SunEarth Inc.

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SunEarth Comments – Non Water Heating Technologies

1. PROCESS HEATING

TESS should develop a TRNSYS template for solar process heating. Collectors performance will be based on OG-100 & therefore only liquid in collectors can be modeled. Collectors using vapor or steam in the collector should be excluded. We recommend that this calculator be kept to a simple set of inputs. There are many additional inputs which could be used to improve the accuracy of the predicted savings, however, more inputs are only of value if they can be inspected and verified. Providing inputs which cannot in practice be verified will only incentivize gaming the - system. If it can't be checked, it should not be included.

Recommended calculator inputs:

1. Collector model – *from OG-100 drop down list*. Implicit in this selection will be gross area; y-intercept, slope and IAM of collector.
2. Climate zone or ZIP code weather data.
3. Collectors tilt.
4. Collector Azimuth.
5. Solar storage included?
   - If yes, volume of storage in system.
6. Make up water or closed loop heating?
   a. If Make Up Water – TRNSYS will use incoming water as local mains temperature
   b. If closed loop – return fluid temperature (returning to collectors) will be entered.
7. Supply fluid temperature & type (glycol, water, etc)
8. Average daily fluid volume supplied, GPD.
9. Draw profile - *selected from drop down list* to include typical draw profiles or use a constant flat draw profile.

2. RESIDENTIAL DHW & SPACE HEATING COMBI-SYSTEMS

Due to the large number of possible system configurations, there is no justification for adding multiple TRNSYS templates.

Residential combi-systems should be eligible for the DHW rebate even if the system is larger than any listed OG-300 system.

Additional rebate (if cap is increased) should be based on "Kicker" rebate as described in "Attachment A" or simply based on additional sq.ft of collector and location (heating degree days for the climate zone).

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

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

California Public Utilities Commission
California Solar Initiative and Distributed Generation Rulemaking
R.10-05-004

CSI-THERMAL PROGRAM
NON-WATER HEATING SOLAR THERMAL TECHNOLOGIES
REQUEST FOR POST-WORKSHOP COMMENTS

FEBRUARY 25, 2011

On February 23, 2011, Energy Division hosted a public workshop to discuss opening the CSI-Thermal Program to non-water heating solar thermal technologies and process heat applications. At the workshop, parties discussed the types of technologies that might seek to participate in the program, explored ways to develop standards for these technologies, and examined potential options for paying incentives to these technologies.

In order to have a complete account of parties' proposals and recommendations on this issue, and to solicit comment from parties that were not present at the workshop, we now ask parties to submit their written comments. Written comments should be sent informally to Energy Division, and should NOT be filed formally with the commission. However, to allow all parties to see the comments, we ask that comments also be sent to the service list for Proceeding R. 10-05-004. Thus, comments should be sent to df1@cpuc.ca.gov and to all parties on Service List R. 10-05-044, which can be accomplished by copying Column D of the spreadsheet located at the following CSV file: http://docs.cpuc.ca.gov/published/service_lists/R1005004_79118.csv.

In order to provide a basis for discussion guide comments in a way that provides useful information, Energy Division and the Program Administrators have devised a list of questions that parties may choose to answer in their comments. Although there are a few general questions, in order to make questions targeted and specific, most of the questions are organized by technology type. Parties are not required to answer all of these questions, nor are they limited to discussing the issues raised in these questions.

Comments should be submitted no later than Friday, March 18.

For more information on how to submit comments, contact: Damon Franz (415) 703-2165; df1@cpuc.ca.gov

POST-WORKSHOP QUESTIONS FOR PARTIES

General Questions:

If applicable, please describe the technology that your company produces and the types of applications it would likely serve. **Liquid Flat plate collectors. Applications include DHW, Space heating, combi-systems and process heat.**

Are there existing standards developed by an independent agency that provide guidelines for proper system design and installation of the technology you employ? **None that I am aware of.**

What tools do you use to estimate building loads and predict the energy production/offset of your system? **F-chart & Polysun**

Do you have recommendations for metering displaced energy that can more cost-effective than the methods currently listed in the Program Handbook? **Yes, Sunreports Apollo 1 & 2, Steca 0603 controller with monitoring. Both these units use Grundfos direct sensors for measuring flow and therefore meet the specifications for CPM but not M&E.**

Technology-Specific Questions

Space Heating or Combination systems (space heat/Domestic Hot Water):

Residential:

Under the current residential rules, systems are held to an incentive cap of $1,875. Many systems providing water heating plus additional thermal energy would exceed this cap.

Should the incentive cap be increased for combination systems? **Yes**

If the cap were to be increased for combination systems, how much or by what method should we use to determine the new cap? **Up to double the DHW cap.**

If the cap could not be increased, is it worth developing/including a residential combination system incentive? **No**

Under the current residential rules, most combination systems would not be eligible because SRCC does not certify systems that are intended to provide non-water heating thermal energy.

Would it be necessary for the Legislature to change the OG-300 requirement or for SRCC to change its certification practices in order to allow combination systems?

If the OG-300 requirement is not a limiting factor, what sizing rules of thumb should we use for combination systems?

Because the OG-300 rating applies only to domestic hot water production, a new incentive calculation method would be required for the space heating and/or cooling components of a residential combination system.

What should be the method for calculating the incentive for combination systems? Options discussed at the workshop included 1) developing a TRNSYS template to model the energy savings; and 2) developing a standard "kicker" for additional savings based on the methodology described in Attachment A. **Kicker method preferred. There are too many types of combi-system to economically develop TRNSYS templates for all possibilities.**

Commercial/Multi-family:

Do you foresee a need to include stand-alone solar space heating? **No**

Do you foresee applications that produce steam in the collector? If yes, please describe the application. **No**

Should we develop installation standards and system design requirements? If so, what should those standards be, or by what process should we develop them? **No**

How should we calculate energy displacement for purposes of paying incentives? Payments can go to any parties involved. Options discussed at the workshop include:

-Up Front: Program Administrators create a simulation tool to predict system performance, and payment is made in one lump sum based on that estimate.
-Performance-Based Incentive: Pay incentive based on actual metered energy displacement over a number of years. The nominal value of the incentive would be increased to compensate the customer for time-value of money. Metering cost would be born by the applicant.
-70/30 true-up: A partial payment is made up front, and the balance paid after 1 year of metering.

Should project size determine the incentive calculation method? **Yes**

Options for determining load profiles include: 1) Use data from pre-installation metering for a given period and extrapolate to create a load profile for 8760 hours of the year Professional Engineer stamp would likely be required); and 2) Use data from the California Commercial End Use Survey Data (link: http://www.energy.ca.gov/ceus/index.html)

If the incentive payment is based on a modeling simulation, how should we determine building load profiles? If there are options for determining load profiles other than those listed above, please provide them here.

Process Heat:

What types of process heat applications will you consider installing? Please describe the load and the system configuration, including temperature needs, storage needs, etc. **Pre-heat make up water to boilers: incoming at mains temperature, outgoing up to 140 F. Low - Medium temperature process heating for Pre-heating agricultural products, fermentation, bio-digestion: supply temperatures 90°F to 160°F.**

Do you foresee applications that produce steam in the collector? If yes, please describe the application. **No**

Should we develop installation standards and system design requirements? If so, what should those standards be, or by what process should we develop them? **No**

How should we calculate energy displacement for purposes of paying incentives? Payments can go to any parties involved. Options discussed at the workshop include: **TRNSYS Process Heating Template: Up Front payment up to 250 kW.**

-Up Front: Program Administrators create a simulation tool to predict system performance, and payment is made in one lump sum based on that estimate.
-Performance-Based Incentive: Pay incentive based on actual metered energy displacement over a number of years. The nominal value of the incentive would be increased to compensate the customer for time-value of money. Metering cost would be born by the applicant.
-70/30 true-up: A partial payment is made up front, and the balance paid after 1 year of metering.

Should project size determine the incentive calculation method?

Options for determining load profiles include: 1) Use data from pre-installation metering for a given period and extrapolate to create a load profile for 8760 hours of the year Professional Engineer stamp would likely be required); and 2) Use data from the California Commercial End Use Survey Data (link: http://www.energy.ca.gov/ceus/index.html)

If the incentive payment is based on a modeling simulation, how should we determine building load profiles? If there are options for determining load profiles other than those listed above, please provide them here.

Solar cooling:

Do foresee installing solar assisted absorption chiller with gas back-up to replace part of an existing electric system chiller?

Do you foresee applications that produce steam in the collector? If yes, please describe the application?

Should we develop installation standards and system design requirements? If so, what should those standards be, or by what process should we develop them?

How should we calculate energy displacement for purposes of paying incentives? Payments can go to any parties involved. Options discussed at the workshop include:

-Up Front: Program Administrators create a simulation tool to predict system performance, and payment is made in one lump sum based on that estimate.
-Performance-Based Incentive: Pay incentive based on actual metered energy displacement over a number of years. The nominal value of the incentive would be increased to compensate the customer for time-value of money. Metering cost would be born by the applicant.
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If the incentive payment is based on a modeling simulation, how should we determine building load profiles? If there are options for determining load profiles other than those listed above, please provide them here.

Attachment A:

Proposed method for determining a "kicker" for space heating component of a residential combination system

Step 1: Identify a "typical" house in terms of size and UA value. The UA should be for a new Title 24 home. Suggested size is 1500 or 2000 square feet.

Step 2: Pick a climate zone to model (say San Diego)

Step 3: Simulate the energy for heating water (for 3 people) and combined space heating and DHW

Step 4: Simulate with one 4' x 10' collector, then two 4' x 10' collectors. Use the difference to estimate the kicker incentive (it will probably be around 25 -50% of the single-collector amount.

Step 5: Repeat this method for each of the climate zones. Simply determine the extra therms per square foot for one extra collector in each climate zone.

Step 6: Pay additional incentives for space heating as a "kicker" based on the additional energy savings determined by the modeling simulation above (rather than custom modeling each system).