

**Clean Energy Fund Evaluation & Review**  
**Richard Watts: Sept 1, 2015**

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## **REPORT SUMMARY**

Visionary student leaders initiated a Clean Energy Fund (CEF) in 2007, winning university support for a \$10 per student increase in the student comprehensive fee. Seven years after the funds started being collected, more than \$1.2 million has been allocated to 36 projects. The campus has seen the impact of the Fund in physical projects and programming, research, and student engagement. Fund collection started in 2008. More than \$1.6 million has been raised and about \$1.2 million spent. Here in this report at the seven-year mark we present an overview of the Fund and its accomplishments and some of the successes and obstacles identified by stakeholders and participants. We interview 30 UVM staff and students involved with the Fund and we present some ideas for going forward.

Over the seven years examined in this report, the Fund's mission and focus has shifted in response to changing times, learning experiences of the Fund's managers, and student interest. Here at the seven-year mark is a chance to step back and think about the role of the Fund at UVM in reducing greenhouse gas (GHG) emissions and engaging students in clean energy-related projects and programming. This report is one step in that process. A second step might be a broad planning process to involve all stakeholders in thinking about the Fund's mission going forward.

Following is an overview of the Fund and a summary of projects funded by category. Comments from interviewees are integrated into the discussion of projects and in the series of recommendations at the end.

Following this report is an appendix of interviewees and the budget of projects for fiscal years (FY) 2008-2015.

## **FOUNDING & MISSION**

In the fall of 2007, a group of undergraduate and graduate students developed the idea of a Clean Energy Fund: student money invested in greening UVM with a focus on energy use. "Green Fees" were being proposed at other campuses. Three student organizers conducted background research, polled students in a campus-wide survey, developed a comprehensive proposal, and then won approval from Student Government, the Faculty Senate, and the Board of Trustees in May of 2008.

The Board of Trustees approved increasing the student comprehensive fee by \$10 per student starting in the fall of 2008. The Trustees also directed that the Fund be administered by the newly formed Office of Sustainability that and a Clean Energy Fund Committee be established to assist in selecting projects. The University's Vice-President for Finance and Administration would make the final selection decision.

## Clean Energy Fund Revenue

During the first seven years, the Fund generated an average of \$231,000 a year. In total between FY 2008-2009 and FY 2014-2015 the Fund has raised \$1,619,388.

Table 1. Clean Energy Fund Revenue by Year

<b>2008-2009</b>	\$ 226,931
<b>2009-2010</b>	\$ 235,966
<b>2010-2011</b>	\$ 237,158
<b>2011-2012</b>	\$ 234,399
<b>2012-2013</b>	\$ 229,191
<b>2013-2014</b>	\$ 225,835
<b>2014-2015</b>	\$ 229,908
<b>TOTAL</b>	\$ 1,619,388

## Project Development

In the fall of 2009, the Office of Sustainability put out the first call for proposals. Interested faculty, staff, and students nominated what they believed to be innovative ideas for clean energy. The Office of Sustainability created the Clean Energy Fund Committee, which includes students, faculty, and staff who review projects and make selection recommendations. The program coordinator in the Office of Sustainability vetted projects and met with project leaders. UVM's newly hired Green Building Coordinator helped with the initial projects., To help administer the Fund, the Office of Sustainability hired a graduate student to conduct outreach and staff the committee selection process.

## Program Goals <sup>1</sup>

The Clean Energy Fund seeks to engage students in education, outreach, and research, related to reducing energy use at the University of Vermont. The program goals are as follows:

1. Develop high-impact projects that bring clean energy to UVM
2. Engage students
3. Increase awareness of renewable energy and energy alternatives

## Summary of Projects 2008-2015

Between 2008 and June 2015, thirty-six projects have expended funds from the Clean Energy Fund. During that time period the Fund has collected \$1,619,388 and expended \$1,210,096. This summary focuses on projects that have expended funds between FY 2008-2009 and FY 2014-2015. An additional seven projects totaling \$236,400 were approved by the CEF Committee in the spring of 2015. At the end of FY 2015 there is an unspent balance of \$426,405.34. (Note: five projects approved for funding but subsequently canceled are not included here.) Appendix B includes a detailed budget for all CEF projects.

## Funding Categories

Funding falls into four main categories: infrastructure, education, research & studies, and program operations. (Note: these categories were developed for this report in consultation with the Office of Sustainability.)

Infrastructure are those projects that require a physical installation on campus and by definition then involve staff within UVM’s administrative units, for example Physical Plant and Campus Planning. Education involves the academic side of UVM and is usually in combination with a class or a UVM faculty member. Projects in the research category are original research. Combined with research are a variety of studies that the CEF has funded examining campus issues ranging from transportation to compost.

Table 2. Analysis of Fund expenditures by end-use 2008 through June 30, 2014 (expended)

<b>End Use of Fund</b>	<b>Total</b>	<b>Number of Projects</b>	<b>Percent</b>
Infrastructure	\$469,549	5	39%
Education	\$225,705	18	19%
Research & Studies	\$273,054	11	20%
Program Operations (including support for graduate students)	\$241,787	2	20%
	\$1,210,096	36	

### *Infrastructure*

About 40 percent of the CEF funds have been spent on five UVM infrastructure projects. The largest of those include \$200,000 to lease 17 solar trackers from Earth Turbines, \$86,000 to place solar panels at the Miller Horse Farm, and \$131,000 to place solar panels on the roof of the central campus heating plant. Other projects include designing and building solar panels for the roof of Votey Hall and energy-saving devices for the desktop computers in Kalkin Hall. (Not included here is an additional \$121,000 allocated in 2015-2016 for a project to synchronize building control systems).

Infrastructure projects have been challenging because these projects require the involvement of UVM staff in the Physical Plant and Campus Planning and Operations. Those staff have work plans that align their work with University priorities. A new project, despite having funding, is in addition to their assigned work plan. The projects are further confounded because any physical project on campus requires multiple levels of staff involvement, which cross-cut many departments.

For example, because of these challenges, four approved infrastructure projects have since been canceled: a proposal to add solar panels to the GreenHouse residential complex, a solar hot water system project, a university-wide energy display system, and a proposal for energy-saving revolving doors. At the same time, considerable staff and principal investigator (PI) time has gone into the planning and construction of the completed infrastructure projects, for example the solar panels on the roof of Votey Hall.

It is difficult to quantify the direct impact of the Clean Energy Fund projects on reducing UVM's energy use. Energy savings can be calculated for a few of the infrastructure projects, such as the solar trackers on Spear Street which off-set about 30 percent of the Aiken Building's electrical use. The solar panels on the roofs of Votey Hall, the Heating Plant, and the Miller Farm have somewhat limited impact on UVM's overall energy costs because of the scale of the projects. On the other hand, CEF funding or projects may have forced some important discussions about policies. The process for designing solar installations on roofs and the complexity of renewable energy installations on campus are examples of this outcome. Interviewees noted that the educational experiences involved in developing a solar rooftop policy when none existed, have also benefitted facilities planning at the University.

Some interviewees also noted that infrastructure projects often do not have student involvement during the implementation phase. In some cases, approved infrastructure projects that started with student involvement, such as the Aiken Solar trackers that were developed through a class, are then, out of necessity, transferred to UVM operations staff to manage and develop.

### *Education*

About twenty percent of CEF funds has been expended on 18 campus-based education projects, including lectures, events, curriculum development, and interns. These include several semester-long seminar series such as the Energy Action Seminar and the seminar series on climate change, food systems, and electric energy. The CEF funds have also sponsored one-time speakers and events including James Howard Kunstler & the Power from the North 2015 conference. Funds have also been used to develop curriculum in two projects and support the student-led Aero electric car race team in the College of Engineering and Mathematical Sciences (\$45,000 over two years). And lastly, this category includes about \$16,000 that has supported six CEF interns providing outreach and other support to the CEF.

The education projects are seen as a successful use of the funds. Attendance and student engagement has been high.<sup>2</sup> In addition, tying speakers to classes has connected the academic side of the university with the CEF. Going forward there may be increased opportunities to connect UVM's new sustainability general education requirements with CEF funding. Interviewees also pointed out the increased emphasis on applied and experiential learning at UVM and the role CEF funds could take in supporting undergraduates engaged in internships and research.

In addition to the CEF-funded programming, eight undergraduate students have worked as interns for the Clean Energy Fund at a cost of \$15,669.60. Student interns have conducted research and worked on several of the feasibility studies. Another major part of student intern work has been public relations and communications. One student, for example, has produced short videos about CEF projects. Other students have helped promote energy funded campus events.

CEF supports graduate student Resident Assistants who assist with managing the fund, the selection committee, and the selection process, posting awarded projects and follow-up with funded projects. Four graduate students have received funding totaling \$156,000.

## *Research & Studies*

The CEF has funded seven campus-based feasibility studies. These include a Biomass Feasibility Study for Trinity Campus (\$1,800); Improve Bicycle Access at UVM (\$8,000); UVM Electric Vehicle Charging Station Feasibility Study (\$5,000); Johnson House Renewable Energy Feasibility Review (\$250); UVM/Community 2013 Biomass Feasibility Study (\$27,000); Comprehensive Campus Renewable Energy Feasibility Study (\$63,000); and the Green Labs Program (\$39,000). Most of these funds have been allocated to campus operations or consultants to manage. CEF interns have had some involvement in several of the studies.

There have been three original research projects funded through the CEF. One was led by a professor in the College of Engineering and Mathematical Sciences to develop a hybrid street lamp system using helix bamboo wind turbines and solar panels (\$34,000) and two student-led projects looked at the heat output of different types of compost at and around Slade Hall. The first of these was led by two undergraduate students in the College of Agriculture and Life Sciences and involved building compost piles and a new greenhouse (\$67,000), and the other project was led by two graduate students (\$27,000).

The three funded research projects received mixed reviews. The first compost research project led by the undergraduate students experienced cost overruns and was eventually abandoned. The bamboo wind research project received positive reviews, but some interviewees question whether CEF funds should be used to support faculty research. Interviewees have identified the feasibility studies as useful data sets and information that could be used and disseminated more widely.

## *Program Operations*

The program operations category includes two separate programs. In the Implementation and Education Program, the CEF has funded graduate students to assist with fund outreach and to staff and support the committee and to follow-up with projects. One goal of the graduate student program has been to connect the data and results from funded projects with the academic side of the University. Projects ranging from the solar panels to the studies have produced considerable information and data. Four graduate students at a cost of \$156,000 have been funded over the seven years of the fund. These have all been two-year Master of Science students in the Rubenstein School.

The second program in this category, Services & Materials and Contingency (\$85,000) includes money for project cost overruns and to pay for other related expenses incurred by the Office of Sustainability (for example this evaluation and summary report).

The cost of the two staff in the Office of Sustainability was not charged to CEF, and has been an in-kind contribution to the CEF activities. One of these staff has spent about 30 percent of their time supporting the fund and managing budgets.

The practice of using graduate students to conduct outreach and administer the Fund received some criticism from interviewees. Some view the overall cost to the Fund to date as being high

(\$156,000 over seven years. If one considers graduate student employment as an administrative cost, the percentage of “administrative” cost to the Fund equated to about 20%. If we exclude the cost of student employment, which served many purposes and is not generally viewed as administrative expense at the University, the administrative percentage amounted to 7% of the CEF.<sup>3</sup> There is a 10% administration limit named in the founding documents of the CEF.<sup>4</sup>

The CEF received high marks from interviewees for providing information about funded projects on the Office of Sustainability website where there are summary descriptions of funded projects. The CEF has also, in recent years, turned to student undergraduate interns to document the projects through the use of videos, seminars, and speakers. How well known the CEF is on campus is unclear. For example, very few projects (less than 5%) have come through the College of Arts and Sciences, the largest unit on campus. There is also a lack of physical signage linking CEF funds to funded projects such as the solar installations.

The CEF committee solicits applications in the fall of each year. Interviewees raised a number of concerns about the selection process. Rules change from year to year and the process is not completely transparent. There might be long gaps between when a proposal was submitted and when notice was announced. There was no scoring or clear understanding of what was funded and what was not. And some projects emerged that were not formally proposed (such as graduate student Resident Assistant opportunities) or made publicly available. The web page has no indication of the process for which to apply for projects. In general, funded and non-funded PIs found the process ambiguous. There also seems to be limited follow-up from the CEF for funded projects and no required final report or documentation of completed projects.

The CEF Committee itself has had some challenges. Students on the committee have been challenged to approve projects without training and background. Some committee members are also directly involved in proposing projects. The evolving nature and ambiguity of the selection process and frequent turn-over of the graduate student administrators were mentioned by interviewees.

### **Fiscal Year 2015-16**

The above analysis was based on expenditures through May 30, 2015. Another round of seven projects were approved in the spring of 2015. Most of those projects have not yet started. The one exception is a student-led project to start a renewable energy club and to host a series of talks with energy speakers (\$1,300). Going forward, more than half of the 2015-2016 funds are allocated to an infrastructure project (\$120,000) to synchronize building control systems and 45% is allocated to four education projects. There is one study funded (\$10,000).

## **RECOMMENDATIONS**

Interviewees suggested a number of recommendations for the CEF going forward.

### **1. Campus-Wide Engagement Process**

One overall suggestion is to develop a comprehensive campus-wide engagement process that revisits the Fund's goals and mission. From this emerges a clear mission and selection process. Ideas, such as some of those below, are then organized and voted on by the CEF Committee and recommended to the UVM Administration. A new process for the Fund, with clear guidelines, is established in time for a spring solicitation.

### **2. Clear Mission and Goals**

The Fund's mission and goals have changed over time. Through the process above, develop a clear, stakeholder-supported mission and goals that are clearly articulated in Fund materials and on the website. This then is used in public materials and outreach.

### **3. Transparent Selection Process**

Going forward, the Fund needs to establish a clear and transparent process for the selection of projects. Project selection should take place at the same time. This would be posted to the website and made clear in outreach materials. Timely notice of chosen and not chosen projects would be made available.

### **4. Existing Balance**

The Fund should spend down, in a high visibility, high impact way, the unspent balance (about \$425,000).

### **5. Fund Branding and Outreach**

The Fund should establish clear branding and outreach strategies. Fund projects should list Fund involvement (e.g. heating plant solar array signage).

### **6. Connect Fund with University Goals**

The Fund needs to clearly connect and align with University goals and plans. This would align staff work plans with Fund spending leveraging those dollars and increasing efficiencies. This would also include aligning the Fund with the new General Education sustainability requirement, Climate Action Plan, and STARS 2.0.

### **7. Pause on Campus Infrastructure Projects**

Dependent on the engagement process and potentially large, one-time investment, the Fund should take a pause on investing in campus infrastructure projects. These often have less student involvement and Fund dollars are dwarfed by overall need.

### **8. Leverage Fund Dollars**

Fund managers should seek ways to leverage funding with other funds to increase fund reach. A requirement of proposers could be that they propose matching funds or additional sources of funds to broaden Fund reach.

## **9. Undergraduate Internships and Research Funding**

Fund money should be used to increase internship, research, and conference attendance opportunities for undergraduate students. This could be done with low CEF overhead costs by simply creating CEF branded placements through UVM's Internship and Office of Undergraduate Research (both offices have said they would welcome this opportunity).

## **10. Graduate Students**

Fund managers should be cautious about funding graduate students for administration-related duties. And if the practice continues, then all UVM departments should be made aware of the opportunity.

## **11. Program Operations**

Fund managers should attempt to spend about 10% (about \$22,500 per year) on managing the Fund. This number is stated in some of the Fund's founding documents.

## **12. Transportation and Heating**

The use of the CEF should broaden mandate beyond electricity. Burlington Electric Department provided electricity to UVM that is 100% renewable. Challenges from climate perspective are heating and transportation. (Although the idea of investigating other aspects of clean energy is a good one, Burlington Electric sells much of its green portfolio to out-of-state entities so UVM cannot claim a green electric portfolio without buying its own renewable energy credits).<sup>5</sup>

## **13. Management and Committee**

Greater undergraduate role in project selection, potentially turning it over to students.

## **14. Energy Mini-Grants**

Consider using more CEF funds for undergraduate research. The Undergraduate Research Office manages small mini-grants to students attending conferences, traveling for research-related activities, or to pay for expenses. These programs have more demand than funding.

## **15. Class Revolving Fund**

There are at least five classes that have/could have substantial CEF involvement. Consider a revolving fund that provides up to \$3,000 for classes, which faculty can use for anything but paying themselves, i.e. field trips, guest speakers, etc. Any course with a substantial energy component could apply.

## **16. Speakers Fund**

Create an overall revolving fund for speakers that would provide matching grants on a 1:1 basis, at a minimum. Invest \$20,000 a year.

## **17. Clean Energy Advocacy Fellow**

Fund a summer fellowship for recently graduated students. The idea would be to capitalize on the fact that they should be at their peak of knowledge about UVM just after graduating.

## **18. Staff**

Use existing staff to support and manage the Fund, rather than graduate students. There could be an opportunity here to provide additional funding to a staff member that is currently employed less than full-time.

### **19. Faculty Course Release**

Use funds to buy out faculty courses (about \$11,000 each) so that faculty can devote time to working with students on a research or applied education CEF-related experience.

### **20. Sustainability Fund**

Broaden the fund to make it a “sustainability fund.”

### **21. Investments**

Put the funds into renewable energy investments.

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<sup>1</sup> These goals are not clearly written in any document. And over the years, the goals have changed from a focus on renewable energy to a broader focus that includes transportation for example. I developed these goals through reading the materials and early founding documents and in interviews with the Fund’s managers.

<sup>2</sup> Interviewees were asked an open-ended question: “As you think about the Clean Energy Fund, what are some of the successes?” Interviewees almost unanimously pointed to the seminars as a successful use of the money. However, the principal author of this report (Richard Watts) is also the manager of several of these seminars so it is possible they were biased in their responses by the interviewers known association with the seminars.

<sup>3</sup> This clarifying statement was inserted by the Vice President of Finance.

<sup>4</sup> “Up to 10% of the fund may be used for administrative needs associated with the fund” Clean Energy Fund web page <http://www.uvm.edu/sustain/cef/about>, web access Sept 3, 2015.

<sup>5</sup> This statement was inserted by the Vice President for Finance based on information published on Burlington Electric’s webpage.