BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Polices, Procedures and Rules for the California Solar Initiative, the Self-Generation Incentive Program and Other Distributed Generation Issues.	Rulemaking 06-03-004 (Filed March 2, 2006)

COMMENTS OF THE CALIFORNIA SOLAR ENERGY INDUSTRIES ASSOCIATION, PV NOW, AND THE VOTE SOLAR INITIATIVE REGARDING THE CPUC ENERGY DIVISION STAFF PROPOSAL FOR CALIFORNIA SOLAR INITIATIVE DESIGN AND ADMINISTRATION 2007-2016

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Pursuant to Administrative Law Judge's Ruling Requesting Comment on Staff Proposal for Performance Based Incentives and Other Elements of the California Solar Initiative, issued April 25, 2006 and subsequent email ruling extending the deadline for comments to May 16, 2006, the California Solar Energy Industries Association ("CalSEIA"), PV Now and the Vote Solar Initiative (hereinafter the "Joint Solar Parties") respectfully submit these comments in response to the CPUC Energy Division Staff Proposal for California Solar Initiative Design and Administration 2007-2016 ("the Staff Proposal") dated April 24, 2006. The Joint Solar Parties have commented on many sections of the Staff Proposal and, therefore, have attached to this filing as Appendix C a key relating these comments to the questions presented in the Staff Proposal.

The Joint Solar Parties represent three different facets of the community. CalSEIA is a 501 (c)(6) industry trade association whose members include 86

contractors, 27 manufacturers, 3 distributors, 2 utilities, and 32 consultants. PV Now is a coalition of the leading photovoltaic companies that joined to aggressively expand North American distributed, grid-connected solar photovoltaic ("PV") market opportunities and eliminate market barriers. PV Now's members include Sharp Solar, Schott Solar, Shell Solar, Evergreen Solar, SunPower Corp., PowerLight, SunEdison, and Energy Innovations. Vote Solar Initiative ("Vote Solar") is a 501(c)(3) non-profit organization with members throughout California and the country working to bring solar energy into the energy resource mainstream.

The Joint Solar Parties strongly support the California Solar Initiative ("CSI") and look forward to working together with the Commission and other interested parties to create a comprehensive and effective long-range plan for encouraging the expansion of solar applications in the state of California. The Joint Solar Parties believe that five overarching principles must guide this effort:

- Sustained orderly program implementation and modification because orderly implementation and modification of the CSI will facilitate the long-term business decisions and customer market comprehension that will bring down the cost of solar.

- The best products and program design for solar system purchasers because it is ultimately purchasers who will be investing increasingly larger percentages of the system cost as the CSI proceeds over time.

- Prevention of any market disruptions from unanticipated regulatory actions because such disruptions lead to disarray for all involved, including end-users, contractors and manufacturers, and it is these end users, contractors and manufacturers who will ultimately determine the success or failure of the CSI through their purchasing and business decisions.

- An incentive structure which is acceptable to end-use system purchasers because it is these purchasers who ultimately make the decision on whether or not the purchase of a solar PV system.

- A program which includes all viable, distributed solar technologies because it is these technologies which have the ability to reduce California's reliance on natural gas, oil, and electricity.

With these principles in mind, the Joint Solar Parties offer the following comments regarding the Staff Proposal:

I. THE CURRENT VOLUME-BASED INCENTIVE ADJUSTMENT TRIGGER REPRESENTS THE MOST ADMINISTRATIVELY FEASIBLE AND MARKET REACTIVE INCENTIVE ADJUSTMENT TRIGGER MECHANISM

A. Key Points

- Incentive level adjustment based on volume-based "buckets" provides greater administrative simplicity and market responsiveness than calendar-based or economic model-based alternatives.
- Uniform statewide incentive levels will distort the market for solar energy systems.
  - There should be separate pro-rata "buckets" for different IOU territories, based on revenue collection.
  - There should be separate "buckets" for residential and non-residential customers with allocation of incentive funds based on collections from residential and non-residential customers.
  - There should be the same incentive level for private-sector and not-for-profit sector non-residential projects.
- The Joint Solar Parties recommend simple mechanisms to transition from one incentive to the next.

- Residential – there should be a 30-day notice period to applicants when 10% of funds in the current "bucket" are remaining.
- Commercial - give customers the option to choose between current "bucket" incentive level (with potential uncertainty on timing and availability of reservation), or next-lower incentive "bucket" level (with greater certainty on timing and availability).

- The program should not include a cap on the annual kWh/kW that would be eligible for PBI incentive.

B. Volume-Based Adjustment is Relatively Simple and Responsive.

In response to Section 4 of the Staff Proposal, which discusses various options for an incentive level trigger adjustment mechanism, the Joint Solar Parties propose that the most effective way to achieve the objectives of the CSI is to utilize a volume-based trigger, as proposed in D.06-01-024.[1] The Commission implemented the trigger mechanism in the March 21 Ruling, which lowered the SGIP incentives to $2.50/Watt.[2] The Joint Solar Parties propose detailed operational protocols for the implementation of the volume-based trigger as the de-facto mechanism for reducing

[1] Interim Order Adopting Policies and Funding for the California Solar Initiative, D.06-01-024, R.04-03-017 issued January 12, 2006

[2] Administrative Law Judge's Ruling Reducing Solar Photovoltaic Incentive Payments, R.06-03-004, issued March 21, 2006, pg. 2 ("March 21 Ruling"); and Administrative Law Judge's Ruling Confirming Reduction in Solar Photovoltaic Incentive Payments, R.06-03-004, issued April 24, 2006 ("April 24 Ruling").

incentives throughout the CSI. Adopting a purely volume-based trigger has many advantages. First, a volume-based trigger is entirely transparent and administratively simple. There are no studies that need to be performed or auctions that need to be held. Moreover, a trigger based solely upon the volume of megawatts ("MW") that actually are conditionally reserved will allow incentives to decline as the market matures based on actual customer commitment to MW of solar technologies, and does not impose arbitrary annual or model-driven incentive reductions that are difficult to accurately apply to the current state of the market.

A volume-based trigger also allows for consistent development of the market, avoiding the stop-start problem that the Self-Generation Incentive Program ("SGIP") has suffered from since 2003. When SGIP reservations hit a threshold amount, the program administrators had started placing incoming applications on a waitlist because the administrators were instructed to spend down their entire budget for each program year at a single rebate level. Then, when the program opened again in the subsequent year, there would be a flood of applications, overloading the Administrators and effectively closing the program for another year. The volume-based trigger avoids this issue, for as the volume targets are reached, the incentive will decline automatically, and the program will remain open and within the budgets allocated by the Commission, allowing customers to file CSI applications when they are ready. Furthermore, the Joint Solar Parties propose a mechanism to provide incentive level certainty for customers through the incentive reduction process.

C. No Need for Additional Incentive Level Adjustment in January, 2007

The Joint Solar Parties believe that planning to reduce the incentive level on January 1, 2007 or any arbitrarily determined date not based on the actual response to the incentive level in the marketplace as proposed in the Staff Proposal is premature and unnecessary. The Joint Solar Parties agree with the incentive reduction targets proposed by the Commission; however, the proposal to automatically lower the incentive level by 10% annually, or in this case introduce another rebate reduction in less than 12 months on January 1, 2007, while simple and transparent, is over-simplified and does not account for the actual state of the market in any respect. While the Joint Solar Parties agree with Staff that a more complex economic model which might attempt to capture and weigh more market factors will result in less transparency and possibly inaccurately weigh any given factor, a reasonable middle ground is to stay the course of reducing incentives based on the MW volume triggers established in D.06-01-024. Volume-based triggers essentially capture the complexity of market decision-making by responding automatically when certain volumes of MW commitments are reached without overly complex, opaque models being involved.

The empirical data provided by the SGIP administrators shows that the rate of customer applications to the $2.80/watt incentive level has fallen considerably from the feverish pace which resulted in the ALJ ruling to reduce the incentive level to $2.50/watt. The Commission should further recognize that the proposed $1.50/Watt incentive level for taxable commercial entities effectively is significantly more than $1.00

lower than the current $2.50/Watt incentive,[3] or essentially a 67% drop in rebate from January 1, 2006. This is a result of three effects:

1) the change from CEC-AC to System-AC (~10% devaluation[4]),
2) the potential impact of the Design Factor (~11% devaluation[5]) and
3) the fact that the CPUC is not factoring in the cost of money (24% devaluation[6]).

When the three factors above are taken into account, the proposed $1.50/Watt (system-AC, PBI) rebate actually results in a $0.91/Watt (CEC-ac, SGIP) effective rebate to the customer when compared to the current $2.50/Watt (CEC-ac, SGIP) incentive. The Commission should recognize that the proposed drop in incentive levels is even more dramatic than it appears, and that it should wait until there is more market response to the $2.50/Watt SGIP incentive before cutting the incentive level by ~43%.

The Administrative Law Judge's ruling was based on presumption that the first 50 MW trigger had been reached.[7] As can be seen from the table below, Pacific Gas

[3] The Joint Solar Parties maintain that the rebate should remain at $2.80/Watt since none of the SGIP Administrator's triggers have yet been reached with conditional reservations.

[4] The Joint Solar Parties recommend that the CPUC use a 10% de-rating for the conversion from CEC-AC to system-AC while the Commission determines an administratively and technically viable system AC verification process.

[5] Page 23 of the Staff Proposal shows that a flat system with no obstructions would have a design factor of 89%.

[6] A Net Present Value calculation of a five-year stream of PBI payments (with payments at the *end* of each year of operation) compared to a lump payment at the start of operation shows that the stream of payments suffers from a 76% reduction in value.

[7] The Joint Solar Parties maintain that the trigger has not actually be reached as there are currently less than 50 MW of conditional reservations issued by the Program Administrators.

& Electric ("PG&E") is the only territory that has enough projects *at any stage of development* that is close to the conditional reservation trigger, though it has not yet reached its volume target[8]. No other territory has enough applications, let alone conditional reservations, to trigger an incentive reduction. This sort of empirical evidence, more than any model of customer economics or demand curve or arbitrary date, should be utilized by the Commission in determining the necessary level of incentives and available funding to drive solar installations.

By taking steps to implement the market trigger mechanism, the Commission has effectively determined that the CSI is already in operation. Customers, installers and manufacturers are making decisions based on the long-term nature of the program. The first of January, 2007 is simply another date in a eleven-year continuum. By staying the course regarding volume-based triggers based on conditional reservations issued by the program administrators, transparency and continuity in program administration will be enhanced. This increased transparency and continuity will allow a seamless transition from the present programs separately administered by the Commission and the CEC to the CSI on January 1, 2007. By continuing to use a volume-based trigger, the Commission will allow stakeholders to engage in longer-term decision-making than just through December 31, 2006. Such longer-term decision-making will facilitate investment and purchasing decisions, thereby promoting development of the CSI.

[8] See Appendix A for data pertaining to current SGIP applications, conditional reservations and IOU MW allocations.

D. Recommended Volume-based Incentive Adjustment Trigger Mechanism

1. Proposed Volume-Based Trigger Incentive Reductions

Based on the discussion above, the Joint Solar Parties recommend the Commission formally adopt the volume-based incentive adjustment program outlined in D.06-01-024 and further clarified in this filing.[9] Table 1 illustrates how the Joint Solar Parties propose to reduce incentive levels based on reaching established MW targets throughout the course of the CSI. The Joint Solar Parties developed this proposal with several key assumptions:[10]

1) 2600 MW installed through the CPUC by 2016
2) $2,125M total incentive budget (accounting for 15% Administration and RD&D budgets)
3) The incentive levels are de-coupled from a calendar based schedule
4) The incentive amounts are not identical to the 1/12/06 staff proposal since the program is already moving through the 'first' 50 MW 'bucket'
5) Residential and non-residential customers each have protected incentive funding 'buckets', split 40% residential, 60% commercial
6) Incentive levels vary by customer class and utility territory based on the MW volumes of solar installations
7) A 10% discount rate is included for PBI recipients

[9] Note that the combination of the commercial and residential segments in Table 2 is essentially the same as the D.06-01-024 Decision, Appendix A, Table 5.
[10] Appendix B attached to this filing explains the assumptions in greater detail.

fund bucket	MW	Weighted Average Rebate* ($/Wac-sys)	Incentive Budget*** ($Millions)
1	70	$2.54	$185
2	100	$2.25	$238
3	130	$1.97	$276
4	170	$1.61	$301
5	230	$1.32	$333
6	300	$0.98	$322
7	400	$0.58	$254
8	500	$0.27	$150
9	650	$0.09	$67
Total	2,550**		$2,124

*Total upfront and energy payment dollars per watt
**Does not include the 50MW of installations receiving rebates in 2006.
***Equal to CSI total $2.5 billion budget less 10% admin. & 5% R&D. Also, total funding is a little higher due to discounting of energy payments

Table 1: The Joint Solar Parties Volume-Based Incentive Reduction Schedule[11]

Participants serving all customer classes have carefully considered the incentive levels. The Joint Solar Parties believe that these incentives are the best starting points in order to meet program goals. It is important to note that commercial incentives reflect the Present Value of Performance Based payments instead of a non-discounted sum of future payments. Most importantly, these incentive levels assume that the Commission, as described in more detail below, adopts the other components of the program.

[11] The underlying model used to produce this table and all tables within this filing is available upon request to PV Now.

The annual collections established in D.06-01-024 will allow de-coupling of incentive level reductions from a calendar because collections in the early years will outpace the proposed expenditures. Therefore, if the volume-based triggers are hit, there will be money available to continue providing incentives by automatically moving to a lower incentive level. For example, the funding necessary to provide incentives for the first 70 MW bucket at $2.54/W is $178 million, whereas collections for 2007 are slated to be $350 million. The surplus of funding could be used to provide incentives to the next funding bucket if the 70 MW trigger is reached. Based on the fact that only 56% of the available funding at $2.80/Watt has received conditional reservations in 2006, the Joint Solar Parties are confident that CSI collections will be sufficient to cover incentive payments. The automatic progression to the next incentive level allows the program to continue to operate in a seamless smooth fashion, with the expectation of continued market growth.

2. Essential Elements a Volume-based Trigger Mechanism

In order for a volume-based trigger mechanism to function successfully, the Joint Solar Parties believe the following elements must be present:

a. Transparency and Information

First, the program administrators must provide complete, ongoing access to data regarding all of the applications to the CSI program updated on a weekly or preferably daily basis. This will reduce market disruption by affording the solar industry the opportunity to adequately plan for incentive reductions before they occur. Ordering Paragraph 6 of the April 24 Ruling has instituted such an information update on a weekly

or more frequent basis and the Joint Solar Parties believe this ruling should be maintained in any future incentive structure.

b. Consistency

Second, actual conditional reservations issued by program administrators should be used as the basis for triggering the incentive reduction. As explained above, and in PV Now's comments on the Draft Decision, filed May 15, 2006 in this proceeding, by continuing to use actual issued conditional reservations, the CSI program will maintain continuity with the current practice in the SGIP program which will allow a seamless transition between programs thereby avoiding market disruption on January 1, 2007.[12]

c. Flexibility based on conditions within each IOU service territory

Third, the markets in each of the IOU service territories should be allowed to operate at their own pace and the MW blocks should be allocated according to utility service territory and customer class.

The Joint Solar Parties recommend that a mechanism be incorporated into the volume-based trigger that will ensure that incentives are distributed to the customer classes on the basis of what they pay into the program. Both residential and non-residential customers should be able to access the funds that they contribute to the CSI. The Joint Solar Parties recommend that that Commission allocate incentive funding according to the proportion of the funds that residential and non-residential customers

pay into the CSI program. Otherwise, heavy use of incentive funds by one customer class could eliminate the ability of another class to participate in the program. The Joint Solar Parties estimate that this will result in approximately 40% of incentives going to residential customers and 60% to non-residential, based on current collection procedures. The Joint Solar Parties request that the Commission make a final determination of incentive availability for residential and non-residential customer classes based on utility collection procedures.

By allocating the MW blocks in this fashion, the Commission will accommodate the different market realities that now exist in the California solar market, including rate structure differences, while providing support for a solar market to develop more evenly across the state. This approach will prevent two harmful situations from occurring. First, if the Commission determines that the incentive level should adjust uniformly across all IOU service territories simultaneously, then as a threshold matter, the Commission must decide what volume will trigger the decline. The Commission appears to be weighing two choices regarding this volume-trigger: the Commission can either decide that any one IOU MW allocation being reached is the volume trigger or that the entire MW allocation across all the IOUs being reached is the volume trigger. Unfortunately, choosing either one of these volumes as the trigger can present a problem in adjusting the incentive statewide.

In the case where an IOU service territory is moving more quickly towards

[12] Comments of PV Now on the Draft Decision Affirming Administrative Law Judge's Ruling Reducing Solar Photovoltaic Incentives, R.06-03-004, filed May 15, 2006.

its allocation, such as is currently the case with PG&E's non-residential solar market, reducing the incentives based on the first IOU territory that meets its allocated MW target will prematurely drive down the incentive level for all customer classes across all territories. This outcome will only further delay solar installations in other territories and customer classes, exacerbating the problem. The Table in Appendix A illustrates the potential problem with reducing incentives across the state based on demand in any one IOU territory. If the volume trigger is based on the first utility to meet its MW allocation, PG&E in this example, then as the incentive level falls across all territories due to a strong market in PG&E, solar installations will slow or stop in other IOU territories as the economics for those customers worsen without having reached the targeted MW volumes within those service territories. In this case, the Commission will not achieve its MW goals for the program.

On the other hand, if the Commission requires all service territories to meet their allocations prior to the incentive declining on a statewide basis, then territories which are moving quickly, such as PG&E's territory currently, must move projects on to a waitlist and markets are crimped by introducing another start-stop cycle in at least one territory. By delaying implementation of projects, carrying costs for customers, installers and manufacturers are increased while these end-users wait for the other territories to catch up, or alternatively some IOUs will not install as many solar MW as others and the 3,000 MW goal will not be achieved. This would create the same problem that the SGIP currently suffers from, whereby applications flood the administrators when the program opens up again.

As these two examples show, the reality of maintaining equal incentive levels for all IOU territories and customer classes is simply not feasible. If the Commission does choose to reduce incentive levels for all territories at the same time, then there will need to be a mechanism for moving funding between utility territories in order to meet the MW goals of the CSI.

An easier, and administratively feasible, alternative is to simply allow incentive levels to adjust based on the characteristics of each individual IOU service territory. Providing different incentives levels by utility territory will not be administratively difficult for the CSI administrators. The SGIP administrators already run four operationally independent programs, so different incentive levels by IOU service territory should not impose any added administrative burden. While the Joint Solar Parties' proposal does add complexity for the sellers and installers (including those submitting this filing) of solar systems - who would need to explain these differences to customers. Furthermore, the Joint Solar Parties already deal with differences between utility territories based on different rate structures. The Joint Solar Parties strongly believe it is an acceptable adjustment as it creates a more smoothly functioning CSI program in which market forces within each service territory determine the pace of installations.

The Joint Solar Parties ask that the Commission rule on this issue immediately, as it has impacts on the current operation of the SGIP.

d. Retain Flexibility on Rebate Adjustment Level

The Joint Solar Parties commend the staff for recognizing that incentive

levels may need to stay constant if "market factors have not produced a lower cost per kWh.[13]" Indeed, by detaching the MW "buckets" from any particular calendar, the Commission takes a major step in automatically accommodating such a situation. The Joint Solar Parties strongly endorse the market trigger mechanism as the best policy approach to responding to market conditions.

However, the Joint Solar Parties recognize that the solar market is California is affected by local market conditions (utility rates), global market conditions (module prices), local policies (CSI) and federal policies (ITC). The market conditions adjust over the course of months and years. The policy conditions can change overnight, and have done so multiple times in the past.

Therefore, the Commission should recognize that even keeping the incentive level flat may not be adequate in certain circumstances. Given the current federal Investment Tax Credit for solar which expires at the end of 2007, there may be one or more events in the policy arena that necessitate an increase in incentives. The Commission should be prepared to change (raise, lower or stabilize) the rebate levels for any one bucket defined in Table 1, *supra*, based on such changes. For example, should new or expanded federal tax credit become available (causing a rapid and unexpected rise in reservations that would deplete a fund bucket quickly) then the Joint Solar Parties suggest that the rebate for the next fund bucket might be lowered more than defined in the Table 1, *supra*. Alternatively, if tax credits expire causing effective solar system

[13] CPUC staff report. California Solar Initiative: Design and Administration 2007-2016. April 24, 2006.

prices to customers to increase, and creating a dramatic decline in applications and reservations – then the Joint Solar Parties suggest that the Commission consider changes in incentives levels in order to ensure that the market continues to grow and develop and that overall CSI targets are achieved. By remaining open to making changes in the incentive levels in any given fund bucket, the Commission can ensure that the maximum amount of solar is installed for the least cost and ensure that incentives maintain a smoothly functioning market focused on driving solar installations and thereby decreasing overall system costs.

The volumetric-based trigger discussed in Section I.A.1 will provide empirical evidence on how the market is responding to external factors and incentive levels. The volume-based trigger reduces the 'year-sensitivity' of the incentives and allows the market to indicate, through customer demand, when incentives should be reduced or stabilized. The Joint Solar Parties are confident that the incentive reduction targets will be achieved over the term of the program, even though the incentive reductions may not correspond to the annual reductions outlined in the proposal.

Even with the volume-based trigger, in order to meet the 2600MW target, the Commission should explicitly acknowledge that it will retain flexibility in adjusting rebate levels to reflect changes in the market context in response to parties' requests or in consultation with market participants. The continual development of a competitive installer industry in the state is just as, and potentially even more, important than solar module price reductions in maintaining downward pressure on the installed cost of solar systems. If the market is not growing for an extended period, and qualified and efficient

solar installers are forced to close their businesses because incentive levels are too low, for too long, then the drive to reduce incentives is counter to the goal of achieving a market transformation of the solar industry. Therefore, the Commission should be prepared to maintain flexibility in adjusting incentives with the volume-based trigger mechanism.

3. Transitioning Between Incentive Levels

To avoid situations in which solar companies provide customers with pricing that turns out to be inaccurate as incentive levels change, the Joint Solar Parties propose some operating protocols for transitioning between incentive levels.

For the residential market, when applications are within 10% of reaching the threshold for an incentive reduction, the Joint Solar Parties propose that the administrators issue a 30 day notice establishing the day on which the incentive level will be reduced to provide absolute certainty and clarity for all market participants as to the date on which the new incentive level will take effect.

The marketing channels used to market and deliver solar systems to residential customers do not support uncertainty about the rebate level several weeks in advance of a transition. For example, direct mail and advertising are prepared weeks in advance of customers' digestion of that information. Uncertainty regarding the date of the transition will lead to customer complaints and dissatisfaction, which the installer community needs to build a healthy market.

For the commercial market, to ensure predictability for the market and to conserve CSI funds, the Joint Solar Parties propose that customers be given the option to

elect to apply for incentives at either the current rate or at the next lowest incentive rate. Applicants would be allowed to elect one (and only one) fund bucket of incentive funding to apply for. For example, suppose the current incentive level is set at $2.50/watt, than under the Joint Solar Parties proposal, a customer could apply for a $2.50/ watt rebate which is the currently available rebate but has less certainty of funding availability because other customer's applications are being reviewed concurrently in that fund bucket. Alternatively, the applicant could apply for a rebate level of $2.25/watt, which is the next lowest incentive level or an even lower rebate level. By electing to apply for a lower rebate level, the applicant would receive a lower rebate but would have greater certainty of the lower rebate level being available. This approach is also responsive to different customer needs, and ability to accept lower rebates on a self-selected, case-by-case basis. If there is no funding available for a particular fund bucket left by the time the applicant would have been reviewed for a conditional reservation, then the customer will go on a waitlist for that particular fund bucket. If projects with conditional reservations in that particular fund bucket cannot proceed and funds become available, then waitlisted customers would have the opportunity to receive conditional reservations for those funds. If all conditionally reserved funds are paid out, then waitlisted customers will not receive any funding from that fund bucket that fund bucket is closed, and at that time a customer may elect to apply for a new fund bucket.

Two key elements of this concept are that: 1) one customer may only apply to one fund bucket for any given site; and, 2) rebates are not transferable from one site to another. Customers/developers will have to decide up front if they go for a higher rebate

level (with less certainty and a likely longer waiting list), or a lower incentive level (greater certainty).

The Joint Solar Parties believe that these incentive transitions minimize problems relating to the complete utilization of funds from each incentive "bucket". For example, consider a situation in which a 1,000 kW commercial project has encumbered incentive funds with a conditional reservation at $2.80/Watt. If the incentive declines to $2.50/Watt and the project drops out, then $2.8 million is still available at $2.80/Watt. If the Commission adopts the Joint Solar Parties incentive transition proposal, then there would be a wait list of projects for the $2.80/Watt incentive that had chosen a higher level of uncertainty in order to receive a higher incentive. The $2.8 million would then be provided to the wait listed projects and the incentive funding would be efficiently allocated.

II. TRANSITION TO A PERFORMANCE BASED INCENTIVE STRUCTURE

A. Key Points

- Recommend gradual transition to hybrid EPBB/PBI incentive structure to ease short-term market disruption and minimize long term PBI program costs. Further detail below.
- Regardless of the EPBB vs. PBI split chosen by the ALJ, ensure that the NPV of incentive payments for a customer is consistent. In other words, avoid a situation where a customer with a 99kW system has an EPBB incentive that is significantly higher in value than the PBI available to a customer developing a 101kW system, as is the case

with the initial EPBB and PBI incentive levels included in the Staff Proposal.

- Proposed EPBB requires some significant changes. Staff Proposal recommends a change to verified system AC output as a basis for target incentive levels and actual incentive payments. This change is likely to cause significant confusion in the short term, especially in the absence of a protocol for short-term field verification of installed PV systems. Recommend that this change be deferred to when such a protocol is available and practical. In the meantime, recommend that the CSI program retain current basis (AC Watts, per CEC) for measuring capacity and for setting incentive levels. In the event that PUC does decide to switch to system-AC as a basis for the program, the Joint Solar Parties recommend that program use as a "baseline" reference system a horizontal system with 5% shading, in order to account for the effects of changing to a system-AC basis. This is explained further below.
- Recommend against setting lower incentives for new construction. As noted above, propose relatively simple customer classification ("buckets") – residential and non-residential

B. Adopt Performance-based Incentives for Solar Energy Systems over 100 kW

Joint Solar Parties support linking financial incentives to improved

performance of large and small customer-owned solar systems. For solar systems 100 kW and below, the Joint Solar Parties support the staff's recommendation to adopt an EPBB performance model. For systems over 100 kW, the Joint Solar Parties recommend a Performance-Based Incentive (PBI) model that provides an increasing level of energy-only based incentive payments over time, and applying the EPBB performance metric as it is applied to other commercial and residential systems on the upfront payment component.

The Joint Solar Parties note that solar energy production already provides value to the customer both in terms of avoided utility costs, and per kWh incentive payments will significantly add to the importance of production. Establishing a PBI model that provides a portion of the payment on energy production supports the performance incentive value of the PBI because even a modest change in the upfront incentive to the PBI provides significant impetus to the customer to maximize system energy output. Moreover, since the capacity-based portion of the incentive is also adjusted to performance, overall performance for systems over 100 kW will be addressed on multiple dimensions.

The Joint Solar Parties proposed PBI model provides for an up-front incentive payment component that lessens the burden of finding capital for smaller system owners. The Joint Solar Parties and our customers are concerned that a policy mechanism that provides absolutely no up-front incentives, would force all but the largest system owners to rely solely on third-party system ownership because these customers lack the capital needed to purchase multi-million dollar projects. The Joint Solar Parties

note that the Commission continues to support up-front payments for medium-sized commercial customers and residential customers. To support the 100 kW to 1 MW size systems, the system size range typically purchased by governments, schools and other larger commercial entities, some up-front payment should be offered as part of the overall PBI incentive structure.

There are several assumptions that inform the underlying PBI model used to generate the Joint Solar Parties proposal, and which are important to maintaining sustained commercial market growth. Large-scale solar installations currently represent about 60% of total installed solar megawatts in California, and continued growth of the commercial sector is critical to meeting the State's goal of installing 3,000 MW of PV by 2017. For this reason, a carefully designed PBI model is critical to the successful outcome of the CSI. Our PBI model assumptions include:

- Meeting staff MW goals within the current available CSI budget
- Taking customer economics into account using reasonable assumptions on IRR and payback to the customer
- Flat, five year payments, with a reasonable discount rate

The following tables illustrate the relationship between the proposed volumetric buckets, incentive funding per bucket, weighted average rebate levels, and total expected megawatt installations.

Table 2 in Appendix D illustrates the funding distribution per volumetric bucket, based on available funding levels in the initial program period. This bucket proposal is discussed on pages 3-20.

Table 3 in Appendix E illustrates the funding distribution by Investor-Owned Utility, and further by Residential and Non-Residential customers (40%/60%). This volumetric IOU allocation is based on each IOUs percentage funding allocation, which is based on staff's recommendation. This bucket allocation is expected to deliver total expected capacity over the course of the CSI program.

Table 4 on page 27 illustrates the proposed rebate reduction schedule per customer bucket and is presented relative to the Revised Joint Staff Proposal rebate schedule issued on December 13, 2005 (R.04-03-017), and the most recent proposed Staff Proposal. The Joint Solar Parties rebate schedule would be applied according to when each IOU reaches their volumetric trigger, as shown in Table 3.

C. Transition to Performance-based Incentives

The Joint Solar Parties believe the ratio of capacity payments to energy payments proposed by PV Now in its pre-Workshop filing on February 23 will best allow a smooth transition with minimal market disruption caused by customers unable to meet the up-front capital costs of the new program.[14]

The PV Now model proposed the following ratio of expected performance-based payments to energy payments for customers in the PBI program:

2007: 80% Expected performance-based payment, 20% energy payment

2008: 70% -Expected performance based payment, 30% energy payment

2009: 60% -Expected performance based payment, 40% energy payment

[14] PV Now's Proposals for Consideration at the March 16, 2006 PBI Workshop, R.04-03-017, filed February 23, 2006.

2010-2016: 50% -Expected performance based payment, 50% energy payment

The Joint Solar Parties believe that the four year phase-in provides a smoother transition for the solar installation community, and provides a mechanism for the Commission to pay for performance, while recognizing that customers do factor in the time-value of money. This four year phase-in will achieve the goal of rewarding performance without creating undue burdens on customers unable to pay the up-front capital costs. Administratively, the four-year phase in is comparable to the 3-year phase in proposed in the Staff Proposal at page 15.

The Joint Solar Parties support the five year payment period for PBI energy payments in the Staff Proposal and the Joint Solar Parties recommend the payments to customers be made monthly.

The following Table 4 illustrates the Joint Solar Parties proposal to allocate funds for Residential and non-residential customers, based on providing EPBBs to residential and small commercial customers and a phased in EPBB/PBI to commercial customers for installations above 100kW.[15]

			Proposed				Original CPUC	CPUC Proposal	
	a. Large commercial				b. Sm. Com'l	c. Residential			
Bucket	Upfront Rebate ($/Wac-cec)	Energy-based Payment ($/kWh)**	% Upfront / % Energy-based	Commercial Upfront Equivalent ($/Wac-cec)	EPBB Value ($/Wac-cec)	Res. Retro ($/Wac-cec)	All types ($Wac-cec)	Commercial (Wac-system)	Residential (Wac-system)
1	$2.00	$0.090	80% / 20%	$2.50	$2.50	$2.60	$2.50	$1.50	$2.25
2	$1.55	$0.120	70% / 30%	$2.22	$2.22	$2.30	$2.25	$1.35	$2.03
3	$1.17	$0.140	60% / 40%	$1.95	$1.95	$2.00	$2.00	$1.20	$1.80
4	$0.78	$0.140	50% / 50%	$1.56	$1.56	$1.70	$1.75	$1.05	$1.58
5	$0.63	$0.115	50% / 50%	$1.27	$1.27	$1.40	$1.50	$0.90	$1.35
6	$0.45	$0.082	50% / 50%	$0.90	$0.90	$1.10	$1.25	$0.75	$1.13
7	$0.28	$0.051	50% / 50%	$0.56	$0.56	$0.60	$1.00	$0.60	$0.90
8	$0.13	$0.023	50% / 50%	$0.26	$0.26	$0.30	$0.75	$0.45	$0.68
9	$0.05	$0.008	50% / 50%	$0.09	$0.09	$0.10	$0.50	$0.30	$0.45

**5-year flat payment per kilowatt-hour

[15] Appendix B attached to this filing explains the assumptions in greater detail.

Table 4: the Joint Solar Parties Proposed Phase-in of PBI

With respect to the question in the Staff Proposal as to whether new construction should receive lower PBI payments, the Joint Solar Parties believe this is not called for as the installation cost differences are not very great and in the interest of program simplicity it is easier to administer one incentive level for both the retrofit and new construction markets. The Staff Proposal also requested comments on whether there should be minimum design standards associated with PBI. The Joint Solar Parties believe the EPBB accounts for this and the establishment of a minimum design standard is unnecessary.

Finally, the Joint Solar Parties strongly disagree with the Staff Proposal's recommendation of not including a discount rate when converting from an upfront payment to a 5 year PBI. The Joint Solar Parties know of no CPUC proceeding where an appropriately selected discount rate on a stream of payments is ignored. The Joint Solar Parties strongly urge that a discount rate be used for the PBI payments because the failure to do so obscures the real cost borne by customers. For example, the failure to include the time value of money results in a real reduction in incentive payments of approximately 24% for a 5 year PBI payment stream, based on a 10% discount rate.

D. Three Modifications to the EPBB are Essential

The Joint Solar Parties recommend that the Commission adopt the Staff Proposal's EPBB Incentive System with three modifications: (1) Use the Estimated Rating in the calculation rather the Verified Rating; (2) The reference system used in the

Design Factor should be a horizontal system with 5 percent shading losses; (3) consistent use of system AC rating.

Estimated Rating is required because there is a lack of industry consensus as to what method should be used to verify the system AC rating. Most importantly, it is not administratively feasible to use Verified Rating since administrators do not have the tools to accurately and effectively perform such a verification in a reasonable amount of time and at a reasonable cost. Therefore, at least at the onset of the CSI, the EPBB should be paid on the Estimated System Rating not the Verified Rating. The process for obtaining and paying incentives based on the Verified Rating can be addressed at a later date thereby avoiding delaying the CSI program.

The Joint Solar Parties concur with the Staff Proposal that the calculation of Estimated System Rating should be based on the CEC AC rating, multiplied by a 90% loss factor, as listed on page 21 of the Staff Proposal:

Estimated System Rating = Number of PV Modules
x PV PTC Module Rating
x Inverter Efficiency
x Other Losses (90%)

The Joint Solar Parties believe that this represents a reasonable approximation of how systems will operate in the field, and, therefore, the Joint Solar Parties suggest that the Commission base EPBB payments on the Estimated System Rating in lieu of the Verified Rating in the initial phase of the CSI.

The second modification relating to reference system used in the Design Factor is required because transitioning to the EPBB Incentive System effectively

reduces the incentive to the customer. Our calculations show that the transition to EPBB under the proposed reference system would result in system performance which is 15% higher than originally contemplated for the program. Thus, a system which would have previously been rated at 3 KW would have to be rated at 3.45 KW under the new performance standard. Rather than increasing incentive levels to compensate for this, adjusting the reference system in the Design Factor leaves customers neutral to the change to the EPBB Incentive System. Moreover, having the reference system used in the Design Factor be a horizontal system with 5 percent shading losses represents a conservative baseline that provides parity with current SGIP and ERP rating systems that are based on California Energy Commission's ("CEC" or "Energy Commission") component-based AC ratings.[16]

The Joint Solar Parties also recommend consistent use of the system AC rating. The CPUC Self Generation Incentive Program Fourth-Year Impact Report[17] and the CEC's Emerging Renewables Program Systems Verification Report 2004-2005[18] suggest that an 18% capacity factor is typical of what is shown in the field under the SGIP program where the capacity factor is calculated using the CEC-AC rating basis. As defined in the Staff Proposal, the system AC rating includes an additional 10 percent

[16] For more information see Appendix F, Hoff, Tom. Expected Performance Based Buydown (EPBB) Incentive Structure: Rationale and Implications

[17] CPUC Self Generation Incentive Program Fourth-Year Impact Report, Final Report, delivered April 15, 2005 to Southern California Edison and The Self-Generation Incentive Program Working Group.

[18] Emerging Renewables Program Systems Verification Report 2004-2005, December 2005, CEC-300-2005-19 available at http://energy.ca.gov/2005publications/CEC-300-2005-019/CEC-300-2005-019.PDF.

losses not included in the CEC-AC rating. As a result, systems will have a 20% capacity factor when evaluated on a system AC basis. Thus, if the Commission uses a system AC rating basis, a 20% capacity factor is appropriate. It is essential, however, that the Commission maintain consistency once a rating system is selected. In particular, if the capacity factor is reported in system AC units, then the price of the system and the incentive must also be reported in system AC units. For example, if the price of a system is $8.00 per Watt under the current SGIP program, then the price of the same system will be $8.88 per Watt as defined under a system AC rating system.

E. On-site Verification

The Joint Solar Parties agree that all systems between 30-100kW should have a post-construction inspection and systems below 30kW should have random inspections to verify the design criteria upon which the EPBB is paid. This verification scheme is entirely possible under the current 10% administrative budget. All SGIP projects are currently inspected and the Staff Proposal does not require all systems below 30 kW to receive an inspection. The Joint Solar Parties do not believe that small systems should be able to opt-in for on-site inspections because the EPBB should only be paid based on Expected Rating, not the Verified Rating.

F. Performance Estimation Tools

The performance estimation tool that should be used to calculate the Design Factor in the EPBB calculation is one that accounts for system orientation (including tilt and azimuth) and system shading for potentially multiple subsystems in different orientations. The tool would need to be applicable to new construction, retrofit and BIPV

applications. The Joint Solar Parties also recommend that the tool be available as a downloadable software package so that installers can use it when internet access is not available.

III. PROGRAM ADMINISTRATION

A. The Commission Should Authorize Existing SGIP Administrators to Continue to Administer the CSI in Order to Maximize Federal Tax Benefits

In the interest of maximizing the value of the federal tax incentives and ensuring that the program is operating on January 1, 2007, the Joint Solar Parties recommend that the Commission delegate administrative responsibilities to the current SGIP administrators, and not pursue third-party administration at this time.

Section 136 of the US Tax Code exempts from federal taxable income any subsidy provided to a residence by a utility for the purchase or installation of any energy conservation measure, including a PV system.[19] Hence, a residential recipient of a utility rebate does not pay income tax on the rebate, but must instead reduce the "tax basis" of the PV system (i.e., the dollar amount to which depreciation and tax credits apply). Because residential systems are not depreciated for tax purposes, and because the 30% federal investment tax credit for residential PV systems is currently capped at $2000 per system (i.e., a relatively small proportion of total system costs), the negative economic impact of the basis reduction is outweighed by the positive economic impact of not

[19] Exploring the Economic Value of EPAct 2005's PV Tax Credits, Case Studies of State Support for Renewables, March 2006 available at http://eetd.lbl.gov/ea/ems/cases/LBNL_59928.pdf. This document presents a comprehensive discussion of the applicability and implications of Section 136 which can be found starting on page 4 ("Utility Energy Conservation Subsidy").

paying income tax on the rebate. As a result, residential PV systems are better off receiving a non-taxable, rather than taxable, rebate. For example, recent analysis by Lawrence Berkeley National Laboratory ("LBNL") reveals that a residential PV system garners the same value (in terms of net present value of after-tax cash flows) from a $2.06/W non-taxable rebate as it does from a $2.80/W taxable rebate.[20]

This substantial difference suggests that the CSI program should be designed to provide non-taxable rebates to residential ratepayers. Having utilities administer at least the residential portion of the CSI program, such that the rebates will fall under the Section 136 exclusion, is the most certain way to accomplish this goal.[21] Other administrative structures may also result in rebates that qualify for the Section 136 exclusion, but it is virtually impossible to know which administrative structures might qualify without a formal determination from the IRS. Additionally, seeking and receiving such a determination will take more time than is available (e.g., perhaps a year or more) given the impending CSI implementation on January 1, 2007.

Because of this short time frame – as well as the arguably unrealistic timeframe of establishing a third-party administrator by January 1, 2007 even absent the

[20] The opposite is true for commercial systems. Because commercial systems are depreciated, and because the 30% federal investment tax credit for commercial PV systems is not capped, the negative economic impact of the basis reduction caused by a non-taxable rebate outweighs the positive economic impact of not paying tax on the rebate. Hence, commercial PV systems fare better under a taxable rebate: LBNL analysis shows that it would take a non-taxable rebate of $3.97/W to provide a commercial system with the same after-tax value as a $2.8/W taxable rebate. See slide 7 of http://www.cpuc.ca.gov/static/energy/solar/ryan_wiser_presentation_on_tax_incentives_at_pbi_workshop__march_16__2005.ppt.

tax uncertainty – and because favorable tax treatment should supersede other administrative considerations, the Joint Solar Parties recommend that the current SGIP administrative structure (i.e., utility administration) be maintained under the CSI at this time for all customer classes and system sizes. The Joint Solar Parties are hopeful that the current SGIP administrators will effectively administer the full CSI, and the Joint Solar Parties encourage the Commission to carefully evaluate the administrative efforts of the SGIP administrators on an ongoing basis. As noted elsewhere in these comments, the Joint Solar Parties also seek greater solar industry representation in these processes. If the current SGIP administrators fail to do an adequate job, or if tax law changes or is clarified, the Joint Solar Parties encourage revisiting the value of third-party administration for both residential and non-residential systems.

The Joint Solar Parties request that the Commission rule on this item immediately, because doing so will provide certainty to the SGIP administrators of their responsibilities and allow them to prepare for the pending transition of the small customer program from CEC to SGIP administrator operations. In addition, the Joint Solar Parties believe that this decision will also allow parties to turn to the question of detailed operating rules design to be dealt with in the development of the CSI Handbook.

1. Incentive Payments Should not Penalize Innovation or 'Over-Production'

The Joint Solar Parties agree with the Commission's objective of creating a

[21] See slides 39 and 40 of http://eetd.lbl.gov/ea/ems/reports/cpuc-pv-tax.pdf or slide 9 of http://www.cpuc.ca.gov/static/energy/solar/ryan_wiser_presentation_on_tax_incentives_at_pbi_workshop__march_16__2005.ppt.

program that pays for kWh produced by solar systems. Therefore, the Joint Solar Parties strongly urge the Commission to remove the 10% cap on systems that are producing more energy than expected. By capping systems that "overproduce", the Commission undermines its objective of paying for kWh actually produced by solar systems and provides a disincentive for innovation both in the optimal installation of traditional PV systems and in the development of new technologies. Further, the administrative rationale for capping overproduction at 10% in order to maintain budget levels is unsupported, as the higher production from tracking and other high-capacity factor systems will by definition be factored into the forecasted EPBB and PBI payments. Accordingly, there should be no need for different incentive payments for high-performance solar systems, as the performance bar for these systems will already be set higher than traditional systems and their incentives already adjusted accordingly.

IV. THE JOINT SOLAR PARTIES SUPPORT THE CONTINUATION OF WORK ON A SOLAR THERMAL PILOT

It is unclear why solar thermal hot water heating was not addressed in Section 3 of the Staff Proposal which discussed incentives for non-PV solar technologies. D.06-01-024 explicitly stated that the CSI would include solar thermal and the San Diego Regional Energy Office ("SDREO") is implementing a pilot program as directed. In the interest of creating a comprehensive solar energy program for California, the Joint Solar Parties support the continuing effort by SDREO to formulate a solar heating pilot program which can be quickly made available on a state-wide basis.

V. INTEGRATION OF NON-SOLAR PV TECHNOLOGIES

A. Ways to Integrate Solar HVAC with the Solar Water Heating Program Proposed by SDREO.

HVAC stands for Heating, Ventilation and Air Conditioning. SDREO will propose a methodology for creating incentives for larger scale non-residential water heating systems. The only difference between a large scale solar water heating system and one that provides heat to an HVAC application is the interface between the solar collector system piping and the conventional HVAC equipment, as well as the electronics which control the interface hardware, including pumps and valves, for example. In some circumstances, other solar collector types may be used besides the typical "flat plate" models; evacuated tube or "trough" systems, for example.

HVAC solar systems are merely utilizing the heat produced by the solar collectors for an application other than residential water heating. In Europe, where solar thermal system use is widespread, residential systems which provide both heated water and space heating are known as "combi-systems." In fact, large scale solar water heating systems are also referred to as a HVAC application. There is no reason why solar for all HVAC applications should not also play a role in the California Solar Initiative.

B. Technical Solar HVAC Specifications for Inclusion in the CSI Program Handbook.

SDREO has already developed a methodology for creating incentives for larger scale solar systems based on solar energy production. Larger scale non-residential systems should be individually engineered, as SDREO recommends, and the solar

collectors used in the system are recommended to be certified and rated by the Solar Rating & Certification Corporation www.solar-rating.org. The Joint Solar Parties concur with this approach.

C. Should a Certification Process be Required for BTU-to-kWh Equivalent Conversion Technologies, or for BTU Ratings Equivalent to Solar PV Ratings. Alternatively, Should the CPUC Establish the Incentives for Solar Thermal on a per BTU Basis?

A kWh is equivalent to 3,413 BTUs, or British Thermal Units. Combined cycle natural gas fired turbines produce electricity at varying degrees of efficiency, known as the turbine's "heat rate." The highest efficiency turbines consume approximately 6600 BTUs of heat produced by combusting natural gas to produce a kWh (baseload) and 9000 Btu/kWh (peaker). An average efficiency California turbine has a heat rate of approximately greater than 10,000 Btu/Kwh.

Distributed PV systems produce electricity at the point of use – the only efficiency loss in a distributed PV system comes from the inverter's conversion efficiency, usually around 82 percent, meaning 82% of the Direct Current (DC) electricity generated by the PV system is converted into Alternating Current (AC). Individual PV module efficiencies range from about 10 to as much as 20 percent, meaning they convert 10 to 20 percent of the sunlight striking them to electricity.

Distributed solar thermal systems also have losses; the efficiency of the collector is dependant on the ambient temperature and the intensity of the sunlight as well as the system's orientation and tilt, and the efficiency of a system is affected by storage and piping losses. The Solar Rating & Certification Corporation ("SRCC") publishes

ratings for individual solar thermal collectors expressed in BTUs as a function of the difference between the ambient temperature and the operating temperature of the collector, and the sunlight intensity. Solar thermal collectors have peak efficiencies in the 80 to 90 percent range (or higher, in the case of "unglazed" swimming pool solar collectors.

Residential solar water heating systems certified to SRCC's OG 300 Standard are rated based on their delivered energy, rather than on their maximum possible performance. The rating takes into account the efficiencies of both the collector(s) and the balance of the system, and the information is expressed in both BTU and kWh production terms. Therefore, SRCC rates systems based on energy, not capacity. SRCC was established in 1977, and is supported by the US Department of Energy.

SRCC does not rate or certify large scale systems, however it does rate and certify individual solar collectors. The American Society of Heating and Refrigeration Engineers ("ASHRAE") has published a large scale solar system design manual, which is available on SRCC's website at: www.solar-rating.org.

Large scale central station solar plants which feed power into the electric grid are rated on their peak electricity generating capacity, expressed in MW.

D. How Should the CPUC Handle a Combination Renewable/Fossil Technology System?

Distributed solar thermal systems will almost always have a fossil input, or

at least the capability of a fossil input (including electricity produced from fossil fuels). The focus should be on the energy production of the solar component, and the fraction that the solar component makes up as compared to the total energy demand of the application.

E. If Solar Water Heating Qualifies as an Energy Efficiency Measure (under rules of the Energy Efficiency Proceeding), Should Solar Water Heating Receive Similar Treatment Under CSI, Especially if California will have "Lost Opportunities" to put Solar Water Heating on Buildings while Awaiting the Results of the SDREO Pilot?

Yes.

VI. THE COMMISSION SHOULD UTILIZE THE EXISTING INVERTER METERING CAPABILITY FOR ALL NON-PBI SYSTEMS

The Staff Proposal states on page 48, that "[a]ll participants in the CSI program must have a revenue-quality solar system dedicated meter." The Joint Solar Parties believe that this will impose an unnecessary burden on customers that receive an EPBB. To avoid this burden, the Joint Solar Parties propose to require existing CEC accepted inverter-meters for all systems that do not receive PBI incentives. The Energy Commission already qualifies inverters for the Emerging Renewable Program. CEC approved inverters must meet stringent requirements, including UL 1741 certification, and other testing procedures done by a qualified laboratory. Most of the CEC approved inverters are equipped with meters (122 out of 126 inverters on the current CEC list[22]

[22] See List of Eligible Inverters, California Energy Commission , Consumer Energy Center, ERP Rebate Program, http://www.consumerenergycenter.org/cgi-bin/eligible_inverters.cgi

have meters), and the CEC requires that inverter meters "have a manufacturer's uncertainty specification of plus or minus five percent.[23]" CEC approved meters will provide sufficiently accurate information to customers receiving an EPBB, and will suffice for measurement and evaluation purposes.

The Joint Solar Parties concur that for systems receiving a PBI incentive, revenue grade meters should be required. However, if the inverter-meter is an approved revenue grade meter, no additional metering on the PV system should be required.

VII. NET METERING IS AN ESSENTIAL COMPONENT OF THE CSI

In Section 7.3 of the Staff Proposal discussion takes place regarding the need to increase the net metering cap from its current level of 0.5% of statewide aggregate installed capacity to 2.5%. Net Metering is a critical component of achieving the 2600MW goal of the CSI within the budget allocated by the Commission. The Joint Solar Parties support the Commission's position on increasing the Net Metering Cap at the California legislature in the 2006 legislative session. The Joint Solar Parties urge that the Commission recognize that existing law, Public Utilities Code Section 2827, defines true Net Metering as metering which values electricity delivered to the grid at the full retail value, up to the point where a net annual export of electricity is reached.

VIII. THE ESTABLISHMENT OF ADDITIONAL WORKING GROUPS WILL FACILITATE DEVELOPMENT OF THE CSI

In addition to the work group proposed in Section 7 of the Staff Proposal to explore transmission of meter data, the Joint Solar Parties recommend the Commission

[23] Emerging Renewables Program Guidebook, Sixth Edition, January 2006, California
(footnote continued)

establish a CSI Working Group now to work on the transition to the new program design, and continue that group to advise the Commission and administrators on program operations after January 1, 2007. The CSI Working Group would be comprised of a variety of necessary perspectives including IOUs, Commission Staff, solar manufacturers, solar installers, solar advocates and other interested parties. By including this broad range of stakeholders, different and needed perspectives will be brought together to ensure the smooth and equitable development of the CSI program. Such broad stakeholder groups are not uncommon. The CEC has recently formed 'New Homes Solar Partnership Committee' - a stakeholder committee of 16 people from the solar industry and other interested parties formed to advise the CEC on the development of the rules and operations of the CEC new homes program for the CSI. The SGIP Working Group has not included stakeholders, such as solar manufacturers, installers and other solar advocates and the Joint Solar Parties encourage the Commission to *broaden*, not reduce, the amount of stakeholder involvement in the development of the CSI through the formation of the CSI Working Group. These Joint Solar Parties have the most relevant experience in working directly with customers and suppliers on a daily basis. Given the complexity of the quickly evolving global market, direct stakeholder input should be included early in the program management process, not as an afterthought. Only by including the industries and communities directly impacted by the administrative decisions relating to the CSI will the ultimate goal of a smooth program that achieves a self-sufficient solar industry be achieved.

Energy Commission, CEC-300-2006-001-ED6F. Appendix 3.

The CSI Working Group would also provide a venue for the notification of incentive reductions upon reaching volume-based market triggers for different IOU territories and customer classes. The Joint Parties foresee the incentive reductions to be a fairly automatic process, but notification of stakeholders and the solar industry will be critical to ensure a smooth transition between 'buckets'. Furthermore, if circumstances arise whereby incentive modifications outside the proposed schedule may be necessary, the CSI Working Group would be the best venue to bring the issues before the ALJ in order to consider policy options and issue a ruling.

IX. CONCLUSION

The Joint Solar Parties are united in our interest in ensuring that the CSI is an outstanding success by all measures. To reach this end, the Joint Solar Parties have offered these comments on the Staff Proposal. For the reasons stated above, the Joint Parties request the Commission adopt a volume-based trigger mechanism for the CSI and make the changes requested above to the PBI/EPBB portions of that mechanism. The Joint Parties also believe inclusionary working groups are an essential forum for developing the CSI in a manner that serves all stakeholders needs. Accordingly, the Joint Solar Parties support the creation of the proposed meter data work group and also request the formation of the CSI Working Group. Joint Solar Parties also request that the Commission rule immediately on the Joint Solar Parties territory and ratepayer class specific volume trigger incentive reduction mechanism and the continuation of third-party administration as these issues are critical to the continuation of the SGIP and the implementation of the CSI as discussed above.

Respectfully submitted this May 16, 2006 at San Francisco, California.

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Appendix A

2006 SGIP Application status as of 5/4/2006[24]

TOTAL NEW APPLICATIONS RECEIVED IN 2006				
ADMINISTRATOR	IOU ALLOCATION (MW)	ISSUED CONDITIONAL RESERVATION LETTERS (MW)	ACTIVE PROJECTS - "UNDER REVIEW" (MW)	INACTIVE PROJECTS - "WAIT LIST" (MW)
PG&E	22	12.4	10.5	12.7
SCE	17	7.9	1.9	0
SDREO	6.5	5.1	0.6	0
SOCAL GAS	4.5	1.9	0.8	0
TOTAL	50	28	13.7	12.7
MAX ALLOWED		50		

[24] This chart is available at http://www.pge.com/selfgen/ under the "What's New?" section. Last accessed May 11, 2006.

Appendix B

Principles of the Market Based Trigger Model

Principles

- The original proposal to allocate incentives by MW "buckets" is sound. In fact, they should be detached from a calendar; some buckets may take more time to work through than others, and that's okay.

- Each utility should manage its share of the total MW in each bucket separately and proceed through each bucket independently of the other utilities. If this results in different incentives around the state at any given time, that's okay. Different territories have different customer economics, and a uniform program will prove suboptimal.

- Within each utility, residential and non-residential systems each have their own "protected" buckets. Each customer class works through its respective bucket independently.

- All non-residential customers should be treated the same regardless of tax status. Public sector building owners have very different time horizons and expectations for project economics than the private sector. Indeed, the current mix in the SGIP between public and private entities is roughly 50/50, amply demonstrating that the tax benefits accruing to private companies (tax credits as well as accelerated depreciation) won't cause them to overwhelm the nonresidential program.

- The split in spending and MW between residential and non-residential is reasonably set at 40%/60%.

- The Joint Solar Parties accept the original Commission MW buckets proposed in D.06-01-024 as reasonable.

- Since there is one fewer MW bucket than the staff report assumed (given that the program will have worked through the 50MW bucket before 1/1/07), the average

incentive amounts won't be exactly the same as in the staff report (dropping by exactly $0.25 per bucket). Indeed, they will need to drop somewhat more quickly in order not to create a "cliff" at the end.

- The PBI incentive amount in the commercial program is flat and paid on production over the first five years of system operation.

- In order to make the PBI-centric commercial incentive program equivalent to what those same customers would receive under an EPBB incentive, it is imperative to take into account the time value of money. All large commercial bids include discounting because that's how customers operate. An undiscounted PBI payment spread over five years will inherently result in poorer project economics than an up-front EPBB – which by definition is already a performance-based calculation. As a result, the PBI portion of the commercial incentive needs to be somewhat higher than it would be simply by dividing total kWh payments by 5. This will narrow the nominal-dollar spread between the commercial and residential programs, but it's important to remember that on a real-dollar basis, the spread is far greater and far closer to the original staff recommendations.

- Total spending for incentives over the 2600 MW cannot exceed $2,125 million starting 1/1/07 over the course of the CSI. This assumes 15% for combined administrative and R&D spending.

- All incentives expressed as "$/W" are CEC_{ac}.

Appendix C

Excel Spreadsheet containing a key relating this filing to the Staff Proposal

Appendix D

Annual Bucket Allocation

[each IOU has its own buckets proportionate to the total program buckets below]

Initial Year / Bucket	Proposed	CSI Budget Allocation by Year in $ Million (based on 85% of annual CSI budget = $2.125 billion) 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Calculction - do not modify
1	$185	$185										$185
2	$238	$113	$125									$238
3	$276		$172	$104								$276
4	$301			$194	$107							$301
5	$333				$127	$206						$333
6	$322					$28	$234	$60				$322
7	$254							$88	$149	$16		$254
8	$150									$132	$17	$150
9	$67										$67	$67
Extra											$1	$0
Totals:	$2,124	$298	$298	$298	$234	$234	$234	$149	$149	$149	$85	$2,124
Annual allocation		$350	$350	$350	$275	$275	$275	$175	$175	$175	$100	
% of Annual allocation		85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	

Appendix E

CSI 2007 Budget Allocation to Each IOU (in $ Million)				
40% / 60% split of residential / non-residential				
2007 TOTAL (sum of Bucket 1 & 2 allocations below)				
	Allocation*	Res	Non-Res	Totals
PG&E	44%	$52	$79	$131
SCE	34%	$40	$61	$101
SDG&E	13%	$15	$23	$39
So Cal Gas	9%	$11	$16	$27
		$119	$179	$298
2007 BUCKET 1 ALLOCATION				
	Allocation*	Res	Non-Res	Totals
PG&E	44%	$30	$45	$75
SCE	34%	$23	$35	$58
SDG&E	13%	$9	$13	$22
So Cal Gas	9%	$6	$9	$15
		$68	$102	$171
2007 BUCKET 2 ALLOCATION				
	Allocation*	Res	Non-Res	Totals
PG&E	44%	$22	$33	$56
SCE	34%	$17	$26	$43
SDG&E	13%	$7	$10	$16
So Cal Gas	9%	$5	$7	$11
		$51	$76	$127
	*From Table 1 of Appendix A of revised joint staff proposal			

Appendix F

Expected Performance Based Buydown (EPBB) Incentive Structure: Rationale and Implications

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Draft, May 11, 2006

Introduction

On March 16, 2006, the California Public Utilities Commission (CPUC) held the first workshop in establishing the CSI program. On April 24, 2006, CPUC staff (Staff) issued its proposal for the Design and Administration of the California Solar Initiative.[25] Staff had a large number of topics to address during those five weeks.

Incentive structure is one issue that was addressed by Staff. Staff recommended two incentive structures: one for systems under 100 kW and one for systems greater than 100 kW. The recommended structure for the smaller systems is the Expected Performance Based Buydown (EPBB). The EPBB is an up-front incentive payment where the incentive amount is adjusted to reflect verifiable system capacity as well as the effect of system orientation and shading on energy production. The recommended structure for the larger systems was a fixed rate 5-year performance based incentive (PBI).

Staff recommended that the EPBB be calculated according to the following formula:[26]

$$Incentive(\$) = Incentive\,Rate(\$/kW_{AC})\ x\ System\,Rating(kW_{AC})\ x Design\,Factor$$

System Rating is the AC rating of the entire installed system as defined under PVUSA Test Conditions (PTC). Design Factor, which is calculated at the time of the application submission, equals the ratio of simulated output for the designed system divided by the simulated output for a system with an identical rating that is oriented south and tilted 30º with no shading over a given period of time.

The proposal also recommended that the EPBB Incentive Rate be set at \$2.25/$Watt_{AC}$ for residential customers and non-profits and at \$1.50/$Watt_{AC}$ for commercial entities.

When one accounts for the adjustment in rating methodologies, these EPBB Incentive

[25] CPUC Energy Division Staff Proposal for California Solar Initiative Design and Administration 2007-2016, Rulemaking 06-03-004 (Filed March 2, 2006), April 24, 2006, http://www.cpuc.ca.gov/PUBLISHED/RULINGS/55786.htm.
[26] Pages 21-22 of Reference 25.

Rates represent a large decline compared to the incentives that are currently available under the Self-Generation Incentive Program (SGIP) and the California Energy Commission's Emerging Renewables Program (ERP). To put the magnitude of the proposed decline into perspective, consider the EPBB incentive that would be paid for a horizontal system. The EPBB residential incentive would drop at least 35 percent (compared to the current \$2.80/$Watt_{AC\text{-}CEC}$ ERP incentive) and the commercial incentive would drop at least 50 percent (compared to the current \$2.50/$Watt_{AC\text{-}CEC}$ SGIP incentive).

The effect of issuing a proposal with such large incentive declines can have negative effects. When a drastic cut in incentives is presented as part of the proposal, the tendency of parties with a financial interest in the success or failure of a market is to focus on the negative aspects of the proposal and to miss the good elements of the proposal.

The proposal, however, is just what the word implies: a proposal. The proposal is not set in stone. Staff has publicly stated that every aspect of the proposal can and should be commented on. In fact, at the May 4, 2006 workshop, Staff reiterated the desire to receive comments throughout the workshop.

Objective

While there are a number of positive aspects to the proposal, there is one aspect of the proposal in particular that constitutes an important move forward for the PV industry: the EPBB incentive structure. The EPBB incentive structure would be very beneficial to the CSI program. The proposed EPBB Incentive Rates, however, are unrealistically low and if accepted would significantly damage the PV market in California.

The objective of this paper is to explain why the EPBB incentive structure is so beneficial. The paper also discusses the fact that transitioning to the EPBB structure may require higher incentive rates (rather than lower incentive rates) because the incentive rates under the current SGIP program versus the EPBB system are not directly comparable.

Analysis

Direct EPBB Calculation

The most straightforward way to calculate an EPBB incentive is to define a baseline energy production incentive rate (\$ per kWh) and multiply it by the simulated output of the designed system over some period of time. That is,

$$Incentive\,(\$) = Energy\ Rate(\$/kWh)\ x\ Simulated\ Ouptut\ \ for\ Designed\ System\,(kWh) \qquad (1)$$

While this equation has intuitive appeal because of its simplicity, it has a critical limitation. Performance simulations are inherently subject to error, thus making it

difficult to validate results without requiring extended duration tests. As a result, it is desirable to derive a form of the above equation that minimizes simulation error and provides for direct field verification over a short period of time.

First, consider how one would establish the Energy Rate ($ per kWh) presented in (1). One needs to set an Incentive Rate ($ per kW_{AC}), multiply it by the System Rating (kW_{AC}), and divide the result by the simulated output (kWh) for some Reference System over a given time period (typically a year should be sufficient).

That is,

$$Energy\ Rate(\$/kWh) = \frac{Incentive\ Rate(\$/kW_{AC})\ x\ System\ Rating(kW_{AC})}{Simulated\ Ouptut\ \ for\ Reference\ System\ (kWh)}$$

Substituting this back in to Equation (1), the Incentive equals the Energy Rate times the Simulated Output for Designed System (kWh).

$$Incentive\ (\$) = \frac{Incentive\ Rate(\$/kW_{AC})\ x\ System\ Rating(kW_{AC})}{Simulated\ Ouptut\ \ for\ Reference\ System\ (kWh)}\ xSimulated\ Ouptut\ \ for\ Designed\ System\ (kWh)$$

The terms in this equation, however, can be rearranged to result in

$$Incentive\ (\$) = Incentive\ Rate(\$/kW_{AC})\ x\ System\ Rating(kW_{AC})x\frac{Simulated\ Ouptut\ \ for\ Designed\ System\ (kWh)}{Simulated\ Ouptut\ \ for\ Reference\ System\ (kWh)}$$

which can be written as

$$Incentive\ (\$) = Incentive\ Rate(\$/kW_{AC})\ x\ System\ Rating(kW_{AC})xDesign\ Factor$$

where (2)

$$Design\ Factor = \frac{Simulated\ Ouptut\ \ for\ Actual\ System\ (kWh)}{Simulated\ Ouptut\ \ for\ Reference\ System\ (kWh)}$$

Equation (2) is identical to the Staff's proposed EPBB calculation when the Reference System is Fixed 30º South-Facing with no Shading.

Discussion

Equation (2) is more complex than Equation (1). It does not, however, have the limitations associated with Equation (1). In addition, as listed below, it also offers a number of advantages.

Potential Performance Issues Are Disaggregated

All of the performance factors and sources of error are lumped into a single term (the

Simulated Output for Designed System) in Equation (1). Equation (2), on the other hand, disaggregates the performance factors into two terms: performance due to system rating issues are captured by the System Rating term; performance due to system orientation and shading issues are captured by the Design Factor term.

System Rating Has Potential to Be Directly Measurable and Thus Verifiable

With Equation (2), the System Rating has the potential to be directly verifiable through field measurements. This is a fundamental feature that has been lacking throughout most capacity based incentive structures: most are operated using rating conventions that rely on calculated values but cannot be directly verified using field measurements.

The System Rating in Equation (2) captures all of the losses and inefficiencies that make up the verifiable AC rating of the system. Inaccuracies in PV module and inverter equipment rating methodologies as well as internal wiring and other losses are captured by the System Rating. The potential exists to specify test procedures that, when implemented, can verify the System Rating.

In the extreme case, when one relies on anything but a verifiable system rating (and a system AC rating is the only verifiable rating), if even one of the system's components is not included in the rating calculation and that component fails to work as specified, it is possible that the system might not produce any power at all. A verifiable system rating prevents this possibility.

Verification Can Be Performed

Verification can be performed since the System Rating is directly verifiable. The only part of the verification that requires testing of any sort is the System Rating. The only verification that is required for the Design Factor is a visual inspection of the system to confirm that it is installed in the orientation and with the shading factors as specified by the applicant.

The Calculation Rewards Good Installations and Penalizes Poor Installations

Since the System Rating can be directly verified once the system is installed, the System Rating will be higher for effective installations, rewarding manufacturers of efficient components and designers who perform high quality installations. Poor quality equipment as well as poor quality installations will be penalized, protecting the market from disreputable companies.

The Calculation Tolerates Model and Data Inaccuracies

In Equation (1), it is critical that both the model and data used in the incentive calculation be highly accurate. Paying an incentive that is highly dependent on model accuracy results in a situation of uncertainty among installers and others as to how the system performance is verified. This could result in the situation where participating parties protest and challenge model and data accuracy. For example, the debates could begin

about whether or not the model is an accurate predictor of how much energy the system will produce (i.e., what is the correct capacity factor).

This situation is much less likely to occur with Equation (2). The simulated kWh production of the system is only factored into the Design Factor. Since the Design Factor is the ratio of two simulated quantities, relative model and data accuracy is of importance, not absolute accuracy. The Design Factor determines what percent of annual energy production the actual design should have relative to the Reference System. As long as the Design Factor uses the same model and same weather data for both the numerator and the denominator, the relative accuracy of the results will be preserved, even if the model is only pretty good. This will help to avoid the model accuracy and data assumption debates.

The form of the Design Factor in Equation (2) normalizes the results relative to the Reference System. Bias in any element of the modeling would be present in both the numerator and the denominator, tending to cancel out in the ratio. For example, if the simulation were based on an optimistic weather data set, the error would tend to cancel when the same data set were used for both the actual System and the Reference System.

Implications

The previous section presented the benefits of the EPBB incentive structure. There are two major factors, however, that need to be accounted for when transitioning from the SGIP and ERP capacity based buydowns to the EPBB incentive structure. First, the system rating used in the EPBB calculation is a system AC rating while the SGIP and ERP are based on a component AC rating. A system AC rating will reduce the total incentive to the customer by 10 percent when the Staff's Estimated Rating calculation is used.

Second, the Design Factor as defined by Staff reduces the incentive to the customer[27] because the Reference System is a fixed-30º south-facing system with no shading. Most fixed systems will have a Design Factor that is less than 1 because of suboptimal orientation and shading issues.

As a result, the transition from the SGIP and ERP programs to an EPBB incentive structure will reduce the total incentive to the customer unless an adjustment is made. Stated in another way, if one does not want the incentive to decline, an adjustment needs to be made to the EPBB incentive calculation to account for the incentive structure change.

One option to offset the reduction is to increase the Incentive Rate. Another option is to

[27] The one exception to this is tracking systems. The Design Factor will probably increase the incentive to the customer.

define a different Reference System in the Design Factor calculation.

Increase Incentive

One option to offset the reduction is to increase the Incentive Rate.

There are two factors that the EPBB calculation accounts for that the SGIP incentive does not: (1) the AC system rating represents a 10 percent reduction compared to the rating under the SGIP; (2) he Design Factor represents a loss in energy production due to suboptimal orientation and shading.[27]

Suppose that the typical system installed in the program produces 94 percent as much energy as the Reference System. Suppose that a customer installs a 100 $kW_{AC\text{-}CEC}$ and the program wants to maintain economic parity with the existing SGIP incentive of \$2.50/$Watt_{AC\text{-}CEC}$.

As presented in Table 1, the customer would receive \$250,000 under the current SGIP program. What would it require for a customer to be equally well off under the EPBB structure? A 100 $kW_{AC\text{-}CEC}$ is equivalent to 90 kW_{AC} and the Design Factor is 94 percent. As a result, the EPBB Incentive Rate needs to increase by 18 percent to \$2.96/$Watt_{AC}$ to provide the customer with the same economic benefit as the SGIP incentive.

Table 1. Incentive comparisons (higher Incentive Rate).

	SGIP Program	EPBB Staff Proposal w/ Higher Incentive Rate
Intentive Rate ($/Watt)	\$2.50	\$2.96
Rating Calculation		
Number of Modules	1,000	1,000
PV PTC Module Rating (W)	105.2	105.2
Inverter Efficiency	95%	95%
Other Losses	-	90%
Estimated Rating (kW)	99.9	89.9
Design Factor	-	94%
Incentive Amount ($K)	**\$250**	**\$250**

Use Different Reference System

The previous subsection described how to adjust for the transition to the EPBB incentive structure by increasing the Incentive Rate. This subsection describes how to leave the Incentive Rate unchanged and to make the adjustment by using a different Reference System in the Design Factor calculation.

An analysis was performed using the Clean Power Estimator for a system in San Jose, CA.[28] A fixed 30º south-facing system with no shading is estimated to have a DC-based capacity factor of 16 percent. A recent report by the California Energy Commission, however, found that the average DC-based capacity factor for systems including the effect of orientation and shading was 15 percent.[29] Thus, based on the CEC report, it appears that systems have an average of 6 percent design losses. When the 6 percent design losses are combined with the 10 percent rating losses, the result is a combined loss of 15 percent.

In order to compensate for this loss through the Design Factor, the Reference System needs to be chosen to have an expected output that is 85 percent of a fixed 30º south-facing system with no shading.[30] Analysis using the Clean Power Estimator suggests that one system that fits this description is a horizontal system with 5 percent shading losses.

The capacity factors for various system configurations are presented in the top part of Table 2. The Design Factors using a horizontal system with 5 percent shading losses as the Reference System are presented in the bottom part of Table 2.

Table 2. Capacity Factor and Design Factor (San Jose, CA using Clean Power Estimator).

Capacity Factor (Based on DC Rating)

	Degrees of Shading				
Tilt	***0***	***5***	***10***	***15***	***20***
Horizontal	14.2%	14.2%	14.1%	14.0%	13.5%
10	15.2%	15.2%	15.0%	14.8%	14.3%
20	15.8%	15.8%	15.6%	15.3%	14.7%
30	16.0%	15.9%	15.7%	15.4%	14.8%

Design Factor (Reference: Horizontal System, 5% or 20º Shading)

	Degrees of Shading				
Tilt	***0***	***5***	***10***	***15***	***20***
Horizontal	105%	105%	104%	103%	100%
10	112%	112%	111%	109%	106%
20	117%	116%	115%	113%	109%
30	118%	118%	116%	114%	109%

[28] PV Watts is another on-line simulation tool. It does not, however, have the capability of performing a shading analysis as is incorporated into the Clean Power Estimator (http://www.njcep.com/html/estimator_f.html). The Clean Power Estimator was run with 10 percent PV Output Adjustment to be consistent with PV Watts 0.77 derating factor.

[29] Nellie Tong (Kema Inc.). Emerging Renewables Program Systems Verification Report 2004-2005, December 2005.

[30] 1/0.85 = 1.18.

To illustrate how the calculations work, assume that a customer installs a fixed 10º south-facing system with minor shading (i.e., a system with a 15 percent DC capacity factor). As presented in Table 2, the Design Factor for this system is 111 percent. Assume that the Incentive Rate is \$2.50 per $Watt_{AC\text{-}CEC}$ under the SGIP and remains at \$2.50 per $Watt_{AC}$ under the EPBB incentive program. Table 3 demonstrates that the total incentive is \$250K for both structures.

Table 3. Incentive comparisons (Reference System is horizontal w/ shading).

	SGIP Program	**EPBB Staff Proposal w/ Modified Design Factor**
Intentive Rate (\$/Watt)	\$2.50	\$2.50
Rating Calculation		
Number of Modules	1,000	1,000
PV PTC Module Rating (W)	105.2	105.2
Inverter Efficiency	95%	95%
Other Losses	-	90%
Estimated Rating (kW)	99.9	89.9
Design Factor	-	111%
Incentive Amount (\$K)	**\$250**	**\$250**

Conclusions

The EPBB incentive calculation proposed by Staff allows the industry to transition to a performance based incentive structure. The EPBB structure creates an incentive calculation that has the potential to provide a number of the benefits of a PBI structure without the full PBI implementation. In particular,

1. Short duration field testing (as yet to be fully specified) and visual inspection can verify the accuracy of critical factors that affect energy production
2. The incentive can be adjusted for the expected energy production of the system by using a verified system rating (thus promoting efficient components and good installations)
3. The incentive is adjusted for expected energy production of the system due to orientation and shading (thus promoting effective system design)
4. The incentive calculation procedure is not highly sensitive to modeling and data accuracy (thus resulting in greater program objectivity)

Transitioning to the EPBB incentive structure, however, will result in a reduction in the incentive for fixed PV systems when compared to the SGIP program.[27] If the goal is to retain a total incentive amount that is unchanged compared to existing SGIP incentive levels, an adjustment needs to be made to the EPBB incentive calculation. Either the Incentive Rate or the Reference System needs to be changed. It is estimated that the Incentive Rate increase needs to be increased by about 18 percent. An Incentive Rate of \$2.96 per $Watt_{AC}$ will result in a total incentive that is comparable to the SGIP \$2.50 per $Watt_{AC\text{-}CEC}$. Alternatively, leaving the EPBB Incentive Rate at \$2.50 per $Watt_{AC}$ but defining the Reference System to be a horizontal system with 5 percent shading losses (i.e., a system that has 85 percent of the energy production of a fixed-30º south-facing system) is also comparable to the SGIP \$2.50 per $Watt_{AC\text{-}CEC}$ rate.[31]

[31] A horizontal system with 5 percent shading losses produces 85 percent as much power as a 30º south-facing system with no shading. Since the Reference System is in the denominator of the Design Factor calculation, this translates to an increase of 18 percent (i.e., 1/0.85 - 1 = 18%).

Appendix: Consistency in Ratings, Prices, and Capacity Factors

An issue that should be addressed by Staff is the need to maintain consistency once a rating system is selected. In particular, there must be consistency in the rating, price, and capacity factor (or energy production).

Assume that the price of 1 $kW_{AC\text{-}CEC}$ of PV under the current SGIP is $8,000 and the system has an 18 percent capacity factor. As shown in Table 1, in order to obtain 1 kW_{AC} worth of PV on an AC system rating basis, the cost would cost $8,900 and the system would have a 20 percent capacity factor.

Table 4. Comparison of ratings, prices, and capacity factor.

Rating Method	Rating	Price	Capacity Factor
Component AC (ERP & SGIP)	1.00 $kW_{AC\text{-}CEC}$	$8,000 per $kW_{AC\text{-}CEC}$	18%
System AC (CSI EPBB)	0.90 kW_{AC}	$8,900 per kW_{AC}	20%
DC or Nameplate	1.17 kWDC	$6,840 per kWDC	15%

As a result, there are several areas where there is a need for consistency between prices, incentives, and output. If the energy production is stated in units of kWh per kW_{AC} (i.e., a 20 percent capacity factor), then the prices must also be stated in $ per kW_{AC}. For example, page 17 of the proposal has the price in units of component AC but the incentive and the energy production are listed in units of system AC. The proposal needs to be consistent in how the units are presented.

Another implication of this is that program goals should be adjusted. The current goals for the program have been stated as 2.6 GW at a cost of $2.4 Billion. The program goals were stated in component AC terms and should be restated in system AC terms. As a result, the goal of the program should be about 2.3 GW_{AC} at a cost of $2.4 Billion.

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CERTIFICATE OF SERVICE

I, Valerie Stevenson, certify that I have on this 16th day of May 2006 caused a copy of the foregoing

COMMENTS OF THE CALIFORNIA SOLAR ENERGY INDUSTRIES ASSOCIATION, PV NOW, AND THE VOTE SOLAR INITIATIVE REGARDING THE CPUC ENERGY DIVISION STAFF PROPOSAL FOR CALIFORNIA SOLAR INITIATIVE DESIGN AND ADMINISTRATION 2007-2016

to be served on all known parties to R.06-03-004 via e-mail to those listed with e-mail on the CPUC service website, and via U.S. mail to those without e-mail service. I also caused courtesy copies to be hand-delivered as follows:

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I declare on penalty of perjury under California law that the foregoing is true. Executed this 16th day of May 2006 at San Francisco, California.

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