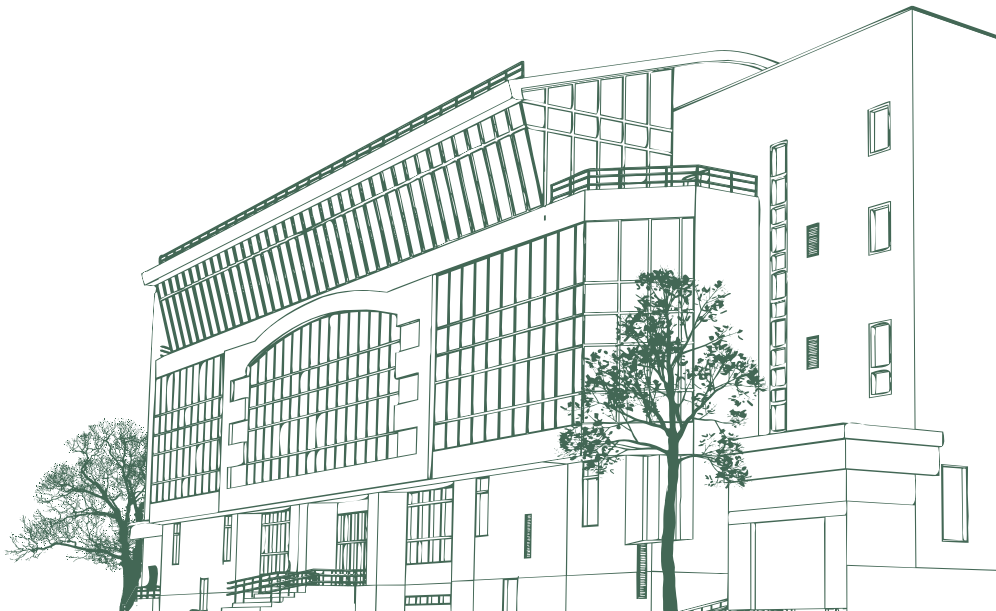
A Sustainable Endowments Institute Report

Greening *the* Bottom Line

The Trend toward Green Revolving Funds on Campus



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Executive Summary

Facing steep budget cuts and rising energy costs, many colleges are grappling with how to finance urgently needed, but capital intensive, energy efficiency upgrades on campus. One innovative approach, using return-oriented green revolving funds (GRFs), is a rapidly growing trend at colleges and universities. GRFs can invest in a variety of cost-saving initiatives, resulting in significant financial and environmental benefits.

Greening the Bottom Line, published by the Sustainable Endowments Institute (SEI) with more than a dozen partner organizations, brings to light current trends based on the first survey ever conducted about GRFs in higher education. Green revolving funds invest in enhancing energy efficiency and decreasing resource use, thereby reducing operating expenses and greenhouse gas emissions. The cost savings boost the bottom line and replenish the GRF for investment in the next round of green upgrades.

Surveying Green Revolving Funds in Higher Education

To better understand the emerging trend toward the creation of more GRFs, the Sustainable Endowments Institute conducted a survey of green revolving funds in 2010. *Greening the Bottom Line* examines and evaluates the results of this survey of 52 institutions with at least $66 million invested through GRFs.



Three kilowatts of photovoltaic panels have been installed on the roof of a building at Lane Community College. These installations were funded by Lane's revolving fund and the Energy Trust of Oregon.

SEI's survey included schools in 25 U.S. states and 2 Canadian provinces with 24 public institutions and 28 private institutions represented. Funds range in size from $5,000 at the College of Wooster (Ohio) to $25.45 million at Stanford University, with an average size of $1.4 million and a median size of $170,000. Approximately 35 percent of funds are $100,000 or less, and over a third of institutions with GRFs have endowment assets of less than $250 million. An institution does not have to be affluent to create a GRF.

Key Findings

Based on survey data from funds at 52 institutions, the following key findings emerged:

- The number of GRFs is growing rapidly, with nearly three quarters created since 2008.
- All sizes and types of institutions are creating GRFs.
- The GRF model is universally customizable to meet a range of institutional goals.
- GRFs help schools advance other goals such as academic, co-curricular, and campus community engagement on sustainability issues.
- Reports to date suggest potential for consistent annual returns ranging from 29 percent (Iowa State University) to more than 47 percent (Western Michigan University).[1]

Given these findings, this report aims to:

- Provide basic information on the formation, operation and performance of GRFs to help institutions that are interested in establishing their own.
- Enable institutions that have GRFs to learn from each other's experiences.
- Create a baseline for tracking the continuing emergence of GRFs in higher education.

Reports to date suggest potential for consistent annual returns ranging from 29 percent (Iowa State University) to more than 47 percent (Western Michigan University). Additional GRF performance data is provided in Exhibit H on page 29.

Return on Investment and Other Benefits

The survey revealed a pattern of reliable returns on investment and short repayment periods. Established funds report a median annual ROI of 32 percent. This suggests that GRFs can significantly outperform average endowment investment returns, while maintaining strong returns over longer periods of time.

GRFs can significantly outperform average endowment investment returns.

1 The figures published in this report were reported to SEI through the survey process. We were not able to fully verify that return on investment figures from various schools were calculated in a comparable manner.

While most funds are new, others have been in existence for a decade or more, such as Western Michigan University (1980)[2] and Harvard University (2001). The results of the survey indicate that green revolving funds are able to maintain a high return on investment both in their initial phases as well as over the long run. Schools also reported average project payback periods ranging from 1 year to 10 years, with a median of 4 years.
In addition to strong financial performance, *Greening the Bottom Line* highlights numerous other benefits that green revolving funds offer:

- Reductions in energy consumption, resource use, waste generation, and pollution levels
- Increased tracking of energy and water use and other sustainability data on campus
- Fostering collaboration between offices of finance, sustainability, facilities, faculty, and students
- Opportunities for interdisciplinary education and research on sustainability, institutional assessment, and a host of related topics.

Opportunities and Challenges

Colleges and universities considering formation or expansion of green revolving funds will find a wide range of potential models in *Greening the Bottom Line*. Case studies highlighted include the following:

- Harvard University's Office for Sustainability established a system that provides consultation on revolving fund projects for departments across campus.
- University of Colorado at Boulder demonstrates how students have used a variety of methods to generate funding for new GRFs.
- Iowa State University modified its billing process to give individual departments financial incentives to lower energy use and apply for GRF project funding.
- Weber State University and the California Institute of Technology have successfully invested a portion of their endowments in green revolving funds for on-campus sustainability improvements, with returns replenishing not only the GRF, but also the endowment.

Colleges and universities that have pioneered use of GRFs have achieved a win/win solution. They are financing cost-saving energy upgrades, while generating low-risk/high yield investment returns. Despite this successful GRF track record, a main challenge in growing and expanding these funds is obtaining sufficient capital. With over $300 billion in combined endowment assets, more schools may discover the benefits of making investments in GRFs from this relatively untapped source.

2 WMU's nonstandard GRF is not a true fund. Funding for projects is directly built into the school's Billing Mechanism for Utility Infrastructure and its Deferred Maintenance Fund. WMU chose not to create a formal GRF.

Introduction

"This building is in good shape for its age, but it is so drafty that if we put all the holes together, we could drive a truck through it" said professional engineer Todd Holland, during a winter campus tour. As energy manager for the Five College consortium in Western Massachusetts, his assessment reflects the current realities for many colleges and universities.

Despite significant strides in improving environmental performance, most institutions of higher education are still confronted with numerous gaps. These gaps are filling slowly because–regardless of an institution's size, budget or endowment–obtaining capital for efficiency upgrade projects has to compete for budget allocations with immediate maintenance demands.

To address the need for capital, colleges and universities have developed a variety of non-traditional funding methods. Green revolving funds (GRFs) invest in energy efficiency upgrades and projects that decrease resource use, thereby lowering operating expenses. These operational savings are returned to the fund and then reinvested in additional projects.

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Why Research Green Revolving Funds?

While conducting its annual campus survey for the College Sustainability Report Card, SEI recognized that a growing number of colleges and universities were establishing GRFs. Additional initial research showed that GRFs are:

1. Reducing natural resource use, energy consumption and/or emission of greenhouse gases.



Iowa State University's two-phase lighting efficiency project in the College of Design was sponsored by the Live Green Revolving Loan Fund.

2. Providing capital for ongoing investment in green projects.

3. Producing a competitive return on investment.

These preliminary findings prompted SEI to initiate further research in 2010. SEI surveyed schools that utilized GRFs and conducted a series of interviews with sustainability directors and other administrators involved in GRF development and operation.[1]

Green Revolving Fund Attributes

This study identified GRFs according to two essential criteria:

1. The fund must finance measures to reduce resource use (e.g., energy, water, paper) or to mitigate carbon emissions (e.g., renewable energy development).

2. The fund must revolve. Savings generated by reducing operating costs are tracked and used to repay the fund (thus providing capital for future projects).

Of 90 institutions identified as having green funds, almost all met the first criterion, while 52 funds also met the second. The funds that did not meet the criterion of "revolving" generally do not use operational savings to fund new projects in the subsequent budgetary cycles. Often these funds use one-time proceeds from student "green fees,"[2] utility budget surpluses, utility rebates, demand response payments[3] or annual budget allocations to fund efficiency or sustainability projects.

Many non-revolving funds are part of well-planned, carefully structured programs that significantly improve campus environmental performance. However, they do not provide two distinct advantages of GRFs, which prompted this report:

First, a fund with a robust revolving function (where the savings associated with specific projects are identified and recaptured) seems more likely

1 A complete discussion of methodology is provided in Appendix A. A number of interviews with higher education staff have been further developed into case studies, which will be published in April 2011.

2 A "green fee" denotes a fee paid by enrolled students for sustainability measures. Fee payment structures include: mandatory (no choice), opt-in (choose to pay) and opt-out (choose not to pay).

3 Some regional electricity grid operators have programs to pay large commercial and industrial facilities for voluntarily reducing electricity load during peak periods.

to become an integral and permanent source of ongoing capital for sustainability projects. Access to easily available capital will help colleges speed and expand the scope of improving operations.

Second, the revolving feature requires tracking the performance of specific projects and of the fund as a whole. As a result, these funds are more likely to have available data that can be used to make financial comparisons among schools, and with other institutional investment options. *Greening the Bottom Line* looks at how green revolving funds can improve institutional environmental performance while equaling, or exceeding, endowment investment returns.

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Institutions with Green Revolving Funds

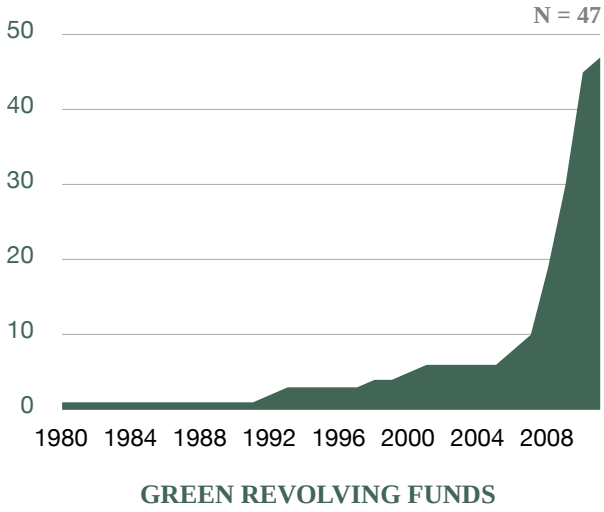
This section addresses the following questions:

- When were GRFs established?
- What types of colleges and universities are creating GRFs?
- Is there a relationship between GRF creation and institutional wealth?

Year Established

The oldest GRF identified was founded in 1980 at Western Michigan University. Since that time, many schools have invested in energy efficiency improvements on campus. However, survey results identify just 10 operating GRFs prior to 2008. These early funds were established at relatively large institutions. Between 2008-2011, the number of institutions with GRFs more than quadrupled, with 37 new funds established.[1]

Exhibit A: Growth of Green Revolving Funds 1980-2011



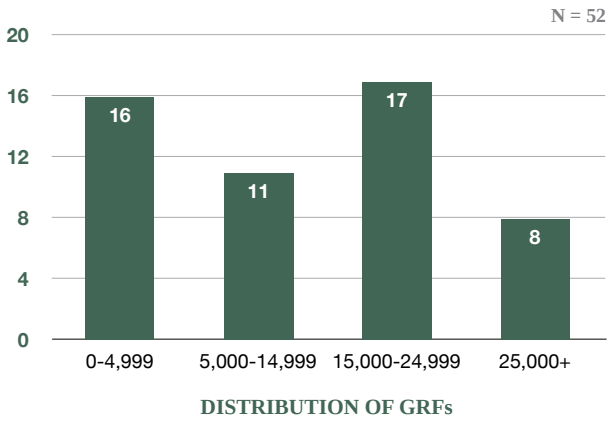
Between 2008-2011, the number of institutions with GRFs more than quadrupled, with 37 new funds established.

1 Of the 52 institutions surveyed, 47 reported the founding years of their GRFs.

Size of Institutions

Colleges and universities of all sizes have created GRFs. The largest school in the survey was the University of Illinois at Urbana-Champaign with approximately 42,000 students. In contrast, Kalamazoo College (Michigan), with 1,381 students, was the smallest. Exhibit B shows that colleges and universities of all sizes have created funds, and that the distribution among institutions of all sizes is relatively even.

Exhibit B: Distribution of Green Revolving Funds in Institutions by Enrollment Size



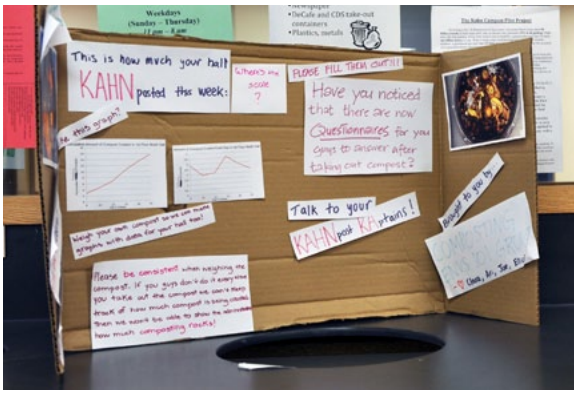
Type of Institutions

Of the 52 colleges and universities with GRFs, 24 are public and 28 are private. Among public institutions, most are the flagship campus within a given system. Notable exceptions are state universities such as California State University–Monterey Bay, Grand Valley State University (Michigan), Weber State University (Utah), and Georgia Institute of Technology. Lane Community College (Oregon) is the only community college with a GRF that was identified by this study. Among private schools, GRFs have been established within institutions of all sizes and types. While large private universities such as Stanford and Yale have established funds, so have small four-year liberal arts institutions such as Allegheny College (Pennsylvania) and the College of Wooster (Ohio).

Of the 52 colleges and universities with GRFs, 24 are public and 28 are private.

Size of Institutional Endowments

One of the central questions in our analysis was whether GRFs were being established primarily at wealthy institutions. In fact, they are being created



Oberlin's Green EDGE Fund supports food waste composting in a residence hall. Students help administer the fund and encourage campus participation by raising awareness about its projects. Credit: Maa'ayan Plaut

at institutions with a wide range of endowment sizes (see Exhibit C). Harvard University has the largest ($27.6 billion) and Lane Community College the smallest ($7.6 million). On an endowment per student basis, Yale University has the highest per student value ($1.4 million), while Lane Community College has the lowest ($423).

GRFs are being created at institutions with a wide range of endowment sizes.

While GRFs are being created at a diverse array of institutions, using the analytical lens of endowment size has two limitations:

1. The majority of colleges and universities in North America do not have endowments.
2. There are no national benchmarks available to evaluate whether a particular level of endowment per student is above or below average.

As a result, we draw three conclusions about the wealth of institutions with GRFs. The first is that on the whole, colleges and universities with GRFs have more resources than the average of all colleges and universities in North America. Second, GRFs are present and flourishing in institutions with a wide range of resources. Finally, a lack of institutional wealth does not appear to be a barrier to GRF formation. Indeed, the majority of institutions with GRFs have an endowment per student value of less than $50,000.

Exhibit C: Distribution of Green Revolving Funds at Institutions by Endowment Value per Student



Green Revolving Fund Goals

This section addresses the following questions:

- What are the institutional goals for GRFs?
- How do GRFs help advance educational goals?

Types of Funds

We identified three general categories to distinguish GRFs based on institutional goals:

- **Efficiency funds** provide capital to energy and/or water efficiency measures. Their benefits are in resource reduction and cost savings. Project ideas are initiated and managed by facilities, energy management and/or finance staff. Efficiency funds tend to expect a relatively short payback period and are typically not used to engage the broader campus community.

The Energy Reserve Fund at Tufts University (Massachusetts) is an example of an efficiency fund. It is administered by the office of the Vice President for Operations and generally looks for projects with no more than a five-year simple payback.

- **Innovation and engagement funds** explicitly seek community engagement and ideas for projects. These may have short payback, long payback or no payback requirements. In some cases, innovation funds require repayment for projects that result in operational savings, and simultaneously operate as a source of grants for projects that do not result in cost savings. These funds are generally administered by a committee and often include significant student participation and/or oversight.



Student volunteers assist in the free CFL bulb exchange program funded by the Green St. Mary's Revolving Fund at St. Mary's College of Maryland.

For example, at Skidmore College (New York), the fund intentionally solicits projects that are unlikely to be paid for through the traditional budget process. The fund has supported pilot projects including a rain garden, a community food garden, and several energy projects. Skidmore's survey response states that its fund

"allows the college to be more flexible to new ideas, as it is not limited by the annual nature and structure of the regular college capital budget."[1] Skidmore further notes that among the fund's projects, "many have had financial paybacks."

The Sustainability Microloan Fund at Yale University is another example of an innovation and engagement fund. Fund administrators state that Yale's fund "is expressly a microloan project that is intended to foster small-scale innovation and savings. The actual aims are to get people thinking creatively and to give them a boost in tight times." The Sustainability Microloan Fund does not have a stated maximum loan amount. If a worthy project exceeds the fund's budget, the Office of Sustainability will seek additional support from the administration.

- **Hybrid funds** target resource reduction and cost saving, but also consider community engagement and outreach goals. Most of the funds in the survey are hybrid funds. They fund efficiency and conservation, but also may finance a wider range of projects such as renewable energy development, solid waste diversion, and reducing use of materials such as paper. Hybrid funds often seek to engage and/or educate the campus community in sustainability efforts. As such, a broad set of campus stakeholder groups tend to provide oversight to hybrid funds while they are administered by facilities or sustainability staff.

The Green Loan Fund at the University of Notre Dame is an example of a hybrid fund. Administered by the Office of Sustainability, the fund is governed by a committee of five administrators, five faculty, five staff, and two

University of Notre Dame

The Green Loan Fund at the University of Notre Dame was started in 2008 by the Energy and Environmental Issues Committee. The committee's research determined that Notre Dame would benefit from the creation of an Office of Sustainability as well as a revolving fund on campus to finance new projects.

Now, the Office of Sustainability manages and reviews project applications for the $2 million GRF. Students and staff can propose projects to a 17-member review committee composed of campus administrators, faculty, staff, and students.

The fund has financed extensive CFL exchanges in all 29 campus dormitories, phased over four stages from October 2008 to September 2010. This initiative resulted in a net reduction of 42,336 kWh, saving about $529 per month and yielding a 75 percent return on investment.

1 Unless otherwise noted, direct quotations are from survey responses collected by the Sustainable Endowments Institute for this report. For more information, please see Methodology in Appendix A.

students. The Green Loan Fund generally looks for a simple project payback of 5 to 10 years. See the sidebar on the University of Notre Dame's fund for more information.

To address operational efficiency and enhance campus engagement, the University of Pennsylvania has established two funds which together meet both goals of a hybrid fund:

1. The Green Fund awards one-time grants of up to $50,000 to foster innovative ideas of faculty, students, and staff through a competitive process. Projects that generate savings repay the fund; initiatives such as education and raising awareness that do not create operational savings are not required to repay the fund.
2. The Energy Reduction Fund (ERF) is "a centralized program for energy saving projects and retrofits for campus buildings. The ERF is intended to be a self-sustaining program funded through [savings from] the utilities budget."

Meeting Educational Goals

While GRFs fit into these three categories, survey results indicate that all types of funds can play a role in student education and/or campus life.

The Revolving Green Fund at Miami University of Ohio offers an example of a GRF directly linked to academic education. Miami explained that the GRF "was established to fund sustainability-related projects on campus, particularly those that combine efficiency, environmental sustainability, and student learning. The initial investment is $50,000 and the first loan has been approved for a student proposal to construct a wind turbine at our Ecology Research Center."

In other cases, the educational benefit of a GRF is co-curricular and often associated with student leadership and governance. The Revolving Loan Program of the University of Illinois at Urbana-Champaign "is allocated and administered by the Student Sustainability Committee. This is a committee of students, faculty and staff...only students vote."

The Office of Sustainability at The George Washington University hired four student interns to propose a structure and model for the school's GRF. As a result, the GW Green Campus Fund was launched in spring 2010.

The student organizers of the Green EDGE Fund at Oberlin College (Ohio) emphasize that "this fund is run by a small but dedicated group of unpaid students that work hard to collaborate with other students, faculty, administration, and residents of Oberlin to improve Oberlin College and community efficiency and sustainability. We are a flexible organization; we fund projects ranging from campus tree planting events to completely retrofitting bathrooms in a campus apartment complex."

Green Revolving Fund Formation

This section addresses the following questions:

- Which campus stakeholders have initiated the creation of GRFs?
- What sources of capital have been used to start campus GRFs?

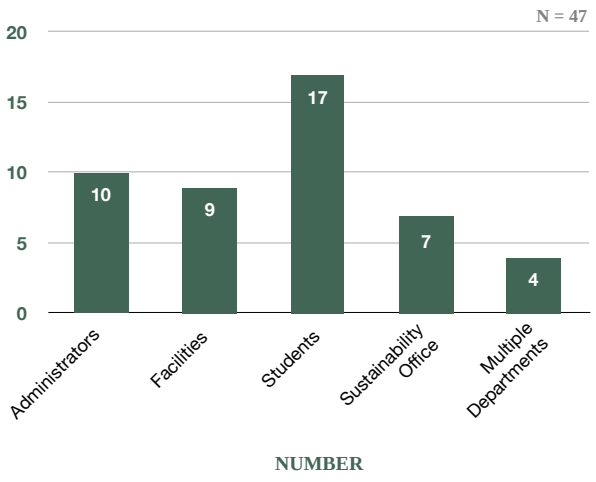
Champions

The initial promotion of GRFs on campus is attributed to a variety of stakeholder groups. Survey responses show that administrators (including sustainability faculty and staff) are the most frequent champion of these initiatives (see Exhibit D).

Administrators cited represent a variety of institutional functions including two presidents, a college dean, and staff from facilities, finance, energy/utilities management, and sustainability functions. GRFs were sometimes catalyzed by particular individuals on campus, such as at Boston University, where the president established its GRF. In addition, cooperative efforts between administrative groups were cited. For example, the University of Denver stated, "This was a joint effort between Facilities and the Office of Business and Financial Affairs." Students were cited by 17 schools as the sole GRF founders or as participants in the founding group. Swarthmore College (Pennsylvania) cites "student organizations and the Student Council" as the primary champions in the formation of its Renewing Fund for Resource Conservation. Seattle University's Sustainable University Revolving Fund was founded by a coalition of student groups and student government in collaboration with the facilities department.

Students were cited by 17 schools as the sole GRF founders or as participants in the founding group.

Exhibit D: Green Revolving Fund Champions



Boston University

The Sustainability Revolving Loan Fund at Boston University was created in 2008 through a university budget allocation to implement energy reduction strategies and technologies. The fund is administered by the Vice President of Operations (a Co-Chair of the campus Sustainability Steering Committee).

This committee oversees four working groups that address energy conservation, sustainable buildings and operations, recycling and waste management, and communications and outreach.

The fund invests an average of $70,782 per project, with an average return on investment of 57 percent (including utility incentives). Potential projects are submitted to the Vice President of Operations, for review and consideration. Approved projects are then submitted to BU's Facilities Management and Planning department for implementation.

Through December of 2010, the fund had invested $995,000 interest-free in projects with estimated annual energy savings of 2,546,000 kWh. The fund will be replenished from financial savings attributable to the reduced energy demand.

Sources of Capital

A central challenge for establishing a GRF is securing initial funding. The survey identified funding sources for 43 GRFs. These sources are diverse and used in various combinations.

In several cases, administrative funding was used as a "matching amount" to leverage donations.

- **Administrative** sources were the most frequently identified–cited by 20 institutions. Funds were often drawn from central administrative and departmental budgets (e.g. facilities or dining). In 14 instances, administrative funding was the only source of seed funding. In several cases, administrative funding was used as a "matching amount" to leverage donations. Bucknell University (Pennsylvania) reported that "an anonymous challenge gift from a senior administrator's office was used as seed money."
- **Student** – Student fees or student government were cited as sources of funding for eight GRFs. In five cases student fees were the sole source of funding.
- **Efficiency/utility** – Pre-existing efficiency savings funded GRFs in seven cases. Utility company rebates or payments for demand curtailment were noted four times as sources

of funding. George Mason University (Virginia) wrote "Mason participates in the load curtailment program through Energy Connect. This means Mason has agreed to shed 1.5 MW of peak load when requested on high-load days. Mason earned $130,000 through that program in 2009, and part was reinvested in energy-saving initiatives."

- **Donation/foundation** – In six cases, either individual donations or foundation grants were the primary sources of seed capital. The Student Climate Action Revolving Fund at Furman University (South Carolina) was funded entirely by a charitable foundation. Miami University of Ohio stated "we hope to attract alumni donations in the future."

Endowment investments have financed GRFs at two schools: Weber State University and the California Institute of Technology.

- **Endowment** – Endowment investments have financed GRFs at two schools: California Institute of Technology and at Weber State University. Caltech used a portion of its endowment designated for capital projects to begin its Energy Conservation Investment Program. Weber State University reports, "We came up with a few [funding] alternatives:

California Institute of Technology

The Caltech Energy Conservation Investment Program (CECIP) was initiated in 2009. It manages $8 million within an existing fund in the school's endowment, which had been created to finance capital projects. Any member of the Caltech community may submit a project proposal, and projects are approved as long as they have a 15 percent return on investment or a simple payback period of less than six years.

Building energy use is carefully tracked, both before and after projects are implemented, allowing for calculation of the precise cost savings resulting from CECIP. Savings accrue to the fund until the loan has been repaid, and then are directed toward the general operating budget.

CECIP has financed 13 large-scale building projects, ranging from lighting replacements to complete mechanical and control system retrofits.

As of August 2010, these projects have reduced the school's energy bills by $1.5 million. They have achieved an average return on investment of 33 percent and an average payback period of three years.



The Green Campus Fund at The George Washington University funded the installation of daylight sensors in the lobbies of GW's Elliott School of International Affairs building to improve lighting efficiency.

bond, municipal lease, and endowment. After some analysis we determined that the endowment would be the best method for funding these projects." Weber State University's endowment invested $5 million into its $9 million GRF, which represents approximately 5 percent of the institution's total endowment value. It is important to note that both institutions structured GRF capitalization as endowment investments, not as payouts from the endowment. This enabled them to avoid any issues related to donor restrictions on gifts to the endowment.

Weber State University's endowment invested $5 million into its $9 million GRF, which represents approximately 5 percent of the institution's total endowment value.

- **Combination** – Fourteen schools cited at least two sources of funding. For example, Carleton College's Sustainability Revolving Fund received funding from a combination of a donation from the Class of 1983, allocations by the Student Association, and by the administration's Environmental Advisory Committee.

Green Revolving Fund Administration

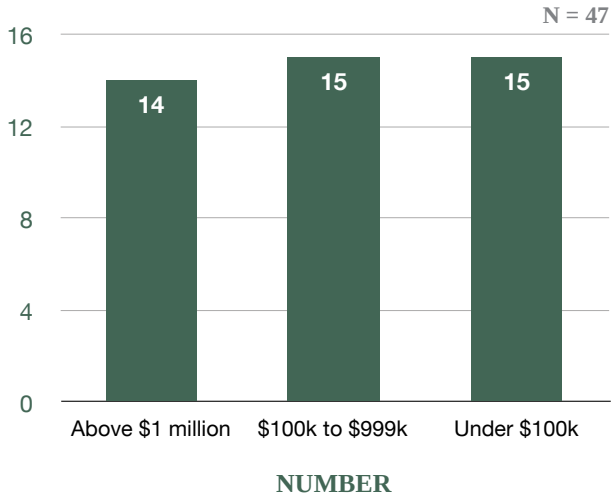
This section addresses the following questions:

- How much are institutions investing in GRFs?
- How are funds managed and administered?
- What criteria are used to select proposed projects?
- How are decisions made?

Fund Size

Despite many large and several very large funds, most funds are relatively modest. Median fund size is $170,000 and the smallest fund is $5,000. The 44 GRFs that reported fund size show that funds are being created with a range of values, with the number of funds somewhat evenly distributed between those above $1 million (14), those of $100,000 to $1,000,000 (15) and those under $100,000 (15).[1]

Exhibit E: Number of Green Revolving Funds by Capitalization



The largest funds typically had funding sources from either a central administrative budget (e.g., Harvard University - $12 million, University of Virginia - $1 million), or from the endowment (Caltech - $8 million and Weber State University - $9 million).[2]

1 In some cases, fund size was determined through estimation or inference. While the survey attempted to determine both the initial size of GRFs and the current size, both categories were difficult to isolate. The fluid nature of GRFs makes an estimation of current size challenging for fund administrators. In the case of long-established funds, the lack of institutional memory made it difficult to discern initial fund size. Generally, GRFs reported the total capacity of their funds.

2 Weber State University's GRF consists of $5 million invested from its endowment, with an additional $4 million rewarded through multiple sources: grants, utility rebates, internal efficiency savings, and donations. The approximate total size of Weber State's fund is $9 million.

University of Colorado at Boulder

The Energy and Climate Revolving Fund at the University of Colorado at Boulder was initiated by the school's Environmental Center director in 2007.

Its initial capital of $500,000 was drawn from the student government's budget, as it was originally intended to finance efficiency measures in student-owned buildings. It has since expanded to cover the entire campus, and is managed by staff within the student government-funded Environmental Center. Managers of campus facilities are able to submit project proposals.

Project approval is contingent on reducing energy use and having a payback period under five years. The university's energy program manager is often consulted to help prioritize projects and analyze cost-saving estimates.

The fund has financed 80 separate efficiency measures in three buildings, which are projected to reduce carbon emissions by 261 tons per year and achieve an average of 38% return on investment.

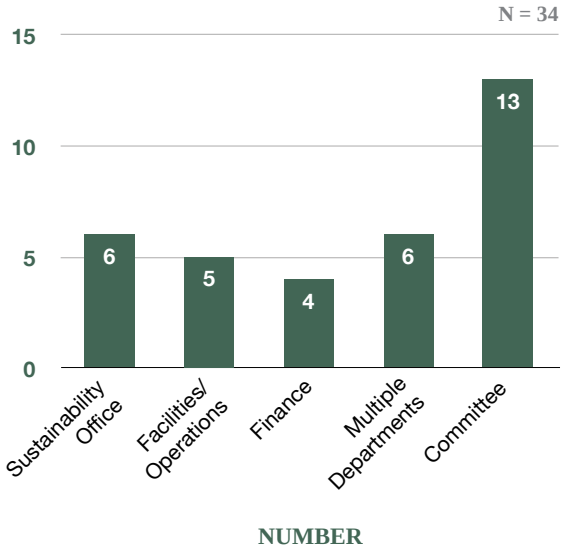
Aside from the University of Illinois at Urbana-Champaign's $1.8 million Revolving Loan Program, GRFs that cite student fees or student government as a primary source of funding do not exceed $100,000, regardless of whether they also had other sources of funding.

Administrative Oversight

The survey identified actors responsible for administering the GRFs at 34 institutions. Fund administration is the monitoring of project performance and fund performance. Performance is generally measured in terms of both financial and energy/resource reduction. Administering the fund includes tracking changes in the cost of energy/resources over the life of a project. An institution may appoint certain groups to identify projects for funding because it wants particular expertise, or has the aim of involving particular stakeholders.

In some cases, the responsibility is shared among multiple stakeholder groups. For example, the Sustainable Energy Revolving Loan Fund at Oregon State University reports that "students approve projects to fund. The OSU Administrative Business Center moves the money, and bills for repayment. Students and one staff member track fund balances."

Exhibit F: Administrative Oversight of Green Revolving Funds



Loan Model vs. Accounting Model

GRF accounting structures fit into two categories. The first we have termed the "loan model;" the second we term the "accounting model."[3]

GRF accounting structures fit into two categories. The first we have termed the "loan model;" the second we term the "accounting model."

In the loan model, the project proponent (department, school, or campus group) signs a loan agreement at which point funds are transferred to its budget. Loan repayment is typically managed through budget transfers, but the project proponent has the responsibility to initiate the transfer to the GRF.

The loan model is used where project proponents have control over budgets and can independently provide repayment to a loan fund. This includes where departments or schools control their own utility budget, or where the GRF focuses on projects which create savings in locally controlled budget items such as paper, rather than on utilities. The Energy and Climate Revolving Fund at the University of Colorado at Boulder uses the loan model.

The accounting model appears to be used at least as frequently as the loan model. In this model, funds are transferred to the project proponent (department, school, or campus group). Repayment is handled through the transfer of funds to the GRF from a centrally managed budget where the savings were generated (e.g. electricity budget). For example, an electricity efficiency project has an initial cost of $30,000 and is expected to save $10,000 per year. The fund provides the $30,000 up front and then repayment is made over three years by transferring $10,000 each year from the electricity budget to the GRF. This accounting procedure is handled by the central finance/budget office and typically takes place at beginning or end of each fiscal year.

3 These categories were identified upon analysis of the survey results; therefore, we do not have statistics on the numbers of institutions that use each approach.

The accounting model is generally used where projects create operational savings in budgets that are managed centrally. The Energy Efficiency Fund at the University of Calgary (Alberta) uses the accounting model and notes that its "utility budget is centrally funded and paid as such there is no funding directly to the units. Savings realized against the utility budget will be reallocated into the Energy Efficiency Fund."

A closer look at the Weber State University GRF demonstrates how the accounting model provides options. Weber State shares operational savings between the GRF and the institution's main operating budget. The school's survey response notes, "We made an agreement with the administration that we would receive 75 percent of all energy savings we can generate." In other words, 75 percent of operational savings are returned to their GRF, and the other 25 percent are realized in the operating budget.

Sharing operational savings between a GRF and another budget may deplete a GRF unless the fund is being replenished. In the case of Weber State, its GRF is structured to continue to recapture savings after the initial project cost has been repaid. This way a GRF can either increase its size, or in the case of Weber State, repay the loan from their endowment.[4] Weber

Weber State University

Weber State University developed a green revolving fund in 2010 by investing endowment funds, along with other internal and external sources of capital, in cost-saving sustainability improvements on campus.

After experimenting with hiring an energy services company and researching numerous potential funding sources, the school determined that harnessing its endowment through a loan program would be the most effective way to fund efficiency improvements.

WSU has committed to invest 5 percent of its endowment into energy efficiency projects on campus, amounting to $5 million of its $9 million total fund size. Additionally, through negotiations with senior administrators and modifications to the university budgeting processes, 75 percent of all energy savings generated will be directed towards replenishing the fund.

As of May 2010, WSU is anticipating $1,000,000 in energy savings by 2015, while fully repaying the endowment's $5 million investment in only nine years.

4 Presumably cost savings can be reasonably recaptured by the GRF until the end of the lifetime of a specific measure. For example, if a lighting project has a two year payback, but the new lamps are expected to last four years, operational savings could be captured for four years.

State reports: "Our goal is to have $1,000,000 in annual energy savings by 2015. Our savings for 2010 were [already] $440,000."

"Our goal is to have $1,000,000 in annual energy savings by 2015. Our savings for 2010 were [already] $440,000." – Official at Weber State University

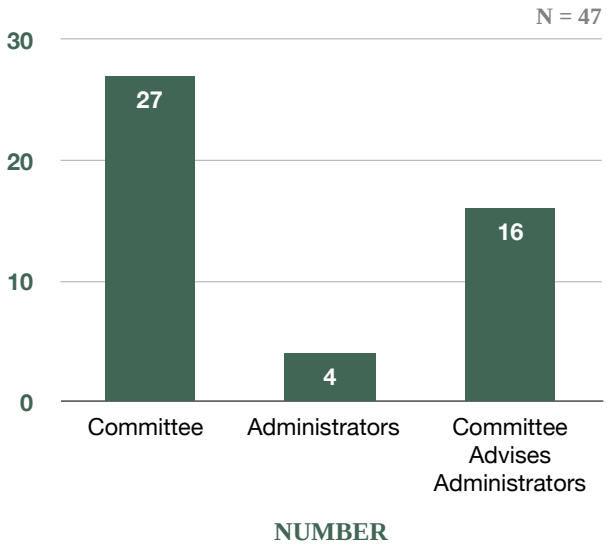
Project Selection

Project selection, a distinct operation within a fund's administration, may be delegated to groups other than its administrators. GRF project funding decisions are made through a variety of processes. Committee-based decision-making or committee input on project selection is a feature of the majority of GRFs. These committee structures generally include administrators, staff, students and faculty. American University (Washington, DC) and Whitman College (Washington) also include alumni on their committees.

Committee-based decision-making or committee input on project selection is a feature of the majority of GRFs.

Specific structure and composition of committees varies. Often, committee membership relates to the group that initiated the fund and/or provided the source of the funds. For example, where the development of the GRF was initiated by students, project funding decisions tend to be made by a committee with substantial student representation. The student-championed Kless Revolving Energy Loan Fund at the University of Montana–Missoula is managed by a committee of students, faculty members, and staff. Student proposals are given first priority in funding allocations.

Exhibit G: Project Selection Process for Green Revolving Funds





Miami University of Ohio's Revolving Green Fund invested in the construction of a wind turbine on campus. The project was a collaborative effort between an engineering class, the campus Ecology Resource Center, and the physical facilities department.

In some cases, the fund approval process involves formal committees and multiple review procedures, such as the Revolving Sustainability Loan Fund at the University of Victoria (British Columbia). Indeed, "the proposed projects will first be vetted by the Campus Planning and Sustainability Office and the Facilities Management Department to ensure completeness of the application and the feasibility of the project. All approved projects are then submitted to a committee made up of students, faculty and administrators for final funding decisions."

The Revolving Green Fund at Miami University of Ohio provides an example of a committee selecting and recommending projects to an administrator or a small group of administrators. There, "the VP for Finance and Business Services (or his designee) ultimately administers the fund on the basis of recommendations from the Green Fund Committee."

Pay-Back Criteria

Most green revolving funds use simple payback as criteria for project selection. This comment from University of Notre Dame is typical: "In order to receive funding the projects must achieve environmental benefits during an acceptable payback period." Notre Dame notes that an acceptable payback should be in the range of 5-10 years.

Most green revolving funds use simple payback as criteria for project selection.

Twenty-seven schools in the survey specified maximum payback periods for project funding. For example, Iowa State University requires a maximum payback period of five years, and each project is expected to demonstrate quantifiable savings within that time period. Among GRFs with maximum payback criteria, the median period was six years and the shortest maximum payback indicated was three years.

Iowa State University

Iowa State University's Live Green Revolving Loan Fund offers a unique combination: an administration-driven initiative with a decentralized implementation structure to incentivize campus-wide participation and benefits.

When ISU administrators established the fund in 2008, they learned that, due to a centralized utility budget, individual departments and buildings had no direct financial incentive to reduce their energy use. To address this aspect of the billing structure, ISU transformed its accounting protocol and installed monitoring systems to track resource consumption.

Each building is now held directly responsible for its energy consumption. Therefore, by implementing efficiency projects through the green revolving fund, cost savings accrue and directly benefit departments and buildings.

Since its launch, ISU's $3 million fund has provided capital for over 11 unique projects throughout campus in areas such as waste diversion, energy conservation, and efficiency. Iowa State reports its fund has generated a 29 percent annual return on investment.

Some GRFs have funded projects with longer payback periods as part of a mixed portfolio. For example, Western Michigan University notes that one project in its portfolio has a 23-year simple payback, although the average payback for the portfolio is just over two years.

Bundling projects with diverse payback periods with the intent of achieving a particular rate of payback (rather the fastest) was a practice mentioned by the University of Colorado at Boulder.

Interest Charges

Of the 21 schools that responded to our question about interest payments, five reported that they charge interest to loan recipients: University of Colorado at Boulder (1 to 2 percent), Oregon State University (2.55 percent), Harvard University (3 percent), University of British Columbia (6 percent) and Furman University (10 percent). The remaining 16 GRFs that answered the question report that they do not charge interest on capital.

Green Revolving Fund Performance

This section addresses the following question:

- How do existing GRFs perform financially?

We sought to quantify the number and kinds of projects that are being funded, and to identify portfolio return on investment. This proved challenging due to:

- **Limited long-term data**: The recent formation of the majority of funds — 37 of 52 (71 percent) were formed between 2008-2011 — means that comprehensive long-term and portfolio performance data is not yet available.
- **Variable terminology**: For example, one institution might refer to retrofitting a single walk-in cooler with new controls as a single "project." For another, a single project might involve retrofitting lighting in five buildings. Among the 30 GRFs that provided data on project numbers, existing funds have financed approximately 600 projects. Without scrutinizing detailed records of each GRF, it is difficult to discern the scope of each project or their aggregate impact.
- **Possible variation in calculation methods**: This study reflects payback period and ROI from data provided in the survey. Reported ROIs may not be entirely comparable due to variations in formulas that the schools used for their calculations. In addition, utilities are purchased, managed and accounted for in a variety of ways, which will also affect reported returns.

Even with these analytical limitations, our data show that the performance of GRFs is very promising. We draw this conclusion from three kinds of data: the portfolio results reported by long-established GRFs, portfolio results provided by a few newer GRFs, and individual project performance information submitted by GRFs.

Two long established GRFs provided project numbers and ROI information.[1] These are Western Michigan University's Fund established in 1980 and the Harvard University Green Loan Fund established in 2001.

Western Michigan University reported funding 101 projects and a portfolio ROI of 47 percent with an average simple payback of 2.1 years.

Western Michigan University reported funding 101 projects and a portfolio ROI of 47 percent with an average simple payback of 2.1 years. The school reports "Since 1996, our total project costs are approximately $5.85 million and our annual cost savings are approximately $2.75 million, with a total cost avoidance to date of approximately $16.71 million. By focusing on overall operational cost reduction–as opposed to funding projects on a simple one-time basis–we have made great strides. As we move forward with more ambitious GHG reduction goals, our strategy is to take a more coordinated, system-wide approach."

The Harvard University Green Loan Fund (GLF) reported an average ROI of 30 percent as of October 2010. The GLF has funded 185 projects since its inception, invested $16 million and produced annual savings of $4.8 million. Furthermore, the GLF reports reduced annual campus emissions of eCO2 by 14,181 metric tons (the equivalent of the electricity consumption of 1,721 average U.S. households).[2]

The Harvard University Green Loan Fund reported an average ROI of 30 percent as of October 2010.

For most institutions, energy efficiency efforts tend to focus first on projects that have easily estimated savings and short payback periods. This type of project is often referred to as "low hanging fruit." Generally, institutions have not completed these projects because their human resources and budgets are focused on addressing maintenance issues in existing buildings. Examples of low-hanging fruit

1 Rate of return: an amount of income (loss) and/or change in value realized or anticipated on an investment, expressed as a percentage of that investment (p. 744). In the case of GRFs, the ROI represents the average annual return to the institution for all projects paid for by the fund.

Shannon P. Pratt and Roger J. Grabowski. Cost of Capital: Applications and Examples. New York: John Wiley and Sons, 2010.

2 US EPA estimates that the average US household emits 8.24 metric tons of eCO2 annually. Please see: http://www.epa.gov/greenpower/pubs/calcmeth.htm

projects are shower head replacement and campus lighting projects, many of which have a payback period of less than two years.

To assess the long-term financial performance of GRFs, one must identify whether there are enough of these projects on an average campus to maintain high returns over a long period. What will happen when all projects with shorter payback periods are completed? Could this potential scenario lead to a deterioration of fund performance over time? The examples provided by Harvard and Western Michigan suggest that returns can be maintained.

In addition to these older funds, several recently established GRFs reported actual or projected average ROI information for their project portfolios. These are summarized in the table below.

Exhibit H: Schools that Reported Return on Investment Data

INSTITUTION	FUND NAME	ESTABLISHED	FUND SIZE	PROJECTS	ROI
Western Michigan University	Quasi GRF	1980	$365,000**	101	47%
Harvard University	Green Loan Fund	2001	$12,000,000	185	30%
University of Utah	Energy Office Conservation Program	2007	$220,000	47	30%
Iowa State University	Live Green Revolving Loan Fund	2008	$3,000,000	11	29%
Oberlin College	Green EDGE Fund	2008	$40,000	9	31%*
University of Colorado, Boulder	Energy and Climate Revolving Fund	2008	$500,000	5	38%
California Institute of Technology	Caltech Energy Conservation Investment Program	2009	$8,000,000	13	33%
University of Denver	Energy Reserve Fund	2009	$1,900,000	19	63%

*Projected ROI

** This number is based on $5.85 million that WMU has invested in direct project costs since 1996. Because of the unique accounting processes involved in WMU's Quasi GRF, the amount spent on return-based sustainability projects varies per year.

Many GRFs reported pay-back or ROI information on specific projects. These are listed individually in Appendix B.

Institutional Challenges

This section addresses the following questions:

- What management challenges can arise for GRFs?
- How have some schools overcome these challenges?
- How does the existence of a GRF affect campus operations?

The survey identified several areas of institutional challenges associated with GRF formation and administration. These include complexity of funding and accounting, issues of collaboration and participation, and project management capacity. Schools have developed a variety of solutions to overcome these challenges.

Funding and Accounting Issues

The development of a GRF necessarily requires tracking the costs and associated operational savings of individual projects. Each project has a unique payback model depending on the commodity it saves (e.g. natural gas, oil, electricity, paper). Often, the cost of these commodities fluctuates year to year, which may require an adjustment of the payback calculation annually.

Macalester College (Minnesota) was one of the first schools to establish a small loan fund; however, it was recently integrated into the school's operating budget as seed capital for a portion of the capital consumption budget that focuses on sustainability projects. The difficulty and labor involved with tracking the savings of small projects did not offer the feedback that was needed to operate the fund in its original form, given Macalester's relatively small fund size (about $80,000). Separating the cost savings related to the projects from the normal fluctuations in usage patterns was too difficult to be practical. As an early adapter of the GRF model, Macalester may have encountered issues that more recently formed small funds have not reported.

A second accounting issue arises if the source of fund repayment is the utility budget. With this structure, the utility budget baseline must be carefully calculated and monitored. Officials at Weber State University, which uses this repayment model, noted that: "The largest challenge is making sure that the utility budget baseline is maintained. The cost accounting is a difficult process. We baseline every commercial utility meter and then calculate for every utility bill (including taxes, fees, and billing structure)

according to how much we spent, and how much we would have spent. This way we very accurately determine how much we saved."

To prevent accounting problems, many schools have delegated accounting responsibility to staff; particularly in facilities, finance, or sustainability functions. Several schools reported problems with tasking student interns or student organizations with the responsibility of fund accounting.

"We baseline every commercial utility meter... this way we very accurately determine how much we saved." – Official at Weber State University



Georgia Tech's revolving fund has enabled the school to update the physical plant infrastructure. Projects have included upgrading boilers for the first time in 50 years, installing efficient lights and variable-speed motors and pumps, and upgrading chillers to high-efficiency models. Credit: Georgia Institute of Technology / Nicole Cappello

Collaboration and Participation

Depending on structure, GRFs sometimes initiate collaboration across functional areas that may be new or unfamiliar. While this may be regarded as beneficial, it may also create new operational issues. One college official noted that the presence of a GRF on campus invites new participants into an area that was formerly the sole domain of the facilities department:

"When well-meaning faculty, students and staff start making suggestions about what needs to be 'fixed,' it can be frustrating for facilities managers who know about these issues, but have been working to meet constant demands within a limited budget. Sometimes this dynamic results in foot dragging or other passive forms of resistance by facilities [staff] who, of course, are essential to making the whole thing work."[1]

For the British Columbia Institute of Technology, however, its fund has "helped remove silos and has given isolated working groups the proper incentive — a budget — to collaborate." According to an administrator, "The perception had been that collaboration would make more work for people, but now because money is available from a common fund, it has created an incentive for departments, whose common interest is cost-savings, to work together."

1 The official who provided these comments asked to remain anonymous.

Some GRFs that seek proposals from the campus community have been challenged by limited engagement and a lack of response. At least 25 institutions indicated that the size of the project applicant pool was less than desirable. For example, administrators at one institution stated that it has been difficult getting students to attend meetings, contribute proposals for funding, and actively participate in the fund's advisory committee.

To address these challenges, schools have found ways to spread the workload and incentivize engagement in fund operations. For example, Iowa State University has decentralized its management of utility payments. Energy use is now monitored and paid separately by each building. As a result, GRF loans can be administered and tracked locally, allowing individual building budgets to benefit from cost-saving improvements.

Project Management Capacity

Finally, when new capital funds are introduced into an area that has been working within budget constraints, the staffing capacity to complete the additional projects may be limited. John Onderdonk, Manager for Sustainability Programs at Caltech, notes that, "Man power (administration and implementation) is really the limiting factor for us. There is plenty of work to be done that could be funded through Caltech Energy Conservation Investment Program (CECIP), but the addition of new employees can't be." Harvard University's Green Loan Fund has become large enough to necessitate dedicated staff. This has reduced the burden on existing staff.

Conclusion

As our study demonstrates, there is a rapidly progressing trend toward colleges and universities creating green revolving funds.

GRFs are being established within all types of institutions, and do not appear to be limited by institutional size, structure, scope or wealth.

While the trend toward GRF formation appears to be taking place across institutions of various sizes, GRFs appear to be more likely located within large public universities, large private universities and small private colleges. However, the survey identified examples of GRFs in state universities (Weber State, California State–Monterey Bay, Iowa State and Grand Valley State) and a community college (Lane). In addition, it does not appear that GRFs are more likely to be created by schools with large endowments. To the contrary, the evidence suggests that institutions with relatively lower levels of endowment per enrolled student are successfully establishing and operating GRFs. In summary, GRFs are being established within all types of institutions, and do not appear to be limited by institutional size, structure, scope or wealth.

Financial Performance

There is only limited long-term financial data for GRFs given that most have been established within the last three years.

GRFs can maintain returns over longer time periods and significantly outperform average endowment investment returns.

The long-term results are encouraging from both Harvard (30 percent annual ROI since 2001) and Western Michigan University (47 percent average annual ROI since 1980). This track record suggests that GRFs can maintain returns over

longer time periods and significantly outperform average endowment investment returns.

Organizational Settings

Survey results show that GRFs are being funded and structured in a wide variety of ways. Some institutions see identification of GRF seed capitals as a fund-raising opportunity; others see it as an endowment investment opportunity. The administration of funds is sometimes done as a formal loan, which includes agreements and interest repayment. In other schools, accounting is handled centrally and fund repayment is handled by moving funds from the utility budget to the GRF at the beginning or end of each fiscal year.

From a process perspective, in some cases GRF project identification and selection is left solely to staff with the greatest financial or technical expertise. In other cases, the process is highly collaborative and engages many campus stakeholders. It is clear that the administration of GRFs can be structured to fit a wide variety of operational and organizational settings.

Institutional Goals

Finally, our survey and analysis show that GRFs are meeting a variety of important institutional goals. In almost all cases, stated goals include reductions in energy use or reduction in equivalent carbon dioxide emissions. In addition, many institutions have established GRFs that play a role in education. These educational goals are sometimes connected with the classroom, are often co-curricular, and sometimes focus on raising awareness and fostering innovation across the campus community.

Prospects

As a growing number of institutions across North America begin proactively improving their environmental performance, the GRF will be an increasingly valuable tool. The green revolving fund is a model that supports college and university investment in campus infrastructure, reduces environmental impact, offers beneficial synergy with academic and co-curricular education and provides a secure investment with promising returns. GRFs do entail some complexity, but as this report indicates, a growing number of campuses are finding that GRFs provide significant benefits.

The green revolving fund is a model that supports college and university investment in campus infrastructure, reduces environmental impact, offers beneficial synergy with academic and co-curricular education, and provides a secure investment with promising returns.

Acknowledgments

The Sustainable Endowments Institute has relied on the talent and generosity of many people to develop *Greening the Bottom Line*. This report is a demonstration of their commitment to advancing sustainability in higher education.

We owe a tremendous debt of gratitude to our Advisory Council for believing in our vision when it was still just an idea, and for helping to provide early and ongoing support for this project and our larger plans for the future.

We are particularly grateful to Dano Weisbord, the principal author of this report. Dano's masterful analysis of the data reflects his vital expertise and personal commitment to the field of sustainability. Dano deserves special recognition for taking a raw data set and transforming it into a beautifully drawn map of a previously uncharted area.

Julian Dautremont-Smith, as a contributing author, played a unique role in generating insightful suggestions and bringing a wealth of knowledge based on the dozens of sustainability reports he has authored or co-authored over the past decade.

Mark Orlowski developed and guided the process from the beginning. Mark reached out to collaborators and advisors to create an effective foundational document for institutions considering the creation or expansion of their green revolving funds.

This report was improved immensely thanks to the time and thoughtful input of many reviewers: Ali Adler, Jenn Andrews, Blaine Collison, Julian Keniry, Dave Kopans, Dara Kosberg, Lea Lupkin, Paul Rowland, Jenna Smith, Anne Stephenson, and Dan Worth.

We received vital financial support for this report from the U.S. Environmental Protection Agency's Green Power Partnership and the Roy A. Hunt Foundation. With more than two decades of experience in sustainability, the global architecture firm HOK recognized the value of green revolving funds and generously contributed to this report. We also received support from GreenerU, which partners with colleges and their students to solve campus sustainability and energy management challenges. In addition, National Wildlife Federation's Campus Ecology program, which has a 20-year history of working with colleges and universities to improve

their overall green educational programming and onsite sustainability, has generously contributed to the publication of this report. We also wish to thank our individual donors for their belief in our mission and our work, many of whom have contributed their encouragement, humor, and wisdom in addition to their financial resources. Thanks to Scott McDonald for his sage insights, practical guidance and financial support. Scott's fresh perspective and creative resources have enhanced our reach and impact. Tiffany Schauer has helped empower our efforts at a critical juncture. Peter O'Neill has generously offered his advice and support since the early stages of this project.

We are especially fortunate to have a dedicated and outstanding Advisory Council:

- Jenn Andrews, *Clean Air - Cool Planet*
- Sam Arons, *Google - Green Business Operations*
- Bill Coleman and Jasmine Tanguay, *CLF Ventures*
- Blaine Collison, *U.S. Environmental Protection Agency*
- Tony Cortese and Georges Dyer, *Second Nature*
- Mike Crowley, *Institute for Sustainable Communities*
- Julian Dautremont-Smith, *University of Michigan*
- Doug Foy, *DIF Enterprises*
- Julian Keniry, *National Wildlife Federation*
- Dave Kopans, *GreenerU*
- Dara Kosberg, *Net Impact*
- Bill McCalpin, *Investment Fund for Foundations*
- Scott McDonald, *Courtney's Foundation*
- Judy Nitsch, *Nitsch Engineering*
- John Onderdonk, *Caltech*
- Billy Parish, *Solar Mosaic and Energy Action Coalition*
- Debra Rowe, *U.S. Partnership for Education for Sustainable Development*
- Leo Pierre Roy, *VHB*
- Arah Schuur and Scott Henderson, *Clinton Climate Initiative*
- Leith Sharp, *Illinois Green Economy Network and Harvard University*
- Gus Speth, *Vermont Law School*
- Anne Stephenson, *Unity College*
- Michael Thomas, *New England Board of Higher Education*
- Bill Valentine, *HOK*
- Dano Weisbord, *Smith College and ActionAid International*
- Dan Worth, *National Association of Environmental Law Societies*

The content and outreach of Greening the Bottom Line has been greatly enhanced by partnering with leading organizations advancing sustainability in higher education:

- Association for the Advancement of Sustainability in Higher Education (AASHE)
- American College and University Presidents' Climate Commitment
- Center for Green Schools at the U.S. Green Building Council
- Clean Air-Cool Planet

- Clinton Climate Initiative
- National Association of Environmental Law Societies
- National Wildlife Federation
- Net Impact
- Rockefeller Philanthropy Advisors
- Second Nature
- U.S. Environmental Protection Agency

We appreciate the hard work of the graphic designers and editors who ensured that the images and text were accurate and effective. The clarity of the text was enhanced immeasurably by the knowledgeable, caring, and dedicated work of wordsmiths at EcoMotiva.

Nate Kerksick at culturegraphic deserves special commendation for taking on this ambitious project with an even more ambitious timeline. His creativity, patience, and attention to detail were exceptional as we worked through many challenges together.

Greening the Bottom Line would not have been possible without the invaluable work of each member of our research team; their exceptional talents and occasionally heroic deeds are at the foundation of this report's success. Christina Billingsley, Rebecca Caine, Emily Flynn and Rob Foley are brilliant individuals whose dedication is energizing.

Thanks to Lea Lupkin and Ria Knapp for coming on board early and providing assistance with important aspects of the project at key points.

Beyond words, images help tell the story, and we wish to express our gratitude to all the schools that provided photographs for the report.

The Institute regrets any possible omissions or misinterpretations of the data that was collected independently or that schools provided. We invite any additions or corrections and intend to update the report with any necessary changes and adjustments.

College and university leaders who commit their limited resources to making sustainability an integral part of their schools make our work significant. This group of leaders is growing each day. We offer our sincere thanks for your dedication, especially to those of you who took the time to respond to the Institute's survey and phone inquiries. We hope that this report gives you additional tools and inspiration to advance change and sustainability at your institution.

Appendix A: Methodology

In 2009, the Sustainable Endowments Institute sought to learn more about green revolving funds (GRFs) and identified a number of schools in the U.S. and Canada that were using this model of financing campus sustainability initiatives.

Our research consisted of two phases: December 2009 through April 2010 and November 2010 through January 2011. During both periods, the research team gathered information via web-based surveys, email exchanges, phone interviews, and in-person conversation with key GRF actors. Unattributed citations throughout the report were drawn directly from survey responses.

Identification Process

In the first phase of research, SEI identified a total of 53 institutions that indicated the existence of green revolving funds. Research sources included: school responses to the College Sustainability Report Card 2010 survey sent to 332 schools, the Association for the Advancement of Sustainability in Higher Education (AASHE) website, along with school websites and newspaper archives.

In the second phase of research, SEI determined that there were additional schools that had been omitted from these original findings. The analysis of survey responses to the College Sustainability Report Card 2011 identified additional institutions that indicated the existence of a GRF. To better understand these reported funds, SEI followed up with institutions indicating the presence of an active green revolving funds on campus.

The GRFs identified have significant diversity of origin, structure, administration and purpose. In some cases, these variations made it difficult to determine if a given fund had a revolving component. Thus, a few funds may have been inadvertently excluded from this study. However, the GRFs identified provide a data set sufficiently rich and comprehensive to substantiate conclusions about this financing mechanism.

Survey Composition and Data Collection

During the first phase, SEI sent web-based surveys to the 53 schools identified as having GRFs. Upon further investigation, it was determined that a significant number of institutions indicating the presence of a GRF either did not have a currently operational fund or did not meet the criteria of a revolving fund. Of the 53 schools surveyed in this phase, 24 provided full survey responses.

During the second phase of research, the survey distribution process was repeated, but was sent to an expanded list of schools, omitting the 24 institutions that had already responded in the first phase. Many of these schools were newly identified with data collected from the College Sustainability Report Card 2011. Out of the 45 schools surveyed during the second phase, 35 responded to the survey.

Between the first phase survey and the second phase survey, a total of 98 institutions were sent the survey. Subsequent interviews for clarification purposes followed the receipt of certain surveys, totaling 15 conversations throughout both phases. This resulted in seven schools being omitted from the report because their fund did not meet our definition of a GRF, leaving the combined total of 52 survey responses.

Case Study Process

In addition to collecting survey data, we sought to construct narratives about the creation and operation of GRFs at seven institutions. We learned detailed information about these seven funds through phone interviews and email correspondence with fund administrators. As a result, case studies were developed to highlight GRFs at the following institutions: Boston University, California Institute of Technology, University of Colorado at Boulder, Harvard University, Iowa State University, the University of Notre Dame, and Weber State University. A brief summary of each case study appears as sidebars in this report. A full version of each case study is forthcoming and will be published in April 2011.

Analysis

The calculations used in this report were based on a total number of 52 schools that confirmed operation of GRFs as of January 2011. The SEI research team analyzed data collected through survey responses, direct communication with schools and publicly available sources. For a full listing of institutions and their GRFs included in this report, see Appendix B.

Addendum

Important additional information about Stanford University was not included in our final analysis and calculations, because it was received after the Greening the Bottom Line report had been completed. However, since the initial release of the report, specific data about Stanford has been updated in the text based on the following: Stanford University has three GRFs in operation with combined total value of $25,450,000. Retrofit Program, launched in 1993, had an initial fund size of $10 million.

The Water Conservation Program, established in 2000, had an initial fund size of $450,000. The Whole Building Retrofit Program, which began in 2004, had an initial fund size of $15 million.

These programs have demonstrated an average payback period of 3.52 years, and focus primarily on energy efficiency and water conservation projects.

Appendix B: List of Green Revolving Funds

INSTITUTION	LOCATION	TYPE	NAME OF FUND	ESTABLISHED	FUND SIZE
Allegheny College	PA	Private		2008	$100,000
American University	DC	Private	Clean Energy Revolving Fund	2010	$100,000
Boston University	MA	Private	Revolving Loan Fund	2008	$1,000,000
British Columbia Institute of Technology	BC	Public	The Revolving Fund for Sustainability Initiatives	2011	$402,114
Bucknell University	PA	Private	Bucknell University Green Fund	2010	$10,000
California Institute of Technology	CA	Private	Caltech Energy Conservation Investment Program (CECIP)	2009	$8,000,000
California State University, Monterey Bay	CA	Public	Energy Innovations Fund (EIF)	2006	
Carleton College	MN	Private	Sustainability Revolving Fund (SRF)	2007	$71,101
College of Saint Benedict	MN	Private	Sustainable Revolving Loan Funds	2010	$100,000
College of Wooster	OH	Private	REEF		$5,000
Furman University	SC	Private	Student Climate Action Revolving Fund (SCARF)	2009	$43,000
George Mason University	VA	Private	Energy Recoveries	2008	
Georgia Institute of Technology	GA	Public			
Grand Valley State University	MI	Public	Sustainable Community Reinvestment Fund	2010	$35,000
Harvard University	MA	Private	Green Loan Fund (GLF)	2001	$12,000,000
Iowa State University	IA	Public	Live Green Revolving Loan Fund	2008	$3,000,000
Kalamazoo College	MI	Private	Climate Commitment Revolving Fund	2008	$100,000
Lane Community College	OR	Public	Energy Management Fund	2006	$122,000

INSTITUTION	LOCATION	TYPE	NAME OF FUND	ESTABLISHED	FUND SIZE
Massachusetts Institute of Technology	MA	Private	Energy Conservation Investment Fund	2007	$2,000,000
Miami University of Ohio	OH	Public	Miami University Revolving Green Fund	2009	$50,000
Oberlin College	OH	Private	Oberlin College Green EDGE Fund	2008	$40,000
Oregon State University	OR	Public	Sustainable Energy Revolving Loan Fund	2009	$160,000
Saint John's University	MN	Private	Sustainable Revolving Loan Funds	2010	$100,000
Seattle University	WA	Private	Sustainable University Revolving Fund (SURF)	2009	$21,000
Skidmore College	NY	Private	Campus Sustainability Fund	2008	$50,000
Smith College	MA	Private	Revolving Fund for Sustainability Projects	TBD	$250,000
St. Mary's College of Maryland	MD	Public	Green St. Mary's Revolving Fund	2010	$72,740
Stanford University	CA	Private	Energy Retrofit Program, Water Conservation Program, Building Retrofit Program	1993	$25,450,000
Swarthmore College	PA	Private	Renewing Fund for Resource Conservation	2009	$43,000
The George Washington University	DC	Private	Green Campus Fund	2010	$2,000,000
Tufts University	MA	Private	Energy Reserve Fund	1991	$1,700,000
University of Alberta	AB	Public	Sustainability Enhancement Fund	2011	$350,000
University of British Columbia	BC	Public	Campus Sustainability Office Loan	1998	$6,000,000
University of Calgary	AB	Public	Energy Efficiency Fund	2010	$1,000,000
University of Colorado at Boulder	CO	Public	Energy and Climate Revolving Fund	2008	$581,995
University of Denver	CO	Private	Energy Reserve Fund	2009	$1,900,000
University of Illinois at Urbana-Champaign	IL	Public	Revolving Loan Program	2009	$1,825,000
University of Kansas	KS	Public	Revolving Green Fund	2010	$40,000
University of Montana - Missoula	MT	Public	Revolving Energy Loan Fund	2009	$90,000
University of New Hampshire	NH	Public	Energy Efficiency Fund	2009	$650,000
University of Notre Dame	IN	Private	Green Loan Fund	2008	$2,000,000

INSTITUTION	LOCATION	TYPE	NAME OF FUND	ESTABLISHED	FUND SIZE
University of Pennsylvania	PA	Private	Penn Green Fund	2009	
University of Texas at Dallas	TX	Public	Revolving Sustainability Account	2010	$20,000
University of Utah	UT	Public	Energy Office Revolving Loan Fund	2007	$220,000
University of Vermont	VT	Public		1992	$180,000
University of Victoria	BC	Public	University of Victoria Revolving Sustainability Loan Fund	2010	$250,000
University of Virginia	VA	Public		2010	$1,000,000
Vanderbilt University	TN	Private		2010	
Weber State University	UT	Public		2010	$9,000,000
Western Michigan University	MI	Public	Quasi GRF	1980	$365,000*
Whitman College	WA	Private	Sustainability Revolving Loan Fund	2008	$50,000
Yale University	CT	Private	Yale Sustainability Microloan Fund	2010	$100,000

*This number is based on $5.85 million that WMU has invested in direct project costs since 1996. Because of the unique accounting processes involved in WMU's Quasi GRF, the amount spent on return-based sustainability projects varies per year.

Appendix C: Sampling of Green Revolving Fund Projects

PROJECT	PAYBACK PERIOD	COST W/O INCENTIVES	ANNUAL $ SAVINGS	SCHOOL
Energy-saving software on 500 computers	23 days	$3,039	$49,000 (projected)	Iowa State University
Replaced 30 showerheads at 2.35 gpm with low-flow 1.5 gpm	1 year	$900	$866	Oberlin College
Trading 7,450 students' incandescent bulbs with fluorescents in dorm rooms	1 year	$17,600	$20,000	University of Notre Dame
Converting one grounds tractor to run on vegetable oil	1 to 2 years	$4,117	$1,286 - $2,572 (depending on fuel prices)	Oberlin College
Insulating pipes for new water heater in one building	2 years	$3,200	$1,600	University of Colorado at Boulder
Replacing T12 fluorescent bulbs with T8 in fixtures across campus	2 years	$10,000	$5,000	Swarthmore College
Lighting retrofits in 10 parking structures: metal-halide fixtures replaced with T8; installation of motion sensors	3 years	$1,200,000	$400,000	Harvard University
Ceiling insulation in two conference rooms	4 years	$12,000	$3,000	University of Colorado at Boulder
Lighting retrofit in academic building: installation of Super T8 bulbs, daylighting controls, and motion sensors	5 years	$293,100	$37,092 (projected)	Iowa State University
Water-efficiency retrofit in an apartment building: faucet aerators and low-flow toilets and showerheads	5 years	$25,000	$5,353	Oberlin College
Vending misers in all campus vending machines	7 years	$5,000	$718	Weber State University
Pre- and post-consumer composting equipment in one dining hall	5 years	$45,000	$9,000 (projected)	Iowa State University

Developing 5 acres of lawn to grow with compost instead of synthetic chemicals	8 years	$5,500	$688	Swarthmore College
Biomass boiler to produce heat for buildings and hot water from scrap wood	10 years	$548,700	$52,500	British Columbia Institute of Technology

Sources:

California Institute of Technology (Caltech): Energy Conservation Investment Program Case Study, April 2011 (forthcoming), Sustainable Endowments Institute, Cambridge, MA.

Harvard University: Green Loan Fund Case Study, April 2011 (forthcoming), Sustainable Endowments Institute, Cambridge, MA.

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"Oberlin College Green Edge Fund," Oberlin College, Accessed January 2011. https://sites.google.com/a/oberlin.edu/edgefund/projects/funded-projects

"Renewing Fund for Resource Conservation," Sustainability Committee, Swarthmore College. Accessed January 2011. http://www.swarthmore.edu/x28540.xml

"Sustainability Revolving Fund," Sustainability at BCIT, British Columbia Institute of Technology. Accessed January 2011. http://www.bcit.ca/sustainability/about/fund/

University of Colorado - Boulder: Energy and Climate Revolving Fund Case Study, April 2011 (forthcoming), Sustainable Endowments Institute, Cambridge, MA.

University of Notre Dame: Green Loan Fund Case Study, April 2011 (forthcoming), Sustainable Endowments Institute, Cambridge, MA.

Weber State University: Green Revolving Fund Case Study, April 2011 (forthcoming), Sustainable Endowments Institute, Cambridge, MA.

"Wind Turbine Proposal," Miami University's Revolving Green Fund Board, Miami University of Ohio December 2009. Accessed January 2011. http://www.endowmentinstitute.org/files/Miami_Proposal

Appendix D: Areas for Further Study

After conducting the survey on GRFs and data analysis, a number of questions have arisen that may merit additional research. A few of these are as follows:

- Given the lack of **GRFs in community colleges**, further research should consider whether there are particular challenges to GRF formation faced by community colleges and whether specific measures might be undertaken to overcome these.
- Further study of **GRF portfolio return on investment** should seek to understand how a GRF might replicate the evidence from the Harvard and Western Michigan funds, which have kept their ROI high while presumably addressing much of their "low-hanging fruit." Consideration of long-term trends in utility costs would be useful to understand as a part of this analysis.
- While this study and report have focused mostly on payback periods and return on investment, further research should include data collected examining **other methods of tracking investment performance**, such as annual cost savings accumulated from fund projects, long-term savings, and life-cycle costing.
- The survey results have shown that **GRF structure and administration** is unique to each institution. The concept of the GRF as a simple, replicable model, or as a function that necessarily needs to be customized for each institution, is an area for further investigation.
- **Educational benefits** are not as easily quantified as number of projects completed, kilowatt-hours saved, metric tons of carbon reduced, or return on investment. However, this synergy with educational goals is one the most interesting aspects of the development of GRFs in higher education and would be worthy of further study.

Appendix E: Key Statistics about Green Revolving Funds

CATEGORY	DATA
Fund Descriptions	Total green revolving funds: **52** Number at public institutions: **24** Number at private institutions: **28** Number of U.S. states represented: **25** Number of Canadian provinces represented: **2**
Size of Funds	Smallest fund: **$5,000** (College of Wooster) Largest fund: **$25.45 million** (Stanford University) Median fund size: **$170,000** Average fund size: **$1.4 million** Combined total value: **At least $66 million**
Fund formation	First fund formed: **1980** (Western Michigan University) 1980 to 2004: **6** 2005 to 2007: **4** 2008 to 2011: **37**
Return On Investment	Minimum reported ROI: **29%** (Iowa State University) Maximum reported ROI: **63%** (University of Denver) Median reported ROI: **32%**
Payback	Minimum reported average project payback: **1 year** (Allegheny College) Maximum reported average project payback: **10 years** (Carleton College) Median reported average project payback: **4 years**
Project data	Maximum number of projects funded: **206** (Stanford University) Maximum amount of capital invested: **$28.84 million** (Stanford University)

Appendix E has been compiled using data on the most up to date list of funds as of January 2011. Note that these statistics reflect reported data from each institution.

Appendix F: Further Reading

The following citations are provided as suggested further reading:

Barlow, Ben, "Financing Sustainability on Campus," NACUBO, 2009 *http://www.nacubo.org/Products/Publications/Sustainability/Financing_Sustainability_on_Campus.html*

Diebolt, Asa and Timothy Den Herder-Thomas, "Creating a Campus Sustainability Revolving Loan Fund: A Guide for Students," AASHE, 2007 *http://www.aashe.org/highlights/press-releases/creating-campus-sustainability-revolving-loan-fund-guide-students*

Eagan, David J, et. al., "Higher Education in a Warming World: The Business Case for Climate Leadership on Campus," NWF, 2008 (pages 46-47) *http://www.nwf.org/Global-Warming/Campus-Solutions/Resources/Reports/Higher-Education-in-a-Warming-World.aspx*

Erickson, Christina and David J. Eagan, "Generation E: Students Leading for a Sustainable, Clean Energy Future," NWF, 2009 (30-31)] *http://www.nwf.org/News-and-Magazines/Media-Center/Reports/Archive/2009/Generation-E.aspx*

Keniry, Julian, "New Financing Tools Help Push for Clean Energy," February 23, 2010 *http://www.nwf.org/campusecology/climateedu/articleView.cfm?iArticleID=130*

About the Authors

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Dano Weisbord is an independent consultant who assists organizations with improving environmental performance through measurement, communication and engagement. Dano was the first Environmental Sustainability Director at Smith College, where he completed a Sustainability and Climate Action Plan in 2010. Dano is currently a special advisor to the Smith College Center for the Environment, Ecological Design and Sustainability and is working with international NGO ActionAid to develop a carbon emissions strategy.

Prior to joining Smith College, Dano was a Senior Project Manager with CLF Ventures Inc., the consulting arm of the Conservation Law Foundation where he assisted corporate clients in the energy and development sectors to initiate environmentally beneficial projects.

Dano is a graduate of the Rhode Island School of Design where he received a Bachelor of Fine Arts in Industrial Design, and Tufts University where he received a Master of Arts in Urban and Environmental Policy.

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Julian Dautremont-Smith is graduate student in the Erb Institute for Global Sustainable Enterprise's dual MBA/MS in Natural Resources and the Environmental program.

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Julian has a BA in Environmental Studies from Lewis & Clark College and is a Doris Duke Conservation Fellow and National Wildlife Federation Campus Ecology Fellow.

Mark Orlowski, Contributing Author

Mark Orlowski is founder and executive director of the Sustainable Endowments Institute, a Cambridge-based special project of Rockefeller Philanthropy Advisors. Mark leads the Institute's research and outreach efforts on college sustainability initiatives including creation of the annual *College Sustainability Report Card*.

Mark has spoken at more than 80 colleges in over 30 states and has worked with students, faculty, administrators, and trustees at dozens of schools. Recent presentations include the 2010 keynote to the New England Board of Higher Education's Sustainability Summit, presentation to the United Negro College Fund's Building Green Institute, and upcoming commencement address at Berkshire Community College.

Along with widespread coverage by campus newspapers, numerous reports on his work have appeared in the national and business press. Media coverage includes articles in the *Boston Globe*, *CNN Money*, *Forbes*, *Chronicle of Higher Education*, *Christian Science Monitor*, *Newsweek*, *New York Times*, and *USA Today*. Mark has also been profiled in *BusinessWeek* and the *Chronicle of Philanthropy* as a social entrepreneur.

A graduate of Williams College, Mark chaired the college's Campus Environmental Advisory Committee and served on its Advisory Committee on Shareholder Responsibility. He also attended Berkshire Community College and earned a master's degree at Harvard University, where he studied nonprofit management.

About the Sustainable Endowments Institute

The Sustainable Endowments Institute, founded in 2005 as a special project of Rockefeller Philanthropy Advisors, is a nonprofit organization that has pioneered research and education to advance sustainability in campus operations and endowment practices. Based in Cambridge, Massachusetts, the Institute publishes the *College Sustainability Report Card*. This annual assessment, profiling 322 schools in the United States and Canada, is available at www.GreenReportCard.org and has been accessed by nearly 1,000,000 viewers.

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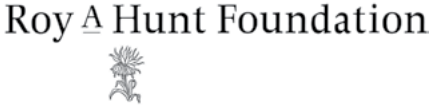




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