SUSTAINABILITY CONFERENCE 2006 – UNIVERSITY OF CALIFORNIA, SANTA BARBARA

JUNE 25-28, 2006

HIGHER EDUCATION ENERGY EFFICIENCY PARTNERSHIP - BEST PRACTICES PROPOSAL FORM for SUSTAINABLE OPERATIONS

CONTACT INFORMATION

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PROJECT CATEGORY

(See attached project category descriptions)

Sustainable Operations

- ✓ Best Energy Efficiency Retrofit Practices
  - o Lab HVAC Systems
  - ✓ Other Building HVAC Systems
  - o Lighting and Controls
  - o Best Comprehensive Building Energy Retrofit
  - o Housing and Dining Best Energy Efficiency
  - o Load Management
- Sustainable Purchasing – Buy Recycled
- Innovative Waste Reduction Programs
- Student Energy Efficiency
- Student Sustainability Programs

PROJECT/PRACTICE INFORMATION

Project/Practice Location: Performing Arts Center
Project/Practice Name: Building User HVAC Control Panel
Project/Practice Description:

Everyone understands that the most energy efficient way to operate a piece of equipment or mechanical system is to turn it off. We dedicate significant resources to connect HVAC equipment and systems to our Energy Management System, and program the schedules that determine when these systems start and stop. This helps to minimize their operating hours and

thereby conserve energy, as well as reducing wear and tear on the equipment. Most buildings have a relatively constant operating schedule which makes this practice easy to manage – schedules need only be updated quarterly or seasonally. However, a Performing Arts Center has a highly variable schedule depending on the frequency, nature, needs, and duration of each scheduled event. The main hall may be empty one day, and in use until 3:00 am the next. A fixed schedule meant to cover all possible operating hours would end up running systems for significant periods of time when they were not needed, wasting valuable energy.

Cal Poly's Engineering Services staff developed a close working relationship with the technical staff at the PAC which coordinates and provides support for scheduled events. A process was established in which the PAC staff reported the event schedule to Engineering in advance, with specific HVAC needs for each event – which zones needed to be in service and whether they needed heating and ventilation, or full air conditioning. These schedules were submitted monthly, with numerous updates as things changed. Engineering could then update the time of day schedules accordingly.

While this worked pretty well and certainly conserved energy, it was somewhat time consuming for both the PAC staff and Engineering – schedule changes were frequent and numerous. It was felt that schedules were being made too conservative, with enough "cushion" to ensure that HVAC systems would run at least as long as needed. Since the PAC building has a staff that takes pride in ownership of their facility, is concerned about conserving energy, and is certainly capable of operating things of a technical nature, it was decided that we should "cut out the middle man" and empower the PAC staff to schedule their own systems on a daily basis.

A custom user override panel was designed and installed in the PAC Tech Services Security Office – a convenient and secure location. Jack Houston and Mike Harris of the Cal Poly Engineering Services staff designed, fabricated, installed and programmed a dedicated control panel that would allow the PAC staff to select which zones in the building would be in service, whether they would require heat and ventilation or full air conditioning, and for how long. Zones with a fixed schedule – such as the administrative offices - are still programmed for a "base" schedule by the time of day program as before. Usage of the system is monitored from the campus Energy Management System at the central plant.

The PAC staff love having direct control over their HVAC system and are able to start up systems at a moment's notice, even if needed at 2 am when the stage crew is loading out the main hall after a big show. They can set zones to run for a predetermined amount of time, or manually shut them down when finished. Engineering staff love that they don't need to

continuously update and correct time of day schedules and keep track of events. Best of all, run hours of the building systems are kept to a minimum, conserving energy and extending the usable life of the equipment.

Describe the features of the project or program that make it a best practice of potential interest to other campuses – e.g. replicability, innovation to control implementation cost, etc.:

This is a solution that can be easily implemented in a number of applications – Performing Arts Centers, gymnasiums, theaters, auditoriums – any space that has a dedicated HVAC system with a variable usage schedule. It builds upon the simple concept of a wind up bypass timer, such as is used for restroom exhaust fans, and applies it to the modern world of digital control systems. It can be implemented using any manufacturer's EMS hardware, and can be made as simple or sophisticated as needs require. It empowers customers and users to take control of their own systems, but does so in a "fail safe" method that prevents them from turning on equipment and leaving it on. It makes users more aware of their usage habits and the impact they have on energy consumption. It is an example of a unique partnership and is certainly a "win – win" for both building users and O&M staff.

Approximate Implementation Cost (if any): $8,500
Estimated Annual Energy Cost Savings: $13,400
Any additional information for the selection team to consider:

This project saves approximately 112,000 kWh per year from reduced air handler run time and reduced load on the central chiller plant.

Please provide above information in sufficient detail to assist the selection team in understanding and evaluating the project. Supplemental information (8 ½ x 11 format) in the form of photos, drawings, etc. may also be submitted.

SUBMISSION DIRECTIONS

Please submit project proposals (electronic transmission is preferable) by Friday April 21st to:

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SUSTAINABILITY CONFERENCE 2006 – UNIVERSITY OF CALIFORNIA, SANTA BARBARA

HIGHER EDUCATION ENERGY PARTNERSHIP
SPRING 2006 BEST PRACTICES CATEGORY DESCRIPTIONS
MAINTENANCE AND OPERATIONS - BEST ENERGY EFFICIENT/SUSTAINABLE PRACTICES

1. Best Energy Efficiency Retrofit Practices (6 categories):

   A. Lab HVAC Systems: Projects in this category should demonstrate leadership in HVAC equipment selection and controls specification appropriate to the laboratory environment. Examples could include: fume hood control innovation, energy efficient equipment selection, maximizing the benefits of local climate, air distribution system innovation and other HVAC innovations.

   B. Other Building HVAC Systems: Projects in this category should demonstrate leadership in HVAC equipment selection, distribution system design and controls specification. Examples could include: appropriate equipment sizing, energy efficient equipment selection, maximizing the benefits of local climate, air distribution system innovation and other HVAC innovations.

   C. Lighting and Controls: Projects in this category should demonstrate leadership in retrofit lighting delivery systems and lighting control systems planning and delivery. Examples could include: energy efficient fixture selection and deployment, utilization of daylighting technologies, use of advanced lighting control technologies and other lighting innovations.

   D. Best Comprehensive Building Energy Retrofit: Projects in this category should demonstrate leadership in a holistic approach to bringing an existing building up to best energy efficiency practices

   E. Housing and Dining Best Energy Efficiency: Projects in this category should demonstrate leadership and innovation in installing energy efficiency retrofit projects in housing and/or dining facilities.

   F. Load Management: Projects/programs in this category should demonstrate leadership in demand responsiveness for existing buildings and systems. Examples could include: deployment and optimized usage of thermal energy storage, on-peak demand response control strategies and other innovative load management projects/programs.

2. Sustainable Purchasing – Buy Recycled: Projects in this category should demonstrate leadership in the long term commitment to purchase materials made from recycled materials. Examples could include: policies, programs, partnerships, and implemented funding strategies that create incentives to buying recycled.

3. Innovative Waste Reduction Programs: This award will spotlight a program, organization or group that has demonstrated significant leadership in waste reduction and recycling efforts. Award candidates in this category should be engaged in campus-wide programs that seek to leverage student, staff, faculty, and community interest and commitment to reduce waste and increase recycling. Programs should be able to demonstrate innovative strategies and programs in reducing waste while maximizing their collections of recyclables to lead the campus to obtain zero waste goals.

4. Student Energy Efficiency: This award will spotlight a program, organization or group that has demonstrated real leadership in student-led energy efficiency and conservation efforts. Award candidates in this category will be engaged in campus activities that seek to leverage student interest and commitment to sustainability in order to increase energy awareness on campus, realize environmentally-friendly campus policies and commitments, and involve students in efficiency activities that compliment their campus' goals and that result in measurable energy savings.

5. Student Sustainability Programs: This award will spotlight a program, organization or group that has demonstrated real leadership in student-led environmental sustainability efforts. Award candidates in this category will be engaged in campus activities that seek to leverage student interest and commitment to sustainability.