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University of California and California State University Program



The Energy Efficiency Partnership with California's Investor-Owned Utilities

The University of California and California State University (UC/CSU) Program is a unique, statewide energy efficiency partnership that strives to accomplish energy savings and peak demand reduction. It establishes a permanent framework for a sustainable, long-term, comprehensive energy management program at the 33 UC and CSU campuses served by California's Investor-Owned Utilities (IOUs): Pacific Gas and Electric Company, San Diego Gas & Electric, Southern California Edison, and Southern California Gas Company.

This program capitalizes on the vast resources and expertise of UC/CSU and the California IOUs to ensure a successful and cost-effective program that meets all objectives of the California Public Utilities Commission (CPUC or Commission). The CPUC lays the groundwork for not only a continued UC/CSU comprehensive energy efficiency program but also establishes a model for other partnership programs as well.

The Challenge of Energy Efficiency

Since 2002, it has been particularly difficult for campus energy managers to implement energy efficiency projects. The state budget allocation process and increases in construction costs have severely strained the campuses' abilities to manage their energy systems and budgets. In addition, significant budget cuts, necessitated by the state's budget deficit, have precipitated a dramatic decrease in O&M resources.

Together, these developments have left the campuses with few personnel or budget resources to prioritize energy efficiency projects. The financial resources described in this program are beginning to rectify the problem by identifying cost-effective measures and allowing UC/CSU campuses to pursue them.

The Partnership Program

The UC/CSU/IOU partnership program is comprised of three elements, which operate on a statewide, integrated basis. They include Retrofit, Monitoring-Based Commissioning (MBCx) and Training & Education (T&E). The results will include some immediate energy savings while setting the foundation for a long-term program focused on sustainability and best practices. The first two elements are required to bring substantial energy savings and peak demand reduction goals to meet the IOU's energy efficiency goals established by the CPUC. Only through the cooperation between the UC/CSU campuses and the IOUs can the aggressive energy efficiency goals be met.



Retrofit

The goal of the Energy Efficiency Retrofit element of the program is to provide cost-effective energy savings during the program implementation period. UC and CSU have an existing and extensive inventory of cost-effective energy-saving measures. This inventory was reviewed and finalized during the initial stages of the program in order to develop an implementation plan and schedule. The process of finalizing the inventory and installation of measures was well documented and was passed on for use in the Monitoring-Based Commissioning and Education & Training elements of the program.

Three components of Monitoring-Based Commissioning

Energy Information Systems/Building Diagnostics

Central monitoring and data acquisition systems will be permanently installed to give campus facilities management staff the tools to reduce energy consumption and peak demand by having consolidated energy information at the building system level. The systems will also be used to perform facility monitoring-based commissioning. This aspect incorporates a facility needs assessment where hardware needs are investigated, such as sub-metering each building and locating monitoring points on major energy usage areas. Software needs, such as databases to display and archive system and building performance, are also considered.

Facility Commissioning

Based on the energy information systems and building diagnostic tools described above, existing campus facilities management staff, using the additional utility and subcontractor expertise supplied under this program, will commission select buildings and central plants to get them operating as efficiently as possible. Prior to this work, campus facilities management staff will have received training in Monitoring-Based Commissioning under the Training and Best Practices Education element of this partnership program. Campus facilities staff will use the knowledge from the classroom training sessions and will work directly with experienced commissioning agents during actual commissioning to gain hands-on experience.

Monitoring-Based Commissioning (MBCx)

To date, almost every retro-commissioning program has consisted of a one-time review of building operations, installation of equipment control measures, one or two training workshops, and possibly development of commissioning documents. The approach of this program is far different, and goes beyond the typical program in three aspects:

- 1) The campuses that participate in this aspect of the program install sufficient equipment to ensure an extensive and comprehensive built-in measurement and verification capability.

Continuous Monitoring of Commissioning Measures

In order to ensure sustainable, ongoing energy savings, the University staff, again with the help of the utilities and expert subcontractors, have established a program to continuously meter the buildings using monitoring systems to ensure ongoing efficient operations. As with the Commissioning activity, this aspect of the program will depend upon the Best Practices training received under the third element of this partnership proposal, Training and Education. Campus facilities management staff will attend Commissioning Best Practices classroom training sessions annually to ensure their commissioning skills remain current and new campus facilities management staff receive adequate training. Ultimately, UC/CSU will have both the trained staff and the permanent monitoring systems to continue to commission the buildings over time, thereby ensuring persistent energy savings. The facilities on UC/CSU campuses are often similar to one another, and the experience gained from performing a monitoring-based commissioning project on one facility can be reproduced on another facility on a different campus.

The monitoring-based commissioning effort will also be developed and implemented so as to identify future cost-effective energy retrofit projects. The combination commissioning will extend the useful life (and energy savings) of the commissioning measures beyond the persistence assumed to date from existing retro-commissioning programs. The UC/CSU/IOU team will coordinate with other organizations and institutions performing building monitoring-based commissioning studies and programs.

- 2) This element of the program is combined with the third element (Energy Efficiency Training and Best Practices Education) to become a “continuous commissioning” program that is institutionalized at the campuses for the foreseeable future. This allows savings to be sustained well beyond those from the more typical and limited retro-commissioning programs.
- 3) The program uses the campus facilities management staff to identify new cost-effective retrofit opportunities efficiently and at low cost. The key to success for this effort is the existing infrastructure that UC/CSU bring to this program – extensive campus facility management staff who are already well-versed in energy skills but who lack the tools to implement monitoring-based commissioning and the specialized training needed to do so in-house.

This program is developing and applying a systematic process for improving and optimizing building operations at all 33 of the UC/CSU campuses in the IOU service areas. UC/CSU recognize the potential of this program component as a way to help ensure that their campus buildings are performing optimally, save much-needed operating and maintenance budget dollars, and defer the need for expensive capital projects. They are secured, long-term owners, committed to following through with the monitoring-based commissioning process.



Training & Education (T&E)

The Energy Efficiency Training and Best Practices Education element of the program is developing a comprehensive program for energy efficiency and peak reduction education and information exchange among the UC/CSU campus energy and facility managers and with the IOUs. This program is providing a venue for those individuals responsible for managing energy use on campuses to share information and experiences related to facility operations, best practices, and successful retrofit projects, among other issues.

The three primary vehicles for training and dissemination of information are:

- 1) A series of intensive **Training Sessions and Workshops** to be held throughout the state.
- 2) Implementation of a commissioning **Monitoring and Tracking system**
- 3) Development of **Best Practices Reports**

The Green Campus Program is also administered through this program. For more information on this program, visit www.uccsuiouee.org. To register for classes, click on Training and Education then click the link near “Course Schedule listing.”