2014

Colby College 2014-15 Sustainability Overview

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Campus Sustainability Engagement

A. Colby College EcoRep Program

This year, Colby's Sustainability Office continued the student Eco-Rep program. The Office hired seventeen (17) student EcoReps throughout the academic year to provide two major functions: (1) promote sustainable living habits in the residence halls; and (2) plan, manage and execute student-focused campus-wide sustainability projects in order to generate environmental discussion and action across campus. A few program highlights are below.

Throughout the year, EcoReps focused on educating the residence hall community on sustainable living practices. One of the most effective campaigns focused on water conservation through a '5 Minute Shower Challenge' the EcoReps initiated in October. The challenge asked classmates to attempt a five minute shower using a shower timer placed in each residence hall bathroom on campus. Participants received a sticker for participating, and the residence hall with the highest participation received a pizza party. Over 20 percent of residence hall rooms participated in the challenge. Colby students use an estimated 38,500 gallons of water for showering each day. Those who participated in the challenge and reduced their total shower time to five minutes helped reduce water consumption, saving more than 8,500 gallons—enough to fill roughly 240 bathtubs!

Another EcoRep program highlight was the Dorm Electricity Challenge where Colby competed against Bowdoin College. EcoReps Carla Nyquist ('16), Grace Fowler ('17), and Andrew Newcomb ('15) planned and coordinated the event. Over the month of April, the EcoReps collected electricity data on a weekly basis from 21 residence halls and ran a competition with two goals: (1) to determine which campus could reduce electric consumption the most over the three-week competition, and (2) internally, to identify the hall that could reduce its electricity the most when compared to an electricity baseline. This data was displayed on a dashboard in Pulver, and provided semi-realtime results in the competition. The EcoReps were responsible for collecting and analyzing the data as well as communicating the results across campus. In total, the competition realized an electricity reduction of over 8,000 kWh, which equated to a 9 percent reduction (up from 4.5 percent last year).

B. EnviroCo Update

This past year marked a number of important accomplishments for the student Environmental Coalition (EnviroCo) group, one of Colby's largest environmental clubs. In 2014-15, they set to work to encourage environmental discussion among Colby's students, implement projects to reduce resource consumption, and engage in community environmentalism efforts. EnviroCo students organized two Freecycle events, one in December and another in April that focused on keeping unwanted but still usable items like office goods and clothes out of the waste stream. In total, over 400 pounds of clothing was reused and an additional 400 pounds of clothing was donated to the Mid-Maine Homeless Shelter.

During the year, EnviroCo initiated projects to help reduce campus resource consumption. First, they further assisted the Physical Plant Department (PPD) in installing engraved light switches across campus which reminded occupants to shut the lights off when they left. EnviroCo also coordinated the planning for the campus Earth Week activities. An exciting addition to this year's celebration was a t-shirt screen printing demonstration. EnviroCo provided t-shirts and an Earth Week design for students to print, and demonstrated the process to do so. It was a great success and the group is excited for expanding its Earth Week planning efforts this upcoming year.

Sustainability in Education

A. Environmental Studies Sustainability Updates

Sustainability is a core value of the Environmental Studies (ES) Program. ES faculty, staff, and students participated in a wide range of sustainability initiatives during 2014-15. Sustainability partners included the Bigelow Laboratory for Ocean Sciences, Maine Lakes Resource Center, Maine Lakes Society, the Environmental Health Strategy Center, the California Academy of Sciences, the Horn of Africa Regional Environment Center & Network, and the Evans School Policy Analysis and Research Group (EPAR) at the University of Washington in support of the Bill and

Melinda Gates Foundation. At Colby, ES faculty and students continued their membership on Colby's Environmental Advisory Group and worked closely with administrators and staff on campus sustainability initiatives, particularly the Office of Sustainability and Dining Services. Student interest in the environmental studies curriculum and co-curricular sustainability projects remained strong, including a record 202 ES majors and minors.

Environmental Studies faculty offered a diverse array of sustainability-focused courses. As with past years, each of the senior research capstone courses had a sustainability theme and a civic engagement component. The ES Program sponsored over 20 student internships in January or during the summer on sustainability topics that sent students to work with partners across Maine, the country, and the world. We hosted or co-sponsored numerous evening and lunch speakers and a public forum on arsenic in drinking water. Our faculty sponsored environmental and sustainability research opportunities, including through the Colby Academic Research Assistants (CARA) program for Presidential Scholars.

Sustainability scholarship and outreach highlights for the year were numerous. ES faculty and students co-authored research papers published in top-tier journals, including *Biological Conservation, Ecology and Society*, *Fisheries Research, Food Security, and Marine Policy*, and mainstream media outlets, including the *New York Times* and *Morning Sentinel*. ES faculty were co-Principle Investigators on major grants with sustainability themes: $391,472 from the National Science Foundation (Reynolds), $197,974 from the Hudson River Foundation (Bruesewitz), and $15,000 from the US Geological Survey (Bruesewitz). Our faculty and/or students presented at national and international conferences, including the Ecological Society of America Annual Meeting; a Gordon Research Conference on watershed science; a Bioversity International Panel in Rome, Italy; and the International Marine Conservation Congress in Glasgow, Scotland. ES faculty and students testified before the Standing Committee on Health and Human Services of the Maine Legislature regarding arsenic in local water supplies.

The ES Program hosted internationally-acclaimed author and environmental advocate Terry Tempest Williams as the 2015 Andrew W. Mellon Distinguished Fellow in Environmental Studies. Williams is the recipient of numerous awards, including a Distinguished Achievement Award from the Western American *L*iterature Association and a Guggenheim Fellowship. In addition to her many books, her writing has appeared in *The New Yorker, New York Times, Orion Magazine*, and numerous anthologies.

Environmental Studies faculty, staff, and students also participated in numerous campus sustainability initiatives. They contributed to invasive species management in the Perkins Arboretum, helped to organize Earth Day activities, supported the Colby garden, worked with Physical Plant, contributed to the AASHE STARS sustainability assessment, assisted with the RESCUE sale, worked with EnviroCO, participated in dorm electricity challenges and sustainable dining projects, and much more.

B. Sustainability and Green Building Education

In January 2015, the Sustainability office offered a three-credit course entitled Green Building Design to twenty Colby students interested in a variety of disciplines. The course provided an introduction to building design and science, and provided students with the methods to analyze and measure sustainability performance. Labs and homework focused heavily on campus operations in order to promote the College as a living laboratory and help students better understand their indoor and outdoor environment. The course participants toured campus LEED buildings and a LEED Platinum grocery store in Augusta. After the course, eight students were interested in sitting for the Leadership in Energy and Environmental Design (LEED) Green Associate accreditation exam. The LEED GA credential demonstrates a basic understanding of green building principles as well as the LEED rating system. As a result of the Jan Plan course, the eight students passed the exam and a number assisted the Sustainability Office with LEED documentation for campus building projects.

Notable Sustainability Program Achievements

A. AASHE STARS Gold Certification – Sierra Club Green Schools / Best Green Colleges

In December 2014, Colby put the final touches on its STARS (College Sustainability Tracking, and Assessment Rating System) recertification created by the Association for the Advancement of Sustainability in Higher Education (AASHE). With its recertification effort, the College increased its certification level from a Silver to a Gold Rating, and currently has the fourth highest point total in the world, and highest among NESCAC institutions. The recertification incorporated recent campus sustainability improvements like the opening of the biomass plant, the establishment of the Sustainability Office, the College's carbon neutrality announcement, and the strength of the College's

sustainability-related academic program, particularly in Environmental Studies.

As a result of the Gold Rating, Colby has climbed considerably in multiple Green Schools Ratings. For the first time since the Sierra Club offered Green School Ratings, Colby has cracked the top twenty, and BestColleges.com ranked Colby third in its Greenest Colleges ranking. This recognition affirms and reflects Colby's commitment and effort to institutionalize sustainability and environmental education.

B. Campus Energy Management Planning

As a first step towards creating a comprehensive energy management plan, the Sustainability Office, in collaboration with PPD, implemented two pilot energy management programs. Throughout 2014-5, Colby collected materials and submitted a grant to the Efficiency Maine's Program Opportunity Notice for Large Energy Efficiency Projects; a program that offers partial funding for projects, or a collection of projects, for organizations that can reduce electricity consumption by 500,000 kWh or more. Colby identified a group of thirteen projects - interior lighting, exterior lighting, variable frequency drives for campus air-handling units and pumps, and a solar project to reach the electricity reduction threshold. In total, these thirteen projects have a simple a payback of six years. With the approved incentive award of $115,101 from Efficiency Maine, Colby's financial contribution is reduced to $236,000, and a simple payback of three years. After implementing the thirteen projects, it is expected Colby's annual electricity consumption will be reduced by ~3.5 percent, a significant campus-wide reduction and testament to Colby's ongoing sustainability efforts.

The second energy management process was an energy audit of the Olin Science Center. The audit identified over thirty low or no-cost energy conservation measures as well as ten capital projects for the College to evaluate. As part of the project, energy meters were installed in Olin in order to better understand the energy performance of the building pre-audit and post-implementation. This information will allow the College to verify energy savings and evaluate the effectiveness of the program. The College plans on integrating these findings into future energy management reduction programs.

Finally, as part of this successful effort, the Environmental Advisory Group (EAG) implemented a Campus Energy Management Goal as a means to further identify and implement campus energy reduction projects. Over the next six years, the goal is to maintain total campus energy consumption inclusive of growth. On a per square foot basis, the College expects to reduce energy consumption by twenty percent by FY21, using FY14 as the baseline year.

Greenhouse Gas Emissions and Energy Reporting

A. Campus Greenhouse Gas Progress

As of June 2015, Colby College continues to be carbon neutral. The following shows Colby's greenhouse gas (GHG) reduction progress since 2000. Major GHG reductions have resulted from the purchase of renewable energy credits (RECs) in 2002, the opening of the biomass plant in 2011, and the purchase of carbon offsets in 2013. There were also several energy conservation projects along the way which contributed to further reductions. More information on Colby's energy reductions is included in the next section.

In 2014, Colby emitted 8,518 metric tons of carbon dioxide equivalent (MTCDE). In 2015, this total was reduced to 8,321 MTCDE, a three percent reduction. This decrease is largely the result of the fuel switching effort where natural gas was burned during the coldest times of the year instead of oil. Further GHG reductions are expected in 2016, as the College continues to implement additional energy conservation measures, renovate facilities, and identify additional means to improve recycling volumes.

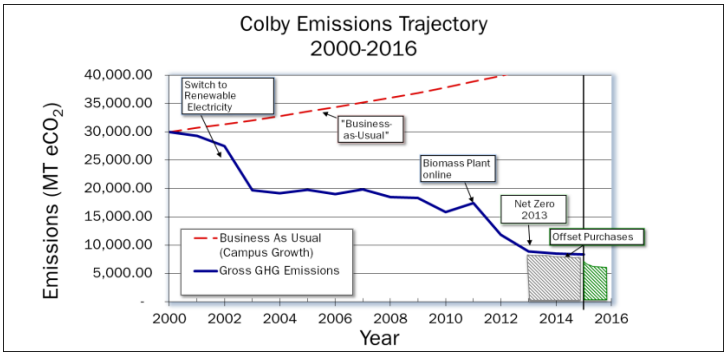

Figure 1: Colby College GHG Emissions progress since 2000

The remaining 8,321 MTCDE from 2015 were balanced through the purchase of carbon offsets as designated by the grey hatching in Figure 1. In doing so, Colby continues to be the only member of the NESCAC to reach carbon neutrality.

B. Carbon Offset Details

Over the course of FY2014-15, Colby continued its commitment to carbon neutrality. After identifying and

implementing a number of efficiency and carbon offset projects, the College's emissions for FY14-15 totaled 8,321 MTCDE. The College solicited proposals for offset projects that were local to the United States, local to New England or Maine, attained third party certification, and priced competitively. Based on these criteria, Colby purchased carbon offsets for FY2014-15 from a New Bedford, Massachusetts, landfill methane reduction project where the methane off-gases were collected and burned to generate electricity and heat, negating their GHG impact by roughly 24 times.

While the College will invest in carbon offsets in order to maintain its carbon neutral distinction, Colby will also continue to implement energy conservation projects, enhance recycling and composting efforts, and explore other greenhouse gas reduction projects on campus.

C. 2013-4 Greenhouse Gas Emissions Breakdown

Figure 2 depicts the proportion of remaining GHG emissions from the 2014-15 inventory. Heating fuels comprise the largest amount of emissions, at approximately 53 percent. College travel comprises 21 percent of the remaining emissions. Air travel is the largest contributor to this piece, and equals close to 1,700 MTCDE of the 8,321 MTCDE total. Finally, commuting is the third largest piece of the College's emissions and comprises 19 percent of the total. A commuter survey was conducted in the fall of 2014 to help quantify commuting emissions and evaluate commuter greenhouse gas reduction projects moving forward.

Colby is also seeking to further reduce emissions by implementing efficiency measures in new and existing facilities, evaluating renewable energy installations and exploring methods to reduce scope 3 emissions.

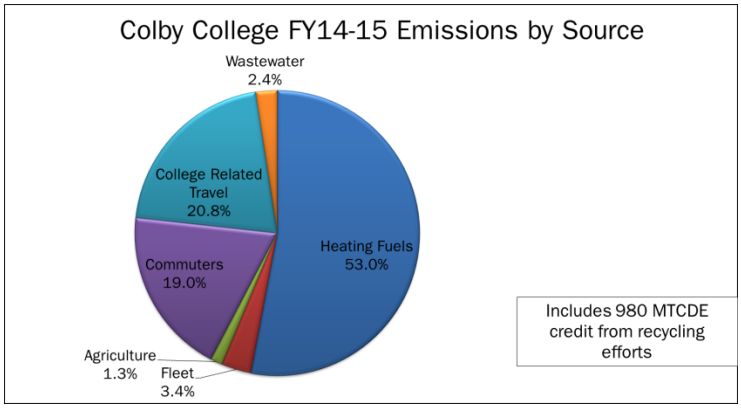

Figure 2: Colby College GHG emissions breakdown for FY2015

D. 2015 Energy Consumption Breakdown

Since 2000, Colby College has realized a substantial reduction in its energy consumption. Figure 3 shows the weather normalized energy use per square foot from 2000 through 2014. The energy data have been corrected for heating degree days in order to better compare data from one year to the next and more accurately display trends.

Since 2000, the College has realized a 15 percent reduction in its energy consumption per square foot. In reviewing the data, there is a small anomaly ranging from 2004 – 2006. During this time, the campus created the Colby Green, adding significant exterior lighting without any corresponding increase in campus square footage. Since that time, consumption decreased for a number of years as new, more efficient buildings were constructed, others were renovated, and upgrades were made to individual building systems across campus. Further efficiency gains stem from the beginning of Colby's Energy Management program, which aims to reduce energy consumption by 20 percent per square foot over the next six years, using FY13-14 as a baseline. In terms of total energy consumption, without weather normalization, the goal is maintain campus energy consumption, inclusive of campus growth over the same time period.

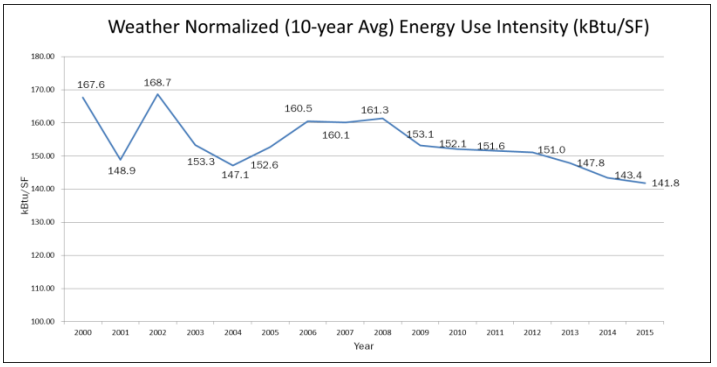

Figure 3: Weather-normalized campus energy consumption per square foot since 2000

The following graph displays the total energy consumption per square foot by utility type. Consumption of oil#6 has dropped considerably the past year as natural gas was introduced to the steam plant and used during the coldest times of the year. Electricity consumption has nominally increased each year since 2012, as new facilities have been brought on-line, and air-conditioning has been added to existing buildings. Despite the additional buildings and mechanical equipment, campus energy consumption nearly remained constant from FY14 to FY15, despite

colder winter temperatures a sign that energy reduction campaigns are beginning to gain momentum.

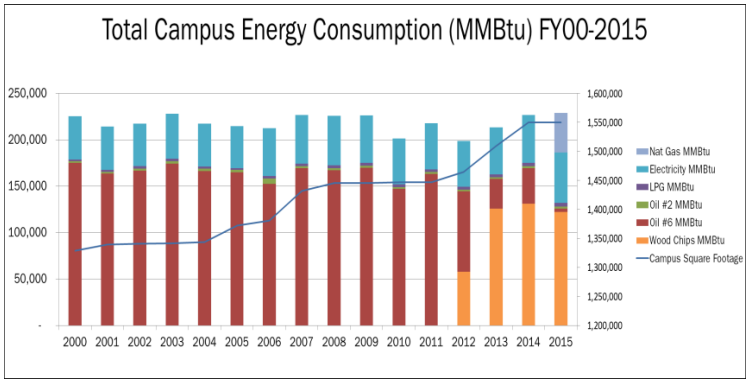

Figure 4: Total campus energy consumption by utility type since 2000

Looking Forward

In 2015-16, the Sustainability Office will focus on the implementation of new policies and programs including the Green Building Standards, Olin Science Center energy audit, the completion of the energy conservation measures identified in the Efficiency Maine Grant as well as the implementation of this upcoming fiscal year's energy management projects. The Environmental Advisory Group (EAG) is continuing its effort to draft a College Sustainability Action Plan, an updated document to the College's Climate Action Plan which outlined a course of action culminating in the College's carbon neutrality announcement in April 2013. This document will set time-bound goals for campus operations, academics, and administrative activities as they relate to the College's sustainability efforts and identify further means and methods to link the College's operations to its academic efforts. This task is being completed with the College's STARS certification in mind. Only one other institution has achieved a Platinum rating, and the College's planning efforts will assist in increasing its rating and place it among select sustainability company in higher education. Further, the College is reviewing its waste collection processes, and evaluating opportunities to improve the College's diversion rate. Thus far, it is clear the College is environmentally and financially motivated to identify ways to recycle, compost, reuse, or donate the College's waste.

In terms of occupant engagement, the Office increased the number of Student EcoRep positions from 15 to 21 in order to expand programming and identify other ways to engage students. Building on the success of the sustainable living projects is a key emphasis for the upcoming year, as well as implementing other small resource conservation projects and demonstrations. The Office is also expanding its education component by offering additional LEED GA preparatory training courses through the Human Resources Department, as well as continuing its January Plan course. "Green Building Design" based on the positive feedback from students and faculty from last year.

Aspirationally, Facilities and the Sustainability Office are discussing means and methods to assimilate our operations with the College's academic mission through the integration of visible sustainability projects. The solar photovoltaic project on the rooftop of the SSWAC building was a first step in this initiative. The next project we have identified is the development of a natural Maine campus landscape, starting with the intentional development of rain gardens and bioswales on campus. These natural areas will promote the use of native plant species, provide a living, breathing example of sustainable operations, and reduce the College's burden on the local sewer system.

For the latest green news at Colby, visit www.colby.edu/green.