5000
Fax: (415) 973-2510

Mailing Address: PG&E Integrated Processing Center
P.O. Box 7265
San Francisco, CA 94120-7265

9.2 California Center for Sustainable Energy (CCSE)
formerly San Diego Regional Energy Office (SDREO)

Website: www.energycenter.org
Email Address: csi@energycenter.org
Contact Person: California Solar Initiative Program Manager
Telephone: (866)SDENERGY: (858) 244-1177
Fax: (858) 244-1178

Mailing Address: California Center for Sustainable Energy
Attn: California Solar Initiative Program Manager
8690 Balboa Avenue Suite 100
San Diego, CA 92123

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9.3 Southern California Edison (SCE)

Website: www.sce.com/rebatesandsavings/CaliforniaSolarInitiative/
E-mail Address: greenh@sce.com
Contact Person: Program Manager, California Solar Initiative Program
Telephone: (800) 799-4177
Fax: (626) 302-6253

Mailing Address: Southern California Edison
6042A Irwindale Avenue
Irwindale, California 91702

10. Appendix A: Description of Total Eligible Project Costs

10.1 Eligible Project Cost Items

The California Solar Initiative program collects information on solar system project costs solely for reporting purposes. The following costs may be included in total eligible project cost:

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1. Solar equipment capital costs, including tracking systems and other ancillary equipment associated with the solar system.
2. Engineering and design costs for solar system.
3. Construction and installation costs. For projects in which the generation equipment is part of a larger project, only the construction and installation costs directly associated with the installation of the energy generating equipment are eligible.
4. Engineering feasibility study costs
5. Interconnection costs if applicable, including:
    a. Electric grid interconnection application fees
    b. Metering costs associated with interconnection
6. Building permitting costs
7. Warranty and/or maintenance contract costs associated with eligible project cost equipment
8. Sales tax and use tax
9. On-site system measurement, monitoring and data acquisition equipment.
10. Customers may claim certain mounting surface costs as eligible project costs. Costs may include mounting surfaces for the photovoltaic/collector module and/or the materials that provide the primary support for the modules. Only the percentage of mounting surface directly under the photovoltaic/collector module is eligible.
11. Cost of capital included in the system price by the vendor, contractor or subcontractor (the entity that sells the system) is eligible if paid by the System Owner.

11. Appendix B: Metering Requirements

The following requirements apply only to solar PV systems. The Metering Subcommittee will provide revisions to incorporate solar thermal and other non-PV metering and ancillary metering requirements in a subsequent revision.

The following Appendix contains detailed information with respect to the minimum metering and monitoring requirements for participation in the CSI Program. These minimum requirements were developed to increase owner knowledge of system performance, foster adequate system maintenance, and thereby ensure ratepayer incentives result in expected levels of solar generation.

CSI Program participants are required to install the following metering related components based on the size of their system and type of program participation (i.e. EPBB or PBI):

Table 16
Metering Summary

	5% Meter (Inverter Integrated)	2% Meter (Standalone Meter)	PMRS
EPBB < 10kW	Required	Optional	Required*
EPBB ≥ 10kW and <20 kW	N/A	Required	Required*
EPBB > 20 kW	N/A	Required	Required
PBI (All System Sizes)	N/A	Required	Required

Notes:

- PMRS stands for Performance Monitoring and Reporting Service
- *Required unless the cost of the PMRS is above the cost cap (the cost of the minimum metering, communication, and reporting system over the first five years for each solar installation size grouping shall be less than 1% of total installed cost for systems up to 30 k and 0.5% for larger systems. See CPUC Decision D.06-08-028). The customer seeking exemption must demonstrate to the Program Administrator that they were not able to satisfy the metering requirements within the applicable cost cap.
- N/A = Not Applicable

Recipients of CSI funding are not precluded or penalized from purchasing or installing a performance monitoring system or service that exceeds the minimum requirements or any cost caps. The selection of performance monitoring system and service provider is made at the recipient's choice and expense.

As with other required solar system components, all installed meters and Performance Monitoring and Reporting Services (PMRS) must be listed with the Energy Commission. Lists of qualifying meters and PMRS Services can be found on the California Energy Commission's website (www.energy.ca.gov).

Detailed information on these summarized requirements follows.

11.1 Minimum Meter Requirements

All systems must be installed with a meter or meters so that the System Owner and Program Administrator can determine the amount of energy produced by the system and the System Owner may support proper system operation and maintenance. The meter must be listed with the Energy Commission and must meet the minimum meter requirements of this section.

The California Energy Commission's list of qualifying meters can be found at: (www.energy.ca.gov).

11.1.1 Meter Type

For all systems with a CEC-AC rating or Thermal rating of 10 kW or higher the installed meter(s) must be a separate Interval Data Recording (IDR) meter(s), or a complete system that is functionally equivalent to an IDR meter recording data no less frequently than every 15 minutes. Installed meter(s) for systems below 10 kW do not need to be separate IDR meters and may be internal to the inverter(s). Program Administrators may have additional meter functionality requirements for systems receiving PBI, as the utilities will use these meters to process PBI payments and system compatibility may be required. For example, meters and service panels must meet all local building codes and utility codes. Each Program Administrator will maintain a publicly-available list of any additional functionality requirements. Please consult your Program Administrator to determine whether any additional requirements apply.

11.1.2 Meter Accuracy

The installed meter(s) must be accurate to ±5% for all systems with a CEC-AC rating below 10kW (a "±5% Meter") and ±2% for all systems with a CEC-AC rating of 10 kW or higher or for systems receiving PBI payments (a "±2% Meter").

Solar thermal system Btu meter(s) must be accurate to ±5%.

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11.1.3 Meter Measurement

Meters must measure net generated energy output as well as instantaneous power.

11.1.4 Meter Testing Standards

±2% Meters must be tested according to all applicable ANSI C-12 testing protocols. ±5% Meters must be tested to testing protocols as defined by the California Energy Commission.

11.1.5 Meter Certification

The accuracy rating of ±2% Meters must be certified by an independent testing body (i.e., a NRTL such as UL or TUV).

The accuracy rating of ±5% Meters must be certified by the manufacturer of the ±5% Meter or an independent testing body (i.e., a NRTL such as UL or TUV).

All test results or NRTL documentation supporting the certification must be maintained on file for inspection by the Commission or Energy Commission.

11.1.6 Meter Communication / Data Transfer Protocols

Protocols for the minimum required Solar Performance / Output Data must enable any Independent Performance Monitoring and Reporting Service Provider to communicate with the meter to obtain the minimum required Solar Performance / Output Data from the meter. The data transfer protocol provided to the utility must satisfy servicing utility requirements.

11.1.7 Meter Data Access

All meters must provide the Performance Monitoring and Reporting Service Provider with the ability to access and retrieve the minimum required Solar Performance / Output Data from the meter using the Meter Communication / Data Transfer Protocols. In the event that the system is not required to have a Performance Monitoring and Reporting Service (PMRS) as shown in the summary table above, the Program Administrator must work with the System Owner to develop a means to retrieve the minimum required Solar Performance/Output Data from the meter.

11.1.8 Meter Display

All meters must provide a display showing the meter's measured net generated energy output and measured instantaneous power. This display must be easy to view and understand. This display must be physically located either on the meter, inverter, or on a remote device.

11.1.9 Meter Memory and Storage

All meters must have the ability to retain collected data in the event of a power outage. Meters that are reporting data remotely must have sufficient memory to retain 60 days of data if their standard reporting schedule is monthly and 7 days of data if their standard reporting schedule is daily. Meters that do not remotely report their data must retain 60 days of data. In all cases meters must be able to retain lifetime production.

11.1.10 Thermal Meters

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For liquid solar heating and cooling systems, it is practical to use a commercial BTU meter.[32] The BTU meter specifications shall be as follows –

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- Provides totalizing outputs in BTUs per period.
- Capable of remote communications.

[32] Hot air solar systems will need to be paid incentives based on the EPBB method described below. Metering the thermal output of solar hot air systems, within reasonable accuracy and cost, is difficult.

- Monthly totalizing accuracy of ≤ 5%.[33]
- Flow meter and temperature sensor accuracy is NIST traceable.

11.2 Minimum Communication Requirements

All systems must be installed with some form of communication capability that will provide meaningful feedback to System Owners and Program Administrators. For all systems greater than 20 kW, and where otherwise possible, the systems should have remote communicating capability whereby performance data can be collected, accessed remotely, and uploaded for processing by a PMRS. For systems smaller than 20 kW, there is no specific communication technology requirement (e.g. telephone modem, cable, wireless, utility's existing meter reading system, etc), but as discussed above, the meter display must be accessible to the System Owner, and the Program Administrator must be provided means to retrieve data to collect performance data.

11.3 Minimum Performance Monitoring & Reporting Capability Requirements

In order to enable system owners to properly maintain and evaluate the performance of their systems and to allow Program Administrators to monitor the performance of systems receiving CSI incentives, a Performance Monitoring and Reporting Service must be installed to monitor and report on the following minimum data points and all monitoring, data collection, data retention, and reporting must be performed as specified in the corresponding sub-sections below. See Table 16 for more information.

The Performance Monitoring and Reporting Service must be listed with the Energy Commission and must meet the minimum requirements of this section.

The California Energy Commission's list of qualifying performance monitoring service providers can be found at www.energy.ca.gov

11.3.1 Required Solar Performance / Output Data

The Performance Monitoring and Reporting Service must monitor, record, and report on instantaneous AC kW and net kWh Generated by the PV system. For solar thermal systems, they must monitor, record, and report on monthly total Btu delivered to the customer's thermal load.

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[33] At least one BTU meter supplier has provided information showing that 5% accuracy is achievable. See Appendix E for an example Btu meter accuracy calculation.

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11.3.2 Minimum Report Delivery Requirements

The Performance Monitoring and Reporting Service must provide for the electronic delivery of reports.

11.3.3 Time Granularity of Acquired Data

The Performance Monitoring and Reporting Service must log all Required Solar Performance / Output Data points no less frequently than once every 15 minutes.

11.3.4 Frequency of Data Collection

The Performance Monitoring and Reporting Service must remotely acquire and process all data points no less frequently than once per day.

11.3.5 Minimum Reporting Requirements

The Performance Monitoring and Reporting Service must provide the following reports based on acquired, processed, and analyzed data:

- Data as collected and summarized by hour, day, month, and year.

- System alerts that indicate a non-functioning or poorly functioning system.

11.3.6 Frequency of Data Reporting

The Performance Monitoring and Reporting Service must at all times provide system owners with on-demand access to all reports required by Section 11.3.5. Time sensitive reports (i.e. System Alerts) shall be made available within 24 hours of the monitoring service provider receiving the recorded data points which, when analyzed, indicated a problem with the system.

11.3.7 Data Retention Policy

The performance monitoring service must retain and provide the System Owner and Program Administrator with remote access to 15 minute average data for a minimum of five years for PBI program participants and two years for EPBB program participants.

11.4 Independence of Performance Monitoring & Reporting Service Provider

The entity responsible for providing and administering the Performance Monitoring and Reporting Service shall not be affiliated with the incentive recipient, or any solar manufacturer or installer.

11.5 Eligible Recipients of Information

Subject to the stated Data Privacy restrictions appearing in Section 11.5.3, the performance monitoring service must at a minimum provide each group listed below with access to data as defined.

11.5.1 System Owner

The performance monitoring service shall at a minimum provide System Owners and/or host site customers (if different) with access to all Required Solar Performance / Output Data.

11.5.2 Program Administrators

The performance monitoring service shall at a minimum provide Program Administrators with all data listed in Section 11.3 for all systems.

11.5.3 Data Privacy

Protecting the privacy of System Owners and host site customer is of the highest order. As such, data shall be collected, processed, and reported to the System Owner and the Program Administrator in accordance with this Appendix. The PMRS may provide data to third parties, including installers and host customers (if different than the system owners), provided the System Owner has consented in writing to the release of such performance data.

11.6 Advanced Metering Infrastructure (AMI) Coordination

To the extent AMI coordination is an important component of PBI or EBPP program administration, the Commission will re-evaluate the requirements of this section at that time.

11.7 Overall Cost Constraint

As described in Table 16, all recipients of CSI funding with systems sizes greater than or equal to 20 kW, or participating in the PBI program regardless of system size, are required to install a performance monitoring system with 5 years of service that meets all of the applicable minimum standards defined in this Appendix.

Recipients of CSI funding are not precluded or penalized from purchasing or installing a performance monitoring service that exceeds the minimum requirements or any cost caps. The selection of performance monitoring system and service provider is made at the recipient's choice and expense.

To the extent that a recipient of CSI funding is not required to install a PMRS, the recipient of CSI funding is still required to install a metering system that meets all applicable parts of Section 11.1 (See Table 16).

12. Appendix C: Contract and Forms

NSHP-4 Registration Form for Sellers

The following NSHP-4 form is used by both the California Energy Commission New Solar Homes Partnership and the California Public Utilities Commission California Solar Initiative Program. Please remit this form to the California Energy Commission to register your firm as a seller of solar equipment. See Section 2.1.5 for more information.

NSHP-4	**EQUIPMENT SELLER INFORMATION FORM** ***NEW SOLAR HOMES PARTNERSHIP***
This information must be submitted before a company can become eligible to participate in the NSHP. To remain eligible, a company must resubmit this form annually, by March 31. This annual submittal is required even if the information identified in the company's prior NSHP-4 submittal has not changed. In addition, a company must submit an updated NSHP-4 form any time its reported information has changed. The updated NSHP-4 form must be submitted to the Energy Commission within 30 days of the change of any reported information. Registered companies are listed at [www.gosolarcalifornia.ca.gov].	
Business name: Address:	Phone: ( ) Fax : ( ) E-mail: Website:
Owner or principal, Title: Business license number: Reseller's license number: Contractor license number (if applicable):	Select one of the following: ☐ Corporate, LLC, LLP or other that is registered with the California Secretary of State ☐ Not a corporation, LLC or LLP
The above information applies solely to the business identified above: Print Name: _____ Title:_____ Signature: _____ Date: _____ Send this completed form by telefax to (916) 653-2543 or by mail to: NSHP Seller Registration California Energy Commission 1516 9th Street, MS-45 Sacramento, CA 95814-5512 **Reminder:** **This form must be on file with the Energy Commission for a rebate application with the above company to be considered. It must be resubmitted annually by March 31 for sellers to remain eligible from year to year.**	

13. Appendix D: California IOU SPC Tables [ref 2007 SPC Procedures Manual, Appendix C, January 31, 2007]

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Table C1 – ELECTRICALLY OPERTED UNITARY AIR CONDITIONERS AND CONDENSING UNITS – MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-A)

Equipment Type	Size Category	Efficiency *	Test Procedure
Air Conditioners, Air Cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	10.3 EER[b]	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	9.7 EER[b]	ARI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	9.5 EER[b] and 9.7 IPLV[b]	
	≥ 760,000 Btu/h	9.2 EER[b] and 9.4 IPLV[b]	
Air Conditioners, Water and Evaporatively Cooled	> 240,000 Btu/h	11.0 EER[b] and 10.3 IPLV[b]	ARI 340/360
Condensing Units, Air Cooled	≥ 135,000 Btu/h	10.1 EER and 11.2 IPLV	ARI 365
Condensing Units, Water or Evaporatively Cooled	≥ 135,000 Btu/h	13.1 EER and 13.1 IPLV	
* IPLVs are only applicable to equipment with capacity modulation.			
[b] Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.			

Table C2 – UNITARY AND APPLIED HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-B)

Equipment Type	Size Category	Subcategory or Rating Condition	Efficiency *	Test Procedure
Air Cooled (Cooling Mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Split System and Single Package	10.1 EER[b]	ARI 340/360
	≥ 135,000 Btu/h and <240,000 Btu/h	Split System and Single Package	9.3 EER[b]	ARI 340/360
	≥ 240,000 Btu/h	Split System and Single Package	9.0 EER[b] 9.2 IPLV[b]	
Air Cooled (Heating Mode)	≥ 65,000 Btu/h and < 135,000 Btu/h (Cooling Capacity)	47°F db/43°F wb Outdoor Air	3.2 COP	ARI 210/240
	≥ 135,000 Btu/h (Cooling Capacity)	47°F db/43°F wb Outdoor Air	3.1 COP	ARI 340/360
* IPLVs and Part load rating conditions are applicable only to equipment with capacity modulation.				
[b] Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.				

Table C-4 – WATER CHILLING PACKAGES – MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-D)

Equipment Type	Size Category	Efficiency	Test Procedure
Air Cooled, With Condenser, Electrically Operated	< 150 Tons	2.80 COP	ARI 550/590
	≥ 150 Tons	3.05 IPLV	
Air Cooled, Without Condenser, Electrically Operated	All Capacities	3.10 COP 3.45 IPLV	
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	All Capacities	4.20 COP 5.05 IPLV	ARI 550/590
Water Cooled, Electrically Operated, Positive Displacement (Rotary Screw and Scroll)	< 150 Tons	4.45 COP 5.20 IPLV	ARI 550/590
	≥ 150 Tons and < 300 Tons	4.90 COP 5.60 IPLV	
	≥ 300 Tons	5.50 COP 6.15 IPLV	
Water Cooled, Electrically Operated, Centrifugal	< 150 Tons	5.00 COP 5.25 IPLV	ARI 550/590
	≥ 150 Tons and < 300 Tons	5.55 COP 5.90 IPLV	
	≥ 300 Tons	6.10 COP 6.40 IPLV	
Air Cooled Absorption Single Effect	All Capacities	0.60 COP	ARI 560
Water Cooled Absorption Single Effect	All Capacities	0.70 COP	
Absorption Double Effect, Indirect-Fired	All Capacities	1.00 COP 1.05 IPLV	
Absorption Double Effect, Direct-Fired	All Capacities	1.00 COP 1.00 IPLV	
Water Cooled Gas Engine Driven Chiller	All Capacities	1.2 COP 2.0 IPLV	ANSI Z21.40.4

Table C-5 – PACKAGED TERMINAL AIR CONDITIONERS AND PACKAGED TERMINAL HEAT PUMPS – MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-E)

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Efficiency [a]	Test Procedure
PTAC (Cooling Mode) New Construction	All Capacities	95°F db Outdoor Air	12.5 - (0.213 x Cap/1000)* EER	ARI 310/380
PTAC (Cooling Mode) Replacements[b]	All Capacities	95°F db Outdoor Air	10.9 - (0.213 x Cap/1000)* EER	
PTHP (Cooling Mode) New Construction	All Capacities	95°F db Outdoor Air	12.3 - (0.213 x Cap/1000)* EER	
PTHP (Cooling Mode) Replacements[b]	All Capacities	95°F db Outdoor Air	10.8 - (0.213 x Cap/1000)* EER	
PTHP (Heating Mode) New Construction	All Capacities		3.2 - (0.026 x Cap/1000)* COP	
PTHP (Heating Mode) Replacements[b]	All Capacities		2.9 - (0.026 x Cap/1000)* COP	

[a] Cap means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7000 Btu/h, use 7000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.

[b] Replacement units must be factory labeled as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS." Replacement efficiencies apply only to units with existing sleeves less than 16 inches high and less than 42 inches wide.

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14. Appendix E: Commercial BTU Meter Accuracy Requirements

BTU meters measure energy flow from a hot source to a cold sink by measuring differential temperature and flow of the working fluid. Commercially available hydronic BTU meters can be found to have the following, National Institute of Standards and Technology (NIST) traceable, accuracy specifications -[34]

Differential temperature error (°F) = ±0.15 °F

Differential temperature error (%) = {(0.15 + 10) /10} – 1 = 1.5%

Flow error (GPM) = 0.4 GPM

Flow error (%) = 1.0%

Computational error (%) = 0.05% (digitizing error)

The combined BTU accuracy is calculate using the square root sum of the squares (SRSS) method

Average energy error (%) = $\{(1.5\%)^2 + (1.0\%)^2 + (0.05\%)^2\}^{1/2} = 1.80\%$

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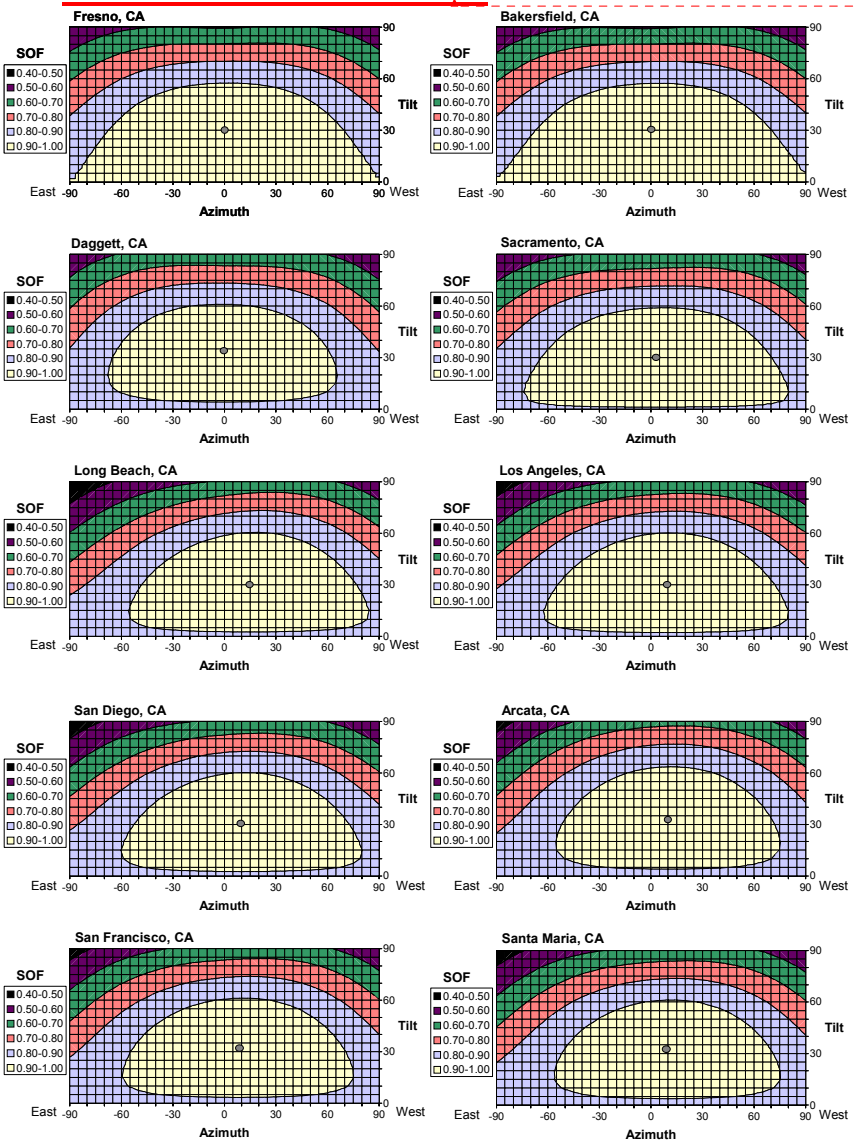
[34] "Compare and Contrast BTU Measurement Using Building Control Systems Versus ONICON BTU Meters", VOLUME 3.1, June 4, 2003

15. Appendix F – Surface Orientation Factors for California Locations[35,36]



[35] Surface Orientation Factor plots provided courtesy of Craig Christensen, Principal Engineer, National Renewable Energy Laboratory.

[36] SOF plots for coastal California locations show the optimal azimuth to be somewhat west of south (presumably due to morning fog in those locations). It is important to remember that this is a temporal effect (foggy skies in the morning when the sun is to the east, clear skies in the afternoon when the sun is to the west).

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16. Appendix G – Example CEC-AC Rating for Glazed Solar Collector

SRCC Collector Efficiency Equation

$\eta = A_o + B_o (P)/I + C_o (P)^2/I$

Where,

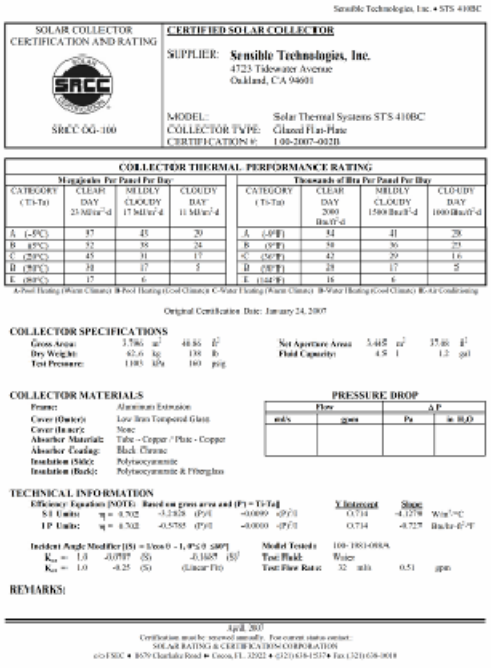
η = Collector efficiency

I = Solar Irradiance

(P) = (Ti – Ta)

Ti = Inlet Temperature

Ta = Ambient Temperature



Sensible Technologies, Inc. • STS 410BC

SOLAR COLLECTOR CERTIFICATION AND RATING

SRCC OG-100

CERTIFIED SOLAR COLLECTOR

SUPPLIER: **Sensible Technologies, Inc.**
4723 Tidewater Avenue
Oakland, CA 94601

MODEL: Solar Thermal Systems STS 410BC
COLLECTOR TYPE: Glazed Flat-Plate
CERTIFICATION #: 100-2007-002B

COLLECTOR THERMAL PERFORMANCE RATING

Megajoules Per Panel Per Day				Thousands of Btu Per Panel Per Day			
CATEGORY (Ti-Ta)	CLEAR DAY 23 MJ/m²-d	MILDLY CLOUDY 17 MJ/m²-d	CLOUDY DAY 11 MJ/m²-d	CATEGORY (Ti-Ta)	CLEAR DAY 2000 Btu/ft²-d	MILDLY CLOUDY 1500 Btu/ft²-d	CLOUDY DAY 1000 Btu/ft²-d
A (-9°C)	37	45	20	A (-9°F)	84	41	28
B (5°C)	32	38	24	B (9°F)	58	36	23
C (28°C)	45	31	13	C (50°F)	42	29	16
D (78°C)	20	17	5	D (50°F)	28	17	5
E (80°C)	17	6		E (144°F)	16	6	

A-Pool Heating (Warm Climate) B-Pool Heating (Cool Climate) C-Water Heating (Warm Climate) D-Water Heating (Cool Climate) E-Air Conditioning

Original Certification Date: January 24, 2007

COLLECTOR SPECIFICATIONS

Gross Area:	3.786 m²	40.86 ft²	Net Aperture Area	3.445 m²	37.08 ft²
Dry Weight:	62.6 kg	138 lb	Fluid Capacity:	4.9 l	1.2 gal
Test Pressure:	1103 kPa	160 psig			

COLLECTOR MATERIALS

Frame:	Aluminum Extrusion
Cover (Outer):	Low Iron Tempered Glass
Cover (Inner):	None
Absorber Material:	Tube - Copper / Plate - Copper
Absorber Coating:	Black Chrome
Insulation (Side):	Polyisocyanurate
Insulation (Back):	Polyisocyanurate & Fiberglass

PRESSURE DROP

Flow		ΔP	
m³/s	gpm	Pa	in H₂O

TECHNICAL INFORMATION

Efficiency Equations [NOTE: Based on gross area and (P) = Ti-Ta]

					Y-Intercept	Slope	
SI Units:	$\eta =$ 0.702	-3.2828	(P)/I	+0.0099	(P)²/I	0.714	-4.1278	W/m²-°C
I-P Units:	$\eta =$ 0.702	-0.5785	(P)/I	+0.0010	(P)²/I	0.714	-0.727	Btu/hr-ft²-°F

Incident Angle Modifier [IS] = $1/\cos\theta - 1$, 0°≤θ ≤80°]

$K_{\tau\alpha} =$	1.0	-0.0707	(S)	-0.1605	(S)²
$K_{\tau\alpha} =$	1.0	-0.25	(S)	(Linear Fit)	

Model Tested: 100-1881-0004
Test Fluid: Water
Test Flow Rate: 32 m/h 0.51 gpm

REMARKS:

April, 2007

Certification must be renewed annually. For current status contact:
SOLAR RATING & CERTIFICATION CORPORATION
c/o FSEC • 1679 Clearlake Road • Cocoa, FL 32922 • (321) 638-1537 • Fax (321) 638-0010

Values for (P)

CATEGORY	APPLICATION
A -5°C (-9°F)	Certain types of solar assisted heat pumps. Swimming pool heating.
B 5°C (9°F)	Liquid collectors with certain types of solar assisted heat pumps. Swimming pool heating. Space heating - air systems.
C 20°C (36°F)	Service hot water systems. Space heating - air systems.
D 50°C (90°F)	Service hot water systems. Space heating - liquid systems. Air conditioning.
E 80°C (144°F)	Space heating - liquid systems. Air conditioning. Industrial process heat.

Six Solar Thermal Systems STS 410BC Glazed Flat-Plat collectors used to provide space heating displacing a < 65,000 Btu/hr central air source heat pump for space heating purposes.

$\eta = 0.512 = 0.702 + (-.5785) (90°F) / (317.40 Btu/hr/ft^2) + (-0.0010) (90°F)^2 / (317.40 Btu/hr/ft^2)$

$1,000 W/m^2 = 317.40 Btu/hr/ft^2$

$T_{PTC} = 11.677 kW_t = 317.40 Btu/hr/ft^2 x 0.512 x 6 panels x 40.86 ft^2/panel / 3,412$

$CEC\text{-}AC = (T_{PTC} / P_R) – E_{AUX}$

Note that $E_{AUX} = 0$, because collector pump is solar driven.

CEC-AC = 5.174 kW = [11.677 / (7.7 / 3.412)] – 0)

Table C-2
Standards for Single Phase Air-Cooled Air Conditioners with Cooling Capacity Less than 65,000 Btu per Hour and Single Phase Air-Source Heat Pumps with Cooling Capacity Less than 65,000 Btu per Hour, Not Subject to EPAct

Appliance	Effective January 23, 2006			
	Minimum SEER	Minimum HSPF	Minimum SEER	Minimum HSPF
Split system air conditioners	10.0	—	13.0	—
Split system heat pumps	10.0	6.8	13.0	7.7
Single package air conditioners	9.7	—	13.0	—
Single package heat pumps	9.7	6.6	13.0	7.7
Space constrained air conditioners – split system	10.0	—	reserved	—
Space constrained heat pumps – split system	10.0	6.8	reserved	reserved
Space constrained air conditioners – single package	9.7	—	reserved	—
Space constrained heat pumps – single package	9.7	6.6	reserved	reserved

2006 Appliance Efficiency Regulations

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Attachment B

California Solar Initiative Program
Measurement & Metering Methodology for
Non-Photovoltaic Technologies

California Solar Initiative Program
Measurement & Metering Methodology for Non-Photovoltaic Technologies

May 31, 2007

Background

In D.06-01-024, the Commission stated its intent that all solar technologies should qualify for incentives, including solar photovoltaic (PV), solar thermal, solar water heating, solar heating and air conditioning, and concentrating solar technologies.[1] In D.06-12-033, the Commission directed the CSI program administrators to assign or hire technical experts to address estimation, measurement and metering of non-PV solar projects that displace electricity.

The CSI program administrators directed Alternative Energy Systems Consulting, Inc. to assemble a team of experts in the field of solar thermal heating, cooling and electric generating technologies. AESC assembled experts from the Florida Solar Energy Center (Robert M. Reedy, Director - Solar Energy Division), Sandia National Laboratories (Greg Kolb, Systems Engineer) and the National Renewable Energy Laboratory (Tim Merrigan, Senior Program Manager).

Presentations were made by solar thermal heating, cooling and electric generation technology developers and providers; first at the March 15, 2007 CSI PA working group meeting and second at a non-photovoltaic technology workshop held at SDREO April 13, 2007. The presenters included; Serge Adamian, President, SunChiller, Inc.; Deris Jeannette, CEO/Designer, ClearDome Solar Thermal, LLC; Barry Butler, PhD, Butler Solar Solutions; Lori A. Glover & John Ellers Co-CEOs, S.O.L.I.D. USA, Inc.; David Townley of Townley Tech representing Infinia Corporation.

Non-Photovoltaic Technology Scope

Eligible non-photovoltaic technologies, that displace customer electric purchases from the grid and for purposes of this study, include –

- Solar water heating[2]
- Solar space & process heating
- Solar driven cooling (absorption & adsorption chillers, desiccant systems, etc.)
- Concentrating solar heating and electric generators (trough, dish and lens; Rankine and Stirling, etc.)

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[1] The Commission noted the need for further workshops and comments to obtain further information about the non-PV solar technologies before committing to provide incentives to them.

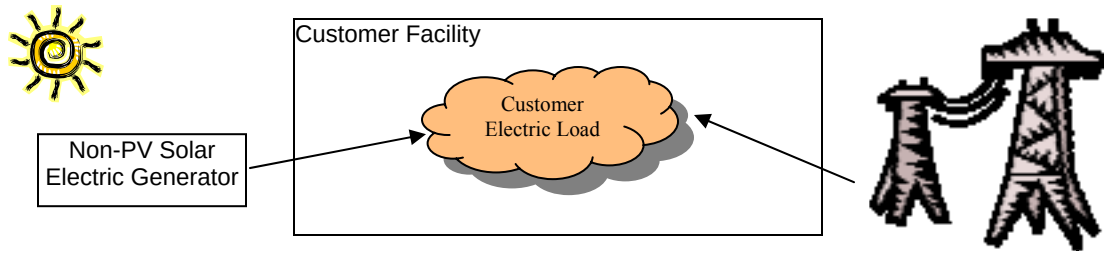
[2] Per D.06-12-033, page 24, the Commission noted "we will include solar thermal and solar water heating in our CSI incentive program, but only those solar thermal technologies that displace electric usage." Also, D.06-12-033, Conclusions of Law, #19, page 38.

Note that the measurement & metering methods discussed in this document are not applicable to solar water heating systems eligible for SDREO's solar hot water heating pilot program.[3]

Estimate of Displaced Electric Grid Load

As directed by the Commission decision "Non-PV solar projects that displace electricity should receive the same incentives, either PBI [Performance Based Incentives] or EPBB [Expected Performance Based Buydown], as paid to PV projects."[4] Therefore the challenge is to determine how much grid supplied electricity would be displaced by the implementation of non-PV technologies.

For non-PV electric generators, the estimate of displaced electricity is fairly straight forward.



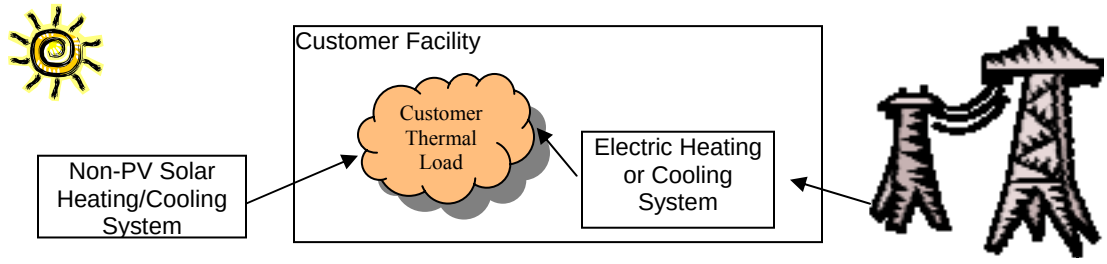
$E_{DE} = E_{NPV}$

Where;

"E_{DE}" = Displaced electricity from the grid.

"E_{NPV}" = Net electric output[5] of the non-PV system.

For non-PV heating or cooling, the estimate of displace electric is more complicated.



$E_{DE} = (T_{NPV} / P_R) - E_{AUX}$

Where;

"E_{DE}" = Displaced electricity from the grid.

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[3] Per D.06-01-024 SDREO has proposed a solar hot water heating pilot program. In that order, the Commission directed SDREO to draft and file a plan for a solar water heating pilot program in the SDG&E territory.

[4] D.06-12-033, Conclusions of Law, page 39.

[5] Net electric output is the system gross output less any ancillary loads or conversion device losses (e.g. inverters, etc.).

"T_{NPV}" = Thermal (heating or cooling) output of the non-PV system (which may include an absorption chiller or other heat driven cooling system) in kilowatts thermal (kW_T)

"P_R" = Dimensionless Performance Ratio of the conventional electric heating or cooling system calculated by the heating or cooling energy output of the system divided by its electric energy input.

"E_{AUX}" = Ancillary electric equipment (e.g. pumps, etc.) used for the solar thermal system operation.

It can be challenging to accurately establish the Performance Ratio ("P_R"). For electric resistive heating systems, the Performance Ratio is fairly constant over the load range and is relatively unaffected by outdoor ambient conditions. However, other electric systems, such as heat pumps and vapor compression air conditioning equipment, have highly variable performance ratios over the load range and are significantly affected by outdoor ambient conditions.

There already exist standards for rating the performance of electric heating and cooling systems. However, rated performance (even if seasonally or load adjusted) is rarely duplicated in real-world installations. This is primarily due to off-design operation of the equipment, inadequate maintenance, poor equipment installation, and/or ambient conditions different than used for rating purposes.

In order to characterize the Performance Ratio for specific situations, baseline heating/cooling load data collection and electric equipment modeling would be necessary. This is prohibitively costly and time consuming.

Another important downside to using installed actual performance of electric heating and cooling systems to determine the Performance Ratio, is that poorer performing equipment would result in higher displaced electricity. This provides a disincentive for utility customers to replace less efficient heating and cooling equipment for higher efficiency equipment. This counters the California Solar Initiative's intent to encourage end-use efficiency.

To encourage end-use efficiency and reduce participate and administrator overhead we recommend that the Performance Ratio be determined by utilizing statewide minimum efficiency standards.

The Performance Ratio may be calculated one of the following two ways –

1) From the minimum efficiency standards for the type and size of the conventional electric heating or cooling system being displaced. The minimum efficiency standards for these equipment are found in the statewide Standard Performance Contract program (Appendix A) and/or the California Appliance Efficiency Regulations[6]. For electric resistive heating systems, the Performance Ratio will be assumed to be 1.0. Integrated Part-Load Value (IPLV), ratings will be used for systems that modulate capacity. Energy Efficiency Ratio (EER), Seasonal Energy Efficiency Ratio (SEER), Heating Seasonal Performance Factor (HSPF) and Coefficient of Performance (COP) ratings will be used

[6] Appliance Efficiency Regulations, California Energy Commission, CEC-400-2006-002, December 2006.

for systems that do not modulate capacity. The conversion of IPLV, EER, SEER, HSPF and COP to the dimensionless Performance Ratio is accomplished as follows -

For IPLV: P_R = IPLV / 3.412

For SEER: P_R = SEER / 3.412

For HSPF: P_R = HSPF / 3.412

For EER: P_R = EER / 3.412

For COP: P_R = COP

2) An engineering model of the facility's heating or cooling load resulting in the electric consumption and output of the conventional electric heating or cooling system being displaced, assuming an minimum efficiency rating for the conventional system. The Performance Ratio is then calculated by dividing the modeled annual output by the electric input and converting to dimensionless units. Appropriate models include DOE-2 (or its derivatives; eQuest, PowerDOE, EnergyPro, etc.), EnergyPlus, Apache, or other engineering based simulation models.

System Capacity Rating

Non-PV system capacity must be rated in terms of their electric output or potential electric displacement. System capacity rating is important because the CSI program includes system sizing requirements relative to customer load and the EPBB incentive is based on system capacity. How non-PV solar technology capacity is rated depends on the type of technology. However, all ratings should be based on PTC[7] so that it is compatible with the CEC-AC rating of PV systems.

For non-PV solar electric generators, the system rating (CEC-AC) is the net electric power output of the system at PTC.

CEC-AC = E_{PTC}

Where;

CEC-AC = Non-PV system electric rating at PTC.

"E_{PTC}" = Net electric output of the non-PV system at PTC.

For solar thermal systems that displace electric load the system rating (CEC-AC) is the rated thermal output at PTC, divided by the Performance Ratio of the electric equipment being displaced, less any solar thermal system ancillary loads at rated conditions.

CEC-AC = (T_{PTC} / P_R) – E_{AUX}

Where;

CEC-AC = System displaced electric rating at PTC.

---

[7] The PTC (PVUSA Test Conditions) rating is based upon 1,000 Watt/m2 solar irradiance, 20 °Celsius ambient temperature, and 1 meter/second wind speed. PTC ratings for non-PV systems should be established by a Nationally Recognized Testing Laboratory (SRCC, NREL, Sandia National Laboratories or others). An example PTC rating using the SRCC OG100 efficiency equation for a glazed solar collector can be found in Appendix D.

"T_{PTC}" = Thermal output (cooling or heating) of the non-PV system in kilowatts thermal (kW_T) at PTC and the operating temperature of the solar collector. If the system includes an absorption chiller or other heat driven cooling system, the system thermal rated output is either the PTC rated thermal output of the panels multiplied by the rated COP[8] of the absorption chiller, or the rated capacity of the absorption chiller, which ever is less.

"P_R" = Dimensionless Performance Ratio of the conventional electric heating or cooling system calculated by the heating or cooling energy output of the system divided by its electric energy input.

"E_{AUX}" = The load of the ancillary electric equipment (e.g. pumps, etc.), at rated conditions, used for the solar thermal system operation.

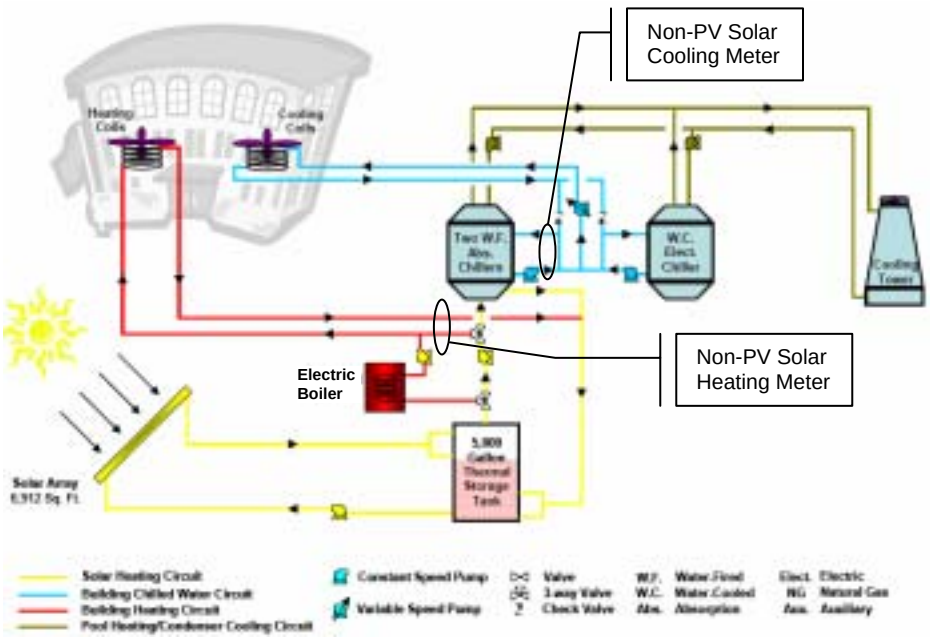
PBI Incentives

Performance Based Incentives (PBI) are the most accurate method of providing incentives for non-PV systems. However, it requires proper and accurate metering to ensure that the correct determination of displaced electricity can be made.

For non-PV electric generators, the metering is straight forward and should conform to the CSI requirements for PV systems. (See California Solar Initiative - Final Handbook, April 2007 – Appendix B: Metering Requirements)

For non-PV thermal systems, the thermal output of the system servicing the customer's thermal load must be metered, divided by the Performance Ratio for the backup, displaced or replaced electric heating or cooling system. The location of the metering is critical for correct assessment of the useful thermal output of the non-PV system. Metering should be placed in the process such that the thermal energy delivered (or removed in the case of cooling) to the customer's thermal load is accurately measured. For example, in the case of a hybrid heating and cooling system –

[8] "COP" is the Coefficient of Performance of a cooling system. It is the dimensionless ratio of the cooling output divided by the heat input. Absorption chiller COP runs in the range of 0.6 to 1.2 depending on the size the chiller, whether the condenser is water or air cooled and if it is single or double effect.



[Permission for the hybrid system image provided by Bob Hess of the Salt River Project]

Non-PV heating and cooling systems may have high ancillary loads[9], which degrade overall avoided electric consumption potential. Because of this potential performance degradation, ancillary electric loads for solar thermal heating and cooling systems, under PBI, will be measured and subtracted from the calculated gross avoided electric consumption. Measurement of electric ancillary loads complicates metering and adds cost. Therefore, ancillary load measurements will be required only if the ancillary rated load is ≥ 5% (i.e., within the uncertainty of the thermal measurement) of the gross avoided electric load potential.

The avoided monthly electric energy (kWh/month) will be calculated by dividing the measured delivered cooling or heating (in equivalent electric thermal) by the appropriate Performance Ratio and, if required, subtracting the system's measured ancillary load (kWh/month). The incentive payment is then determined by multiplying the net avoided electric load with the incentive rate ($/kWh).

Example #1 – Solar Space Cooling System

$$E_{DE} = ((T_{NPV} / 3{,}412) / P_R) - E_{AUX}$$

$$\$_{PBI} = E_{DE} \times \$_{PBIrate}$$

Where;

"E_{DE}" = Displaced electricity from the grid.

"T_{NPV}" = Measured thermal (heating or cooling) output of the non-PV system (which may include an absorption chiller or other heat driven cooling system) in Btu/month.

[9] A Salt River Project study found that "…solar thermal HVAC systems require more energy to operate pumps associated with the circulation requirements of absorption chillers." [ref – SRP Solar Thermal HVAC Feasibility – Study Results, Salt River Project, April 2005.]

"P_R" = Dimensionless Performance Ratio of the conventional electric heating or cooling system calculated by the heating or cooling energy output of the system divided by its electric energy input. In this example, the conventional cooling system is a 20 Ton (240 kBtu/hr) air cooled packaged chiller with a standard IPLV of 9.2. The Performance Ratio for this system is 2.7.

"E_{AUX}" = Ancillary electric equipment (e.g. pumps, etc.) used for the solar thermal system operation.

"$\$_{PBI}$" = Monthly PBI incentive payment.

"$\$_{PBIrate}$" = Current step PBI incentive rate (e.g. $0.34/kWh)

PBI Thermal Meter

For liquid solar heating and cooling systems, it is practical to use a commercial BTU meter.[10] The BTU meter specifications shall be as follows –

- Provides totalizing outputs in BTUs per period.
- Capable of remote communications.
- Monthly totalizing accuracy of ≤ 5%.[11]
- Flow meter and temperature sensor accuracy is NIST traceable.

EPBB Incentives

Expected Performance Based Buydown (EPBB) pays an upfront incentive based on a forecasted performance of the solar system. For non-PV systems this is calculated by multiplying the system's CEC-AC rating, Surface Orientation Factor (SOF)[12,13] and the appropriate capacity based EPBB incentive rate.[14]

Example #2 – Small Solar Space Cooling System

$$\$_{EPBB} = \text{CEC-AC} \times \text{DF} \times \$_{EPBBrate}$$

Where;

"$\$_{EPBB}$" = Upfront incentive payment.

"CEC-AC" = System displaced electric capacity rating at PTC.

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[10] Hot air solar systems will need to be paid incentives based on the EPBB method described below. Metering the thermal output of solar hot air systems, within reasonable accuracy and cost, is difficult.

[11] At least one BTU meter supplier has provided information showing that 5% accuracy is achievable. See Appendix B for an example Btu meter accuracy calculation.

[12] The "Surface Orientation Factor" and how it is calculated is detailed in "Effects of Tilt and Azimuth on Annual Incident Solar Radiation for United States Locations", Proceedings of Solar Forum 2001, April 21-25, Washington D.C

[13] SOF charts for various California locations may be found in Appendix C of this paper.

[14] Note that the described EPBB methodology is only appropriate for solar systems displacing only electric load. For solar systems simultaneously displacing gas and electric loads, the solar energy displacing the electric load must be metered under a PBI arrangement.

"DF" = Design Factor that modifies the incentive rate accounting for location, tilt and orientation of the system. For fixed solar thermal collectors, the DF is the Surface Orientation Factor (SOF).

"SOF" = Surface Orientation Factor for the location, tilt and azimuth of the system. Charts of SOF for various California locations may be found in Appendix C. The chart for the closest location to the system's location should be chosen and the SOF determined by reading it off of the chart using the system's tilt and azimuth.

"$\$_{EPBBrate}$" = Current step EPBB incentive rate (e.g. $2.50/kW)

APPENDIX A – California IOU SPC Tables [ref 2007 SPC Procedures Manual, Appendix C, January 31, 2007]

Table C1 – ELECTRICALLY OPERTED UNITARY AIR CONDITIONERS AND CONDENSING UNITS – MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-A)

Equipment Type	Size Category	Efficiency *	Test Procedure
Air Conditioners, Air Cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	10.3 EER[b]	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	9.7 EER[b]	ARI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	9.5 EER[b] and 9.7 IPLV[b]	
	≥ 760,000 Btu/h	9.2 EER[b] and 9.4 IPLV[b]	
Air Conditioners, Water and Evaporatively Cooled	> 240,000 Btu/h	11.0 EER[b] and 10.3 IPLV[b]	ARI 340/360
Condensing Units, Air Cooled	≥ 135,000 Btu/h	10.1 EER and 11.2 IPLV	ARI 365
Condensing Units, Water or Evaporatively Cooled	≥ 135,000 Btu/h	13.1 EER and 13.1 IPLV	
* IPLVs are only applicable to equipment with capacity modulation.			
[b] Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.			

Table C2 – UNITARY AND APPLIED HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-B)

Equipment Type	Size Category	Subcategory or Rating Condition	Efficiency *	Test Procedure
Air Cooled (Cooling Mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Split System and Single Package	10.1 EER[b]	ARI 340/360
	≥ 135,000 Btu/h and <240,000 Btu/h	Split System and Single Package	9.3 EER[b]	ARI 340/360
	≥ 240,000 Btu/h	Split System and Single Package	9.0 EER[b] 9.2 IPLV[b]	
Air Cooled (Heating Mode)	≥ 65,000 Btu/h and < 135,000 Btu/h (Cooling Capacity)	47°F db/43°F wb Outdoor Air	3.2 COP	ARI 210/240
	≥ 135,000 Btu/h (Cooling Capacity)	47°F db/43°F wb Outdoor Air	3.1 COP	ARI 340/360
* IPLVs and Part load rating conditions are applicable only to equipment with capacity modulation.				
[b] Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.				

Table C-4 – WATER CHILLING PACKAGES – MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-D)

Equipment Type	Size Category	Efficiency	Test Procedure
Air Cooled, With Condenser, Electrically Operated	< 150 Tons	2.80 COP	ARI 550/590
	≥ 150 Tons	3.05 IPLV	
Air Cooled, Without Condenser, Electrically Operated	All Capacities	3.10 COP 3.45 IPLV	
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	All Capacities	4.20 COP 5.05 IPLV	ARI 550/590
Water Cooled, Electrically Operated, Positive Displacement (Rotary Screw and Scroll)	< 150 Tons	4.45 COP 5.20 IPLV	ARI 550/590
	≥ 150 Tons and < 300 Tons	4.90 COP 5.60 IPLV	
	≥ 300 Tons	5.50 COP 6.15 IPLV	
Water Cooled, Electrically Operated, Centrifugal	< 150 Tons	5.00 COP 5.25 IPLV	ARI 550/590
	≥ 150 Tons and < 300 Tons	5.55 COP 5.90 IPLV	
	≥ 300 Tons	6.10 COP 6.40 IPLV	
Air Cooled Absorption Single Effect	All Capacities	0.60 COP	ARI 560
Water Cooled Absorption Single Effect	All Capacities	0.70 COP	
Absorption Double Effect, Indirect-Fired	All Capacities	1.00 COP 1.05 IPLV	
Absorption Double Effect, Direct-Fired	All Capacities	1.00 COP 1.00 IPLV	
Water Cooled Gas Engine Driven Chiller	All Capacities	1.2 COP 2.0 IPLV	ANSI Z21.40.4

Table C-5 – PACKAGED TERMINAL AIR CONDITIONERS AND PACKAGED TERMINAL HEAT PUMPS – MINIMUM EFFICIENCY REQUIREMENTS (TABLE 112-E)

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Efficiency *	Test Procedure
PTAC (Cooling Mode) New Construction	All Capacities	95°F db Outdoor Air	12.5 - (0.213 x Cap/1000)* EER	ARI 310/380
PTAC (Cooling Mode) Replacements[b]	All Capacities	95°F db Outdoor Air	10.9 - (0.213 x Cap/1000)* EER	
PTHP (Cooling Mode) New Construction	All Capacities	95°F db Outdoor Air	12.3 - (0.213 x Cap/1000)* EER	
PTHP (Cooling Mode) Replacements[b]	All Capacities	95°F db Outdoor Air	10.8 - (0.213 x Cap/1000)* EER	
PTHP (Heating Mode) New Construction	All Capacities		3.2 - (0.026 x Cap/1000)* COP	
PTHP (Heating Mode) Replacements[b]	All Capacities		2.9 - (0.026 x Cap/1000)* COP	

* Cap means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7000 Btu/h, use 7000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.

[b] Replacement units must be factory labeled as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS." Replacement efficiencies apply only to units with existing sleeves less than 16 inches high and less than 42 inches wide.

Appendix B – Commercial BTU Meter Accuracy Requirements

BTU meters measure energy flow from a hot source to a cold sink by measuring differential temperature and flow of the working fluid. Commercially available hydronic BTU meters can be found to have the following, National Institute of Standards and Technology (NIST) traceable, accuracy specifications -[15]

Differential temperature error (ºF) = ±0.15 ºF

Differential temperature error (%) = {(0.15 + 10) /10} – 1 = 1.5%

Flow error (GPM) = 0.4 GPM

Flow error (%) = 1.0%

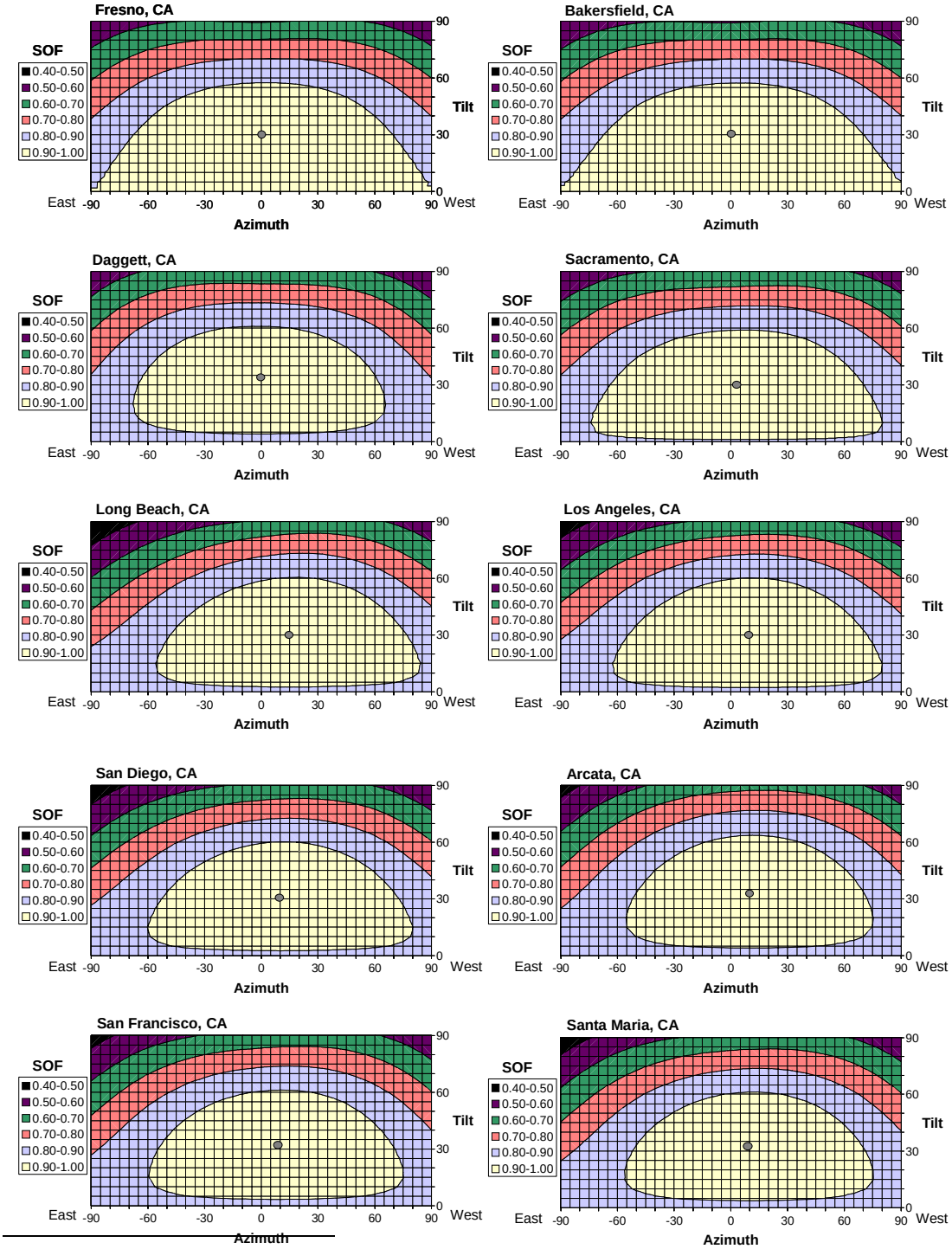
Computational error (%) = 0.05% (digitizing error)

The combined BTU accuracy is calculate using the square root sum of the squares (SRSS) method

Average energy error (%) = $\{(1.5\%)^2 + (1.0\%)^2 + (0.05\%)^2\}^{1/2} = 1.80\%$

[15] "Compare and Contrast BTU Measurement Using Building Control Systems Versus ONICON BTU Meters", VOLUME 3.1, June 4, 2003

Appendix C – Surface Orientation Factors for California Locations[16,17]



[16] Surface Orientation Factor plots provided courtesy of Craig Christensen, Principal Engineer, National Renewable Energy Laboratory.

[17] SOF plots for coastal California locations show the optimal azimuth to be somewhat west of south (presumably due to morning fog in those locations). It is important to remember that this is a temporal effect (foggy skies in the morning when the sun is to the east, clear skies in the afternoon when the sun is to the west).

Appendix D – Example PTC Rating for Glazed Solar Collector

SRCC Collector Efficiency Equation

$\eta = A_o + B_o (P)/I + C_o (P)^2/I$

Where,

I = Solar Irradiance

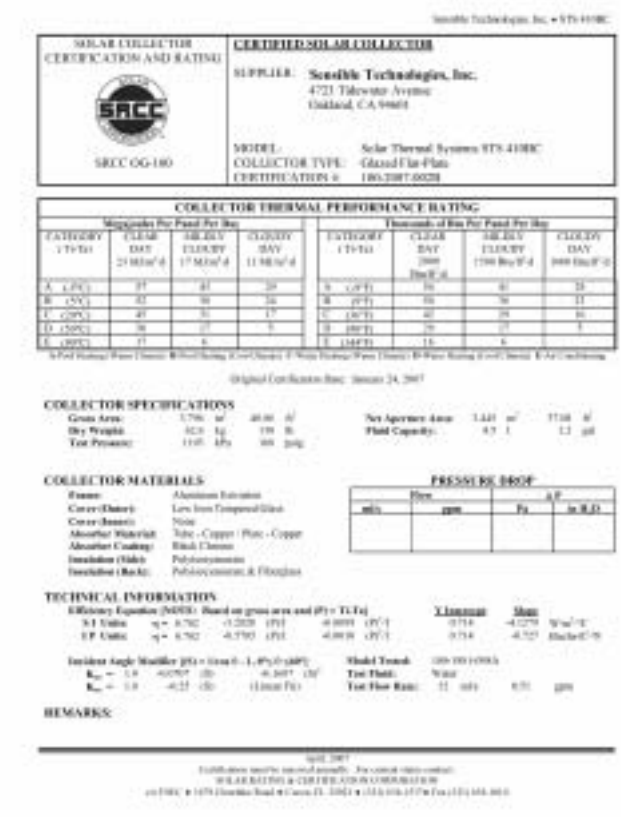
(P) = (Ti – Ta)

Ti = Inlet Temperature

Ta = Ambient Temperature

Values for (P)

CATEGORY	APPLICATION
A -5ºC (-9ºF)	Certain types of solar assisted heat pumps. Swimming pool heating.
B 5ºC (9ºF)	Liquid collectors with certain types of solar assisted heat pumps. Swimming pool heating. Space heating - air systems.
C 20ºC (36ºF)	Service hot water systems. Space heating - air systems.
D 50ºC (90ºF)	Service hot water systems. Space heating - liquid systems. Air conditioning.
E 80ºC (144ºF)	Space heating - liquid systems. Air conditioning. Industrial process heat.



SOLAR COLLECTOR CERTIFICATION AND RATING

SRCC OG-100

CERTIFIED SOLAR COLLECTOR

SUPPLIER: Sunstrip Technologies, Inc.
4721 Tidewater Avenue
Oakland, CA 94601

MODEL: Solar Thermal Systems STS 410BC
COLLECTOR TYPE: Glazed Flat-Plate
CERTIFICATION #: 100-2007-002B

COLLECTOR THERMAL PERFORMANCE RATING

COLLECTOR SPECIFICATIONS

COLLECTOR MATERIALS

PRESSURE DROP

TECHNICAL INFORMATION

REMARKS:

Six Solar Thermal Systems STS 410BC Glazed Flat-Plat collectors used to provide space heating displacing a < 65,000 Btu/hr central air source heat pump for space heating purposes.

$\eta = 0.512 = 0.702 + (-.5785)\ (90ºF) / (317.40\ Btu/hr/ft^2) + (-0.0010)\ (90ºF)^2 / (317.40\ Btu/hr/ft^2)$

$1{,}000\ W/m^2 = 317.40\ Btu/hr/ft^2$

$T_{PTC} = 11.677\ kW_t = 317.40\ Btu/hr/ft^2 \times 0.512 \times 6\ panels \times 40.86\ ft^2/panel / 3{,}412$

$CEC\text{-}AC = (T_{PTC} / P_R) – E_{AUX}$

Note that $E_{AUX} = 0$, because collector pump is solar driven.

$CEC\text{-}AC = 5.174\ kW = [11.677 / (7.7 / 3.412)] – 0)$

Table C-2
Standards for Single Phase Air-Cooled Air Conditioners with Cooling Capacity Less than 65,000 Btu per Hour and Single Phase Air-Source Heat Pumps with Cooling Capacity Less than 65,000 Btu per Hour, Not Subject to EPAct

Appliance	Minimum Efficiency			
	Effective January 1, 1995		Effective January 23, 2006	
	Minimum SEER	Minimum HSPF	Minimum SEER	Minimum HSPF
Split system air conditioners	10.0	—	13.0	—
Split system heat pumps	10.0	6.6	13.0	7.7
Single package air conditioners	9.7	—	13.0	—
Single package heat pumps	9.7	6.6	13.0	7.7
Space constrained air conditioners – split system	10.0	—	reserved	—
Space constrained heat pumps – split system	10.0	6.6	reserved	reserved
Space constrained air conditioners – single package	9.7	—	reserved	—
Space constrained heat pumps – single package	9.7	6.6	reserved	reserved

2006 Appliance Efficiency Regulations