



ASSOCIATION OF  
ENERGY ENGINEERS

Bay Area Chapter

# NEWSLETTER

October 2002

## Meeting Information Tuesday, October 22, 2002

*AEE Bay Area Chapter Presents*

### **“AEE Tour of Calpine’s Delta Energy Center” by Calpine Representatives**

**6:30-7:00 p.m.**

Overview and Orientation

**7:00-8:00 p.m.**

Site Tour and Q&A

**8:30-? p.m.**

Informal Dinner at Restaurant to be selected (optional)

**Location:**

Calpine – Delta Energy Center  
1090 Arcy Lane  
Pittsburg, CA

**Cost:** None. (Dinner, if desired, is paid individually)

**Reservations:**

Call Rory Moran at (925) 437-2718

FAX (877) 638-4942

chapter website [www.aee-sf.org](http://www.aee-sf.org)

or by e-mail [rorym@axiomengineers.com](mailto:rorym@axiomengineers.com)

See insert for more information.

## President’s Message

If you were fortunate enough to attend last month’s meeting, you probably came away with a better understanding of what it takes to become a “micro-generator”. I know I did. Thanks to Steve Greenberg and Gary Gerber for an excellent tour and discussion of Steve’s new solar photovoltaic system. Although the manpower needs can be great, it’s amazingly simple (and fun) to create your own generation plant in your home. You are basically free to design any reasonably sized system for connection to your local grid. PG & E will not pay for energy directly produced by your plant by rather uses “net metering” to credit your account on an annual basis. Any excess energy is applied as a donation to your utility. Through astute load management, however, you can assure a positive net cash flow at reconciliation time. If your considering one of these systems for your own home, you need to act fast as tax credits are threatening to dry up. As a bonus, consider the fact that you could end up with a new roof!

Lastly, have you ever “Dsired” to find information on incentive programs? The [Database of State Incentives for Renewable Energy](http://www.dsireusa.org) can be found at [www.dsireusa.org](http://www.dsireusa.org).

Thanks for listening



John Clark  
President, AEE Bay Area Chapter

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*Bay Area Chapter*

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*Experts in Energy Efficiency for Industrial Facilities*  
**WE REDUCE MANUFACTURING COSTS**

AEE Bay Area Chapter serves as a unique forum for the discussion of energy issues and concerns. AEE Bay Area Chapter provides common professional meeting ground for facility managers, design and specifying engineers, utility and vendor representatives and energy researchers to participate in vigorous peer-to-peer dialogue, learning and group discussion.

AEE Bay Area Chapter strives to provide quality professional development opportunities that build knowledge and skills through meetings, seminars and publications. Emphasis is placed on:

- Assessing the applicability of emerging technologies, and
- Improving the performance and reliability of current technologies.

Meetings are held on the fourth Tuesday of the month. All interested persons are welcome to attend, participate and join the Chapter. If you are interested in joining the AEE Bay Area Chapter, contact Leslie Kramer, 415-434-0900 ext 146.

## Secretary's Report

A pre-meeting tour took place before the dinner and presentation. The tour was of two of PV-powered homes: Steve Greenberg's home (affectionately known as the "Ordway Solar Power Plant"), located on Ordway Street in Berkeley, and the Berkeley Eco House located around the corner at Hopkins and Peralta. Steve's home is an example of a grid-tie-only system (no batteries) while the Eco House has batteries that allow operation in a grid failure.

After dinner, Steve gave a more formal presentation, titled "Zero Energy Buildings and Beyond: A Solar Barn-Raising". Steve took his introduction from the U.S. DOE's program description for zero energy buildings: "The Solar Buildings Program's aim is to combine solar energy technology with energy-efficient construction techniques to help create a new generation of cost-effective buildings that have zero net annual need for non-renewable energy" (see [http://www.eren.doe.gov/solarbuildings/zero\\_energy\\_blds.html](http://www.eren.doe.gov/solarbuildings/zero_energy_blds.html)). In other words, the strategy for these buildings is to design with power conservation strategies in order to make the power load low, then use renewable sources to provide for the load that's left. Steve postulated that "Beyond Zero Energy Buildings" would be buildings that contribute to environmental restoration rather than just reduced environmental degradation. These would be "solar power plants that look like buildings".

The solar array on Steve's house, which was installed earlier this year, is sized to generate significantly more annual electric energy than the house uses. The house is fed from the grid whenever the PV array is generating less than the power consumption of the house. There are no storage batteries in the system, so that excess PV power is fed to the grid, and the meter actually runs backwards during excess power times. PG&E is not presently mandated to pay for energy that exceeds the usage of the house, so Steve doesn't get paid for excess power. Once a year, there is a reconciliation of net electrical energy use, with the energy cost being the net for the year. Steve's net annual bill for electric energy will be zero, since the PV output more than offsets the usage in the home.

Steve presented slides showing the various stages of the installation of the system. Since he installed the system himself (with the barn-raising help of a lot of friends), his costs for the system (about \$10k net for the 2.2 kW system, including the state rebate of \$4.50 per watt) were less than those of most PV system owners. For the spring and summer months, data from the house meters showed house consumption to be around 3 kWh per day, and PV output to average around 9 kWh per day.

The second presenter for the evening was Gary Gerber, president of Sun Light & Power (SL&P), a design and construction company for solar systems. SL&P has been in business since 1976. Historically, they have designed passive and active thermal solar systems for homes. However, in the last several years, 80% to 90% of their business has been in PV systems. Interestingly enough, their customers are now often adding solar thermal hot water, as stimulated by their purchase of PV power systems. Gary said that the main reason that people state for buying a system is their concern about the environment.

Gary presented slides and physical samples of single crystal (efficiency of about 12%) and amorphous (efficiency of about 6% to 7%) PV cells. The dollar per installed watt of these cells is about the same, and the output of the single-crystal cells is on the order of 10 peak watts per square foot. Tracking units, suitable for ground-mounted systems, cost about \$1500 and boost output by about 40% in summer. Fixed position panels don't have to be south-facing only: Theoretical output is only degraded about 10% for panels facing SE or SW. Actually, SW-facing panels outperform south facing panels here in the Bay Area due to the summertime morning overcast conditions.

Gary showed slides of a number of installed systems. A standard module cost is about \$5.5 per peak watt, while the state tax credit is about \$4.5 per peak watt. In addition to panels that mount on top of roofs or trackers, the Sunslate system features PV modules that actually constitute the roof itself. This is a much more expensive system, but its lifetime is about 50 years.

Gary presented cash flow summaries for various systems. For a grid-intertied system with batteries, some values were:

Number of modules:	40	
Peak rated watts:	4400	
CEC rated watts:	3720	
CEC rebate:	\$16,741	
Installed cost before rebate:	\$45,304	
Net cost per installed rated watt:	\$6.49	

For the same size system without batteries, the cost after rebate was about \$23,100, and the net installed cost per rated watt was \$5.26. For a typical residential system, the time to net positive cash flow is about 14 to 15 years. This results in about a 4% to 5% return on investment, tax-free.

Submitted by Stan Boghosian

# Job Posting

## FACILITIES MANAGEMENT ENGINEER II

LBNL's Environmental Energy Technologies Division seeks an individual to develop and implement building retro-commissioning and tune-up strategies and techniques in commercial buildings to reduce energy use. You will design, implement and evaluate control tune-up interventions, provide leadership on advanced control technologies and operational improvements in buildings, and develop control tune-up and retro-commissioning deployment programs helping both private and government agencies utilize such strategies. Requires extensive experience with programming and commissioning of building HVAC control systems produced by the major vendors, experience designing and engineering large, complex control projects, knowledge of advanced energy-efficiency technologies and a professional engineering license.

For immediate consideration, please complete our online application at <http://cjo.lbl.gov>. Alternatively, e-mail one copy of your resume to [AVPJobs@lbl.gov](mailto:AVPJobs@lbl.gov) (no attachments please), mail to LBNL Staffing, One Cyclotron Road, Bldg. 937R0600, Berkeley, CA, 94720-8076, or fax to (510) 486-5870. Reference job number EE/015078/WAEE. Berkeley Lab is an AA/EEO.

Do you know someone who might be interested in joining AEE Bay Area Chapter?

The benefits of joining include:

- Participating in exciting and informative programs
- Receiving a monthly newsletter containing information on meetings, events, and job openings
- Communicating with other energy professionals

For membership application:  
**Contact Leslie Kramer**  
**(415) 434-0900 ext. 146**

Meetings are held on the fourth Tuesday of each month. All interested persons are welcome to attend, participate and join.



*Bay Area Chapter*

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