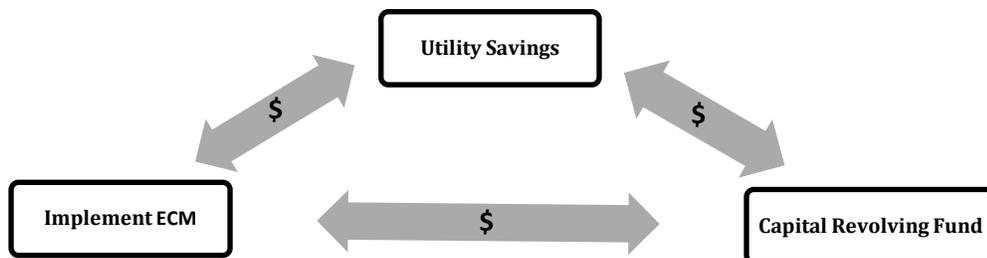




Caltech Energy Conservation Investment Program

The California Institute of Technology (Caltech) is committed to minimizing its impact on the environment through energy efficient operations, while carrying out its mission to expand human knowledge and benefit society through research integrated with education. As with most higher education institutions, Caltech’s operating budget is separate from its capital project budget. This separation makes it difficult to use the operating budget to fund the up-front capital costs for energy conservation projects. To overcome this challenge, Caltech has created the **Caltech Energy Conservation Investment Program (CECIP)**.

CECIP is the process by which the Institute’s endowment, via the Capital Revolving Fund, is used to finance energy conservation projects and is then reimbursed from avoided utility costs that result from the implementation of the projects. All projects must have a return on investment greater than 15%, exhibit verifiable savings via metering and must not be part of a planned capital project. Strategically, the program aims to implement high-return projects first to stimulate cash flow to create a balanced project portfolio strong enough to cover future projects of considerable size and engineering complexity.



CECIP may appear to be similar to other financial vehicles commonly used in the higher education sector; however CECIP differs in that it achieves its results without the mark-up or long term commitment of energy savings performance contracts (ESPCs) and with a more comprehensive approach to implementation than most green revolving funds.

Unlike most ESPCs and green revolving funds, CECIP doesn’t end with the completion of the projects, but continues on an operational level to improve the skill set of facilities maintenance staff and building users. Every CECIP project must contain training and education to outline the project’s overall sustainability goals, the method of verification for loan repayment, and the specific maintenance and operation guidelines. Without this training, a gap in the operational skill set would exist and the modeled ROI would not be realized jeopardizing the repayment of the endowment and the long-term savings to the utility budget. To enhance this training, Caltech is aggressively utilizing



information technology via energy dashboards to identify performance outliers and to ensure operations stay at optimum efficiency throughout the project life-cycle.

CECIP was created in 2008 in response to a call to action issued by a committee of faculty, staff, students and post-docs who authored Caltech’s Climate Action Plan. Capitalizing on this need for organizational innovation, CECIP was implemented within a few months by shepherding the concept through the Office of Business and Finance, Office of Procurement and the Facilities Department to receive formal approval. Using a small LED lighting retrofit project as a pilot, all specific project management tools were developed from the protocol for discrete financial journal entries to methods for comprehensive internal audits.

From an initial allocation of \$25,000 to perform that pilot project, CECIP’s allocation has grown to roughly \$8,000,000, which at its projected peak will finance over \$30,000,000 in energy conservation measures. CECIP is managed by Caltech’s Energy Manager with oversight from the Institute’s Sustainability Council, Facilities management and senior administrators. Extensive involvement from electric utility engineers, in-house maintenance technicians and third-party energy retrofit companies ensures that a balanced project portfolio is maintained.

Because CECIP is a process grounded in transparency, clearly identified performance assumptions and auditable financial performance criteria, this model can be applied to many other universities and corporations. With initial access to capital via a revolving fund, a balanced portfolio of projects of varying complexity, and management of cash-flows, the process can be utilized throughout the higher education sector.

Because of its innovative approach, CECIP has had a substantial impact across Caltech. In 2009 and 2010 Caltech implemented a wide range of complex energy efficiency projects which resulted in a demand reduction of over 700 kW and annual energy savings of 8,300,000 kWh; equivalent to approximately \$1,300,000 annually in avoided utility costs. An additional \$1,000,000 of avoided costs is projected for FY11 thru FY12. These projects have reduced Caltech’s annual greenhouse gas emissions by over 6,000 metric tons and have reduced deferred maintenance by more than \$2,000,000.

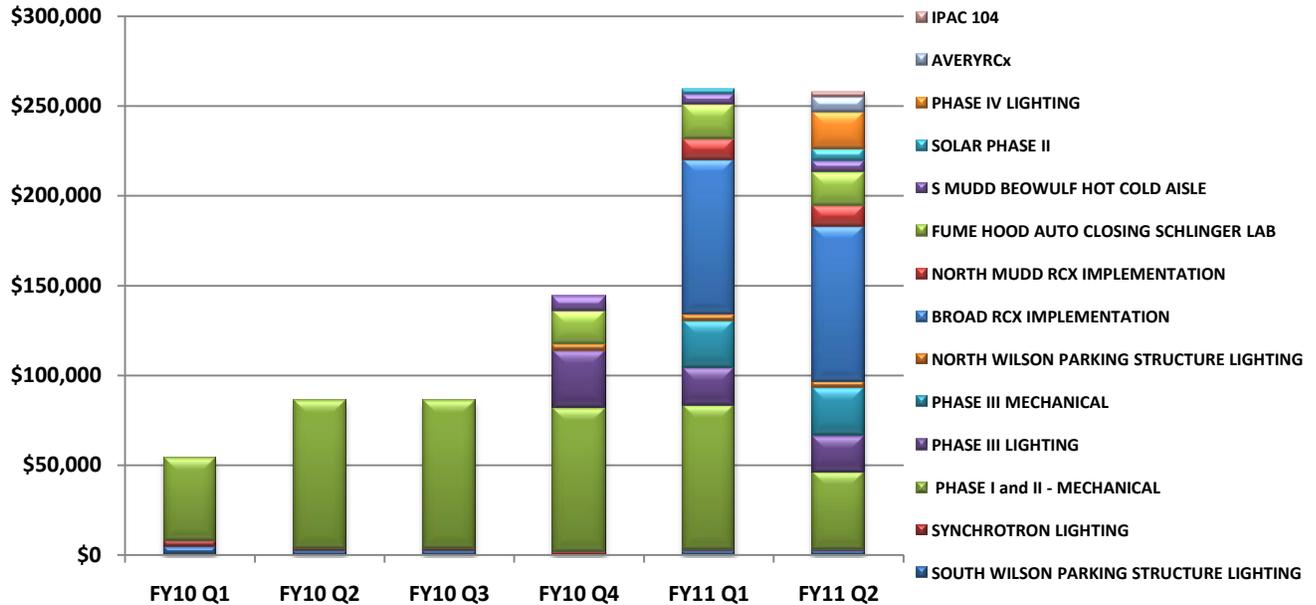
	Net Cost After Rebate (\$K)	Annual Savings (\$K)	Simple Payback (yrs)
FY 09	\$624	\$409	1.5
FY 10	\$3,340	\$929	3.6
FY 11/12 (projected)	\$4,400	\$1,000	4.4

The benefits also extend far beyond the balance sheet. Through reducing energy consumption, CECIP helps mitigate future regulatory risks associated with greenhouse gas emissions and cap & trade legislation pending in California. CECIP also engages members of the Caltech community to increase their sensitivity and awareness of resource usage on campus. In one building, the energy efficiency upgrades have reduced the energy consumption to such a degree



that the building’s plug load became the biggest energy user. In response, the faculty collaborated with lab equipment manufacturers to improve the energy efficiency of their products thereby creating a benefit for other universities and corporations.

CECIP Quarterly Payback by Project



In summary, CECIP is far more than a way to access capital; it is an innovative approach to effectively embedding energy conservation into an organization using a collaborative process that brings accountability to resource utilization in terms of both direct capital outlay and utility consumption. CECIP’s focus on effective project selection, detailed training, a rigorous system of checks and balances and an emphasis on measureable results, has positioned Caltech for success in the long-term as energy conservation projects become more difficult and the need for conservation and operational efficiency increases.

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