Green Revolving Funds in Action: **Case Study Series**

Boston University

Sustainability Revolving Loan Fund

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Summary

Location: Boston, Massachusetts

Full-time student enrollment: 23,500

Combined gross square footage of all buildings on campus: 14,785,972

Endowment: $919 million as of June 30, 2009

Type: Private

Boston University's (BU) Sustainability Revolving Loan Fund was created in 2008 through an allocation of $1 million from the university's administrative budget.[1] The fund is administered by the Vice President of Operations. Potential projects are identified by the university's Director of Energy Administration and Operations along with the Sustainability Director; projects are approved by the Vice President of Operations. The fund achieves an average cost-savings of $70,782 per project, with an average return on investment of 57 percent, including utility incentives. As of December of 2010, the fund had invested $995,000 in projects on campus including lighting upgrades in the campus hockey rink and a fitness center. Cumulatively, these projects have contributed to an annual energy savings of 2,546,000 kWh for the university. The fund does not charge interest, a policy that will maintain the fund at its original size of $1 million.

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History

Background of Sustainability on Campus

The BU Strategic Master Plan includes a section devoted to a Strategic Plan for Campus Sustainability. This plan outlines policies for reducing the school's environmental footprint and energy consumption, stating that they are key values which reflect BU's commitment to both the local and international community.[2] To advance plan implementation and coordination, the university instituted a campus Sustainability Office in 2009. The office employs a Sustainability Director, a Communications Specialist, a Sustainability Coordinator for dining services, and several student workers. Together they provide guidance and support for active sustainability programs and interdisciplinary projects on campus.[3]

President Robert A. Brown created the Sustainability Revolving Loan Fund in September 2008 with an allocation of $1 million from the school's administrative budget.[4] Concurrently, BU established a Sustainability Steering Committee to advise on sustainability matters and, specifically, revolving fund projects.[5] The committee is composed of four working groups that include administrators, faculty, staff, and students; they focus on four areas: 1) recycling and waste management, 2) energy conservation, 3) sustainable building and facility operations, and 4) communications and outreach.[6]

Operations

Boston University's Sustainability Revolving Loan Fund

Year created: 2008

Size: $1,000,000

Source of capital: Administrative budget

Average payback period: 1.97 years

Administrators: Vice President of Operations; the Co-Chair of the Sustainability Steering Committee

Average cost-savings: $70,782 per project

Average return on investment: 57 percent including utilities incentives

How the Fund Works

Operation of BU's Sustainability Revolving Loan Fund was designed for simplicity, says Dennis Carlberg, Sustainability Director at Boston University.[7] Funding a project through the fund begins with discussions between the Sustainability Director and the Director of Energy Administration and Operations, who identify and recommend potential projects.[8] Next, the Vice President of Operations reviews and approves successful project proposals with assistance from the Facilities Management & Planning staff.[9] Once approval has been granted, project construction can begin.

Projects are reviewed on a case-by-case basis and the fund has no guidelines to dictate requirements for a successful project. However, potential projects with a payback period of less than one and a half years are favored. To date, there have been no projects approved that exceed an expected three year payback period.

BU taps into incentive programs offered by local utility companies such as NSTAR and National Grid to make energy-efficiency upgrades financially feasible for the university.

These utilities provide big-picture project development support over the course of project implementation. They also offer specific advice about efficient equipment and design for the green revolving fund projects. Information about project efficacy is provided primarily through utilities billing data, which is used to validate cost-savings of implemented projects every quarter.

Performance

Cumulative Project Data

According to BU Sustainability Director Dennis Carlberg, the revolving fund currently focuses on financing the "low-hanging fruit" projects, which, while simple to execute, can dramatically reduce BU's energy use. "[These projects are] a great place for colleges and universities to begin investing at the start of a revolving fund," he said.[10]

Past projects supported by the Sustainability Revolving Loan Fund have addressed lighting retrofits in campus buildings. These projects include the installation of occupancy sensors and upgrades of inefficient lighting as well as retrofits of HVAC systems.[11] Cumulatively, these projects have resulted in energy savings of approximately 7,000,000 kWh annually, a figure that BU calculates to have reduced the school's carbon emissions by 500 metric tons.[12]

BU's FitRec Center hosts many courts and recreational centers on campus. The Sustainability Revolving Loan Fund financed installation of energy-efficient light bulbs and occupancy sensors to reduce electricity use when the Center was unoccupied.

The net cost-savings tracked by the revolving fund equals $424,696 per year, or approximately an average $70,782 per project.[13]

Overall, the fund's projects demonstrate an average return on investment of 57 percent including incentives from local utilities.[14] The average payback period for all six projects funded by the university's green revolving fund is two years.

As of December 2010, the fund had loaned approximately $995,000 of its total $1 million.[15] Notably, the fund does not require projects to pay interest on their loans, a characteristic that will maintain the fund at its initial size of $1 million.[16]

Fund Project: The FitRec Center Lighting Retrofit

One of the first projects financed by the Sustainability Revolving Loan Fund was a complete lighting upgrade for the campus Fitness and Recreation Center.[17] Known as FitRec, the facility provides the campus community with spaces for recreational activities such as eight basketball and multipurpose courts, two swimming pools, a climbing wall, and an exercise gym.

To reduce the facility's energy consumption, a complete overhaul of the lighting system replaced the previously installed T12 40-watt bulbs and standard T8 32-watt bulbs with super T8 25-watt bulbs that require significantly less energy. The lighting upgrade replaced a total of 198 metal halides and 318 halogen bulbs. Additionally, occupancy sensors were installed to turn off lights if the space became vacant for a period of ten minutes or more, a feature that helps to further reduce energy use at the FitRec Center.

The Walter Brown Arena, located inside the Case Center, underwent lighting upgrades in the summer of 2010 that included occupancy sensors and installation of energy-efficient light bulbs.

To date, the facility's lighting upgrades have resulted in an energy savings of 546,000 kWh.[18]

The FitRec lighting upgrade was spearheaded by BU's Director of Energy Administration and Operations, with renovations undertaken through support from BU's in-house maintenance team and external electrical contractors.[19]

Fund Project 2: The Case Center Lighting Upgrade

BU's Case Center, which houses the campus ice rink, underwent an intensive lighting and mechanical system upgrade in 2010. The Sustainability Revolving Loan Fund financed the lighting retrofits, while the mechanical upgrades were paid for by capital renovation funding. The energy conservation project was originally initiated by the Director of Energy Administration and Operations, along with assistance from BU's construction team and an NSTAR account representative.[20]

The main concern of the project was to lower the building's overall energy needs while preserving the Center's functionality and usability. To accomplish this, Facilities staff solicited input from members of the BU community that used the facility the most, including the university's hockey coach. BU's Director of Energy Administration and Operations Aandy Ly remarked that campus reactions favored the renovations. "The response has been positive from the coaches and building

tenants, specifically on the increase of lighting quality at the ice skating rink," he said.[21]

The lighting retrofit project replaced seventy-two 1,000-watt mercury vapor lamps with 8-lamp T5HO fixtures. The new lamps use approximately half the wattage of the previous models, which will reduce the Center's short- and long-term electricity use. The project also included re-lamping and re-ballasting all of the building's T12 40-watt bulbs and the standard T8 32-watt bulbs with super T8 bulbs, which require only 25 watts of electricity. To further reduce energy consumption, the facility installed occupancy sensors to ensure that lights remained off when the space was not in use.[22]

With these upgrades, the university expects to see a drop in energy use at the rink and an increase in cost savings afforded by the energy-efficient technologies.[23] The lighting retrofit project (combined with Case Center mechanical system upgrades not directly financed by the green revolving fund) are projected to result in a total energy savings of approximately 2,000,000 kWh annually.[24] Separate figures for energy savings resulting specifically from the lighting upgrades were not available at the time of publication.

Lessons Learned

Centrally Managing BU's Revolving Fund

Boston University Sustainability Director Dennis Carlberg noted that the straightforward structure of BU's fund has been critical to its success. "We wanted to keep it very simple, so that it doesn't get complicated and doesn't take a long time to get some of these projects approved," he said.[25] The fund's centralized management, headed by the Director of Energy Administration and the Sustainability Director, has allowed it to operate efficiently without adding additional work for other university staff and administrators.

Promoting Sustainability on Campus and Online

The Sustainability Director also discussed the integral role of the university's sustainability website, "Sustainability @BU." The site helps to educate the campus and surrounding community about BU's environmental and energy initiatives. There, interested community members can learn information about current projects being completed by the Sustainability Revolving Loan Fund and become involved in some of the university's sustainability efforts.

"The homepage is intended for people to understand the magnitude of our challenge, and hopefully understand that we all have to get into this and work on it together," Dennis Carlberg said. He hopes that the website will be used as a resource to inspire more sustainable action on the Boston University campus and beyond.[26]

Endnotes

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