Owners, designers and the public are all interested in green, energy efficient buildings. A senior project manager from Pacific Gas and Electric Company (PG&E) observed that “A true green project can only be accomplished through teamwork and an integrated, parallel design process. You can’t build green with a minimum first-cost, consecutive design approach.”

The Li Ka-Shing project demonstrated that by using these design approaches and a spirit of cooperation from the beginning, a world-class showcase laboratory design can result. PG&E-funded research estimates that the Li Ka-Shing Center for Biomedical and Health Sciences on the UC Berkeley campus is projected to use 33.7% less energy than the California Energy Code (Title 24) baseline once the facility is completed. The modeling used to project this result is based on early schematic designs. Actual energy performance results may differ once the building is completed.

PG&E’s NRNC [Non-Residential New Construction] Program is an innovative new program to encourage the design and construction of energy efficient buildings in California. The analysis and research for the Li Ka-Shing project has been performed on behalf of UC Berkeley by an engineering firm and is provided through PG&E’s NRNC energy efficiency program. Information about the project, including design details and operating characteristics, was obtained through a collaborative effort with UC Berkeley and their design team.

INTEGRATED DESIGN APPROACH

Given that UC Berkeley and their partnering design and engineering firms are all very committed to sustainability in the built environment, the La Ka-Shing Center project proceeded very differently from typical projects. Early on, the architectural firm hosted an “Integrated Design Workshop” —and it was a great success.

An exhaustive matrix of more than 50 energy efficiency options was developed with input from the various design and facilities personnel. This type of thorough brainstorming is only possible when all the players are invited to participate from the beginning of the process.

SIMPLE DECISIONS YIELD ENORMOUS POTENTIAL

An Associate Partner with the architectural design firm described two simple design decisions that stand out because of their potential impact. The participation of an engineering firm, Lawrence Berkeley National Lab (LBNL), and LBNL’s “Labs21” ratings system helped to reinforce and guide these decisions.

The first stop was developing a design intended to reduce the standard ventilation rate in the laboratories from the typical value of ten air changes per hour (ACH) to a projected target of six ACH. The anticipated energy benefits of the reduced ACH goal is based upon research sponsored by PG&E. Reaching consensus on the reduced ACH goal involved study and commitment by all of the project stakeholders. Everyone had to be convinced that safe laboratory operating conditions could be maintained with this volume of air circulation, and be willing to occupy and operate the facility accordingly.

The second step was to develop an estimate of the actual cooling loads that would be required in the labs. Careful study of the current energy usage in existing lab facilities established a realistic baseline for the internal loads of new labs that was considerably lower than conventional lab design standards. LBNL’s “right-sizing” policies and studies of safe ventilation rates in lab spaces established credibility for this decision.

“By accepting this unconventional approach to the project, a precedent has been set that could be carried through not only this facility but many others within the University system and beyond.”

Associate Partner
Architectural Design Firm

Photos courtesy of UC Berkeley
The Associate Partner from the architectural firm indicates that, “While these simple decisions may appear to be small, their implications are enormous. By designing an HVAC system sized for current operations instead of a grossly oversized system, the university will realize substantial savings in construction costs due to smaller ductwork and equipment sizes, easier coordination of equipment on the densely packed support areas of the building, and tremendous energy savings over the life of the building. By accepting this unconventional approach to the project, a precedent has been set that could be carried through not only this facility but many others within the University system and beyond.”

EARLY INVOLVEMENT LEADS TO MORE EFFICIENCY OPPORTUNITIES

As the Principal of the engineering firm explained, “Laboratory facilities present significant opportunities for dramatic improvements in energy efficiency because of their high energy demands. The Li Ka-Shing project is an excellent opportunity for U.C. Berkeley to demonstrate its commitment to environmental stewardship. PG&E’s unprecedented investment in and commitment to energy efficiency were underscored by their high level of involvement in the design process. Our early involvement during the schematic design phase allowed us to explore more opportunities for energy efficiency than usual.” The following is a list of just a few of the HVAC efficiency features that will be incorporated into the project:

- Implement a Supply Fan Static Pressure Setpoint Reset
- Premium Efficiency VFD Chiller
- Implement Chilled Water Pumping Delta-P Setpoint Reset and Specify Efficient Pumps with VFDs
- Night Flushing
- Low Pressure Drop Ducts
- Low Approach Temperature Cooling Tower
- VFD on the Cooling Tower Fan Motor
- Implement an Active Condenser Water Temperature Reset
- Operate Cooling Towers in Parallel

IF YOU WANT A GREEN DESIGN KEEP AN OPEN MIND

The Associate Partner from the architectural firm advises those who wish to design a green building to “First and foremost, keep an open mind. There are other ways to do things instead of the traditional model. If done well, efficient projects can be completed with little or no additional capital costs and still save enormous amounts of energy. There are plenty of resources out there to help design teams. PG&E, for example, is wonderful for their dedication to, and expertise in, energy efficiency. PG&E’s generous incentive for this project helped tip the balance and focus people’s attention on the incorporation of energy saving features into this project.”

To learn how PG&E can assist with your project, contact your PG&E Account Services representative or call our **Business Customer Service Center at 1-800-468-4743**. You may also visit [www.pge.com/mybusiness](http://www.pge.com/mybusiness) for more information.