

EDUCATION PARTNER

UNIVERSITY OF UTAH



Image Courtesy of the University of Utah

Implementation Model: Internal Green Revolving Fund

ORGANIZATION TYPE

Public University

BARRIER

Energy efficiency projects were being funded piecemeal from a general fund, with savings disappearing back into the general facilities budget

SOLUTION

Implemented an internal Green Revolving Fund (GRF) to allocate savings from current energy efficiency projects to invest in future energy efficiency projects

OUTCOME

This “virtuous circle” has saved the university \$1.6 million on energy costs and 227,000 MMBtu in the six years since its implementation

Overview

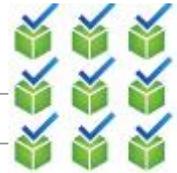
The University of Utah recognized opportunities for campus energy efficiency savings and engaged in its first Energy Savings Performance Contracts (ESPCs) for building retrofits and mechanical systems upgrades in 1998. Soon, the school began to see very positive results through measurement and verification (M&V) and realized that these projects were easily paying for themselves. An Energy Manager position was formed at the university in 2001 to locate more energy efficiency projects, sharing the same budget as general facilities services across campus. This led to competing for funding with other high priority investments such as deferred maintenance and replacement of broken equipment. Confident in the documented results, the school recognized the opportunity before them and diverted funding from the initial M&V to initiate an Energy Management Fund – a revolving fund that established a dedicated budget for energy projects, using savings to continually reinvest in future projects.





Policies

As a signatory of the American College and University President's Climate Commitment, the university committed to an 80% reduction in greenhouse gas emissions (GHG) by 2050, and eventually becoming climate neutral - emitting zero net GHGs.



Process

In the initial campus projects, the savings that ESCOs had predicted were validated by the measurement and verification process after work was completed, confirming the estimates in actual performance. That gave University of Utah confidence that certain project types (e.g. lighting replacements or HVAC) could be counted on for specific savings. To capitalize on this success, the school hired a full-time Energy Manager primarily tasked with finding more campus energy efficiency projects and establishing a behavioral energy efficiency program. Over six years, these projects would

Before Energy Management Fund

return \$1.54 million annually in net excess savings, \$1.25 million of which went toward repaying current financing and \$293,000 of which returned to a larger facilities budget as savings. However, any new projects that were identified still had to be proposed and approved within the larger facilities budget that was influenced by many other factors. Energy efficiency projects were typically prioritized below critical maintenance and replacement of essential equipment in the general facilities budget. As a result, identified energy efficiency projects often went unfunded. The Energy Office staff decided to propose a separate fund to address this disconnect.



Creating an Energy Management Fund

In 2007, Energy Office staff proposed to the administration that the school cancel plans for future monitoring and verification of previous Energy Savings Performance Contracts and use the funds to seed a

school green revolving fund. The new fund would tie energy efficiency projects to the office's budget, allowing the office to reinvest the generated project savings into future projects without having to seek approval behind higher priority budget items, like breakdowns and deferred maintenance. This positive feedback loop, or virtuous circle, continually produces savings that are then re-invested to produce even more future savings. Additionally, money from the school's general fund had been used previously to cover rising utility costs – a solution that did not incentivize energy reduction activities within the Energy Office. As a part of the Energy Management Fund proposal, the Energy Management Office retains 80% of project energy savings, with 20% going to the university's fuel and power account for a period of time equal to the simple project cost payback. After that point, 100% of savings benefits the fuel and power account.

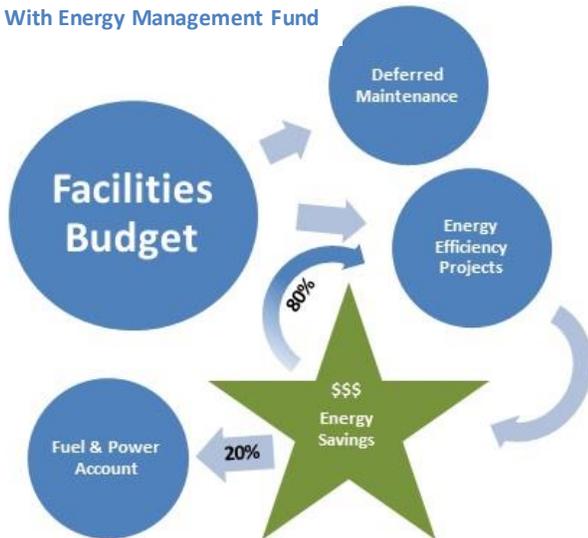
Although the fund conserves energy resources and supports reductions in campus greenhouse gas emissions, the proposal to the administration focused on program's financial benefits. With

that said, the university had signed onto the President's Climate Commitment and may have considered the carbon reduction benefits in the approval process. Thanks in part to years of demonstrating the benefits of energy efficiency projects through their ESPCs, the university administration saw the proposed fund as a safe and worthwhile investment. It was approved to begin in 2008.

The Energy Management Fund was initially seeded with \$225,000 from two sources:

- 1) Funding reserved for monitoring and verification of ESPCs
- 2) Savings generated from \$300,000 in state grants for specific energy efficiency projects

With Energy Management Fund



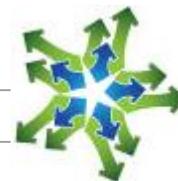
The fund is managed by the university's Energy Manager and Energy Management Office staff. Though the Energy Management staff's initial purpose was to find energy efficiency projects across campus, the office is moving towards a model where on-the-ground university engineers identify most campus projects. The university easily saves an estimated 30% by doing these projects in-house as opposed to through an ESCO. However, since ESCOs usually bundle much larger projects than these, the Energy Management Fund would not compete directly with an ESCO.

Selecting Projects to Fund

All energy efficiency projects proposed through the Energy Management Fund must have less than a 7-year payback, though preferably less than 5 years,

and must have a total cost that is low enough to fund. This usually means there must be enough cash available in the fund at the time of project evaluation, though the Energy Management Office has partially funded 2 projects via a state zero-interest revolving loan fund for energy efficiency projects, one at 30% and the other at 80%. Any proposed projects that have more than a 7-year payback are transferred for consideration under the capital improvement budgeting process. Facilities coordinators and campus HVAC engineers propose most of the 10-15 projects funded each year, all of which are developed at a typical cost of under \$100,000 each. To date, lighting projects represent about 80% of all completed projects. Energy Management has successfully partnered with the academic departments to share the costs of more expensive projects whose savings fall within the payback timeline. Table 1 outlines some of the projects completed at the university through the Energy Management Fund.

Project	Description	Cost	Annual Savings	Payback (years)
Steam Traps	Identified and repaired/replaced 30 defective campus steam traps	\$8,902	\$66,460	0
Lighting Retrofit	Lighting retrofit replacing T12 lamps and ballasts and with T8's. Delamp where feasible to maintain sufficient light levels	\$44,540	\$9,558	7.4
Building Commissioning	Building commissioning to improve HVAC systems	\$61,083	\$8,050	7.6
Gym Lighting Retrofit	Retrofit existing 450 Watt HID lights with new 324 Watt Hi-Bay T5 fixtures. Added timers and motion sensors to the gymnasium lights and timers to the hallway lights	\$137,995	\$31,287	4.6
Boiler Controls	Install Intellidyne LCS fuel economizer to reduce boiler run time and minimize cycling losses	\$4,500	\$13,746	0.3



Outreach

The Energy Management Office produces an annual report to the administration describing the activities and performance of the energy and utility-cost savings program. However, the centralized structure of the fund contributes to its success – the Energy Management Office manages the fund, and selects and implements projects – which limits the coordination required between offices at the university.

Outreach and interaction does occur between students and the Energy Management Office through the Sustainable Campus Initiatives Fund (SCIF), which is infused annually through a small student fee. Students decide which sustainability projects to invest in every year, with half typically involving resource conservation. This leads to conversations with the Energy Management Office to discuss project feasibility and proposal development. If SCIF cannot finance an entire project, the Energy Management Fund may also contribute funding.



Tools and Resources

- FY '14 Program Report
- Energy Office Proposal Form
- Project Cash Flow Summary Spreadsheet
- Project Data Spreadsheet



Measuring Success

The university quantifies the energy and cost savings from the individual projects that are financed through the fund. Since the school elected to divert funding from their original monitoring and verification ESPC, and due to some difficulties with campus sub-metering, the energy savings for most projects are calculated based on engineering studies performed prior to project implementation. Projects that have few performance variables, like lighting, have their savings calculated through tools from the local utility, while in projects with more performance variables, like retro-commissioning, a consulting engineer calculates savings estimates. However, measurement and verification of the original ESPC projects is still performed by a university utilities analyst to produce a savings summary, which is then verified by a third party contractor. Phase III of the campus metering project is underway, and will support more accurate measurement of installed project savings and identification of future energy saving opportunities.

The Energy Management Office tracks all individual project finance data as well as portfolio cash flow. A spreadsheet tracks upfront costs, funding sources, average estimated monthly savings, and estimated annual simple payback for current and retired projects undertaken by the office. Overall, paybacks have been well under 5 years.



Outcomes

In six years, the Energy Management Fund has increased its total value from \$225,000 to over \$700,000. While some projects remain too costly, the Energy Office has greatly enhanced its ability to fund energy efficiency projects across campus. In FY '13, the overall average simple payback for all projects was 3.3 years, saving \$182,779 annually. Since 2008, the Energy Management Fund has saved 227,000 MMBtu, 18,684 metric tons of CO₂e, and \$1.6 million in campus energy costs with simple payback for all projects averaging 2.6 years.

The fund also allocates anywhere from \$90-200k per year towards projects with no payback, such as third-party monitoring and verification and installation of sub-metering, which offer no direct financial incentive, but do enhance the office's ability to track energy usage and savings. Even with these projects factored in, the average simple payback for portfolio projects is a healthy three to four years.

The Energy Management Fund has developed a streamlined financing process built on mutual trust between university administration and Energy Management staff. The autonomy granted to the Energy Management staff by administration has contributed to the fund's success. The Energy Management Office is free to propose, select, and implement energy efficiency projects with no outside approvals required, resulting in faster project implementation, and greater energy savings returned to the fund for future work.