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Our company is California Solar Thermal, Inc., and we are a solar thermal development company. We will create market awareness and demand, handle all customer relations and incentive paperwork, select and design systems, offer financing solutions, and work with a statewide network of installers to do the installations.

Here are our Post-Workshop Comments for the CPUC regarding the Non-Water Heating Solar Thermal Technologies portion of the CSI-Thermal Program:

General Questions:

If applicable, please describe the technology that your company produces and the types of applications it would likely serve.

Our company offers all types of solar thermal technologies, including domestic water heating, pool and spa heating, process heating, space heating, and solar cooling systems. The applications that can likely be served by non-water heating solar thermal technologies include manufacturing and processing plants, office buildings, multi-family housing, textile service companies, etc. To point out a few specific examples: A cheese manufacturing plant uses a closed heating loop at different temperatures during different parts of the cheese manufacturing process. A brewery also uses a closed heating loop during the brewing process to keep the "mash" between 165-170˚ F for a certain amount of time. A hot tub manufacturing plant tests each hot tub produced with ~ 400-500 gallons of 80˚ F water and uses a water recycling system.

Are there existing standards developed by an independent agency that provide guidelines for proper system design and installation of the technology you employ?

We are under the impression that the IEA is developing standards for non-water heating solar thermal technologies. For domestic water heating systems, we use the SRCC standards as well as the ASHRAE manual and UFC Criteria for Active Solar Preheat Systems. Currently, when we offer non-water heating solar thermal systems, we rely on the manufacturers of the components and our mechanical engineers to properly size and design the systems.

What tools do you use to estimate building loads and predict the energy production/offset of your system?

We currently use our mechanical engineers and energy auditors to estimate buildings loads. However, we are under the impression that there are many accurate tools available for use including TRNSYS, RETScreen, EQuest, Energy Plus, etc. We use TSOL, PolySun, and FCHART to estimate the energy production of our solar thermal systems.

Do you have recommendations for metering displaced energy that can more cost-effective than the methods currently listed in the Program Handbook?

Although we feel that more cost effective options are available on the metering side of things, we feel that for accurately metering displaced energy for non-water heating solar thermal systems, the current specifications for the meters for the large commercial systems should be adopted for non-water heating solar thermal systems.

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. The cap should be removed for combination systems.

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

There should not be a cap; instead the larger combination systems (which could be space heat / domestic hot water / & COOLING) should require metering and or PPD data submittals. We would also recommend offering a PBI rebate for these larger residential combination systems. For example, homes in the Rancho Santa Fe area can be 15,000 sq ft or more and will have large heating and cooling loads and therefore will be great applications for larger combination systems.

If the cap could not be increased, is it worth developing/including a residential combination system incentive?

Yes. Residential combination systems are a big market, especially in Northern California.

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?

A few years ago, the SRCC entertained the idea of establishing a OG-500 rating system which would provide ratings of combination solar heating systems. We strongly encourage them to revisit that idea. If that could not happen, we would need the Legislature to change the OG-300 requirement for residential systems and instead only require OG-100 collectors to be installed IF the system is a combination system.

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

We do not believe that rules of thumb should be used for sizing combination systems. An energy audit or Title 24 documentation should be required to establish the heating/cooling load(s) of the residence, and the system should be sized accordingly. There are too many variables to establish rules of thumb.

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.

We are in favor of the idea of developing TRNSYS templates to model the energy savings for combination systems as long as it is a cost-effective for the PAs to implement. We do not believe that the "kicker" method will be as accurate.

Commercial/Multi-family:

Do you foresee a need to include stand-alone solar space heating?

Yes. Office buildings do not use much hot water and have large heating loads.

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?

Yes, standards and system design requirements should be put in place. Most importantly, overheat protection design requirements should be established.

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?

We firmly believe that PBIs are the best way to pay rebates for non-water heating solar thermal systems. We feel that non-water heating solar thermal systems of any size should be paid using PBIs.

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.

We do not believe that the incentives for non-water heating solar thermal systems should be paid based on a modeling simulation. Instead, a PE stamp should be required on the engineered drawings and building load calculations. The PAs should not need to review the designs, and instead should only verify that their design requirements have been met.

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.

Breweries, wineries, food processing/manufacturing, etc. Loads will vary greatly, but closed loop systems will usually be the existing system that will be integrated with the solar thermal system. A brewery needs 165-170˚ F, wineries need about 140˚ F, and food processing/manufacturing plants need various temperatures for varied amounts of time. Storage will not always be necessary for solar process heating systems; however a dump load may be necessary for non-operating daytime hours.

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?

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Solar cooling:

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

Yes. With the availability of absorption/adsorption water-fired and hybrid chillers (with natural gas backup) comes an opportunity to increase the adoption of solar and natural gas cooling systems.

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?

Yes, standards and system design requirements should be put in place. Most importantly, overheat protection design requirements should be established.

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Regards,

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