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Green Roots 2011 Annual Report

Lawrence University

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GREEN ROOTS

THE SUSTAINABLE LAWRENCE INITIATIVE

2010-11 Report on Activities

Executive Summary:

- Green Roots committee extended for three additional years as the President's Committee on Environmental Sustainability.
- Community read of Cheap: The High Cost of Discount Culture, by Ellen Ruppel Shell, engages over 120 students, faculty and staff in a campus-wide discussion of the environmental, social, political and economic costs of consumer culture.
- 10th place finish (our of ~350 schools) in Recyclemania
- ~12,000 lbs of electronic waste collected and recycled at first campus E-Sweep
- Gleaned ~\$65,000 in state and utility funding for 20 kW solar array on Hiatt Hall
- Gleaned \$200,000 in state and utility funding for 50 kW wind turbine at Bjorklunden
- ~15% of every food dollar spent locally, supporting local farmers and Wisconsin economy
- Nearly 30 tons of kitchen prep waste composted by SLUG.
- Greenhouse gas audit for Appleton campus shows a normalized emissions reduction of 41% since 2002 and by approximately 5% over last year.
- Lawrence University wins UMACS energy reduction competition for February, 2011.
- Campus wide use of 100% recycled copy paper and letterhead
- Sustainability a major theme of the university strategic plan
- LU again profiled in the Princeton Review Guide to Green Colleges
- Sierra Magazine Rates LU at 103 among colleges in "cool schools" survey
- LU scores a B+ on the Sustainable Endowments Institute Green Report Card (up from a D in 2009)

Introduction:

Green Roots: The Sustainable Lawrence Initiative was launched officially at the Matriculation Convocation on September, 25 2008. The goal of the initiative is to focus the attention of the university at large on issues pertaining to sustainability. To that end a committee was formed and charged with task of coordinating university operations and programming related to sustainability.

In the Spring of 2010, Green Roots, upon the recommendation of the Faculty Committee on University Governance (FCUG), was approved by the faculty of Lawrence University as a presidential committee. The official title is the President's Committee on Environmental Sustainability. The structure and charge of this committee can be found in the faculty handbook and is included in Appendix A.

Membership:

Because the GR initiative is campus wide, representation from all divisions of the college, non-teaching faculty, and two LUCC appointed students were included. The committee for 2010-11 consisted of the following members:

Jeff Clark (Geology and Environmental Studies)*
Andrew Knudsen (Geology and Environmental Studies)**
Jason Brozek (Government and Environmental Studies)
Joe Gregg (Mathematics and Computer Science)***
Greg Griffin (Campus Center Director)
Dan Meyer (Director of Facilities Services)
Patrick Miner (Greenfire; LU '11)
Will Meadows (LUCC; LU '13)

*Faculty Associate to the President

**Terms I and II only

***Terms I and III only

Summary of 2010-11 Academic Year Activities, Initiatives, and Accomplishments:

With guiding principles established in the first year, the committee continued its review of university operations in the eight following areas; Water, Food, Buildings, Curriculum, Energy, Waste and Recycling, and Transportation. Within each of these areas the committee worked to identify and prioritize opportunities. In our efforts to coordinate sustainability efforts and to publicize them, we present all activities of which we are aware in each of the focus areas. In many instances Green Roots worked in collaboration with students, faculty, and existing campus groups like Facilities Services, ITS, Dining Services, Greenfire, LUCC Committee on Environmental Responsibility, Communications, and Admissions.

Water

Water use on campus is driven by five primary sources – laundry facilities, showers, toilets, dining services, and grounds keeping. Conservation practices were initiated in 2008, including a decision not to serve bottled water on campus. Additionally, Bon Appétit is using modern, water-efficient appliances as part of the new dining facilities in the Warch Campus Center (WCC). This is in addition to the other water-efficient fixtures that were installed as part of the Campus Center's construction. The WCC scored 4 out of 5 possible points in the LEED Water Efficiency Category, including points for water-efficient landscaping, water-efficient appliances, and overall reductions in expected usage. Without major investment in infrastructure or facilities, the efficiency of water use on campus is now primarily an issue of behavior.

The main residential uses of water are in showers, laundry, and flushing toilets. Unfortunately, not all residence halls are individually metered for water usage which makes comparison between halls and identification of high use areas difficult.

Toilets are replaced with low flow models (according to state building code) whenever renovations are made. Low-flow shower heads were explored, but there were concerns

that (1) the initial financial outlay to fit every shower in the student residence houses and halls was not feasible, and (2) in the past, low-flow heads were replaced by students with less efficient showerheads. However, as existing showerheads wear out and replacements are purchased, the provisional Green Purchasing Policy (see below) requires Facility Services to purchase and install low-flow models. Likewise, the recently-adopted Building and Renovation Policy (see below) encourages new construction and major renovations on campus to meet LEED Silver or similar certifications, of which a major component is water efficiency. The recent renovations on campus (the Wellness Center, Trever and Plantz halls) all included low-flow, high-efficiency water fixtures, in line with the new building policy.

Campus laundry facilities are maintained by Mac-Gray Intelligent Laundry Systems. All washing machines and driers provided by Mac-Gray are high-efficient, Energy Star-rated appliances. As a corporation, Mac-Gray is committed to sustainable practices, including water conservation. They note on their website that managing environmental impact, “is a corporate priority that calls for knowledge, and the commitment of our employees and business partners to treat the environment with a sense of responsibility.”

The main buildings and grounds use of water comes in irrigating the athletic fields and the Sustainable Lawrence University Garden (SLUG). In 2008, Megan Bjella presented ideas about water usage on athletic fields, developed as part of an independent study project. At this time, the Athletic Department recommends against cessation of watering on athletic fields, because of the need to maintain high-quality and safe playing surfaces. However some fields like the softball and baseball fields will be not be watered during the summer because they will not be used for competition until the next spring. The Football and Soccer Fields, however, need to be maintained throughout the summer. Other lawns around the campus are not watered regularly. SLUG has adopted a water efficient drip irrigation system for approximately ½ of the garden. Oren Jakobson, the student manager of SLUG for 2010-11, reports that the company that manufactures this drip irrigation system does not support the type of intensive planting that SLUG does, and for the foreseeable future, drip irrigation will need to be supplemented with traditional watering. A rainwater harvesting system has been set up to capture rainwater from the 12’X24’ garden shed.

Future Work (completed work from previous year(s) by check mark):

- ✓ Investigate installation of low-flow shower heads
- ✓ SLUG to implement drip irrigation as feasible
- Incorporate water conservation into the final Green Purchasing Policy
- Implement water conservation measures are part of building renovations (as suggested in sustainable building policy – see below)
- Detailed accounting of water use
- Water meters in all residence halls
 - Target high-use facilities for further investigation
 - Hold a water-saving contest between residence halls

Food

In the fall of 2009, Lawrence University partnered with Bon Appétit (BA) to provide institutional food service. Their mission statement is to *make food choices that celebrate flavor, affirm regional cultural traditions, and support local communities without compromising air, water or soil, now and in the future*. Specifically, they have a corporate goal of sourcing at least 20% of the food purchased from a 150 mile radius. Approximately 8% of food purchase was local for the 2009-10 academic year. This improved 15.5% in 2010-11 and they should reach their target of 20% in 2011-12. Other highlights of the year include:

- Eliminated all plastic knives, spoons and forks from Café
 - Replaced with FSC certified wooden cutlery
- Partnered with Greenfire for a month-long re-useable coffee mug campaign
- Added the following local/sustainable vendors:
 - Gebhart Organic Beef
 - Century Sun Oil (Organic Sunflower Oil)
 - Riese Hog Farm
 - Hidden Valley Farm (Lamb)
 - Grassway Organic Turkey
- Replaced “box Lunch” program with a plated box lunch that uses zero disposables
- Reduced the use of plastic “to go” containers by switching to paper bags and paper wraps in the Café and bron bag lunches in Kate’s

BA also runs innovative campaigns in its dining halls such as the Low Carbon Diet and a Food Waste Minimization program (see www.bamco.com/page/3/sustainable-food-service.htm). Collaboration between SLUG and BA diverts some 30 tons of kitchen prep waste per year from the landfill to the SLUG compost operation. BA has also worked with GR by eliminating the sale of bottled water and providing BPA-free reusable water bottles. Efforts to minimize packaging and waste generated primarily at the snack bar are ongoing. Reusable clam-shells are available for a one-time \$4 purchase, but they were rarely used last year. This year an additional \$0.25 discount was given to diners who used the clamshells for carry out. Reusable stainless steel hot-beverage containers are also available for purchase in WCC. Greenfire helped promote the use of these (or any reusable hot beverage container) by giving discounts to beverages purchased with the mugs for the month of February.

The ENST 300 Symposium on Environmental Topics class conducted an intensive assessment of food waste at Andrews Commons. The weights of plate scrapings at total of four lunches and four dinners were recorded over a two-week period. Drinks were not measured. The results indicate that the per capita food discard is fairly consistent between lunches and dinners. With a mean of 2.9 ounces and a high and low of 4.4 oz and 2.2 oz respectively. These data are within the range of previous year’s plate scrapings conducted by Greenfire using a slightly different methodology. Greenfire found an average per capita waste of 2.6 oz in 2008-09 and 2.4 oz in 2009-10. These amount to approximately 250-300 lbs of waste per meal. This waste is compostable and could be diverted from the wastewater stream (all food waste goes into a garbage disposal and becomes part of the

water waste stream). An industrial composter with the capacity for this level of waste would cost approximately \$60,000, and at this point is not economically feasible.

Future Work (completed work from previous year by check mark):

- ✓ Investigate large scale composting to include post-consumer waste (see also section on waste reduction below).
- ✓ Record post-consumer waste for at each meal for 2-3 weeks.
- Continued collaboration with Bon Appétit
 - Improve communication between customer and green dining options (e.g. clamshells, re-useable hot and cold beverage containers.
 - Increase to 20% purchase of local foods

Construction, Renovation and Maintenance of Buildings

The Gold LEED-certified Warch Campus Center officially opened in the fall of 2009. As the campus moves into a renovation phase over the next decade the committee discussed the opportunities that would come with retrofit of existing buildings. The end result was the following sustainable building policy, which was endorsed by the president's cabinet:

“Ongoing building maintenance and operation as well as renovation shall incorporate principles of sustainable design, building, and operation including energy efficiency, indoor air quality, water conservation, construction site and waste management, and use of local materials. All new construction shall be designed to meet or exceed LEED Silver standards or at an equivalent level to those of a comparable rating system.”

This policy has already been implemented in a number of new and ongoing building renovations, including the use of high-efficiency LED light fixtures in Coleman Hall and the Wellness Center, recirculated-heat HVAC systems in the bathrooms of Trever and Plantz Halls, and low-flow water fixtures in those renovations. Additionally, the policy helped inform a thorough energy audit and renovation plan for Wilson House and SLUG house, conducted by Jacob Esch ('11) in the summer of 2010.

As the university moves forward with additional new construction and building renovations, the building policy will become increasingly important. Practices are being put into place to inform bidders, contractors and subcontractors of this policy so they can include our goals into their estimates.

Additionally, as we move forward with construction and renovation, the issue of waste is significant. On this front, students in the ENST 300 symposium on waste reviewed current practices to ensure the continuation of currently sustainable practices and proposed a system to better record and track post-renovation materials flows.

Future Work (completed work from previous year by check mark):

- ✓ Develop a policy that can be used to guide new campus construction and renovation (including waste disposal) according to sustainable principles
- Revisit recent remodels like Youngchild to see if it is LEED or Energy Star equivalent.
- Compare performance of WCC to like buildings in similar climatic settings.
- Develop a plan and model for retrofitting small houses and dorms.

Energy

The historic energy use data and greenhouse gas emission inventory for main campus was updated to include the 2010 calendar year. Current and historical data back to 2002 on use of natural gas and electricity, demographics of the university, building sq. footage was gathered in consultation with Facilities Services and the Office of Institutional Research. Information on the mix of energy used to generate electricity was supplied by Randy Sable of WE Energies. These data were analyzed using the Campus Carbon Calculator™, a tool developed by Clean Air-Cool Planet Inc. This is the accepted methodology by which over 600 colleges and university track and report their carbon emissions to AASHE.

An analysis of our emissions sources last year indicated that the vast majority of CO₂ is was produced through the use of electricity and natural gas for the main campus. Bjorkluden has been has not yet been included in the analysis, but will likely be added in next year so that the influence of the wind turbine can be assessed. Based upon last year's data, travel made up approximately 10% of our emissions. Other institutions of similar size report that these will make up 10-15% of the carbon emissions. The contributions from these sources are relatively low, problematic to track, and difficult to mitigate, so we have excluded them from the present analysis. We believe that efforts directed at reducing the use of electricity and natural gas (heating and hot water) will have the largest proportional effect on reducing our carbon foot print.

Lawrence has reduced its scope 1 and scope 2 (natural gas and electricity) gross greenhouse gas emissions by approximately 27% since 2002 (Figure 1). On a per square foot basis greenhouse gas emissions have dropped 41% over the same time period. Some of this reduction is due to a change in the fuel mix that Wisconsin Energies (WE) uses to make electricity (Table 1). With the exception of our purchase of renewable energy directly through WE, the energy mix is beyond our control. Within our control, however is how much energy we use on campus. In the past 9 years we have made great strides towards energy efficiency, which have directly reduced our greenhouse gas emissions. Moreover we have begun to produce some of our own energy on campus.

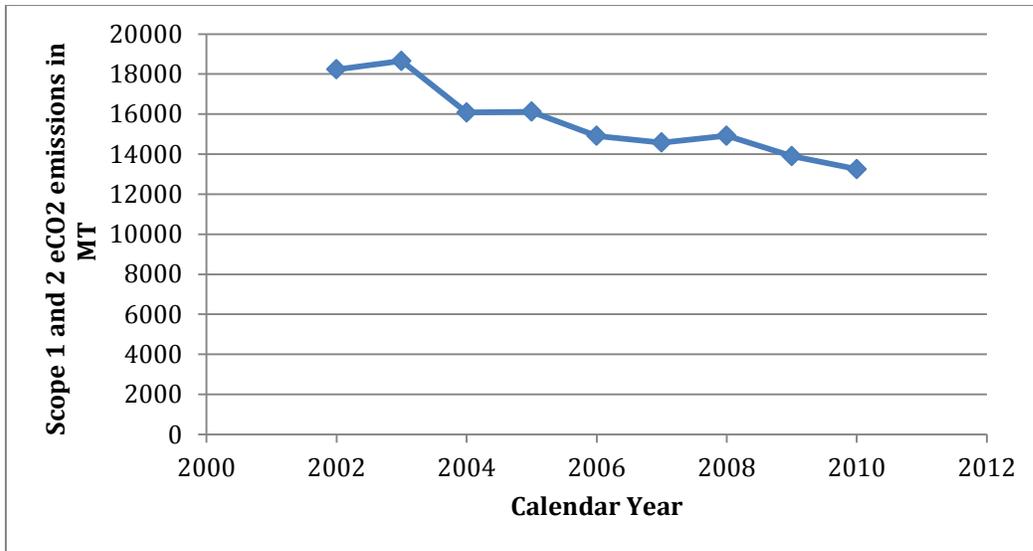


Figure 1: Scope 1 and Scope 2 equivalent carbon dioxide emissions of Lawrence University in metric tons (MT) per year. Analysis does not include emissions due to travel or the operation of Bjorkklunden.

The use of electricity and natural gas at the Appleton campus has decreased over the last 9 years by 2% and 45% respectively (Figure 2). During that same time period, however building square footage increased by 16% with the addition of Hiatt Hall in 2003 and the Warch Campus Center in 2009. Temperatures also change from year to year as reflected by the heating degree day trend line (Figure 2). Normalizing the total energy use data by square footage and temperature proxies (HDD and CDD – cooling degree day) allows direct comparison between years (Figure 3). These data indicate a 43% reduction in combined energy use per square foot per HDD + CDD since 2002. This suggests that our efficiency in energy use has improved over time.

Year	Coal	Natural Gas	Nuclear	Renewable	CO ₂ Per Megawatt Hour ¹
2001	70%	1%	28%	1%	1659.7
2002	69%	1%	29%	2%	1646.2
2003	70%	0%	29%	1%	1624.3
2004	71%	0%	28%	1%	1669.2
2005	71%	4%	25%	1%	1644.4
2006	64%	5%	30%	1%	1568.5
2007	64%	7%	28%	1%	1610.4
2008	65%	7%	27%	1%	1646.5
2009	55%	8%	32%	5%*	1,469.2
2010	57%	9%	29%	5%	1616.0

¹Sabel, Randy, Wisconsin Energies. Personal communication, March 2010.

Table 1: Wisconsin Energies Fuel Mix and Carbon Dioxide emitted Per Megawatt Hour . Data provided by Randy Sabel of WE. *In 2009-10 2% of the energy mix came from renewable sources and Lawrence University purchased an additional 3% for use in the Warch Campus Center.

The biggest reductions are clearly on the use of natural gas. Electricity consumption has remained flat in the past 9 years. However, this is against a backdrop of an enlarging campus community. The student body has increased by 12% over that time period. When this is considered there is a reduction of approximately 13% in electricity consumption and nearly a 50% reduction in combined energy use per square foot per HDD + CDD per student since 2002.

Improved efficiency in natural gas use can be attributed to three main factors. First, both the WCC and Hiatt hall were built to at least LEED silver standards (though certification was not sought for Hiatt). Our new buildings are simply more energy efficient than the older ones and this underscores the importance of adding energy efficiency measures in all building renovations and new buildings. The second factor is the move to a distributed rather than a centralized heating system, which started in 2005-06. The most recent change was the implementation of a new HVAC policy in April of 2009 and the change in academic calendar in which the campus is closed from Thanksgiving until just after New Year’s Day. Together these changes reduced consumption of natural gas by ~10% over 2008 (normalized by HDD).

It deserves mentioning that these reductions in energy consumption save the university large amounts of money. If consumption since 2002 grew proportionally to the size of the institution, the university would be spending roughly twice as much on energy today (not adjusted for changes in energy prices).

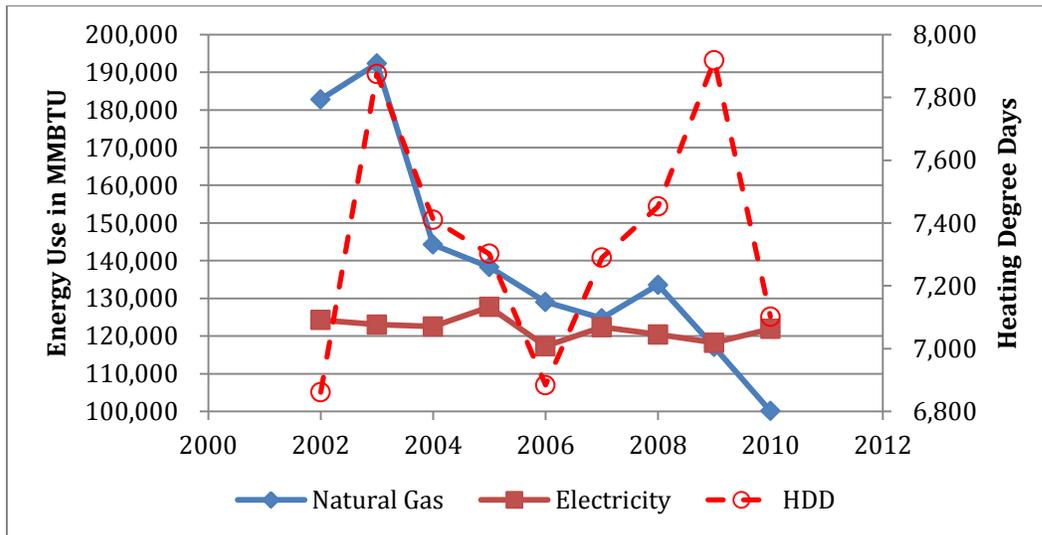


Figure 2: Historical trend of energy use electricity and natural gas (our two primary contributors to CO₂ emissions) and heating degree days for each year. MMBTU = 1 mega btu = 1 decatherm.

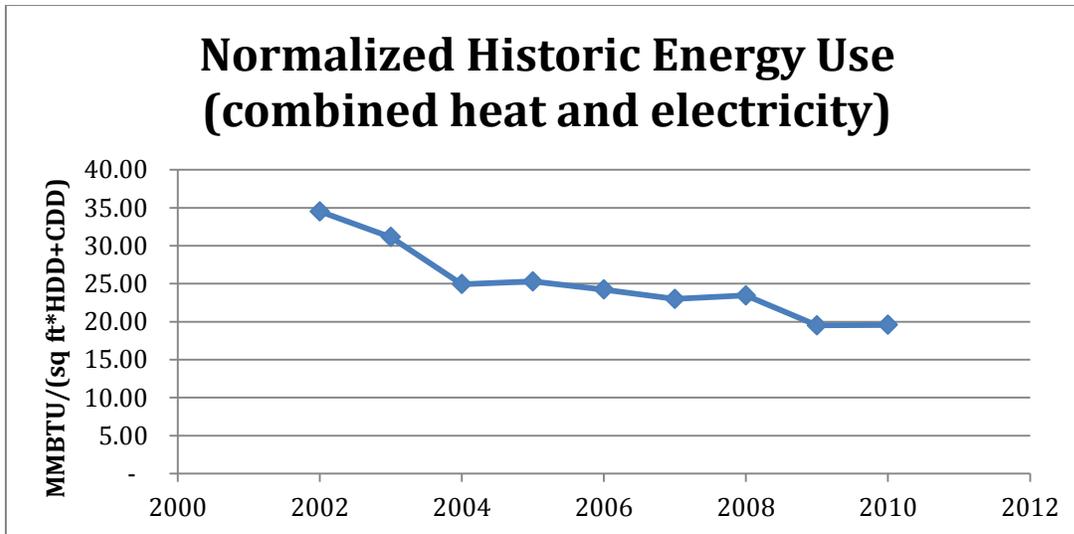


Figure 3: Combined natural gas and electricity expressed as megaBTUs (decatherms) from 2002 through 2010. The energy use has been normalized by square footage and the sum of heating degree days (HDD) and cooling degree days (CDD).

In April 2011, WE Energies conducted an energy audit that included all of the primary residential, academic and administrative buildings on campus. The auditing team observed current practices and made recommendations across eight categories, including building envelopes, lighting fixtures/controls, food service, information technology and future construction. Recommendations were categorized according to estimated cost, availability of rebates/external funding, and size of impact. The lengthy final report will be a valuable resource to focus our energy conservation efforts as we move forward.

Thus far reductions in electricity consumption have not been on pace with those for natural gas. A few trial efforts like a “slay the vampires” campaign against devices that draw power when on standby mode was launched in the fall of 2009 and Instructional Technology Services has experimenting with smart power strips that are on motion sensors. The effects of these pilot projects are too small to measure. However, as per the WE Energies auditors suggestions, replacing all lighting with lower wattage fluorescents (or LEDs) should be phased in and all lecture halls should be equipped with motion sensors and timers to control lights when not occupied.

Facilities Services and Green Roots continue to search for “low-hanging fruit” in the realm of energy efficiency. For example, all small house attics will be insulated this summer in conjunction with updated fire suppression systems and the steam lines in the boiler house received new insulation. More significant additional reductions in energy use will require substantial investments in infrastructure such as placing the Music Drama center on its own boiler system and investments in on-site production of energy such as renewables and co-generation. However, there are potentially large gains by engaging the student body in energy conservation measures, rather than relying simply on infrastructure.

Campus energy reduction competitions during the year might lead to additional reductions in energy use for heating and electricity. Each of the seven major dorms is scheduled to be metered individually by the start of the 2011-12 academic year. (Another suggestion of the WE audit.) Once in place these meters will allow real time monitoring of energy use and can be used to gauge per capita consumption among the dorms. Moreover each dorm's energy usage could be displayed on a website for easy comparison. A display in the common space of each dorm and at the WCC would serve as a reminder of how much energy is being consumed. Research has shown that this type of feed back results in 5-10% savings in energy usage, simply because people can see what they are using in real time (Darby, 2006). Our own experiment with small houses last year gleaned savings of 10-20%. Connecting students with the impact of their lifestyles, in a fun but meaningful way, could also result in significant energy savings.

On-site energy production:

In the 2009-10 academic year the university commissioned professional assessments of three different renewable energy systems, solar photovoltaics, solar thermal, and wind power at Bjorklunden. Two first-year students, Austin Federa (LU '13) and Will Meadows (LU'13) worked with Northwind Renewables to assess the feasibility of installing photovoltaics on campus. The students also worked with this committee to apply for external grants from WE Energy and Focus on Energy. Together they garnered approximately \$18,000 in funding. The remaining \$10,000 was funded by Facilities Service, Green Roots, and LUCC. A relatively small 2.94 kW solar array for use in courses was installed over the week of April 19th and began producing power in May. To date the array has generated over 4,700 kWh of electricity and reduced our CO₂ production by nearly 5 tons.

In January of 2011, Samuel Flood (LU 11) suggested that Green Roots get in touch with Solar Innovations Inc. This company offers attractive deals to non-profits and schools for PV systems up to 20 kW. Green Roots penned grants to the state program WI Focus on energy, and to WE energies and amassed approximately \$65,000 in funding (Note: shortly after securing these funds WE eliminated this grant program). This, combined with a non-profit rebate through Solar Innovations, brought the final cost of the 20 kW array down to ~\$12,000. Installation on Hiatt Hall began in mid-July 2011 and will be operational by the time new students arrive on campus in September. The payback on the initial investment is ~6 years over a useful life span of 30-40 years.

Based upon an initial independent study project by Steve Schnorr (LU'10), a wind assessment of the Bjorklunden property was performed by Kettle View Renewable Energy. Bjorklunden was chosen over the main campus due to space limitations at the main campus, city ordinances against such structures, and because the wind resource is superior along the lakeshore. The assessment indicated that a refurbished 95kW unit would produce approximately 1/2 of the lodge's electricity and would have a payback of just over 7 years with state and utility incentives. Unfortunately the refurbished units are very difficult to acquire, so in the fall of 2010 we shifted focus to a new 50kW Endurance E3120. The Development Office managed to raise ~\$170,000 by Dec of 2010. Grants from Focus on Energy and the Door County utility WPS were fully funded, bringing the

total to \$370,000. Work will begin on the turbine in the summer of 2011, with commissioning expected in late fall. The payback is estimated to be ~12 years with a life span of 20-30 years.

Three other feasibility studies were initiated in 2010-11; cogeneration, solar thermal, and wind at Alexander Gymnasium.

The study of installing a co-generation system on the existing LU boiler system suggested that this option was not cost effective at this juncture. If the boiler house and boilers are ever upgraded co-generation should be re-explored.

A solar thermal assessment was performed also by Northwind Renewables in May of 2010 to determine the effectiveness of offsetting some of the Buchanan Keiwitt center's pool heating. The study showed that a solar thermal array on top of the wellness center could supply ~10% of the heat needed, and would have a payback period (after state and utility rebates) of approximately 7 years. However because our utility no longer offers monetary support for renewables this option is no longer economically feasible under the present Focus guidelines. If those guidelines change, or if WE changes their stance, then this might be the best future option for renewables.

A wind site assessment was performed by West Wind Renewable Resources for the practice field at Alexander Gymnasium. The site assessor noted that the site has good wind speed, particularly for a site within city limits, and wind power for Alexander Gymnasium is feasible. As noted, however, the termination of the WE grant program makes funding very difficult. If the grant program returns in the future, we suggest further investigating the possibility of small, tilt-up turbines (like those produced by Renewegy, a manufacturer based on Oshkosh). In addition to an attractive payback period, turbines in this location would make a visible public statement about our commitment to sustainability.

Future Work (completed work from previous year by check mark):

- Review HVAC policy implementation
- Develop a series of BMP for office/room heating and cooling.
- Residence Life training (heating/cooling, recycling, etc.)
- ✓ Work on a vampire voltage elimination campaign
- ✓ Continue exploring possibility of wind power at Bjorklunden
- "Turn it off" campaign with stickers on bathroom and other switches not already on motion sensors.
- Meter all residence halls
- Put Music and Drama center on own boiler
- Upgrade air handler in Science Hall
- Upgrade lighting across campus
- Install motion sensors/timers in all lecture halls
- Assess feasibility of cogeneration
- Assess feasibility of solar hot water heater for pool.

- Continue assessing feasibility of wind power for Alexander gymnasium.

Waste Reduction and Recycling

Our waste diversion rate as reported by Waste Management remained at 32% this year. These figures are misleading because they are based on the volume of the containers and the number of times it is emptied to determine the cumulative amounts. Unfortunately this system is inadequate for recording our actual waste production and documenting the effects of any changes. However, the ENST 300 Symposium on Environmental Topics class explored the broad characteristics of our solid waste stream and proposed innovative solutions to some of our problems.

The ENST 300 class conducted a university-wide waste audit in the winter of 2011. Three dorm buildings, three academic buildings, the Warch Campus Center, outdoor receptacles, and those from a basketball game were chosen to represent a point count of Lawrence University's waste stream. The results indicate that 18% by weight of the contents of garbage cans was recyclable and that 37% was compostable (Figure 4). Of the recyclables paper and plastic make up the largest proportion. Bags designated as recyclable material were also collected and sorted. Only about 4% of the material in recycling bins is garbage. Students surveyed indicated that in general there is poor understanding about what could be recycled and where to recycle. Based upon these data a number of suggestions were made.

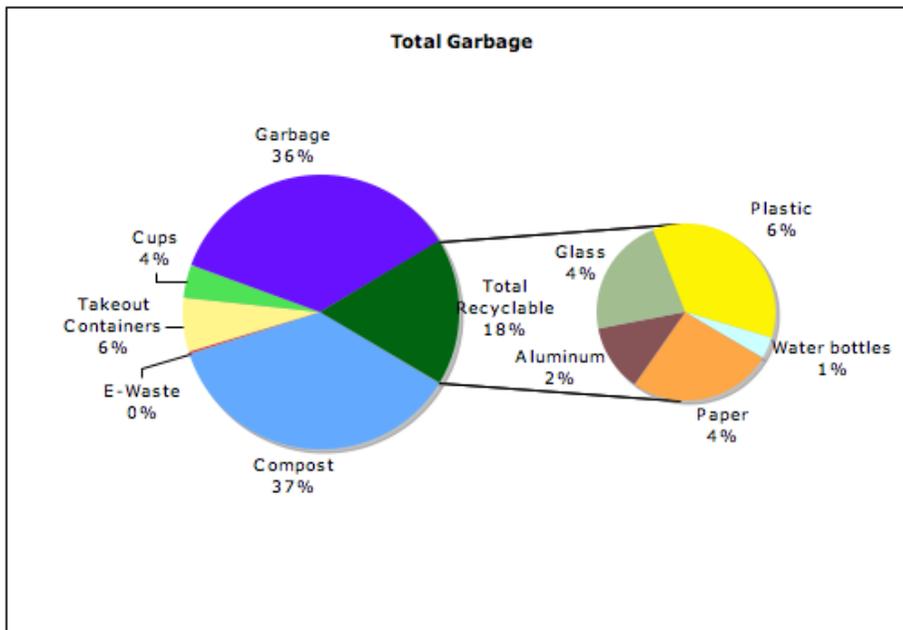


Figure 4: Breakdown of garbage sort conducted by ENST 300 class.

1. More education/training of incoming and existing students is necessary. To facilitate this Green Roots will work with Student Life and the Sustainability RHD.

2. There must be a consistency in design and placement of recycling containers and waste containers. GR will work with Sara Gorton and her staff to address this.
3. Outdoor recycling bins need to be added to campus. GR is working with Facilities services on this.
4. Better recycling options (more containers placed next to garbage) need to be provided at athletic events. GR will work with the Athletics department on this front.
5. Better education/training of new and existing students on use and availability of reusable drink and take out containers. GR will work with Bon Appétit on this front.
6. Use the information desk at WCC as a clearing house for e-waste. GR will coordinate this with Greg Griffin.
7. The large amount of compostable material in the waste stream could be captured by an industrial composter. However such an investment cannot not be justified on the basis of cost alone, but could be beneficial for the campus community.

Other waste reduction efforts on campus include the move to 100% recycled paper for all copier paper and university letterhead. This change involved no additional cost to the university and uses a local supplier for the letterhead. Sophie Leppanen (LU 11), a member of the ENST 300 course, with the help of Greg Griffin, put together a campus wide e-sweep. In one day, Sophie, 17 student volunteers, and workers from facilities services collected 12,000 lbs of electronic waste for recycling from the university and Appleton community. Greenfire once again spearheaded the Recyclemania competition and Lawrence again finished in the top 10. Reuse of materials on campus is facilitated by a student run thrift store called the Magpie and ListIt@Lawrence, a web resource where students, faculty, and staff can buy and sell used items.

Future Work:

- Faculty education on double-sided printing
- ✓ Work with Honors committee to accept double sided honors projects
- ✓ Follow up with the registrar on getting rid of paper notifications;
- ✓ Electronic submission of tutoring reports from the CTL
- ✓ Adopt use of recycled paper campus wide
- Lower print runs for Conservatory programs
- ✓ Work with Greenfire and Residence Life on recycling campaign
- ✓ Educate campus about single stream recycling
- Develop Campus Center recycling center for old cell phones, etc.
- New Campus Center and disposables: follow up on report from Megan Bjella and commitments from Greg Griffin about not using plastic bags, reusable to-go containers
- ✓ Double check on the practices of our electronics recycler.
- Develop system for tracking actual amount of waste and recycling produced
- Develop system for tracking amount of paper used on campus.

Curricular and Co-curricular

As a service to new and current students, Sophie Patterson ('11) wrote a tri-fold booklet titled "A Guide to Sustainability at Lawrence", which includes information on recycling, ride shares, environment student groups, and other student-centered sustainability efforts (attached as Appendix B). After minor updates, the sustainability guide will be distributed to new students through a collaboration between GR and the Campus Life office, and relevant excerpts will be posted on the Campus Life website. Sophie also developed a sustainability tour for the admissions office. This tour is an option in addition to the standard tour for visitors to campus.

To date there has been no serious effort to incorporate sustainability "across the curriculum." However, there is a well established environmental studies major and curriculum at Lawrence with contributors from 12 different academic departments. Approximately 1/4 of the student body takes an Environmental Studies course each year.

The sustainability-themed community read that began in Spring 2010 grew substantially in Spring 2011, with approximately 110 students, faculty and staff participating (a 10% increase over the 2010 community read). The group read Ellen Ruppel Shell's Cheap: The High Cost of Discount Culture, which explores the environment, social, political, and economic costs of consumerism in the US. Over the four-week course, students, faculty and staff discussed quantity versus quality, shopping at outlet malls, dumpster diving, and wearing hand-me-down clothing. One student put the ideas from the book into action by organizing a volunteer trip to Goodwill.

Future Work (completed work from previous year by check mark):

- ✓ Follow up on the possibility of a "community read" project;
- ✓ ENST 300: Symposium on Environmental Topics will focus on sustainability and college campuses
- ✓ Collaboration with Government Department to include environmental speakers as part of Winter and Spring Povolny Lecture series.
- ✓ ENST 300 course on waste reduction.
- Continue and expand the sustainability-themed community read program.
- Continue participation in regional sustainability workshops.
- Finalize and distribute the campus sustainability guide.

Transportation

For 2009-10, Lawrence continued to run shuttles to destinations of interest 5 days a week and to and from Alexander Gymnasium. The LUCC student welfare committee voted to extend the shuttle program into the 2010-11 academic year. The bike program was deemed successful and some students are seeking funding for additional bikes. The university no longer subsidizes student parking in off campus garages.

In 2011, the LU Ride Board (a community carpooling resource) became part of the new ListIt@Lawrence web resource where students can share offers and requests. This is a

major technological improvement over the previous Ride Board (simply a corkboard with pins and paper), but we will continue to evaluate the new system.

- ✓ The expanded van service will be assessed in the middle of fall term.
- ✓ Parking ramp costs will again be charged to students as will passes for the 24 hour student spaces
- ✓ An area near the Banta Bowl will be reserved as free parking for students who do not need their cars often.
- ✓ GR may explore the “Zipcar” concept further.
- ✓ GR continue to explore routes with Valley Transit.
- Move to an electronic ride share/web ride board.

Funding

Green Roots explored funding mechanisms with the development office and with the Long Range Financial Planning Committee (chaired by Provost Burrows and VP for Business affairs Riste). Development has fully engaged with fund raising for specific green initiatives (i.e. solar panels and wind power at Bjorklunden). Establishing a more general “green” fund was not as well received. Fortunately the LRFPC was amenable to establishing a fund that could be used to promote and continue green initiatives. This fund will roll over from year to year allowing unused sums to accumulate. The funding level for 2010-11 is \$40,000. The LUCC ERC developed its own funding mechanism whereby students can apply to LUCC for funding of sustainability themed projects. This past year funding was awarded to the solar panel project as well as the construction of a hoop house for the garden. In 2010-2011, LUCC funding for this grant was increased from \$2000 to \$5000.

After gauging interest with a student survey, the LUCC ERC facilitated a student initiative called the Lawrence University Sustainability Fund. If approved, this fund would establish a separate fee of \$5.00 per student per term committed exclusively to sustainability-related infrastructure changes. The Sustainability Fund was approved unanimously by the LUCC General Council, and will be presented to the Board of Trustees in the fall of 2011-2012. If approved, the Sustainability Fund would begin in 2012-2013.

- Establish a ‘green’ fund with contributions from students, alumni, and university.
- Work with LUCC Environmental Responsibility Committee to implement the LU Sustainability Fund, and in particular, design a mechanism for choosing projects and evaluating the effectiveness of the fund.

References Cited

Campus Carbon Calculator, 2008, User’s Guide Version 6.4.

Darby, S., 2006, *The Effectiveness Of Feedback On Energy Consumption*, Environmental Change Institute of Oxford University.

Appendix A

The University Committee on Environmental Sustainability

Members: Three faculty members, one of whom will be appointed by the president and designated as chair; two student representatives (appointed by LUCC, one of whom shall be a member of the LUCC Committee for Environmental Responsibility); the Vice President for Student Affairs (or a designate of that office); and the Director of Facilities Services (or a designate of that office). Faculty committee members will serve staggered multi-year terms.

Purpose: To improve the environmental sustainability of Lawrence University by continuing with existing efforts related to university operations and promoting environmental awareness, and by exploring new opportunities in these areas. The committee will be responsible for:

1. Identifying and addressing environmental sustainability challenges for Lawrence University;
2. developing procedures for periodic review and revision of environmental sustainability initiatives;
3. record keeping on all environmental sustainability efforts;
4. reporting to the Lawrence community and external agencies on the state of environmental sustainability at Lawrence;
5. promote awareness of environmental sustainability related issues.

To these ends, the committee will:

1. advise the president and cabinet on matters relating to environmental sustainability;
2. promote student, faculty, and staff engagement in improving the environmental sustainability of Lawrence;
3. prepare and publish on the Lawrence website an annual report of environmental sustainability efforts;
4. sponsor, on an annual basis, workshops, symposia, or other events for faculty, staff, students, and the broader Fox Cities community on environmental sustainability related themes.

Duration:

The form and function of this committee will be reviewed after three years by the President, the Faculty Committee on University Governance, and the committee itself. At that time, this ad-hoc review group will recommend a long-term structure to ensure the continuance of environmental sustainability efforts at Lawrence.

Appendix B

<p>II. Get Involved!</p> <p>On-Campus Organizations: Lawrence has numerous groups to join. Attend meetings, look online, and talk to other students to see if you want to get involved.</p> <p>LUERC: The LU Environmental Responsibility Committee is a policy-oriented group dedicated to environmental awareness and energy issues. Have an idea for a change on campus but need funding? Check out their Environmental Initiative Grant!</p> <p>Greenfire: Centered on student-activism, members work to increase environmental awareness on-campus. Become friends with the club on Facebook to learn more about their events!</p> <p>SLUG: The Sustainable Lawrence University Garden is dedicated to practicing sustainable agriculture and providing fresh produce to the Lawrence Dining Service. Learn more at http://www.lawrence.edu/sora/sluga</p> <p>GreenRoots: GreenRoots is a committee of faculty, staff, and students who work to improve sustainability at Lawrence. Read more at http://www.lawrence.edu/committee/greenroots</p> <p>ORC: The Outdoor Recreation Club gives students affordable and fun opportunities to get off campus and interact with the natural environment. Trips include skiing, canoeing, hiking, backpacking, and many more.</p> <p>McCarthy Co-op: Stop in at 122 N. Union Street for a vegetarian-friendly dinner every Friday at 6:30pm. Everyone is welcome!</p> <p>For a full list of extracurriculars Lawrence offers, see the Campus Life Student Involvement Guidebook. If no organizations exist that incorporate your interests, create your own!</p>	<p>III. Spend time off-campus!</p> <p>Community Service: Get to know your surroundings by volunteering in the community.</p> <ul style="list-style-type: none"> • Contact the Volunteer and Community Service Center (VCSC) if you need help finding opportunities. It is located on the second floor of Raymond House. <p>Go Outside: Appleton has some great natural areas to explore. Try visiting (by car or bike) Bubolz Nature Preserve, High Cliff State Park, or the Lawrence Riverwalk.</p> <p>Transportation:</p> <p>LU Shuttles: Free shuttles going to locations such as Woodman's and the Fox River Mall are offered multiple times a week. Look for posters around campus.</p> <p>Ride Share: On the fourth-floor of the campus center is a ride-share board. Here you can offer or ask for a ride.</p>  <p>Public transportation/bus: The Fox Valley offers decent and inexpensive public transportation. You can plan your trip at www.myvalleytransit.com.</p> <p>Bike: Biking is great option when the weather is nice. Most places in Appleton are accessible by bike, the landscape is flat, and it is good exercise.</p>  <ul style="list-style-type: none"> • Don't have a bike? Bikes, helmets, and locks can be rented at the info desk in the campus center. 	 <p>A Guide to Sustainability at Lawrence</p>  <p>Written for Lawrence Students by Lawrence Students</p>
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What is Sustainability?

- A widely accepted definition created by the UN Brundtland Commission on Environment and Development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
- How does this apply to life at Lawrence? ... In 2008 Lawrence President Jill Beck announced GreenRoots: The Sustainable Lawrence Initiative, spurring a movement of increased environmental awareness and sustainability initiatives on-campus.
- Sustainability is more than just LEED certified buildings; it is making thoughtful decisions, realizing the relationships to your surroundings, and recognizing your impact as an individual and as part of a college campus.

Reduce Consumption:

Many individuals choices can minimize the amount of waste at Lawrence .

1. In Your Room:

- Use Compact Florescent Light bulbs (CFLs), they are provided at any dorm's front desk
- Shut down your laptop if you're not using it within the next half hour
- Unplug electronic devices: just having them plugged in uses energy
- Residences should be kept at 68°F during October through April. If your room is too hot or cold see an RLA. Do not open windows or crank the thermostat



2. In the Bathroom:

- Conserve water: report leaks, turn off the water while brushing your teeth, sing somewhere other than the shower
- Talk to your floor about invoking an "if it's yellow let it mellow" policy

3. In Your Classes:

- Buy used textbooks
- See if your teachers will let you e-mail an assignment rather than printing it out. When you have to print, do it double-sided.



4. While Dining:

- When eating in the WCC use the plates, ceramic mugs, and metal silverware provided.
- Remember your eyes might be bigger than your stomach. Go back for seconds instead of taking too much the first time
- Eat less meat! In 2006, a United Nations Report proclaimed the meat industry "one of the top two or three most significant contributors to the most serious environmental problems, at every scale from local to global."
- If taking out food, use the reusable clam-shells provided by Bon Appétit, as well as reusable coffee mugs and water bottles.



Be a Conscious Consumer:

1. Make Informed Decisions:

- Before going to the Store. Think about:
- where the product you are buying was shipped from and who was it was made by
 - what corporation you are supporting with your money, what organizations it supports, how its employees are treated, and whether or not it benefits the Appleton economy.

Websites like <http://www.newdream.org/marketplace> and <http://www.greenamericatoday.org/programs/responsible shopper> can help you gather this type of information.

Best ways to deal with waste:

Trash: There are garbage cans spread out around campus, use them!

General Recycling: Lawrence has single stream recycling. This means you can deposit aluminum/plastic labeled 1-7/glass bottles and cans, used paper, cardboard, and even the take-out containers for the café, all into the same bin!

*Pizza boxes cannot be recycled, put these in the trash.

Electronic waste: Batteries, cell phones, and CFLs need to be recycled separately. At the front desk of every dorm is a drop-off container for used batteries. Recycle other waste through the WCC info desk.

Composting: Over one ton per week of pre-consumer food waste from the campus center, various small houses, and local businesses is composted by SLUG then used in the campus garden.

Look around your dorm for 'free boxes'. These are a place to trade clothing and other goods. If there isn't one on your floor, talk to your RLA and start one!

