The Rahus Institute Comments on CEC SB1 Eligibility Criteria

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Founded in 1998, the Rahus Institute is a non-profit 501c3 educational organization dedicated to the promotion of renewable energy and resource efficiency. The Institute engages in a wide range of activities centered on greater use of renewable energy at a personal level. Current projects include: **The California Solar Center** – a web-based source of solar energy information relevant to California; **Solar e-Clips** – an e-newsletter covering current stories and legislative updates; organizing **Solar Forums** throughout California; coordinating the **California PV Utility Manager** working group; and **Solar Schoolhouse** – a hands-on, project-based solar for schools program.

Working with utilities, non-profits, manufacturers, and installers, we've learned about the differing priorities and views of each group as the solar industry has grown in California. Our common goal is to establish a successful solar market here in California. A future where every new home is a solar home (aka 'true net zero energy home'), many existing homes converted to solar homes, all performing optimally for a long long time. Benefits provided to individual building occupants, society as a whole, and an economic boost for the state. We recognize that a 'solar' home is not just one with a Photovoltaic (PV) system on the roof, but one that is also super efficient, and with maximum use of passive heating & cooling design strategies.

We submit our comments in the hope that they will contribute to the establishment of a solid, simple, and efficient program. A program that is easy to administrate, easy to use, provides sufficient incentives to meet our common goal of ~ 3000 (plus) MW of solar installed, and a program with new tools that will provide better feedback to system owners.

CommonDatabase – PowerClerk

The CSI (California Solar Initiative) program has been working to incorporate a common database for administrating the CSI program. The database is provided by Clean Power Research and called "PowerClerk". This tool is also used in other states such as New York and Arizona. Work is being done to encourage POUs (Publicly Owned Utilities aka munis) to also use this tool as they launch their new and improved solar incentive programs in 2008.

The benefits of a common database include:

- Reporting to PAs (Program Administrators), CEC and Legislature– push of a button, or autocalc reports that would otherwise take months and several FTEs.
- Reporting to the Market – eg. "Blue book for solar", providing market pricing data, providing information on what price range a buyer should expect to pay for a PV system. Smarter buyers = better performing systems.
- Performance Index Tool – system owners can enter their own PV production information and receive a Performance Index with recommendations for any needed maintenance.
- EPBB – for both NSHP and existing homes. Incorporate the preferred CEC-EPBI calculator directly into this tool. Should be useful for entire state.
- Equipment data – CEC to maintain list of eligible PV modules and inverters. Updates are posted online and integral to the database, instead of requiring manual download by the users.
- Ease of smaller utilities to administrate their own programs or subcontract administration if there is a standard incentive process to work with.

Given the benefits a common database tool can provide, the **CEC should consider subsidizing the cost of using PowerClerk-CSI for the participating utilities in California**. Much work has been done to integrate California specific solar incentive processes into PowerClerk, such that it is incremental work that is required to add NSHP and EPBI. Additionally, PowerClerk-California should not be "owned" by any one utility, or otherwise restricting use of the tool by additional California utilities.

What Watt?

The rest of the world uses watt dc peak values when referring to price per watt or otherwise describing the size of a PV System. California had previously introduced the idea of a PTC CEC 'Watt' to closer describe the AC wattage after the inverter. With the advent of CSI and NSHP, additional changes to the definition of a 'watt' are underway. Perhaps unintentional, this needs to be cleaned up. Data presented at solar conferences, in solar market data analysis journals and websites, comparing $/watt can result in errors up to $1/watt difference. California needs to settle on one watt to use as reference when discussing $/watt and system sizes. The CEC is the agency to establish this. Please use the DC watts as described per international standards. The CEC may also consider tightening that standard to include only +/-2% rating tolerance (current allowed tolerance is +/-10%). The derating that is common practice in the EPBB/EPBI

calculations can continue as desired, though dc watts will be the rating referred to when talking about Installed Watts (kW, MW), and price per watt ($/watt).

TOU?
CEC should work on developing and making available tool(s) that can help installer/buyer evaluate benefits of being on TOU rates with PV. This tool could also live within the PowerClerk-CA online database.

The issue of requiring TOU rates as condition of solar incentive remains for the CPUC to address during the next rate cases of the IOU Program Administrators. It is generally believed that TOU rates would again be required in order to receive a solar incentive, if customer is within IOU region, though not required in POU areas. We believe that TOU should not be required but that the CEC should develop tools that **encourage** PV System owners to switch to TOU because of the economical benefits. Additionally, tools that help a PV system owner understand how to manage their loads and maximize the benefits of TOU for themselves, while providing maximum peak reduction benefits to the grid, would be of great use and of more benefit than simply requiring TOU without regard for system owner benefit.

EE/RE –
A true Zero Energy Home (aka a "Solar Home") maximizes energy efficiency, passive solar design features, along with an optimally sized PV system. For all the homes that are off-grid and must produce all of their own power, this is standard practice. Grid-connected homes have the luxury of being able to use as much energy as desired, with the only constraint being $$. The goal of increasing energy efficiency along with increased installation of PV systems is good. As others have commented, the CEC recommendation that certain EE measures be completed BEFORE qualifying for a PV incentive, runs the risk of dragging the PV market down.

The CEC should focus on providing tools for utility administrators to use in encouraging Energy Efficiency Measures when purchasing a solar system. For example, providing an **effective** online audit tool for **ALL** California residents would be beneficial. Most audit tools provide generic information and could be improved by providing links to energy efficient product indices, relating suggested EEMS to actual products. Ease in retrieving 12 month billing history could be improved, this information helping with both energy audit & PV system sizing analyses.

Retain the Energy Audit requirement within the Solar incentive programs, together with effort to improve functionality and effectiveness of existing energy audit online programs. Simplify reporting, and consider linking to PowerClerk-CA database for ease in applying for solar incentives. DO NOT require EEM implementation as a basis for receiving a solar incentive for existing buildings. Allow site owners the flexibility to choose.

For the NSHP (New Solar Home Partnership), CEC should develop 'sample' homes in each climate zone that meet the 15% and 30% beyond Title-24 requirements. Illustrate the requirements through actual or simulated examples –showing EEMS, their added costs, and EE incentives available from utilities.

If the CEC is serious about integrating Energy Efficiency and Renewables, then work on making PV an allowable EEM (energy efficiency measure) for Title-24 calculations. Raise the bar for the 2011 standard to a level that will either require a PV system or Solar thermal AC system (or other) to achieve. At that time, Silicon supply capacity will have increased, PV prices reduced, and incentives will no longer be necessary. Key is to recognize PV as an 'EEM', a key ingredient for a home to achieve true net zero energy performance.

Recognizing PV as an EEM is also required within the **HERS rating system**. Currently PV is **not** considered in the rating system. If it were, bundling of EE and RE measures would be much easier. Financing, now only available for EE measures, would also cover the PV system. Financing for PV systems would dramatically open up the solar market to a wider audience that cannot afford to write a check for $20,000, but could afford a monthly payment that is less than the savings they achieve in energy bills. If the HERS rating system included PV, it would also provide documentation on increased property value due to energy measures. This elusive piece of information would ease the minds of homeowners worried about 10-15 year payback periods. They would recoup the cost of the EEMs in the house price, if they sold the house before the end of the payback period.
Including PV in the HERS rating would also allow 'Solar' homes to be eligible for Energy Efficient Mortgages.

Many of the utilities have successful energy efficiency programs. Many POUs still actually offer **onsite** energy audits for residential customers. Participants in the CPVU working group would welcome the opportunity to work with the CEC in developing EE standards going forward.

Meter Reading

The CSI Metering Subcommittee has focused on meter accuracy requirements, what size systems need metering, and who can provide PMRS services. Very little discussion has centered on what information is provided to the system owner, in order to assure long-term high performing systems. Remote meter reading, that depends on the site host maintaining a broadband internet connection, has been problematic in providing datasets without gaps[1]. The cost of establishing and maintaining the broadband connection is also not factored into the metering/monitoring cost.

Several POUs have indicated a move toward PBI for ALL system sizes. The PBI approach provides kWh performance data over time, not provided in the EPBB approach. PBI also puts more of the responsibility of performance on the system owner, leaving more room for innovation and less front-end administrative (EPBB) requirements.

One of the perceived benefits to having Utilities administrate the Solar Incentive programs is that they have experience reading meters. Several utilities within the CPVU working group have indicated that reading an additional site meter (PV Production) would add very minimal cost to what they already do. As utilities introduce Automated Meter Reading (AMR) capabilities to

[1] Rahus experience with Solar Schoolhouse remote metering network.

their customers, the PV meters could also be read via AMR. In the meantime, utilities would read the PV meter at the same time as reading the site utility meter. For system owners that wish to sell RECS, a utility grade meter ($<100) would serve this purpose. Data could be entered online by the system owner, or read and entered by the Utility (meter reader or amr).

For those with EPBB incentives, a PMRS meter should not be required. The only stated reason for having this feature is to provide the system owner feedback on the performance of their system and provide alerts to any required maintenance. **No PMRS provider provides alerts yet**, providing only what is currently happening, and no comparison to expected performance. A simpler approach would be to allow system owners to read their own meters (typically inverter based) on a monthly or daily basis, then enter this data on a website (that has their system specs – ie. PowerClerk-CA), to see what their **Performance Index** is and if any maintenance is suggested. This simple and low cost approach, would help system owners identify inverter problems, excessive soiling, changing shading conditions, and any other dynamic conditions that effect the system performance over time. Participation would be on a volunteer basis, with option to receive email notification to remind owners to read their meter. In this manner, Program Administrators would be able to collect performance data for EPBB (smaller, residential) systems, which otherwise would not be collected, at minimal cost. EPBB approach steers system owners toward good performing systems, but cannot verify performance over time, nor does it currently provide any ongoing support to ensure long-term performance. An added benefit would be for homeowners that buy a house with a PV system on it. If the previous homeowner entered any performance data, they would have a benchmark to work from in assessing current performance.

Additional improvements to inverter metering/monitoring capability could be encouraged. Eg. Saving data in daily, monthly, and annual data bins for ease in retrieving and entering into the online Performance Index tool.

CALL CENTER & System Owner Support

As more homes are installed with PV, and as utilities begin to rely more on the performance of these homes for grid stability, it becomes critical to provide support to system owners regarding the ongoing performance of their system. The online database will help to facilitate this, along with an 800# support line and appropriate website.

Recent reports from utilities where solar homes have 1 and 2 new owners (since installation) indicate that the new home owners know nothing about the solar system on their rooftop. There is a great risk of repeating the solar hot water story of the 80s where a system might not be functioning at all, yet the home still receives hot water, power, etc. (all from utility, none from solar). Education is key here, providing support over the long run.

Rahus/California Solar Center has established an 800# line and is working to rebuild it's website to help serve this function statewide.