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PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION **RESOLUTION E-4131**
December 20, 2007

R E S O L U T I O N

Resolution E-4131. Pacific Gas and Electric Company's (PG&E) and Southern California Edison (SCE), on behalf of all California Solar Initiative (CSI) Program Administrators, including the California Center for Sustainable Energy (CCSE), propose a set of revisions to the CSI Program Handbook that address non-photovoltaic (non-PV) technologies. The inclusion of these revisions will allow qualifying non-PV technologies to participate in the CSI program.

By PG&E Advice Letter 3060-E and SCE Advice Letter 2130-E (filed on June 1, 2007).

SUMMARY

PG&E and SCE propose CSI Program Handbook Revisions Designed to allow non-PV technologies to participate in the CSI program.

This Resolution approves the proposed revisions to the CSI Program Handbook. In approving these proposed revisions to the CSI Program Handbook, the CPUC is following both legislative and Commission directives to qualify non-PV technologies, including electric displacing solar thermal (generally defined as solar water heating, solar forced air heating and solar cooling or air conditioning) and electric generating solar thermal (generally defined as dish stirling, solar trough and concentrating solar technologies) for participation in the CSI Program. Currently, these technologies are not eligible for participation simply due to the fact that the CPUC had not previously had information to calculate incentives. As directed by Commission Decision (D.) 06-12-033, the CSI Program Administrators (PAs) hired technical experts to address estimation, measurement and metering of non-PV solar projects that displace electricity. These revisions to the CSI Handbook are a result of the recommendations developed by these technical experts.

- PG&E and SCE's proposed revisions conform with CPUC decisions and Sections 25405.5 and 25405.6, and Chapter 8.8 to Division 15 of the Public Resources Code, and Sections 387.5 and 2851 of the Public Utilities Code.

- PG&E and SCE's proposed changes, when not directly related to either CPUC decisions or California State Law, are in the spirit of the goals of the CSI Program and further the goal of achieving 3,000 MW of installed distributed generation solar by 2017.

- Comments to this Resolution shall be returned to the CPUC no later than 5 p.m. Pacific Standard Time on December 7, 2007, with Reply Comments being submitted no later than December 12, 2007, by 5 p.m. Pacific Standard Time. This Resolution will be on the next regularly scheduled meeting date after comments, likely to be December 20, 2007 date.

BACKGROUND

PG&E and SCE propose CSI Program Handbook Revisions Based on Legislative and Commission directives to include non-PV technologies in the CSI program.

In D.06-01-024, the Commission stated its intent that all solar technologies should qualify for financial incentives, including solar PV, solar thermal, solar water heating, solar heating and air conditioning, and concentrating solar technologies. 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. The CSI PAs hired and 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).

The CSI PAs convened a working group meeting on March 15, 2007. Presentations were made by solar thermal heating, cooling, and electric generation technology developers and providers. The same presentations were made again at a non-PV technology workshop held in at San Diego Regional Energy Office (now California Center for Sustainable Energy) on April 13, 2007.

The presenters included: Serge Adamian of SunChiller Inc; Deris Jeanette of ClearDome Solar Thermal; Barry Butler, Butler Solar Solutions; Lori Glover and John Ellers of S.O.L.I.D USA; and David Townley representing Infinia Corporation.

Based upon these presentations and input from the team of experts assembled by AESC, a draft methodology for the measurement and metering of non-PV technologies was developed and delivered to the CSI Program Administrators. This methodology specifically addresses the measurement of the electric displacement associated with non-PV technologies, which is then used to calculate either the Expected Performance Based Buydown (EPBB) or Performance Based Incentive (PBI). The AESC team also developed a System Capacity Rating methodology to determine system sizing, incentive eligibility and EPBB incentive levels for both electric generating and displacing systems.

The final issue that the AESC dealt with in their report was metering requirements for all non-PV technologies. The metering component of this filing is incomplete and will be supplemented at a later date. This supplement for thermal metering requirements will be filed as an Advice Letter in the near future. The proposals prepared by the AESC team were then integrated into the CSI Handbook as the revisions that make up the substance of this Advice Letter.

Summary of Proposed CSI Program Handbook Revisions

The goal of this set of CSI Program Handbook revisions is to integrate the necessary language and requirements to allow non-PV technologies to participate in the CSI. These additions to the CSI Program Handbook address the definition of non-PV technologies, the eligibility requirements of non-PV systems, system capacity rating for non-PV technologies, metering requirements[1], the estimation of EPBB based incentives, and the quantification of production (electric displacement of thermal systems) for PBI.

[1]A full proposal for thermal metering requirements will be submitted to the CPUC as a separate Advice Letter. In the interim, the current CSI metering requirements shall apply to all non-PV technologies. Functionally, this means that only technologies that meet these existing requirements can begin their application process in the CSI Program.

Summary of AL 2130-E and 3060-E:

1. **Definition of Non-PV technologies**: This proposed revision to the CSI Program Handbook supplements the current definition of non-PV technologies in the first section of the Handbook and adds new language that details the methodology behind the development of the requirements for non-PV. (Sec. 1.2.2 and 1.8)

2. **Eligibility of Non-PV Systems:** This proposed revision to the CSI Program Handbook states that in order for a non-PV system to be eligible for an incentive, it must use a solar based technology to displace customer electric purchases from the grid. While there is no set definition for what a non-PV technology is, this revision sets forth four categories of eligible technologies: solar water heating, solar space heating and process heating, solar driven cooling, and concentrating solar heating and solar electric generators. They also state that all non-PV systems must be safety and performance rated by a Nationally Recognized Testing Laboratory (NRTL). (Sec. 2.2.3 and 2.2.5)

3. **Non-PV System Capacity Rating**: This proposed revision to the CSI establishes the methodology for quantifying the capacity of non-PV technologies. This methodology sets a rating that is equivalent to the CEC-AC rating of PV modules. The methodology includes both a PVUSA Test Conditions (PTC) rating set by an NRTL and the Performance Ratio of the conventional unit that the solar thermal system is replacing. For solar thermal systems that displace electricity, the capacity rating and the Performance Ratio are then used to convert thermal output into electric displacement, which serves as the basis for incentive payments. These revisions also establish that system sizing for non-PV technologies shall use the same approach as PV technologies (system size in kW multiplied by Design Factor). (Sec. 2.2.5.1 and 2.2.6)

4. **Metering Requirements for non-PV technologies:** This proposed revision to the CSI Program Handbook states that solar thermal metering shall measure system output with a Btu meter with a combined accuracy of +/- 5% or better, taking into consideration differential temperature, flow and

computational errors. These rules are to be applied to electric displacing solar thermal systems. All non-PV technologies that generate electricity are subject to the same metering accuracy requirements as PV technologies. The specific requirements and rules for solar thermal metering (all non-PV technologies) are being developed by a working group, and the Program Administrators will submit an Advice Letter to supplement this filing that will more fully address thermal metering rules. The issues to be dealt with will include thermal metering accuracy requirements, performance monitoring and costs. (Sec. 2.9 and Appendix E)

5. **Estimation of Expected Performance Based Buydown Incentives**: This proposed revision to the CSI Handbook defines the design factor for solar thermal systems. For these technologies the design factor is the surface orientation factor of the location, tilt and azimuth of the system. (Sec. 3.2 and Appendix C and F)

6. **Performance Based Incentives for Non-PV Thermal Systems:** These proposed revisions to the CSI Handbook define the methodology for converting the thermal output of a solar system into displaced electricity. The process takes into account the output of the solar thermal technology (in Btu, which are converted to kWh) and divides it by the performance ratio of the conventionally powered back-up, displaced or replaced electric heating or cooling system. The last step is to subtract any ancillary electric loads associated with equipment in the solar thermal system. The output number is the net avoided electric load which is multiplied by the PBI incentive rate. (Sec. 3.3.1)

7. **California Investor Owned Utility Standard Performance Contract Tables:** This proposed revision to the CSI Program Handbook is the table of baseline system efficiencies from the Standard Performance Contract for energy efficiency. These efficiencies serve to set the baselines for the Performance Ratio used to calculate electric displacement. (Appendix D)

8. **Commercial BTU Meter Accuracy Requirements:** This proposed revision to the CSI Program Handbook is sets the minimum accuracy requirements for Btu metering of non-PV solar thermal systems, and also defines the methodology for determining this level of accuracy. (Appendix E)

9. **Surface Orientation for California Locations:** This proposed revision to the CSI Program Handbook provides surface orientation factor data for ten reference locations in California. (Appendix F)

10. **Example CEC-AC Rating for Glazed Solar Collectors:** This proposed revision to the CSI Program Handbook gives an example of how non-PV thermal systems capacity can be calculated in terms of CEC-AC. (Appendix G)

11. **Conforming CSI Handbook language to include non-PV technologies:** These proposed non-substantive revisions to the CSI Handbook either change or add language to the CSI Program Handbook so that non-PV and PV technologies are both included within all ordering and descriptive language. (Sec. 1.2.2, 2.4, 4.1.1, 4.1.2, 4.2.3, 4.2.4, 4.7.1.7, 4.7.3.2, 8.2)

NOTICE

Notice of AL 3060-E and 2160-E was made by publication in the Commission's Daily Calendar on June 1, 2007. PG&E states that a copy of the Advice Letter was mailed and distributed in accordance with Section III-G of General Order 96-B.

DISCUSSION

In D.06-12-033, the Commission gave the Program Administrators the directive to

"assign or hire technical experts to address the technical details of estimating non-PV output for EPBB incentives and metering and measuring electric displacement for PBI payments. The Program Administrators should file CSI Handbook revisions relating to these non-PV estimation, metering, and measurement guidelines."(p.26)

PG&E and SCE have, through the submission of these Advice Letters, fulfilled these requirements of this directive. CPUC staff finds that these ALs conform to the word and intent of D.06-12-033. The purpose of these AL filings is to set standards for estimation, metering and measurement of the output of non-PV technologies, in order to allow these systems to participate in the CSI and receive incentives.

The proposed revisions to the CSI Program Handbook, and the documentation prepared by the AESC's team of technical experts that serves as the basis for these revisions, have been thoroughly discussed and represent a consensus based proposal. While there are certainly a number of outstanding issues which could be better defined regarding non-PV technologies, the scope of this Advice Letter directly corresponds to the direction in D.06-12-033. So, while many of the issues brought up in CEERT's protest may certainly be relevant to the implementation of the non-PV component of the CSI, these two Advice Filings are not the correct venue to address their proposed changes to the CSI Program.

Energy Division staff concur with all, but one of the proposed revisions to the CSI Program Handbook. Energy Division staff believe that section the revisions made to Section 1.2.2 of the CSI Program Handbook misinterpret the intent of CPUC D.06-12-033. Specifically, this proposed CSI Handbook revision addresses how non-PV technologies are defined and states that they are all subject to the $100.8 million incentive cap,

"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 the non-PV technologies will be counted toward and paid at the current MW trigger level." (section 1.2.2 of Proposed Revisions to CSI Program Handbook)

Energy Division disagrees with the statement in proposed revisions that the budget for non-PV technologies should be capped at $100.8 million. Rather, this cap should only be applied to electric displacing non-PV technologies. In CPUC D.06-12-033, the Commission stated:

"Thus, there will be no percentage cap on participation of electric-displacing non-PV technologies, other than the $100.8 million limitation in SB 1 for solar thermal incentives." (CPUC D.06-12-033, p26)

Further, Pub. Util. Code 2851(b), as established by SB 1, states that "the [CPUC] may authorize the award of monetary incentives for solar thermal and solar water heating devices, in a total amount up to [$100.8 million]." This means that the $100.8 million limitation set forth in SB1 only applies to electric-displacing solar thermal non-PV technologies, rather than the more broad interpretation included in the proposed revisions to the CSI Program Handbook that cover all non-PV solar technologies such as concentrating solar. As such, Energy Division proposes to modify the revision to section 1.2.2 in the following way,

... non-PV technologies, include but are not limited to electric displacing solar thermal (generally defined as solar water heating, solar forced air heating and solar cooler or air conditioning) and electric generating solar thermal (generally defined as dish stirling, solar trough and concentrating solar technologies). The CPUC has included the budget for non-PV technologies, within the overall CSI budget, but capped the budget for electric displacing solar thermal non-PV technologies at $100.8 million. Any MW from the non-PV technologies will be counted toward and paid at the currently applicable MW incentive step level.

Staff also finds that one specific area has not been addressed in the Advice Filings, and so, will address this issue now. The issue relates to the Legislative mandate that only technologies that displace electrical load (not natural gas) be eligible for CSI funding. While it is clear in both the current the Handbook as well as in the proposed revisions, that only electric displacing technologies can participate in the CSI program, Energy Division has concern that for certain non-PV technologies, it may be difficult to fully understand the extent to which a system displaces gas or electricity. The primary example being a solar water heating system. Currently, only solar water heating systems that displace the output of a conventional electric powered water heater are eligible for a CSI incentive. The concern is that CSI incentives may defray a very large percentage of the total system cost of a solar water heating system, thereby making it economical to switch from a natural gas to electric powered water heater and then install a solar water heater. Natural gas powered water heaters tend to be significantly more efficient than electric powered water heaters. So, by paying an incentive that encourages the installation of less efficient equipment, the CSI is in fact backsliding in its goals of reducing the consumption of non-renewable energy. With this in mind, Energy Division proposed the addition to the CSI Handbook of language below that the non-PV technology being installed is displacing electrical load from a unit that has been in place for at least 12 months. Subsequently, in comments provided by CCSE, the concerns surrounding this issue were resolved and this proposed requirement has been removed.

Energy Division Proposed Additional CSI Program Handbook changes
The Advice Letter included an appendix with the actual proposed Program Handbook revisions in track changes. Energy Division concurs with changes.[2]

[2] The Proposed change to section 2.2.4 has been removed pursuant to CCSE's comment to the draft Resolution.

PROTESTS

Advice Letter's 3060-E and 2030-E were protested by the Center for Energy Efficiency and Renewable Technology (CEERT) on June 20th, 2007, with a concurrence filed by S.O.L.I.D USA on June 20th 2007. Infinia Corporation also filed a protest on June 27th, 2007, while PVNow and California Solar Energy Industries Association (CalSEIA) jointly filed a protest on June 26th, 2007.

CEERT's protest addresses a wide range of issues related both to the substance of the Advice Letter filings, as well as determinations made about incentive structures and eligibility requirements in related CPUC Decisions. The issues that CEERT raises in its protest that are directly relevant to this Resolution are the proposed electric displacement methodology (Summary Item 6 above), system capacity rating (Item 3), technology eligibility (Item 2) and the $100.8 million incentive cap for non-PV technology (Item 1).

CEERT argues that the electric displacement methodology that the AESC team developed, and that the PAs have adopted through these Advice Letters do not accurately credit solar thermal system production. Instead, CEERT proposes two alternate approaches which would result in a more generous thermal energy to electricity (Btu to kWh) conversion for non-PV thermal systems. The first proposal suggests only measuring the "useful energy" of the solar system, which functionally means measuring thermal output of the solar system without accounting for ancillary loads or conventionally powered back-up units that are integrated in the solar energy system. CEERT's alternate proposal uses the same electric displacement methodology as the Advice Letter, but assumes a different Performance Ratio for the conventionally powered unit, thereby increasing the effective output of the solar system. With regards to the $100.8 million incentive cap for non-PV technologies, CEERT argues that this cap should only be applied to electricity displacing non-PV thermal technologies.

The other matters that are raised in CEERT's protest, while relevant to the larger discussion of how to best design the non-PV technologies component of the CSI, cannot not be directly dealt with in this Resolution, as they relate to rules that were set by CPUC Decision (specifically D.06-12-033). These protests relate to the following issues:

- **MW targets and Step Triggers for CSI Program**: CEERT argues that non-PV technologies should have separate MW targets and step triggers

- **Incentive Structure**: CEERT argues that there should be a separate incentive table for non-PV, and includes in their protest a proposed set of PBI and EPBB incentives for these technologies
- **Non-PV Systems**: Requests that the requirements for non-PV technologies be dealt with through a draft decision or resolution.
- **Equipment Certification and Rating:** CEERT argues that equipment certification and rating requirements may be difficult to achieve and should be reconsidered on a case by case basis
- **System Size:** CEERT argues that the incentive cap of 1MW per project should be raised for solar thermal technologies
- **Warranty Requirements:** CEERT argues that the warranty requirements should for non-PV technologies should be limited to the solar collectors instead of the entire systems.
- **Time of Use Rates:** CEERT states that Time of Use rates should be optional for solar thermal technologies
- **CSI Program Database:** CEERT requests that the CSI Program Database include solar thermal technologies
- **Application Process for California Solar Initiative Projects:** CEERT argues that the application process for the CSI Program should be reduced to one-step
- **Connection to the Utility Distribution System:** CEERT states that solar thermal electric displacement technologies should not have to submit interconnection documentation

Infinia Corporation's protest relates to the treatment of Infinia Corporation's solar dish system. Infinia argues that their dish stirling technology should not be subject to the $100.8 million incentive cap, as stated in the revised section 1.2.2 of the CSI Program Handbook. Their argument centers upon the fact that the $100.8 million incentive cap was designed to only be applicable to non-PV technologies that displace electricity. They support their argument with language in Senate Bill (SB) 1 (Murray, 2006) that states that a solar electric system is,

"*a solar energy device that has the primary purpose of providing for the collection and distribution of solar energy for the generation of electricity.*"[3]

[3]Senate Bill 1, California State Legislature 2006 (Section 25405.5 of the Public Resources Code)

Infinia takes this to mean the CPUC intended to group all electric generating solar energy technologies into the same category, all of which are then eligible for CSI incentives.

While PVNow and CalSEIA's originally filed a protest, they have since rescinded their protest and have no other official comments of this matter[4].

Southern California Edison (SCE) issued reply comments to each of the three protests on July 3rd, 2007. SCE first addressed CEERT's recommendations limiting the eligibility of certain systems, by stating that in CPUC D.06-12-033, the Commission "*will avoid naming specific non-PV technologies that can apply for incentives*".

SCE next addresses CEERT's comments regarding the need to change the incentive levels and incentive reduction schedule for non-PV technologies. Again, SCE relies upon D.06-12-033, which specifically states both PV and non-PV technologies shall be "paid…with the same rate on incentive reduction", to demonstrate that the CPUC has already made a determination on these issues.

The next issue that SCE addresses in their reply comments is CEERT's proposed adoption of the International Energy Agency's system capacity rating factor of 0.7kW per sq.ft. of collector. SCE specifically comments that this approach is inaccurate for most devices and does not adequately take into account the impact that ancillary electric loads may have on overall system efficiency.

The next issue that SCE addresses is CEERT's request to alter the maximum system size requirement, to raise the incentive system size cap from 1MW to 5 MW for solar thermal systems. SCE again relies upon D.06-12-033 to address this proposal, by pointing out that the Decision clearly states that sizing limitations shall be the same for PV and non-PV. SCE then addresses CEERT's comments regarding the elimination of the 10-year warranty requirement for non-PV technologies. SCE once again relies upon Commission direction that, unless otherwise stated, all requirements shall be the same for PV and non-PV technologies.

[4]Letter from CalSEIA is attached to this document

The next issue that SCE addresses is CEERT's proposed alternative to calculating the electric equivalent of a thermal systems output. SCE argues that the Commission clearly directs the CSI program to consider the impact of solar thermal in terms of electric displacement, instead of CEERT's proposed "useful energy" approach. Furthermore, SCE points out that CEERT's argument that Arizona has adopted the "useful energy" approach is moot, because their incentives are much lower than those available through the CSI.

The final issue that SCE addresses in their comments relates to both Infinia and CEERT's request to distinguish between solar generating systems which produce electricity versus those that displace electricity. SCE comments that the Commission, in D. 06-12-033, clearly sets the framework for non-PV technologies, whether they generate or displace electricity, to participate in the CSI on equal footing and be subject to the $100.8 million incentive cap. While SCE's response to this point supports the above interpretation that all non-PV technologies are subject to the incentive cap, they also reference comments they made to the CPUC on September 25, 2006. In these comments, SCE supported the argument that CEERT and Infinia are making regarding electric generating non-PV being eligible for all the same incentives as PV technologies. They go on to say that as the Commission did not respond to these comments, that decided to adopt the interpretation that all non-PV technologies are subject to the $100.8 million incentive limitation.

DISCUSSION OF PROTESTS

CEERT

With regards to the protest filed by CEERT, as stated earlier in this Resolution, there are only four elements of their filing which are directly relevant to these Advice Letters, and as such, we will only address these three issues here:

1) Minimum size for eligibility

The first is to modify the proposed eligibility requirements to stipulate that solar water heating systems must have at least 1,500 sq.ft. of collector area. There is nothing in SB1 or any Commission Decision that speaks to this proposed modification. Given that the eligibility requirements for non-PV technologies are assumed to be the same as for PV, except for *"estimation, metering and monitoring issues"*(D.06-12-033), are dealt with in these Advice Filings, it is presumed that

the minimum size eligible for CSI incentives is the equivalent to 1 kW of capacity regardless of technology type. Energy Division rejects this protest.

2) System Capacity Rating

The second area of CEERT's protest is to adopt the International Energy Agency's (IEA) system capacity rating of 0.7 kW per sq.ft. of collector instead of the displaced energy formula that is included in these Advice Filings. The IEA approach to quantifying capacity seems to represent a simplified approach that may be worth considering. The problems that the CSI non-PV working group found with the IEA methodology are that it assumes constant operating temperature of the fluid in the collectors, which may be the case for solar water heating applications, but other solar thermal collectors have variable fluid temperatures. This variability impacts collector performance, thereby shifting the 0.7 kW per sq.ft of collector either up or down significantly. For these reasons, CPUC rejects this proposal as to limited in scope, and instead affirms the methodology in the Advice filing's as it can be applied to any non-PV technology.

3) Electric Displacement Calculation

The third area of CEERT's protest that is relevant to these Advice Filings is their proposed alternative to the electricity displacement methodology. CEERT's proposed alternative to the electricity displacement methodology does represent a simplified approach to determining the kWh impact of solar thermal, but it also lacks the level of specificity of impact that is necessary to fully understand the net impact of solar thermal. CEERT proposes to meter the thermal output of the system being powered by a solar thermal collector and use that as the thermal load to be converted to kWh (and therefore serve as the basis for incentive payment). CEERT's argument, at least initially, to adopt their simplified approach to quantifying displaced electricity, centers of the idea that the electric displacement approach developed in the Advice Filings under-values the output of non-PV technologies. They reason that based upon the acknowledged difficulty associated with quantifying the expected performance of cooling and heating, using a performance ratio fundamentally under-values the contribution of solar thermal, because it assumes that the units being offset are more efficient than those actually in place. So, instead they propose to only meter the output from the solar system, without taking into account conventionally powered back-up units within the solar system or ancillary electric loads. CEERT also proposes a second alternative approach to the electric displacement methodology. CEERT proposes that the CSI maintain the current displacement methodology, but

change the assumed efficiency (or Performance Ratio) of the conventional units in place. The methodology in the Advice Filing sets baseline efficiencies that are derived from the Investor Owned Utility Standard Performance Contract (SPC). While CEERT proposes setting baselines where the Coefficient of Performance is 2.0 or the Performance Ratio 1.0.

The primary problem with CEERT's proposals are that in each case there will be a tendency to overstate the actual performance of solar systems. Their first proposal calculates output based upon a mix of thermal output, combining the thermal load from the solar collectors with any back-up system that must be used when solar output does not meet the entire need of the solar powered system. The issue being these back-ups can be powered by brown power and not renewably generated electricity. The result being metered output from the solar system that is a mix of green solar thermal and brown electricity from the back-up. Given that the CSI Program cannot pay incentives for energy that is not derived from the sun, this proposal raises may come into direct conflict with SB1.

Their second proposal sets baseline efficiency levels for the conventional electric heating and cooling that are not supported by any concrete data, and as a result may credit solar thermal systems with electric displacement that does not match actual output. While there is little reasoning given for using either of these figures, the argument that CEERT puts forth is that SPC efficiency is too high. They further argue that setting the assumed efficiency of the conventional unit being displaced lower than the SPC more accurately reflects the real system efficiencies of heating and cooling units in the field. While, we acknowledge the difficulty of assessing the actual performance and system efficiency of heating and cooling units in the field, we believe that underestimated these efficiency figures does not advance to goals of the CSI Program. Furthermore, underestimating the efficiency of the conventional units being displaced by solar thermal may create perverse incentives vis-à-vis the the Commission's energy efficiency programs, by making solar thermal a cheaper solution for the program participants than energy efficiency measures that, from a ratepayer and societal perspective, are actually less expensive to implement. The CSI Program seeks to leverage energy efficiency in tandem with solar, thereby creating the greatest environmental and ratepayer benefit.

While the proposed electric displacement methodology proposed in these Advice Filings acknowledges that it is challenging to accurately establish performance ratios for conventional air condition (heating or cooling), the approach therein is

nonetheless based upon accepted statewide system efficiency data. Specifically, the use of baseline efficiency numbers from the California IOUs Standard Performance Contract represents the kind of defensible methodology for identifying the electric units being offset by solar thermal that is mandated by Commission Decision. This approach also represents an example of a way to quantify the impact of solar thermal, while also advancing SB1's stated goal of coupling solar with energy efficiency. For these reasons, Energy Division sees no reason to reject the electric displacement methodology proposed in these Advice Filings, in favor of the methodologies proposed in the protest.

4) Special Funding for Non-PV Technologies

The fourth area that CEERT addresses in its protest that is directly relevant to these Advice Filings relates to the incentive cap of $100.8 million for non-PV technologies. CEERT argues that this cap was only intended to be attributed to electric displacing non-PV, instead of the current definition that applies it to all non-PV technologies. Energy Division concurs with this protest, as it relates to a misinterpretation of a CPUC Decision, instead of wholesale change to the intent or language included in a Decision. As a result, Energy Division will amend the Program Handbook to reflect the fact that the $100.8 million incentive cap should only be attributed to electricity displacing solar thermal non-PV technologies.

INFINIA

Infinia's protest relates to a single issue, that of whether the incentive cap for non-PV should be attributed to all non-PV technologies. Their protest is the same as CEERT's "*Special Funding for Non-PV Technologies*". They argue that the intent of both SB1 and CPUC Decisions was to create a cap for only electric displacing technologies, and therefore to allow all electric generating technologies, whether PV or non-PV, to be eligible for all CSI funds. Energy Division concurs with their argument and will conform the Advice Filing to reflect this fact.

COMMENTS to DRAFT RESOLUTION

Two parties filed comments to Draft Resolution E-4131, the California Center for Sustainable Energy (CCSE) and Pacific Gas and Electric Company (PG&E). Both CCSE and PG&E agreed with the intent of the Draft Resolution, and the comments they each submitted were focused on procedural issues related to the implementation of the non-PV component of the CSI Program.

CCSE's comments and disposition of the comments:

- **Propose to add solar water heating as one of the explicitly mentioned non-PV technologies mentioned in Section 1.2.2 of the CSI Program Handbook**: the current handbook mentions "dish stirling, solar trough, solar cooling, and solar forced air heating", but solar water heating is not included. CCSE references Commission D. 06-01-024 that states that solar water heating should have been included as one of the 'included' technologies, and they propose its addition to the Handbook.
  - *Solar water heating* should be added to the Section 1.2.2 of the CSI Program Handbook as part of these advice filings.

- **Propose to modify the surface orientation factors chart in Appendix F of Resolution:** The SOF proposal included in the non-PV white paper is limited to a range of 0.9 to 1.0. CCSE, through the implementation of the SHW pilot has determined that there is a more accurate approach to determining SOF. They propose that each PA develop and adopt their own approach.
  - The question of whether or not SOFs should be developed for each Program Administrator should be dealt with through a subsequent Advice Filing to modify the CSI Program Handbook once more information is available.
- **Propose to modify 10 year warranty requirement for hardware components of non-PV technologies:** CCSE proposes to modify the warranty requirement for non-PV hardware because many of these systems include equipment that is does not include factory certified 10 year warranties. CCSE further proposes that the warranty requirement be limited to the solar collectors and the installation (labor), while the rest of the equipment be covered by the factory warranty.
  - The warranty requirement should be examined further, and perhaps addressed through a subsequent Advice Letting filing, but in the interim should not be changed.
- **Propose to remove the requirement that non-PV technology displace a unit that had been on-site for a minimum of 12-months:** CCSE believes that this requirement adds administrative burden and that the goal of preventing fuel-switching can be addressed through education. They also include analysis that demonstrates that moving from a gas to electric water heater, even when the electric water heater is associated with a SHW system, increases annual energy costs.

  - The requirement that non-PV technology displace a unit that had been on-site for a minimum of 12-months should be removed.
- **Develop an implementation timeline for non-PV incentives**: CCSE proposes that the Resolution address the need for an implementation plan and timeline for the role-out non-PV incentives. They propose that the CSI Working Group should be tasked with this job.
  - Energy Division and the Program Administrators shall develop and publicize an implementation timeline for the non-PV portion of the CSI incentive program.

PG&E's comments:

- **Propose to remove the requirement that non-PV technology displace a unit that had been on-site for a minimum of 12-months:** PG&E concurs with CCSE on this matter.
- **Develop an implementation timeline for non-PV incentives**: PG&E concurs with CCSE on this matter.

DISCUSSION OF COMMENTS

Both parties raise a number of valid points in their comments. CCSE correctly points out that in D.06-01-024, *solar water heating* is one of the technologies that is explicitly included in the list of non-PV technologies. CCSE next points out that the methodology for calculating the surface orientation factor (SOF) is limited and should be developed by each Program Administrator. In the interest moving non-PV technologies towards full inclusion in the CSI, each of the Program Administrator is encouraged to develop a more detailed SOF, at which point this issue can be revisited via a subsequent Advice Letter. CCSE's third comment relates to the warranty requirement. CCSE proposes to modify the warranty requirement so that certain components of non-PV system are not covered under the mandated 10 year warranty. CEERT raised this same issue in their protest to the Advice Filing. CEERT's protest was already dismissed in the discussion above on the grounds that CPUC D. 06-12-033 clearly states that the Program rules, where not explicitly mentioned in the Decision, shall be the same for PV and non-PV technologies. Given that there is no explicit mention of the warranty requirement in D.06-12-033, it is considered a Program requirement that must enforced equally for PV and non-PV technologies.

The final two points that CCSE raises in comments are the same of those raised by PG&E. The first issue relates to the requirement that non-PV technologies must replace and/or displace electric powered systems that have been on-site for 12-months. Both CCSE and PG&E state that this requirement will functionally disqualify new construction from participating in the non-PV component of the CSI Program. They also state that Energy Division's concern related to the replacement of gas-powered systems with less efficient electric powered units that are combined with non-PV technologies is not a significant problem due the existing CSI Program requirement that no solar powered system can be sized larger than the previous 12 months of on-site electrical load. Energy Division will issue a revised Program Handbook that removes the Program Handbook requirement that non-PV systems replace and/or displace electric powered systems that have been on-site for a minimum of 12 months. Finally, both CCSE and PG&E request that an implementation timeline be set for the role out of non-PV incentives. The Commission orders Energy Division to work with the CSI Program Administrators to create an implementation timeline for non-PV incentives.

FINDINGS

1. By PG&E Advice Letter 3060-E and SCE Advice Letter 2130-E filed on June 1, 2007, PG&E and SCE propose revisions to the CSI Program Handbook. The proposed changes conform to D.06-12-033 and are consistent with the intent of the CSI program.

2. CEERT submitted a protest dated June 27, 2007, on PG&E AL 3060-E and SCE AL 2130-E. CEERT objects to the incentive structure for non-PV technologies, as change to the CSI Program Handbook in section 2.1.4, relating to self-installation of solar photovoltaic systems because the rules represent a danger to utility workers and the public. Infinia Corporation filed a protest on June 27, 2006. Infinia objects to the classification of electric generating non-PV technologies within the $100.8 million incentive cap in section 1.2.2.

3. SCE submitted a response to the protest on July 31, 2007, stating that the proposed change to sections 1.2.2 and 2.1.4 of the CSI Program Handbook are consistent with current law and regulatory direction.

4. The incentive limitations of $100.8 million set forth in SB1 for solar thermal technologies is only applicable to electric displacing solar thermal non-PV technologies.

5. The CEERT protest is out of the scope of this Advice Letter or inconsistent with the law, except as related to Item 4 above.

6. CCSE and PG&E each filed comments on December 7, 2007. CCSE's comments related to the inclusion of *solar water heating* as approved non-PV technologies, a modification of the Solar Orientation Factor calculation methodology, a modification of the warranty requirement, a removal of the requirement that non-PV systems replace and/or displace conventional electric powered systems that have been on-site for 12 months, and the creation of an implementation timeline for non-PV incentives. PG&E's comments mirrored CCSE's final two comments.

THEREFORE IT IS ORDERED THAT:

1. The request of PG&E and SCE to make revisions to the CSI Program Handbook pursuant to Attachment 1 of PG&E AL 3060-E and SCE AL 2130-E is approved, except for Energy Division's changes to section 1.2.2 of Attachment 1, effective as of the date of this resolution.

2. Energy Division will conform the CSI Program Handbook to incorporate the revisions proposed in these Advice Filings and in this Resolution, including the modifications ordered by the response to comments, and it will reissue the new CSI Program Handbook as soon as practicable.

3. All elements of the protest of CEERT are denied, except for non-PV incentive cap protest. The protests have been denied because they are either not directly relevant to these Advice Filing, and should be brought up in a different venue, or they do not adequately prove that their recommendations are superior to those made by the Program Administrators in their filing. The Infinia Corporation protest is also accepted, as it correctly interprets the intent of CPUC D.06-33-012 to only cap incentives for electric displacing solar thermal non-PV technologies.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on December 20, 2007; the following Commissioners voting favorably thereon:

/s/ Paul Clanon
Paul Clanon
Executive Director

MICHAEL R. PEEVEY
PRESIDENT
DIAN M. GRUENEICH
JOHN A. BOHN
RACHELLE B. CHONG
TIMOTHY ALAN SIMON
Commissioners