
2013-14 Sustainability Overview

Campus Sustainability Engagement

A. Colby College EcoRep Program

This year, Colby's Sustainability Office reestablished the student Eco-Rep program. The office hired nine (9) 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 College community around its sorted recycling program. In order to improve education and communication efforts, EcoReps engaged their residence hallmates through monthly dorm meetings, reported on campus-wide recycling metrics during the annual RecycleMania competition, conducted waste audits and widely shared the results in order to identify areas of opportunity, worked with Dining Services to expand composting efforts, and even created recycling games in the Student Union in order to promote and teach proper recycling methods to their peers. Overall, these efforts made a significant difference in the College's recycling metrics and improved the campus diversion rate to 53 percent. This means over half of the College's waste by weight was diverted from a landfill and reused, recycled, composted, or donated.

Another EcoRep program highlight was the inaugural Dorm Electricity Challenge planned and coordinated by EcoReps Mollika Tahsin '17, Ester Topolarova '17, and Norah Flynn '14. Over the month of April, the EcoReps collected electricity data on a weekly basis from 21 residence halls and ran a competition to see which hall could reduce its electricity the most when compared to an electricity baseline of each facility collected in the fall. 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 2,100 kWh, which equated to a 4.5 percent reduction across campus residence halls when compared to their baseline. The competition was deemed a success, and as a result, the EcoReps are planning to hold two dorm electricity competitions in 2014.

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 2013-14, they set to work to encourage environmental discussion among Colby's students, implement projects to reduce resource consumption and beautify the campus, and engage in community environmentalism efforts. In terms of campus events, the group had a strong presence during April, a widely recognized sustainability month across campuses and countries. EnviroCo students organized a Freecycle event that focused on keeping unwanted but still usable items like office goods and clothes out of the waste stream, assisted Dining Services with Weigh the Waste Campaigns, and scheduled an invasive species removal event during Earth Week.

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. In collaboration with PPD and student EcoReps, EnviroCo proposed a new recycling program in six of the campus residence halls to encourage the recycling of plastics. They met with PPD, reviewed possible bin locations, and summarized the results for the program's unveiling for the start of the 2014 academic year. Based on its success, the group is hoping to expand the program across another set of residence halls in the fall of 2014.

Sustainability in Education

A. Environmental Studies Sustainability Updates

Environmental Studies faculty and students engaged in a variety of sustainability initiatives during the past year. Professors Denise Bruesewitz, Philip Nyhus, and Russ Cole continued their NSF-funded research collaboration with other Colby faculty investigating the impacts of development in the Belgrade Lakes watershed. Professor Bruesewitz continued her work with Professor Whitney King, Department of Chemistry, with *Goldie*, the Great Pond monitoring buoy. The buoy

is designed to help us understand changes in Great Pond in response to human activities. *Goldie* enables Colby representation in national and international projects emphasizing sustainable use of freshwater resources through the Global Lakes Ecological Observatory Network (GLEON).

Through civic engagement and original research, the domestic environmental policy capstone course taught by Professor Loren McClenahan investigated the benefits and potential for developing local seafood systems in Maine. Seafood systems that are based on community-scale management and local distribution of seafood can be more sustainable than large-scale, industrialized fisheries for global markets, and as such, have been proposed as a solution to overfishing. Students investigated potential innovative initiatives aimed at increasing the sustainability of Maine's seafood systems by evaluating the three critical elements of sustainable seafood systems: required resources, rights to fish and the diversity of resources available locally, and a business model that supports community-scale fishermen. The final results of this group research and analysis were presented in a public meeting and published in a report that was distributed to community members.

The international environmental policy senior capstone taught by Professor Travis Reynolds focused on the roles of local governance, foreign investors, modern technologies, and globalizing markets in supporting and undermining the environment and local communities in central, western, and northern Ethiopia. Working with project partners in Ethiopia, students investigated and assessed environmental rehabilitation efforts in the Ethiopian Rift Valley and changes in land-use patterns and their impact on threatened wildlife habitat in western Ethiopia as well as topics as varied as ecotourism development planning and the development and commercialization of wild-harvested shea butter markets.

Postdoctoral fellow Reuben Hudson, who works with Associate Professor of Chemistry Jeffrey Katz, received a National Science Foundation Grant through a program called Science, Education and Engineering for Sustainability purposed to encourage and develop sustainability through interdisciplinary collaboration. With the grant, Hudson aims to study developing types of polymers and their potential application for membranes in hydrogen fuel cells which could improve their efficiency. With the education portion of the grant, Hudson will hire a Colby student researcher as well as other Colby students to assist with green chemistry outreach with local K-12 students.

The Environmental Studies program was very pleased to host Frances Moore Lappé as the 2013-2014 Andrew W. Mellon Distinguished Fellow in Environmental Studies. Frances Moore Lappé, an internationally recognized food policy activist and the author or co-author of 18 books including the three-million copy *Diet for a Small Planet*, made two visits to campus during which she participated in an extensive series of events centered around sustainable food policy that included well-attended public lectures, class visits and discussions, a book reading at Barrel's Community Market, and a very popular Frankie's Favorite Recipes dinner hosted by the Colby Dining Services. We are grateful for collaborations with Colby Dining Services and the Center for the Arts and Humanities that helped make these events possible.

B. Sustainability and Green Building Education

In January and April of 2013, the Sustainability Office offered a non-credit Leadership in Energy and Environmental Design for Green Associate (LEED GA) training course for students, faculty, and staff interested in sustainable design and green building. In total 15 students and 10 staff participated in the course, and eight students sat and passed the LEED GA exam. The LEED GA credential demonstrates the a basic understanding of green building principles as well as the LEED rating system. The course relied heavily on campus LEED certifications in order to help draw corollaries between sustainable design principles and their campus surroundings.

Notable Sustainability Program Achievements

A. Campus Green Building Standards

Throughout the year, the Sustainability Office, in collaboration with PPD, created Green Building Standards for future new construction, building renovations, and equipment upgrades. The standards still require LEED Silver certification, but have a number of other requirements focused on integrated design principles. The process-focused standards require at least one sustainability-focused, goal-setting meeting to set specific project standards as they relate to the site, energy consumption, water use, and other environmental attributes for any renovation project. With these vetted goals, the standards outline a process to evaluate design strategies using a combination of energy modeling and life-cycle costing.

This refined process will help the College evaluate and design superior, more efficient, comfortable, and healthier buildings while maintaining past LEED

certification goals. The standards are in place as of July 1, 2014 and will be applied to future construction projects beginning this upcoming fiscal year.

B. Campus Energy Management Pilot

As a first step towards creating a comprehensive energy management plan, the Sustainability Office, in collaboration with PPD, researched and started the implementation process for two energy management programs. Throughout 2014, 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 12 projects—interior lighting, exterior lighting, and variable frequency drives for campus air-handling units and pumps—to reach the electricity reduction threshold. In total, these 12 projects have a simple payback of 5.41 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 3.41 years. After implementing the 12 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 final energy conservation measure package is proposed for board approval in the fall board meeting of 2014.

An energy audit pilot is planned for the Olin Science Center. The College is currently evaluating bids for an engineering firm to conduct an energy audit to Level II standards as created by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE). The audit will identify a number of low or no-cost energy conservation measures as well as capital projects for the College to evaluate. As part of the project, energy meters are being 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.

Greenhouse Gas Emissions and Energy Reporting

A. Campus Greenhouse Gas Progress

As of June 2014, 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 2013, Colby's emissions were at 8,878 MTCDE. In 2014, this total was reduced to 8,518 MTCDE, a 4 percent reduction. This decrease is the result of the increased generation of electricity at the biomass plant and boost in campus recycling efforts. Further GHG reductions are expected in 2015, as the College continues to implement additional energy conservation measures and renovates facilities.

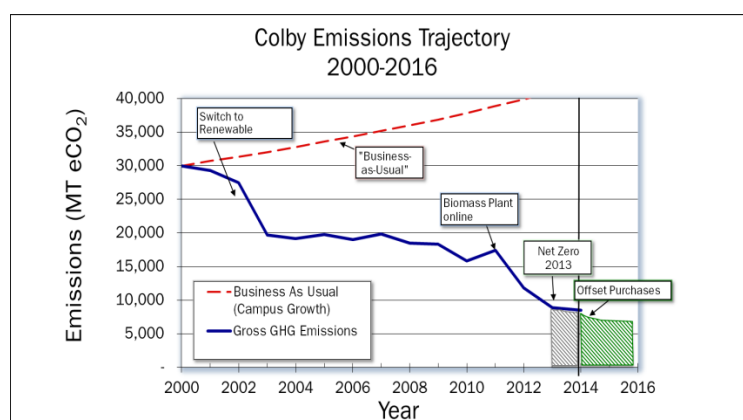


Figure 1: Colby College GHG Emissions progress since 2000

The remaining 8,518 MTCDE from 2014 were balanced through the purchase of carbon offsets as designated by the green hatching in Figure 1. In doing so, Colby continues to be the only member of the NESAC to reach carbon neutrality.

B. Carbon Offset Details

Over the course of FY2013-14, Colby continued its commitment to carbon neutrality. After identifying and implementing a number of efficiency and carbon offset projects, the College's emissions for FY13-14 totaled 8,518 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 FY2013-14 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 implement energy conservation projects, enhance recycling and composting efforts, and explore other greenhouse gas reduction projects on campus.

C. 2013-14 Greenhouse Gas Emissions Breakdown

Figure 2 depicts the proportion of remaining GHG emissions from the 2013-14 inventory. Heating fuels comprise the largest amount of emissions, at approximately 56 percent. College travel comprises 26 percent of the remaining emissions. Air travel is the largest contributor to this piece, and equals close to 2,200 MTCDE of the 8,518 MTCDE total. Finally, commuting is the third largest piece of the College's emissions and comprises 17 percent of the total. A commuter survey to be conducted in the fall of 2014 will help identify and prioritize commuter greenhouse gas reduction projects moving forward.

Colby is also seeking to further reduce emissions by optimizing the performance of the steam plant, pushing for efficiency measures in new and existing facilities, and exploring methods to reduce scope 3 emissions.

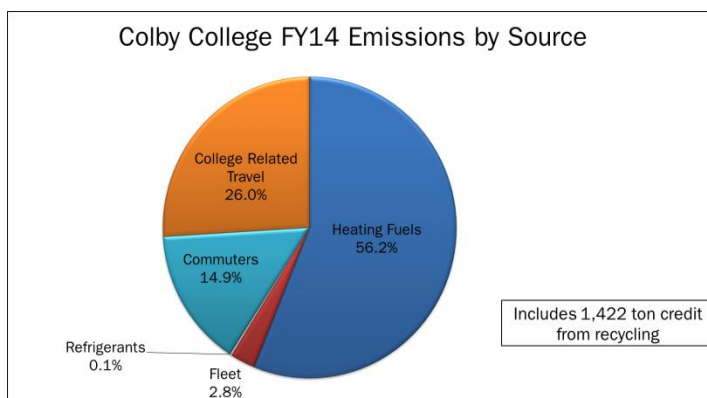


Figure 2: Colby College GHG emissions breakdown for FY2014

D. 2014 Energy Consumption Breakdown

Since 2002, Colby College has realized a substantial reduction in its energy consumption. Figure 3 shows the weather normalized energy use per square foot from 2002 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 2002, 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.

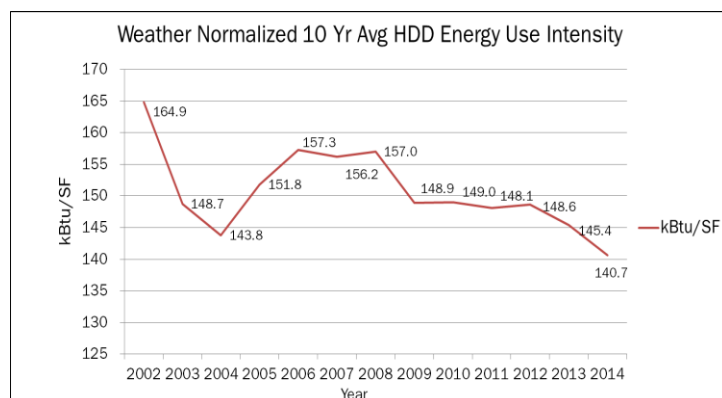


Figure 3: Weather-normalized campus energy consumption per square foot since 2002

The graph below displays the weather normalized energy consumption per square foot by utility type. Consumption of liquid petroleum gas and oil #4 has remained relatively constant over the past several years. Electricity consumption has nominally decreased each year since 2012, a sign of conservation efforts of campus. The normalized data accounts for this past year's cold winter and shows that the College heated the campus more effectively in FY2013-14 than in previous years.

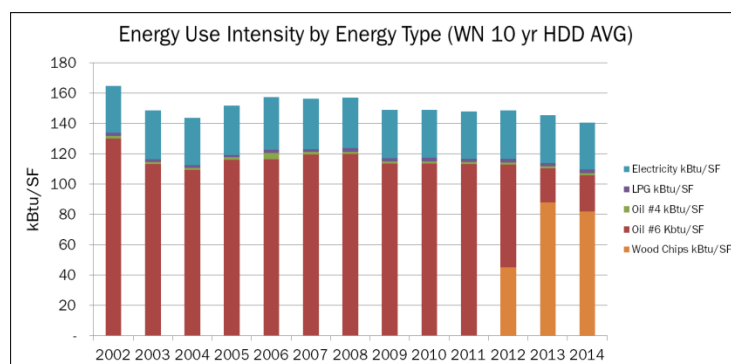


Figure 4: Weather-normalized campus energy consumption per square foot by utility type since 2002

Looking Forward

In 2014-15, the Sustainability Office will focus on the implementation of new programs including the Green Building Standards, Olin Science Center energy audit, and the completion of the energy conservation measures identified in the Efficiency Maine Grant.

In terms of occupant engagement, the office increased the number of Student EcoRep positions from 9 to 15 in order to expand programming and identify other ways to engage students. The office is also expanding its education component by offering additional LEED GA preparatory courses, as well as a January Program course, "Green Building Design." This course offers an introduction to building design and science, providing students with the methods to analyze and measure sustainability performance.

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