

# Harvard University

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## *Green Loan Fund*

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# Summary

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**Location:** Cambridge, Massachusetts

**Full-time student enrollment:** 19,207

**Combined gross square footage of all buildings on campus:** 26,500,000

**Endowment:** \$26 billion  
as of June 30, 2009

**Type:** Private

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The Green Loan Fund at Harvard University has been an active source of capital for energy efficiency and waste reduction projects for almost a decade. This case study examines the revolving fund's history from its inception as a pilot project in the 1990s to its regeneration in the early 2000s to its current operations today. The green revolving fund has been a

successful self-replenishing tool for encouraging Harvard's schools and units to invest in projects that generate cost savings and reduce their environmental impacts. Originally funded by the President's Office at \$1.5 million, the now \$12 million revolving loan fund provides capital to Harvard for high performance campus design, operations, and maintenance projects. The fund's low-interest loans have successfully financed projects which save the university electricity, natural gas, water, waste disposal fees, along with other operating costs.

Challenges faced by the fund's administrators have included promoting the fund across a decentralized campus, soliciting project proposals, and ensuring that projects are successfully implemented and documented. Despite these challenges, the fund has experienced average annual returns of 30 percent, saved the university \$4.8 million dollars annually, and reduced Harvard's environmental footprint.

# History

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## Harvard's First Revolving Fund

In 1993, Harvard's first green revolving fund, the Resource Conservation Incentive Program (RCIP), was created with an allocation of \$1.5 million from then-President Neil Rudenstine.<sup>1</sup> A report released in 2000 found that "the \$1.5 million loan fund yielded an annual average savings of \$880,000 with an average annual return [on investment] of 34 percent" after having financed 35 projects.<sup>2</sup>

While the fund initially experienced a surge of interest on campus and funded over 20 projects, in subsequent years it became underutilized and was disbanded in 1998. However, both the RCIP's financial success and its ability to improve environmental performance were noted by members of the Harvard community and it served as the model for the formation of the Green Loan Fund (GLF) in 2001.<sup>3</sup>

While students have played an important role in promoting sustainability at Harvard, the GLF, along its predecessor the RCIP, were primarily initiated as a result of faculty and administrator input.<sup>4</sup> The creation of the Harvard Green Campus Initiative (HGCI) in 2001 marked the

introduction of a formal sustainability office to institutionally support green initiatives on campus. The GLF was one of the first green initiatives launched after the HGCI was formed.

## Creating the Green Loan Fund

The newly created HGCI was able to make the case that renewed interest in sustainability at Harvard, combined with expanded sustainability staff, would create a demand for campus resources to fund and develop sustainability projects.<sup>5</sup> Further, such resources would be used most effectively if the administrative staff of the HGCI were able to focus on program development and research, rather than on implementing individual projects.

*The fund was identified as an ideal model for supporting improvements to Harvard's campus that would reduce energy use and demand ... and above all, pay for themselves..*

In 2001, a \$3 million revolving loan fund was endowed through the offices of then-President Neil Rudenstine and then-Provost Harvey Fineberg, using the central administrative budget. Their motivation stemmed from recognizing the importance and value of institutionalizing support for energy and resource reductions as well as sustainability goals.<sup>6</sup> The fund was initially interest-free until 2007, when a 3 percent administrative fee was added to defray administrative costs of the GLF and provide initial consulting to ensure project teams follow Harvard's Green Building Standards.<sup>7</sup>

## **Evolution of the Fund**

The fund's eligibility requirements changed in 2003 to include feasibility studies and renewable energy projects, after the value of these projects were recognized on campus. The eligibility requirements were also changed to reflect increased availability of matching funds.<sup>8</sup> In 2007, the GLF added the Incremental Loan, which funds the cost difference between base code and sustainable design using life-cycle cost analysis. These projects are repaid based on internal rate of return.<sup>9</sup> The fund was enlarged in 2004 to \$6 million, and again in 2006 to its current level of \$12 million by then-President Larry Summers as a reflection of its consistent success.<sup>10</sup>

In 2008, the Harvard Green Campus Initiative was institutionalized into the Harvard Office for Sustainability (OFS) by President Drew Faust. This change included an expanded mission to oversee University-wide sustainability goals and initiatives, including the GLF. Currently, the fund can commit up to \$500,000 for any approved project, although larger projects often find external grants or operating funds to cover the difference. Expected payback periods for improvements on existing infrastructure must be five years or less in order for a project to be approved.<sup>11</sup>

# Operations

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## Harvard Green Loan Fund Overview

**Year created:** 2001

**Size:** \$12,000,000

**Source:**

Offices of the President and Provost

**Average payback period:**

Approximately 3 years

**Administrator:** Office for Sustainability

**Average return on investment:** 29.9%

**Total savings:**

Over \$4.8 million annual savings

consulting, energy auditing, and commissioning, as well as financial staff.<sup>12</sup> A majority of Harvard's schools and central administrative departments are represented on the committee.<sup>13</sup>

This committee composition not only allows proposed projects to be scrutinized from multiple diverse viewpoints; it also helps spread knowledge of the fund's existence to many departments across campus. Applicants are encouraged to contact OFS staff before submitting proposals, both to benefit from the range of support services and to align the project direction with the GLF criteria.<sup>14</sup> The ability of designated OFS staff to advocate for the loan fund and solicit proposals, as well as consult and provide feedback on potential projects, is a crucial component of the program's effectiveness.<sup>15</sup>

## Managing the Fund

The GLF was initially administered by the HGCI, in which project approval decisions were made by a Green Loan Fund Review Committee composed of facilities staff and administrators. Currently, the review committee resides within the Office for Sustainability and is co-chaired by its director. The committee is made up of stakeholders from across campus, including staff involved with new construction, existing projects, renovations,

## Approving Project Proposals

After submitting a proposal, the project applicant presents to the committee and answers questions about the proposal; the project can then be modified to address the committee's feedback and concerns. Primary considerations for potential proposals are the

projected cost savings and how the applicant intends to quantify and verify the results.

The committee requests that a report be prepared on the project's performance and savings six months after completing construction. Sometimes temporary metering of energy and resource use is used to augment the verification process.<sup>16</sup> Applications are then sent to the Director of Administration and Finance and the Vice President of Campus Services, both within Harvard University Campus Services, for final approval.<sup>17</sup>

Once a loan is approved, a department moves forward with the project and sends invoices to the Office for Sustainability, where it then receives the loan in the form of an internal fund transfer to reimburse the actual cost of the project based on the invoiced amount. The department begins repaying the loan at the start of the fiscal year following project completion and according to a payback schedule determined by the cost of the project and annual cost savings. The loan fund will only reimburse projects that are successfully completed.

## **Types of Loans**

Currently, the GLF provides either full-cost loans with a simple payback period of five years or less, or incremental loans with an internal rate of return of 9 percent or higher. The incremental loans are often used for high-performing new construction projects. Both types of these loans are limited to \$500,000. Applicants are also required to apply for utility

rebates when they are available. When utility rebates are approved, they are required to be either deducted from the loan amount or used to fund other conservation projects.<sup>18</sup>

There are several other finance payback options available in addition to the five-year full cost and incremental cost loans. Renewable energy projects qualify for GLF loans regardless of the entire project's payback period, but the loan itself must be repaid within five years. Utility sub-metering and engineering services also qualify for GLF loans, and must be repaid within two years. Additionally, projects may be "bundled" as long as the average payback period is five years, allowing very low payback projects to be leveraged for funding those with longer paybacks.<sup>19</sup>

## **Loan Criteria**

An approved project must result in a direct reduction of costs and environmental impact for the university with a simple payback period of five years or less, based on cost savings. Thus, the GLF allows departments to improve their environmental and financial performance without any up-front capital costs. The loan application requires an engineering study or other form of documentation demonstrating the case behind the projected cost and resource savings. While the goal of the GLF is to provide funding for a broad array of projects within a dynamic field, eligible projects often target:

- Greenhouse gas emissions
- Energy use
- Waste disposal

- Water use
- Pollutants
- Maintenance costs
- Procurement practices
- Community education and behavior, and
- Installation of renewable energy technology.<sup>20</sup>

As loans are repaid, the fund is replenished; however, the total fund size only grows through specific additions of capital, such as from the President’s office through the Central Administrative budget.<sup>21</sup> While the GLF itself has not sought new seed capital since 2006, the ability of loan applicants to find additional funding through grants, rebates, or even applying their own operating budgets, has enabled the GLF to expand its reach.<sup>22</sup> The GLF has no limit on the number of loans a department may take out and the funding is available on a first-come, first-served basis.<sup>23</sup>

## Appendix A: Table of Performance\*

ALL FIGURES ARE CUMULATIVE AND ANNUAL (EXCEPT ROI)	RCIP 1993-1998	GLF FALL 2002	GLF SPRING 2003	GLF FALL 2003	GLF SPRING 2004	GLF FALL 2004	GLF FALL 2005	GLF SPRING 2006	GLF SPRING 2007	GLF DECEMBER 2010
Capital Allocated (loaned out, in millions)	\$2.6	\$1	\$1.7	\$1.8	\$2.3	\$3.25	\$5	\$6.5		Over \$16
Average project ROI	34%		30%		34%	40%	35%	33%	35%	29.9%
Cost-savings	\$800,000	\$300,000	\$500,000	\$600,000	\$750,000				\$3.9 million	\$4.8 million
Number of Projects			18	18	23	38	38	92	130	185
Pounds CO2e Savings (millions)	8	4	7	9	11.6		51	66.7	60.4	
Gallons Water Savings (millions)		5	5.3	5.3	5.3		8.6	12.7	15.27	
Pounds Solid Waste Savings (thousands)			200	200	200		200	200	200	

*\*This table highlights several measures of the Green Loan Fund’s performance over the years, including the average return on investment of all loans issued so far for almost a decade, as well as some data on the performance of the Resource Conservation Incentive Program. Average annual return on investment figures are based on highly detailed engineering estimates of the projected resource, maintenance, and cost savings resulting from the projects.*

# Performance

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*Since its creation a decade ago, the fund has financed over 200 projects that cumulatively total more than \$16 million dollars.*

These projects have produced an average annual return on investment of 29.9 percent and currently result in over \$4.8 million in cost savings for the university on average each year. The annual return on investment figures are based on highly detailed engineering estimates of the projected resource, maintenance and cost savings resulting from the projects. Additionally, loans have been awarded for a range of project costs: 57 percent of the total number of loans have been up to \$49,999, 35 percent between \$50,000 and \$250,000, and 8 percent above \$250,000.<sup>24</sup> For more data on the GLF's aggregate performance, see the table in Appendix A at the end of this report.



# Example Project

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## Harvard Business School Cogeneration

Harvard Business School (HBS) used the Harvard Green Loan Fund to install a 75 kW cogeneration unit, along with infrastructure for the future installation of a second 75kW unit, in the basement of Shad Hall. The cogeneration units were installed to increase Shad Hall's overall energy efficiency and to substantially reduce energy expenses by simultaneously producing heat and electricity. The project had a payback of 4 years and resulted in an estimated reduction of approximately 1,695,527 pounds of CO<sub>2</sub>. The natural gas fired unit routes exhaust heat-to-heat exchangers that warm water for the entire domestic hot water heating load for showers. The unit feeds electricity into the building's main electric grid, supplementing building power provided from the grid and from photovoltaic panels on the roof.



*Shad Hall at Harvard Business School underwent the installation of a cogeneration unit in 2010 that used the waste electrical heat to produce hot water for the building. The cogeneration capabilities represent an annual reduction of approximately 500 tons of greenhouse gas emissions.*

# Lessons Learned

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From 2001 to 2011, the GLF has been a successful funding tool for projects that reduce Harvard's environmental impact while providing cost savings across the university. The loan fund has helped extend the reach of sustainability initiatives across the entire university by funding projects that deliver measurable and positive environmental change on campus.

OFS is currently analyzing and reviewing the current stats of the GLF to explore ways to improve its operations to fit within larger institutional sustainability commitments and goals.<sup>25</sup> The office has also drawn important lessons from its efforts over the years:

- Designated staff must support the fund and advocate for project proposals from the campus community.
- The committee that reviews proposals must be multi-stakeholder and represent many constituencies.
- Projects must be thoroughly reviewed and carefully implemented, especially in the stages of calculating performance and cost savings.<sup>26</sup>

The future of the fund may involve expanding the evaluation criteria to focus on innovation and new technology in addition to longer payback periods to accommodate costlier, higher impact projects.<sup>27</sup> The existence of the 3 percent administrative fee on loans is also being reviewed. These considerations and the need to continue soliciting project proposals, as well as keeping staff engaged in the review process, all point to the need to keep the model relevant and focused on maximizing impact and innovation.

# Endnotes

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