



Sustainability is Central

**2010-2012 Biennial Report on Sustainability
at Central Michigan University, Mount Pleasant, Michigan**

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November 2012



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www.cmich.edu, keyword: GLISS.

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Sustainability is Central: 2010-2012 Biennial Report on Sustainability at Central Michigan University, Mount Pleasant, Michigan

Campus Sustainability Advisory Committee: 2008-2012

In late January, 2008, Dr. Michael Rao, former president of Central Michigan University (CMU), established a Campus Sustainability Advisory Committee (CSAC). This committee was charged with developing a sustainability program for the university with the leadership of the committee assigned to the Vice President for Finance and Administrative Services, Mr. David Burdette.

CSAC was formed to serve as an advisory body to the President and senior officers regarding university actions and practices that promote sustainability, with a strong focus on student and faculty involvement. Appendices 1 and 2 contain the text of the original memos. The charge to the committee was as follows:

“Within one year, the Campus Sustainability Advisory Committee, in concert with existing campus groups, organizations, committees, and/or offices, will:

- Complete a comprehensive inventory of CMU’s past and present energy use, greenhouse gas emissions, and building growth.
- Develop a comprehensive plan to stabilize and reduce long-term energy and utility costs while recognizing future growth needs of the university.
- Draft an energy-efficient appliance purchasing policy for adoption by the President that promotes the purchase of ENERGY STAR certified products.
- Formalize sustainable design and operations policies so that all new campus construction and major renovation projects are built to LEED specifications.
- Develop an institutional action plan with target dates, goals, actions, and mechanisms for tracking the progress of CMU’s sustainability efforts.

Beyond the first year, CSAC will:

- Determine the appropriate level and recommend a target percentage of electricity that should be purchased or produced from renewable energy sources. Recommend a deadline for which CMU should achieve the target.
- Determine and recommend the target percentage by which CMU should reduce greenhouse gas emissions. Recommend a deadline and strategies for achieving the target.
- Complete a comprehensive review of additional initiatives and activities that will further the university’s commitment to sustainability.
- Partner with senior leadership to model appropriate behaviors, raise public awareness, and integrate sustainability into the institutional culture.
- Engage and encourage academic leadership to integrate sustainability into the curriculum.

- Incorporate sustainability concepts into existing purchasing policies and practices.

Through CSAC, CMU will seek relationships and partnerships regionally, nationally, and internationally that will further the stated objectives for sustainability, and will strive to serve as a model institution of efforts that ensure the future sustainability of our shared planet.”

At one of its first meetings, CSAC articulated its mission and discussed general area goals upon which to focus its efforts. The mission of CSAC is as follows.

Mission:

The mission of CSAC shall be to institute practices and create a culture of sustainability at Central Michigan University to assure that the economic, environmental and social concerns of the university community are managed in a sustainable manner to ensure that we have the resources to meet the current needs of students, faculty and staff while assuring that future needs of the university and local community will also be met. In carrying out the mission, we will focus on the following areas to improve sustainability.

Focus Areas:

1. Energy Conservation and Management
2. Water Conservation and Management
3. Green Purchasing Programs
4. Recycling and Waste Management
5. Sustainable Transportation
6. Reduction of Greenhouse Gas Emissions
7. Green Building and Remodeling
8. Curriculum and Instruction in Sustainability
9. Develop a Culture of Sustainability at CMU
10. Build a Sustainable Community and Society

Defining Sustainability:

While sustainability can be defined in many ways, the broadly accepted definition as outlined in *Our Common Future*, a report of the United Nations World Commission on the Environment published in 1987, is the one used by the university. Sustainability consists of meeting the needs of the present generation without compromising the ability of future generations to meet their needs. Sustainable systems are those which foster stewardship and wise management of natural resources and energy that allow the needs of the current day to be met while ensuring that vital resources and energy supplies will be available to meet the needs of future generations.

CSAC of Central Michigan University has used this general definition of sustainability to develop twelve specific goals addressing the ten focus areas listed above. In FY 2008-2009 and FY 2009-2010 CSAC developed institutional action plans to meet the listed goals. The goals are listed in the Institutional Action Plan (starting on page 5) together with specific accomplishments under each of them. Efforts from FY 2010-2012 are detailed in the narrative below; those from 2008-2010 are included in Appendix 3.

Awards and Recognition

CMU has been recognized by state and national organizations for its accomplishments in campus sustainability.

In 2010, CMU received an Honorable Mention for the American School and University's Green Cleaning Award for their green cleaning efforts. In 2011, CMU won the Grand Award in the Colleges/Universities category of the Green Cleaning Award sponsored by American School and University.



The Campus Grow project, which includes campus food gardens and a pilot project to compost food waste from a residential hall restaurant, was recognized by the Association for the Advancement of Sustainability in Higher Education (AASHE) in its August 2010,

electronic newsletter.

In 2009, CMU was presented with an award from the Michigan Recycling Coalition as Institutional Recycler of the Year.



The Residence Life program received a sustainability award from the Great Lakes Association of College and University Housing Officers, 2010, in recognition of their incorporation of sustainability principles in residential operations.

CMU was listed as one of Sierra Club's *Cool Schools* in September 2009 and 2010, in recognition of its ongoing sustainability programs, efforts to reduce greenhouse gas emissions, and academic programs. CMU ranked 43rd in 2009 and 96th in 2010.

Southeast Michigan's Corp Magazine gave CMU one of its *Going Green* awards in January 2010 in recognition of the development and implementation of a comprehensive sustainability program on campus.



In 2010, CMU won Capital Area Transportation Authority's Clean Commute Challenge. In 2012, CMU received 2nd place.

In September 2012, CMU was recognized by Consumer's Energy for its efforts in energy efficiency.



Great Lakes Institute for Sustainable Systems

In 2010, the College of Humanities, Social and Behavioral Sciences, under the leadership of then interim Associate Dean, Dr. Rick S. Kurtz, brought together a coalition of various academic units on campus to form the Great Lakes Institute for Sustainable Systems (GLISS). This institute will serve as a focal point for sustainability programs on campus and will promote academic programs, research, community outreach, and campus operations that are dedicated to the advancement of sustainable systems.

The institute will promote these goals through interdisciplinary collaboration within the university and through complementary external partnerships to benefit the community, the Great Lakes region, and the world. Campaigns for support and funding for this new institute began in the fall of 2010. The mission, enduring principles and narrative for the new institute is contained in Appendix 4. The GLISS website can be found at the following links:

www.cmich.edu/sustainabilityinst

www.cmich.edu, keyword: GLISS



Institutional Action Plan

Goal 1: REDUCE CAMPUS ENERGY CONSUMPTION PER GSF BY 20% BY 06/30/2013

Includes electricity, natural gas and wood;
Using FY 2007 baseline = 130.5 kBTU/GSF
FY 2009 to date = 133.8 kBTU/GSF

FY 2010-2012 Initiatives

- Compact fluorescent bulb installation in 11 buildings (*complete*)
- LED light replacement in Kessler, Kulhavi and Campbell halls as well as Park Library (*complete*)
- T-8 bulb replacement in Engineering and Technology Building (*complete*)
- Light motion sensors installed in 9 buildings (*complete*)
- Wireless thermostats installed in Engineering and Technology Building (*complete*)
- Radiator valves installed in residence halls (*image to the right, complete*)
- 64 solar panels installed on the Education and Human Service Building (*complete*)
- Kitchen exhaust hood fans adjusted to be shut down or slowed, depending on need, in residential restaurants kitchens (*complete*)
- Apply for rebates from Consumer's Energy and DTE (*complete*)



FY 2010-2012

Several energy-saving measures were established in pursuit of achieving this goal.

Compact fluorescent lights have been installed in the Alumni House, Anspach, Dow Science, Grawn, Moore, Rowe, Bovee University Center, Warriner, Campbell, Kessler and Kulhavi Halls on campus; this resulted in a wattage reduction of 83% and an annual savings of \$26,318. LED lights have replaced incandescent bulbs in Kessler, Kulhavi and Campbell Residence Halls and in Park Library; this resulted in an average of 83% wattage reduction. Light bulbs in the Engineering and Technology Building were replaced with energy efficient T-8 bulbs and have incurred \$20,035 annual savings.

Motion sensors for interior lighting were installed in Anspach, Dow Science, Foust, Engineering and Technology, Grawn, Indoor Athletic Complex, Moore, Music, and Pearce Halls. Wireless thermostats have replaced pneumatic versions in the Engineering and Technology Building for \$7,000 in annual savings.

Sixty-four solar panels have been installed on the Education and Human Services (EHS) Building. These panels are anticipated to save CMU roughly \$15,000 a year in heating and cooling costs, as well as reduce the carbon footprint by 45 metric tons per year.



Solar panels on the roof of the EHS Building

Kitchen exhaust hood fans in residential restaurants have been adjusted and curtains were added in areas with hoods, which helps direct the flow of air. They can now be slowed down or shut off completely, depending on need, resulting in annual savings of approximate \$4,365 in electrical, heating, and cooling costs.

In residence halls (Merrill, Beddow, Sweeney, Thorpe, Carey, Wheeler, Cobb, Troutman, Robinson, Larzelere, Calkins, Trout, Emmons, Herrig, Woldt and Saxe) the installation of 4,861 radiator valves, which increase energy efficiency, accrue savings of approximately \$227,500 annually.

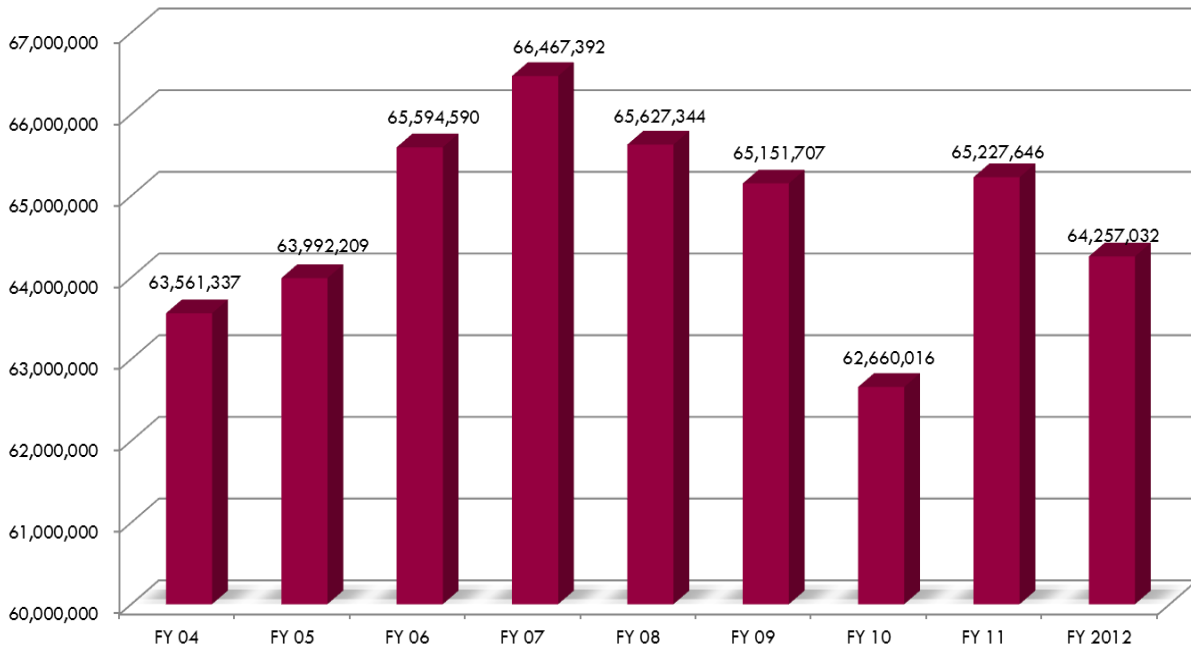
CMU has applied for and received over \$262,100 in rebates from Consumer's Energy and DTE Energy. Since 2008, CMU has received over \$200,000 from Consumers Energy, the largest amount any university in Michigan has received, in energy rebates for its energy conservation efforts.

In fall 2012, CMU was listed on the Top 20 On-site Generation list sponsored by the Environmental Protection Agency's Green Power Partnership Program.



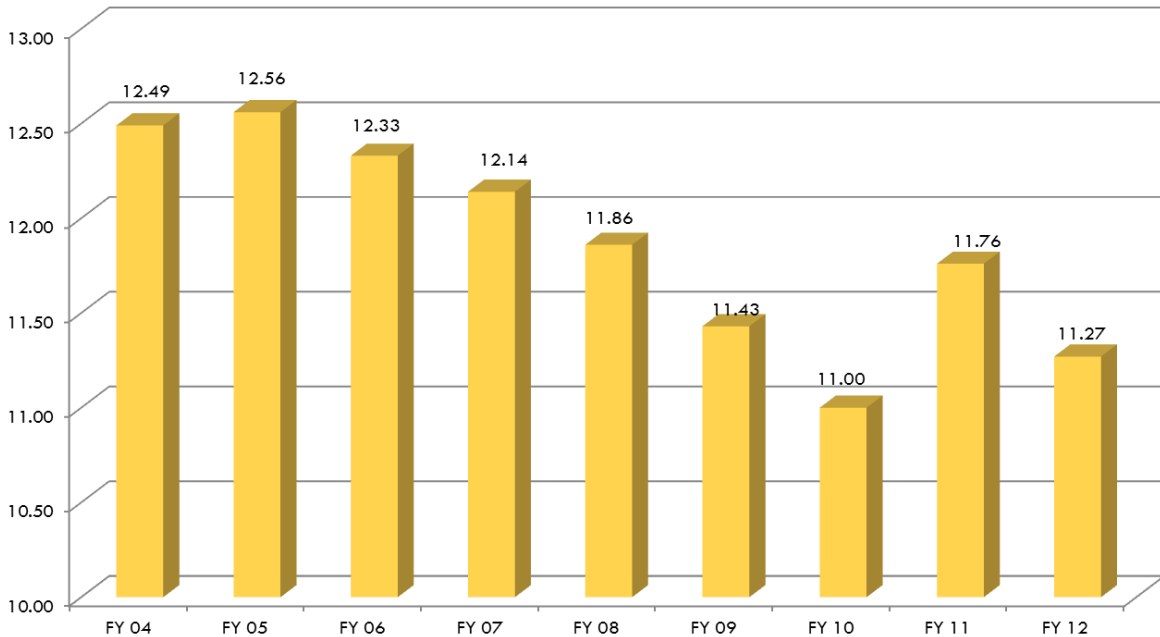
Energy Optimization Director, Mike Walton (left), receiving \$146,000 check from Consumer's Energy Customer Account Manager Mike Poliskie (right)

Total Electrical Consumption (Main Campus) (kWh)



Square footage of CMU's main campus has increased 12% since 2004, but total electrical consumption has risen by only 1.09%

Electricity Consumption (kWh/gsf)



The graph above illustrate kWh/gsf from FY 2004-2012, even with a 12% increase in square footage, CMU has decreased its usage by 1.22 kWh/gsf or 9.77%, since 2004

Goal 2: REDUCE WATER CONSUMPTION PER GSF FROM MUNICIPAL SOURCE BY 6% BY 6/30/2013

FY 2008 baseline = 31.0 gallons usage/gsf

FY 2010 to date = 25.8 gallons/gsf (16.77% decrease)

FY 2010-2012 Initiatives

- Trayless dining in residential restaurants (*implemented in 2008, ongoing*)
- Explore campus landscaping options that incorporate plants which require less frequent watering, such as rain gardens and xeriscaping (*ongoing*)
- Install low flush or dual flush toilets and low flow faucets (*ongoing*)
- Water consumption overall reduced by 16.77%



Dual flush handle and label



Trayless dining at CMU

FY 2010-2012

Trayless dining continues in all residential restaurants. Facilities Management (FM) is continuing to explore the use and placement of plants that reduce the amount of necessary watering. Low flush toilets and low flow faucets continue being installed on campus. Measures taken to reduce water consumption have resulted in a 16.77% reduction in water consumption per gsf at CMU; this surpasses the goal of 6% reduction by June 30, 2013 by 10.77%.

Goal 3: INSTITUTIONALIZE PURCHASING PROTOCOLS/PRACTICES WHICH FOSTER IMPROVEMENTS IN CAMPUS SUSTAINABILITY

FY 2010-2012 Initiatives

- Most coffee served in Java City locations are certified as one or more of the following: Fair Trade, organic, Rainforest Alliance, Shade Grown and Bird-Friendly Coffees (*ongoing*)
- Meals 2 Go and Express Grab programs using biodegradable packaging (*ongoing*)
- Stock environmentally friendly products in CMU Stores for use in campus operations (*ongoing*)
- Purchase ENERGY STAR rated appliances (*ongoing*)
- Nearly 83% of custodial products purchased and used in campus buildings have EPA or Green Seal certifications (*ongoing*)
- Explore more sustainable toilet paper options, such as coreless toilet paper (*ongoing*)
- Bottled water purchases across all departments decreased from 2010 to 2011

FY 2010-2012

Campus dining has made several changes to their purchasing policies in order to further their sustainability efforts.

Most coffee served in Java City locations is made with coffee beans that are certified as one or more of the following: Fair Trade, organic, Rainforest Alliance, Shade Grown and Bird-Friendly Coffees.



The Meals 2 Go and Express Grab programs now use biodegradable packaging. Styrofoam dish products, once used as backups, have been replaced with biodegradable and compostable products. Plastic cutlery has been replaced with PotatoWare biodegradable products. Straws and stir sticks are composed of recycle based products. Paper and reusable bags are available in campus stores.

In 2010, \$17,456 was spent on 1,705 cases of bottled water across all departments at CMU. In 2011, \$10,651 was spent on 1,578 cases of bottled water. This resulted in a 38.98% decrease in the amount of money spend on bottled water and a 7.45% decrease on the amount of bottled water purchased.

Goal 4: INCREASE RECYCLING ON CAMPUS BY 30% BY 6/30/2013; ACHIEVE 0% GROWTH IN TOTAL MUNICIPAL SOLID WASTE (MSW) BY 6/30/2013

MSW – FY 2009 baseline = 2,346.8 tons

Recycling – FY 2008 baseline = 455.5 tons

MSW 2010: 2,374.86 tons (approximately 1.19% increase from baseline)

Recycled 2010: 565.70 tons (approximately 24.19% increase from baseline)

MSW 2011: 2,302.35 tons (approximately 1.89% decrease from baseline)

Recycled 2011: 558.02 tons (approximately 22.51% increase from baseline)

FY 2010-2011 Initiatives

- Pilot composting operations on campus, with student groups (*ongoing*)
- Explore disposal cost of textbooks, if any, and develop alternatives to reduce costs
- Participate in RecycleMania (*ongoing*)
- Items that are no longer useful to CMU are to be sold at Surplus Sales through the Purchasing Department (*ongoing*)

FY 2011-2012 Initiatives

- Red Oaks, of Waste Management Inc., Recycling and Disposal Facility used by CMU implemented technology to use leachate gas to generate electricity used to power a leachate evaporator (*complete*)
- Ink cartridges collected for recycling (*ongoing*)
- Participate in RecycleMania (*ongoing*)
- E-waste collection at 2012 Earth Day event (*complete*)
- Pre-consumer waste composting expansion to 5 residential restaurants and Java City (*ongoing*)
- Zero-waste pilot program in Robinson Residential Restaurants (*March 2012, complete*)
- Assess feasibility of future zero-waste programs (*ongoing*)
- Reduce bottled water on campus and the purchase of bottled water by departments (*ongoing*)
- CMU vs. MSU football game recycling challenge (cans, glass, plastics) resulted in a total of 1.649 tons of recyclables with CMU winning by 454 pounds; total recyclables amounted to 5.189 tons and MSW collected was 8.35 tons
- Encourage textbook rental and use of electronic textbooks (*ongoing*)
- All five residential restaurants and Java City locations participate in pre-consumer composting (*ongoing*)
- Items that are no longer useful to CMU are to be sold at Surplus Sales through the Purchasing Department (*ongoing*)
- CMU's Museum of Cultural and Natural used recycled display cases in most of its 2012 renovations
- Increased recycling tonnage by 22.51% from baseline
- Reduced MSW by 1.89% from baseline

FY 2010-2012

Northern Oaks Recycling and Disposal Facility has been receiving CMU's trash and recycling since 1992. Since then, Northern Oaks implemented several sustainable techniques. Byproduct gases, such as methane, are captured and used to generate electricity. Northern Oaks also uses leachate gas, a byproduct, to power a leachate evaporator. The evaporator reduces the amount of leachate that needs to be shipped to treatment facilities and therefore lowers overall emissions and fuel consumption.

CMU participates in RecycleMania every year. RecycleMania is a ten week recycling competition among schools in the United States and Canada. Awards are given out based upon how much was recycled in total, how much was recycled based on how many students attend the college/university, as well as the diversion rate. The diversion rate is a measurement used to determine how much material is diverted from landfill to recycling.



In spring 2012, CMU began collecting used ink cartridge containers to send back to factories for refilling. This program generates money for every cartridge collected to be recycled. Monthly funds varies, based on numbers from June-August 2012, the average rebate will be about \$40 per month. Money generated from this program will be used to promote sustainability on campus through student group efforts. Any cartridges that cannot receive a rebate, like those in contracted copy machines, can be recycled at O-ink in Mt. Pleasant. At CMU's 2012 Earth Day celebration, e-waste recycling was available; students, faculty, and community members were able to recycle used electronics throughout this event.

CMU's composting program has expanded to collect pre-consumer waste from four residential restaurants and the University Center. Java City locations have begun composting coffee grounds as well.



CMU's compost pile

In March 2012, Robinson Residential Restaurant piloted a zero waste program. This program collects and composts or recycles pre and post-consumer waste, paper, and cardboard products. In March, Robinson Residential Restaurant composted 4.09 tons and in April 7.25 tons were composted. Experiences and information obtained from this pilot program, which ended in April 2012, is being used to determine the feasibility of implementing future zero waste programs at Residential Restaurants.

Instead of paying for old equipment and furnishings to be disposed of through traditional MSW avenues, CMU's Purchasing Department sells them through sealed bids, monthly public sales, and public auctions. Items sold at Surplus Sales are first evaluated to determine if there is any use for it on campus. Once determined to be no longer useful or damaged/broken it is sold through one of the three mentioned methods. Bicycles, lab equipment, classroom and office furnishings, and athletic equipment, are some of the common items at Surplus Sales. At public Surplus Sales events, there are usually between 100-150 people in attendance. This saves CMU money, reduces MSW disposal, provides the community benefit of purchasing used goods for a fair price, and increases the sustainability of CMU operations by ensuring items once used by CMU are able to be reused.



CMU's chapter of Take Back the Tap, a registered student organization (RSO), continues to work toward ending the sale of bottled water on campus.

The Museum of Cultural and Natural History implemented Phase I of its main gallery renovations in 2012 by recycling or reusing 90% of the materials recovered from dismantling 15 permanent exhibit cases and panels from the 1970s.

CMU offers multiple sources for textbook disposal. Most commonly used are companies that allow users to pay a fixed amount by the disposal box. This service is usually used when the textbook is no longer being used at CMU and has no wholesale value nationally. The CMU Bookstore rented nearly 8,000 units of textbooks in fall 2012, amounting to about 10% of all course materials sold. Over 500 units of digital course material were sold in fall 2012 as well; this amount is almost double the amount sold during any other semester. During FY 2011-2012, 10,000+ units of textbooks were rented.

In 2012, CMU began a partnership with Waste Management for recycling cardboard. There are 53 green cardboard recycling tanks across campus and through Waste Management, CMU is able to participate in profit sharing. CMU has 44 maroon and gold recycling containers for bottles and cans permanently located across campus.



Cardboard recycling tanks

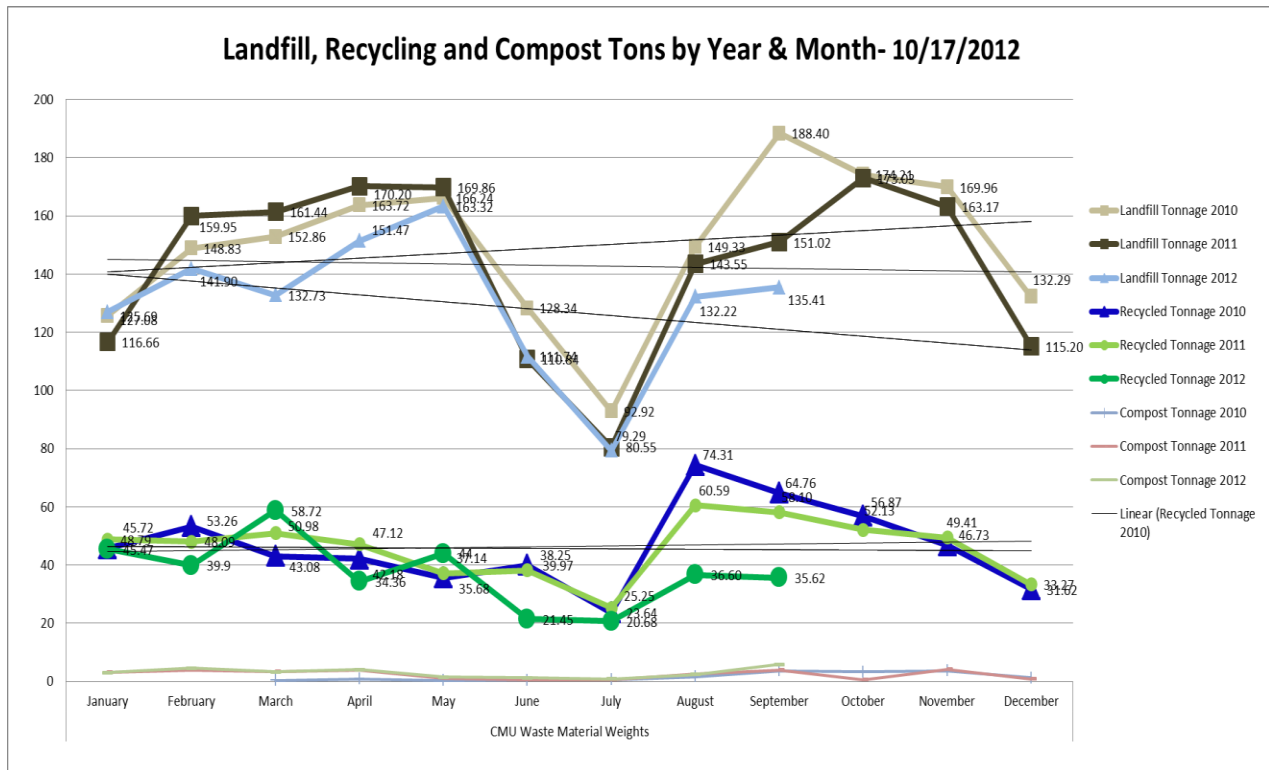


CMU's outdoor recycling bins

In September 2012, CMU hosted the football game against MSU. On game day a recycling challenge (cans, glass, and plastics) was held. The challenge resulted in a total of 1.649 tons (3,298 pounds) of recyclables with CMU winning by 454 pounds. The total weight of recyclables amounted to 5.189 tons and MSW collected was 8.35 tons.



Jay Kahn, Director of Facilities Operations, with the recycling trophy from the 2012 CMU-MSU challenge



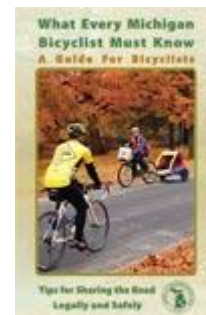
Goal 5: ENCOURAGE USE OF MASS TRANSIT, CAR POOLING, AND HUMAN POWERED TRANSPORTATION BY UNIVERSITY STUDENTS, FACULTY, AND STAFF

FY 2010-2011 Initiatives

- Bike lanes installed on Washington Street between Preston and Broomfield (1.0 mile, complete)
- Bike lanes installed on Franklin Street between Bellows and Preston (.5 mile, complete)
- Participated in and won the Clean Commute Challenge sponsored by Capital Area Transportation Authority (CATA) in 2010
- Evaluate limits on new personal vehicle parking spaces, possibly through premium rates (ongoing)
- Isabella County Transportation Commission (ICTC)/IRide shuttle bus provided 247,138 rides for the academic year

FY 2011-12 Initiatives

- CMU Police Department (CMUPD) has officers trained to and are patrolling on bicycles (complete)
- CMUPD provides educational pamphlets about safe riding practices with bicycle registration (ongoing)



- CMUPD provides informational pamphlets about sharing the road with vehicle registration (*ongoing*)
- ICTC/IRide shuttle bus provided 272,207 rides for the academic year, a 10.14% increase from 2010-2011
- Campus map updated to include all bike lanes (*complete*)
- Two CMU staff certified by the League of American Bicyclists to teach bicycling safety courses (*complete*)
- Hold bicycling education courses on campus for CMU and surrounding community (*ongoing*)
- Explore educational signage (*ongoing*)
- Participate in the 2012 Clean Commute Challenge sponsored by Capital Area Transportation Authority (CATA)

FY 2010-2012

Bike lanes were installed on three new segments: Washington Street between Preston and Broomfield and Franklin Street between Bellows and Preston.

In fall 2010, CMU participated in the Clean Commute Challenge sponsored by CATA and came in first out of four universities participating in the competition. CMU participated in CATA's 2012 Clean Commute Challenge and came in second, barely losing to Michigan State University. There were seven total colleges and universities that participated: CMU, Michigan State University, Grand Rapids Community College, Grand Valley State University, Lansing Community College, Eastern Michigan University, and Wayne State University. Samantha Fiani, GLISS Graduate Assistant, had the highest number of clean commutes out of any other individual in the campus challenge with 25 commutes during the 5-day challenge.

ICTC provides the shuttle bus, IRide, to CMU. These buses travel to several apartment complexes that are student oriented. In the 2010-2011 academic year, IRide shuttle bus provided 247,138 rides.

Samantha Fiani (GLISS Graduate Assistant) and Benjamin Rollenhagen (faculty in PED) are certified by the League of American Bicyclists to teach bicycling safety courses; CMUPD, Environmental Health and Safety, and Residence Life sponsored certification. Fiani and Rollenhagen intend to hold bicycling safety courses for campus and surrounding communities.



CMUPD sent officers to training in order to patrol on bicycle around campus and are patrolling on bike to display and promote safe cycling practices. CMUPD is also sending out the informational pamphlet, *What Every Michigan Bicyclist Must Know*, composed by the League of Michigan Bicyclists with every bicycle registration. Motorists receive an educational pamphlet about sharing the road with pedestrians and cyclists when they register their vehicle for parking.

Discussions are ongoing concerning educational signage around campus. The campus map was updated in 2012 to include all bicycle lanes.



GLISS GA, Samantha Fiani, and CMUPD's Lt. Larry Klaus work together on transportation issues

Goal 6: REDUCE UNIVERSITY'S CARBON FOOTPRINT BY 10% BY 6/30/2013

FY 2007 baseline – 32.6 pounds CO²e/gsf

FY 2008 – 34.4 pounds CO²e/gsf

FY 2009 – 33.3 pounds CO²e/gsf

FY 2010 – 32.5 pounds CO²e/gsf

FY 2011 – 31.7 pounds CO²e/gsf

FY 2012 – 30.8 pounds CO²e/gsf (estimated, October 2012)

FY 2010-2012 Initiatives

- Implement Green IT program across all computing platforms on campus by encouraging the following (*ongoing*):
 - Turning off personal workstations when not in use
 - Turning off workstations and other equipment in labs and mediated classrooms when not in use
 - Replacing CRT monitors with more energy efficient LCD monitors,
 - Reducing energy use in data center operations
 - Leveraging CMU technologies in conjunction with FM systems to reduce campus energy use
 - Taking advantage of e-waste recycling programs offered by manufacturers
 - Complete the installation of a digital imaging system to hand all applications for admission and other student documents in a paperless system
- Conduct Biomass Cogeneration Facility feasibility study (*ongoing*)
- Review flex-time policies to accommodate alternate work arrangements for staff, as appropriate, without negatively impacting campus operations or student services (*ongoing*)

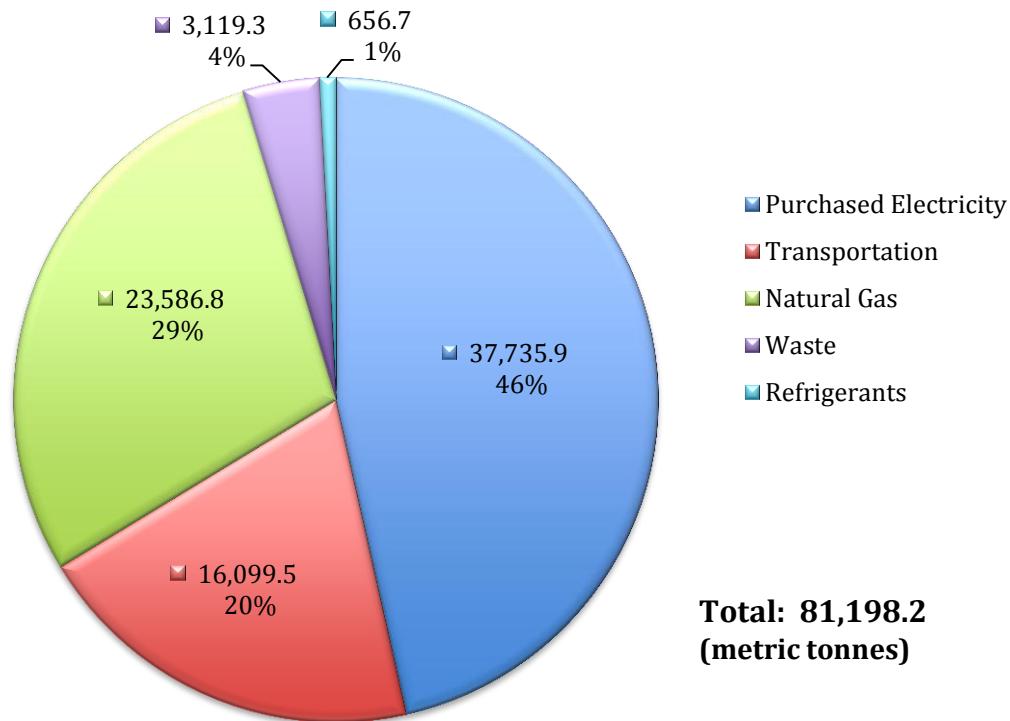
- Educate the campus community about idling cars in parking lots and the impact on carbon footprints (*ongoing*)
- Encourage use of non-motorized transportation, public transportation, and carpooling (*ongoing*)



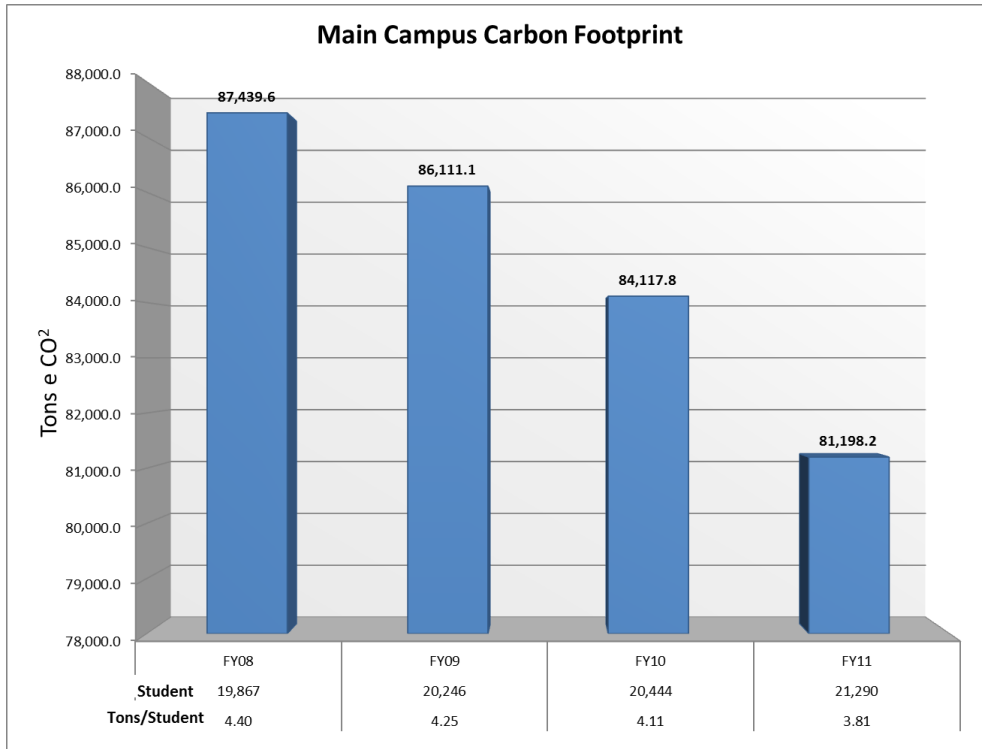
FY 2010-2012

To reduce the contribution of transportation emissions, the university began the review of flex-time policies to accommodate alternative work arrangements for staff, as feasible, without impacting campus operations or student services. This evaluation continues. Campus employees, as well as suppliers, have been educated about the impact of idling vehicles on CO₂ emissions. FM continues to evaluate expansion of the biomass co-generation power facility to reduce our dependence on power purchased from fossil fuel sources.

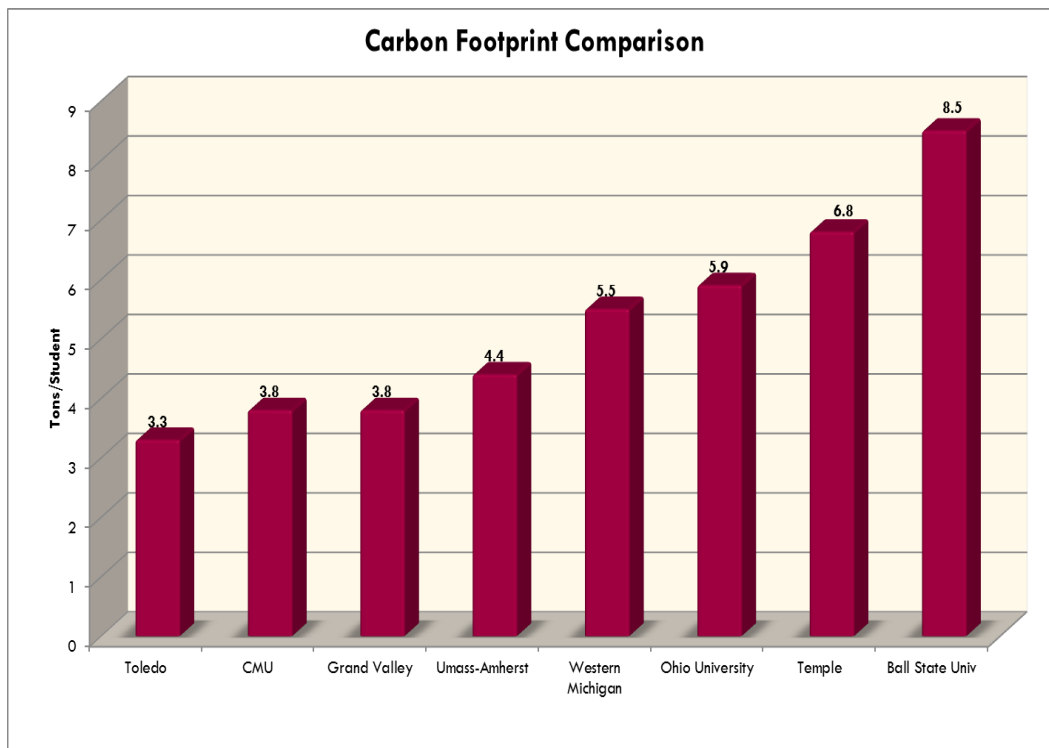
**Main Campus Carbon Footprint - FY 2011
(metric tonnes e CO2)**



The graph above details sources of emissions that contribute to CMU's carbon footprint



The graph above illustrates how CMU's student population has grown since FY 2008, but their individual carbon footprint has shrunk



The bar graph above depicts CMU students' carbon footprint in relation to other universities, fall 2012

Goal 7: IMPLEMENT LEED (Leadership in Energy and Environmental Design) PRACTICES FOR DESIGN AND OPERATIONS ON ALL CAMPUS PROJECTS AND BUILDINGS; ACHIEVE LEED CERTIFICATION ON ALL NEW BUILDINGS, ADDITIONS AND MAJOR RENOVATIONS

FY 2010-2012 Initiatives

- Received the Grand Award for Green Cleaning for Colleges and Universities, sponsored by American School and University Magazine
- CMU Design Standards to follow LEED criteria for all new construction and renovations (*ongoing*)
- Pursue LEED certification for completed construction projects (*ongoing*)
- Use green cleaning practices in campus buildings (*ongoing*)
- Established project plans to obtain LEED certification in the Events Center, UC Renovation, Ronan Renovation and Health Professions addition projects (see *table below*)



FY 2010-2012

In 2011, CMU won the Grand Champion Green Cleaning Award sponsored by American School and University. CMU competed against more than 50 institutions for this award.

Some of the procedures that were modified in order to receive this award include using green cleaning products (EPA of Green Seal certified), Carpet and Rug Institute (CRI) certified vacuums, and extensive custodial training that focuses on preventative measures to reduce clean up and containing outside pollutants and dirt to specified areas. CRI vacuums must pick up a specific amount of soil, cannot release more than 100 micrograms of dust particles per cubic meter of air, and vacuum cannot affect the texture of the commercial cut pile carpet. Custodians are required to participate in 24 hours of training per year and FM has 30 hours of workshops available. Microfiber cloths have replaced paper towels; this reduces waste and saves approximately \$24,000 per year. In Residence Life buildings, 82.8% of cleaning products and practices are green and in General Fund buildings 83% cleaning products and practices are green.





EHS Building—LEED certification in progress Health Professions Building addition—LEED Silver

In October 2012, CMU received its first LEED certifications from the United States Green Building Council. Silver level LEED standards were met for the addition to the Health Professions Building for the College of Medicine and to the renovations of Ronan Hall. CMU has submitted applications for the EHS Building and renovations to the University Center, aiming to achieve Gold level and Certified level for each respectively. There are several construction projects planned for CMU which were developed using LEED guidelines. These projects include: Bioscience, East Campus, Events Center, and Graduate Housing. The table on the following page details which stage of the LEED certification process each construction projects has reached.

LEED Project Status Summary

LEED CERTIFICATION HAS BEEN FINALIZED AND THE FOLLOWING HAVE BEEN OBTAINED:		
LEED Building Project	LEED Program	Achieved
Ronan Hall Renovation	Commercial Interiors (CI)	Silver
Health Profession Addition	New Construction (NC)	Silver

THE FOLLOWING ARE SUBMITTED TO THE USGBC AND ARE IN THE PROCESS OF BEING EVALUATED:		
LEED Building Project	LEED Program	Achieved
Education & Human Services	New Construction (NC)	Gold
University Center Renovation	Commercial Interiors (CI)	Certified

THE FOLLOWING BUILDINGS HAVE A GOAL TO ACHIEVE:		
LEED Building Project	LEED Program	Achieved
Bioscience Project	New Construction (NC)	Certified
East Campus Project	New Construction (NC)	Silver
Events Center	New Construction (NC)	Certified
Graduate Housing	Homes	Platinum

Updated 10/30/2012

Goal 8: INCORPORATE PRINCIPLES OF SUSTAINABILITY INTO UNIVERSITY CLASSES, CURRICULA AND SERVICE LEARNING OPPORTUNITIES

FY 2010-2011 Initiatives

- Develop new sustainability-related courses as needed (*ongoing*)
- Assist in transferring the successful operations of CMU's program to other campuses and communities (*ongoing*)
- International Business and Sustainable Development minor established in the College of Business Administration and is available to business and non-business students (*complete*)
- Participate in CMU's New Venture Competition (NVC) with sustainable ventures (*complete*)

FY 2011-2012 Initiatives

- Honors course on sustainability, HON 321S, launched (*complete*)
- Environmental Health and Safety major instated (*complete*)
- Courses in sustainable systems and development added to Masters of Business Administration curriculum (*ongoing*)
- Develop new interdisciplinary major/minor program, Sustainability and Environmental Studies, designator SES (*ongoing*)
- Participate in CMU's NVC with sustainable ventures (*complete*)
- Instate a Field Colloquium Scholarship to encourage students to research wild lands management (*complete*)

FY 2010-2012

In fall 2011, the interdisciplinary major, Environmental Health and Safety, began accepting students. As a part of this curriculum, students can take courses about the sustainable management of water and wastewaters.

The College of Business Administration and the Honors College added courses on sustainability to their curriculum. In fall 2012, the Masters of Business Administration (MBA) program started offering a course titled, Sustainability and Sustainable Systems. The MBA program is developing and intends to add a course titled, Sustainable International Development, in fall 2013.

Honors course on sustainability called Building Sustainability, HON 321S, is a 3 credit course available to honors students at CMU. Course description in the Fall 2012-2013 bulletin is as follows:

This team taught class provides students with an interdisciplinary awareness and understanding of the principles guiding human efforts to manage resources that are essential for the survival of our species and the health of the planet. From the science behind resource management and energy systems to the social science of

sustainable economy and society, students will be encouraged to put lessons of the class into practice designing their own innovative solutions to problems of resource management and energy use.

Sustainability and Environmental Studies major/minor program is being developed to replace Environmental Studies-- Policy Track.

In 2011 and 2012 GLISS Director, Tom Rohrer, was an advisor for several students in NVC. These sustainable business ventures such as Energize Education, a business to perform energy audits for schools and provide incentive to implement energy conservation solutions; Bright Bikes, a business developing sustainable bicycle lighting; and Advance Battery Concepts, a market-based business to store energy in home systems which buy energy when prices are low in order to sell high when energy prices peak.



GLISS Director, Tom Rohrer (center) and his Bright Bikes team, Nate Brown (left) and Samantha Fiani, GLISS GA (right) at the 2012 NVC

In 2012 a Field Colloquium Scholarship was instated. This scholarship is for \$50,000 to be given out over the next 5 years and is sponsored by Dan and Charlotte Peyerk. Recipients of the scholarship are intended to be students from Museum Studies, Environmental Studies, or Biology programs with a focus on researching wild lands management.

Goal 9: INCREASE THE AWARENESS OF SUSTAINABILITY AMONG STUDENTS, FACULTY AND STAFF OF THE UNIVERSITY

FY 2010-2012 Initiatives

- Increase promotion of sustainability through Speak Up, Speak Out panel discussion (*complete*)
- In collaboration with CMU's Museum of Cultural and Natural History, an exhibit is in the works that will display Great Lakes Basin's energy trends (*ongoing*)

- Create a Sustainability Committee within the Student Government Association (*complete*)
- Develop signage to promote CMU's sustainable efforts and to educate public about sustainability (*ongoing*)
- Prepare videos describing CMU's sustainability achievements (*ongoing*)
- Tom Rohrer, GLISS Director serves as the Faculty Advisor for RSOs, Take Back the Tap (TBTT) and Student Environmental Alliance (SEA) (*ongoing*)
- CMU's Recycling Office participates in several events on campus (*ongoing*)

FY 2010-2012

GLISS has increased its promotion of sustainability on campus. A panel discussion was held during the current events series, Speak Up, Speak Out, on creating a sustainable future.

CMU's Cultural and Natural History Museum, in collaboration with GLISS, is developing an exhibit that will display a historical representation of energy sources utilized by Great Lakes Basin area, including the trend toward sustainable energy sources.

A group of students on campus put together a proposition to create a sustainability committee as a part of the Student Government Association. The purpose of this committee is to draw a diverse group of students to work on multidisciplinary sustainability projects. The committee was instated spring 2012.

CMU's chapter of TBTT is working toward ending the sale of bottled water on campus. The group collects signatures on petitions and does educational and visual campaigns at least twice per year. TBTT also hosts fundraising events and participates in campus events, such as MAINstage and the Earth Day Celebration. Funds raised by students are allocated to the installation of retrofit kits for water fountains that include a water filter and bottle fill station. The group started small, but continues to grow in members each semester. TBTT often collaborates with SEA and other RSOs on initiatives.



TBTT's fall 2011 visual campaign



TBTT photo pledge at MAINstage 2012



Retrofit water fountain kit

SEA promotes environmental awareness, protection, and sustainable lifestyles. The group hosts a couple of annual and biannual events, such as CMU's Earth Day Celebration and Chippewa River cleanups. CMU has held an Earth Day celebration since its inception in 1970. Students work to educate CMU and the surrounding community about environmental issues. SEA students participate in forums, such as the Speak Up, Speak Out series and Green Scissors, an event help in partner with College Republicans. Students in SEA attend conferences to expand their knowledge base and improve their ability to communicate with campus and the community. SEA partners with TBTT and other RSOs on initiatives.



SEA's fall 2012 Chippewa River clean up



SEA members at the 2012 Earth Day Celebration

CMU's Recycling Office participates in MainStage, Leadership Safari, Earth Day, and Freshman Orientation. At these events the Recycling Office has an information table and materials describing CMU's recycling and green cleaning programs. Student employees from the Recycling Office are available to answer any questions. The Recycling Office facilitates CMU's participation RecycleMania every year. They also use social media outlets, Twitter and Facebook, to communicate with the public.



Goal 10: ENCOURAGE COMMUNITY LEADERS AND PRIVATE INDUSTRY IN MOUNT PLEASANT, ISABELLA COUNTY AND THROUGHOUT MID-MICHIGAN TO COOPERATE WITH UNIVERSITY SUSTAINABILITY INITIATIVES

FY 2010-2011 Initiatives

- Identify contaminated sites in Gratiot and Isabella Counties in cooperation with Gratiot-Isabella Environmental Collaborative (*ongoing*)
- Develop comprehensive Non-motorized Transportation Plan in partner with Union Township, City of Mt. Pleasant, Saginaw Chippewa Indian Tribe, and Isabella County (*ongoing*)
- GLISS Director and graduate assistant participate in Union Township's Sustainability Committee (*ongoing*)

FY 2011-2012 Initiatives

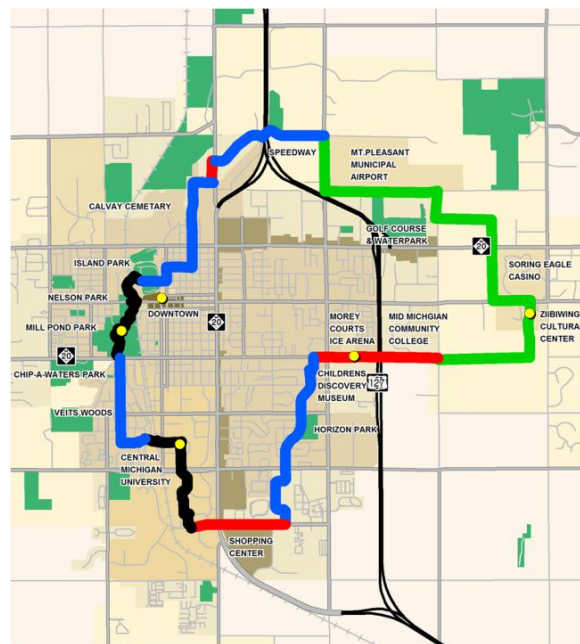
- Publish Non-motorized Transportation Plan in partner with Union Township (*complete*)
- GLISS Director and graduate assistant, and Associate Vice President of FM participate in Union Township's Sustainability Committee (*ongoing*)
- Participate in Great Lakes Bay Regional Alliance (*ongoing*)
- CMU's Museum of Cultural and Natural History to take a tour of Union Township wind energy system as a part of their Tour Tuesday program (*complete*)

FY 2010-2012

GLISS is cooperating with the Gratiot-Isabella Environmental Collaborative Coalition on a project to identify and characterize contaminated sites in Gratiot and Isabella counties.

GLISS Director, Tom Rohrer, and Graduate Assistant, Samantha Fiani, and Associate Vice President of FM, Stephen Lawrence, are a part of Union Township's Sustainability Committee.

CMU partnered with Union Township, City of Mt. Pleasant, Saginaw Chippewa Indian Tribe, and Isabella County to develop a comprehensive, boundary-free non-motorized transportation plan for the Mt. Pleasant area. GLISS is continuing to work with Union Township on grants to support the complete implementation of the Mt. Pleasant Area's Non-motorized Transportation Plan.



Complete 22-mile route in Mt. Pleasant Area's Non-motorized Transportation Plan

Stephen Lawrence, Associate Vice President of FM, and Tom Rohrer, Director of GLISS, participate in the Great Lakes Bay Regional Alliance (GLBRA); their purpose is described below:

There's only one way to create a strong regional economy: regional cooperation and collaboration.

It was under this premise that the Bay Area, Midland Area and Saginaw County Chambers of Commerce, along with Bay Future, Midland Tomorrow and Saginaw Future Inc., formed a regional alliance called VISION TRI-COUNTY, now the Great Lakes Bay Regional Alliance with the addition of Isabella County which brought in Central Michigan University.

The members of the Alliance have worked together to build on the regional strengths critical to both individual and collective futures.

The Alliance members are fully committed to this collaborative effort, which capitalizes on the region's many amenities that allow us to build a dynamic, unique, and prosperous future. Protection of Bay area resources, a recognition of the value of tourism and the value of a sustainable economy has resulted in institutions of higher learning participating in the sustainability committee of this group.

One of the initiatives Rohrer and Lawrence are working on is the development of a manual containing best practices for greening higher education institutions.



The Museum of Cultural and Natural History introduced its first sustainability-based Tour Tuesday program in July 2012, taking visitors to tour Union Township facilities and wind energy system.

Goal 11: IMPROVE CAMPUS STORM WATER MANAGEMENT BY 6/30/2013

FY 2010-2012 Initiatives

- Establish vegetative roof standard for the future (*ongoing*)
- Use native plants that require less watering and assist in storm water management (*ongoing*)
- Pave parking lots to include rain gardens and porous pavement, where feasible (*ongoing*)

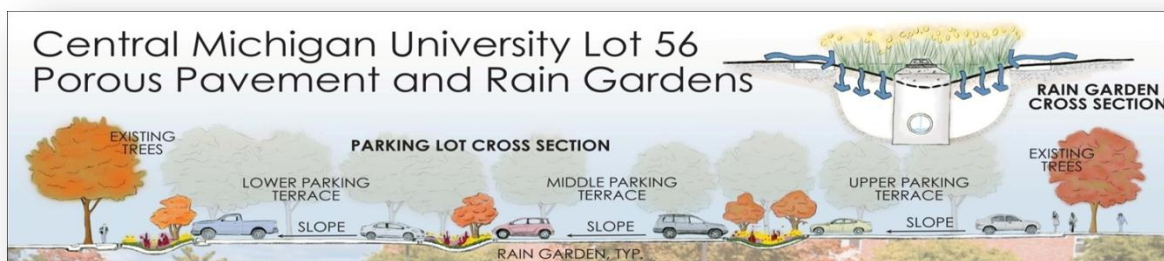
FY 2010-2012 Initiatives

As a result of the success of the vegetative roof on the EHS building, CMU is working toward developing a vegetative roof standard for future construction projects.

When landscaping, CMU uses native plants that require less frequent watering and assist in storm water management.

The EHS Building's porous parking lot with integrated rain gardens has been successful and CMU is in the process of creating a standard in order to implement these types of parking lots. Rain gardens help reduce the flow of water and have a positive impact on storm water management.

CMU requires that all new buildings, additions, and major renovations are built to LEED standards, as a part of this effort, porous parking lots are implemented during construction where feasible. As of October 2012, CMU has built two porous parking lots; the first is Parking Lot 56 and the second is the extension of Parking Lot 8.



Goal 12: ENCOURAGE CAMPUS VISITORS TO ACTIVELY PARTICIPATE IN SUSTAINABILITY EFFORTS WHILE THEY ARE ON CAMPUS

FY 2010-2012 Initiatives

- Clearly marked and accessible recycling receptacles; aluminum and plastic available outdoors and mixed paper, newspaper, cardboard, paperboard, plastic, and aluminum available indoors
- Green products are sold at CMU's convenience stores
- Plastic dining ware has been replaced with biodegradable alternatives throughout campus
- Developing signage to promote CMU's sustainable efforts and to educate public about sustainability
- Promotes use of non-motorized transportation
- Preparing videos describing CMU's sustainability achievements
- Student Environmental Alliances sticker campaign



FY 2010-2012

CMU's campus has several recycling receptacles, both indoors and outdoors, which promote and make recycling easy for all campus visitors. Outdoor recycling bins are maroon and gold and are intended to collect plastic and aluminum containers. Indoor recycling bins can be used to recycle cardboard, paperboard, mixed paper, plastic, and aluminum. Small recycling bins are supplied to all residential rooms. Recycling tanks located outside of residential halls and throughout campus provide a way to recycle all of the above, with the addition of glass.



CMU promotes the use of non-motorized transportation on campus. Information about safe cycling is available at Parking Services. CMU maps also include all bike routes. Bicycle racks are located by buildings all over CMU's campus for bike parking. Sidewalks and bike lanes are integrated into the campus and are plowed and salted as needed.



Non-motorized pathways, Franklin Street



Sidewalks are present throughout CMU's campus

Once developed, signage will be displayed on campus describing CMU's sustainability efforts and achievements, as well as to educate the public on the subject of sustainability.



Signage will be similar to the one pictured above, which is from Arizona State University

Products in CMU's convenience stores and dining ware used at on-campus eateries reflect CMU's sustainability culture. Paper and reusable bags are available at CMU's convenience stores.



PotatoWare has largely replaced conventional plastic dining ware on campus



Reusable bags are available for purchase at CMU's convenience stores

Student Environmental Alliance (SEA), an registered student organization, designed stickers to be given to SEA members and to be placed on water fountains and trash cans to encourage the use of reusable water bottles and recycling. SEA also uses stickers to communicate their organization's mission to have as little impact on the environment as possible in order to preserve natural resources for future generations.



APPENDIX 1: Memo from President Rao to David Burdette

MEMORANDUM

Office of the President
Warriner Hall 106
Central Michigan University
Mt. Pleasant, Michigan 48859

Voice: 989/774-3131

Fax: 989/774-3665

To: David Burdette

From: Mike Rao

Date: January 23, 2008

Subject: Campus Sustainability Advisory Committee Charge

David, as you are aware, the issue of campus sustainability is very important. I believe firmly that CMU needs to be very proactive in moving toward sustainable efforts to ensure the long-term success of our students, employees, institution, and community. This effort should be both an opportunity to instill in the CMU community and beyond a way of life, and also model excellent examples and experiences for student, faculty, and staff learning.

As such, I request that you lead CMU's effort as Chair of a Campus Sustainability Advisory Committee. I request that you, on my behalf, issue the attached charge and oversee the efforts of this advisory group and plan.

Thank you for your leadership to this initiative. Please keep me informed on a regular schedule (of which you should inform me) regarding your progress on this critical topic.

MR/jfs

APPENDIX 2: Charge to the Campus Sustainability Advisory Committee

Charge to the Campus Sustainability Advisory Committee
January 23, 2008

There is an immediate need for a coordinated effort to address sustainability issues at Central Michigan University. CMU President Michael Rao has established the Campus Sustainability Advisory Committee (CSAC) to study and address the issues of environmental usage, energy conservation, local buying practices, climate control, and CMU's carbon footprint to ensure that Central Michigan University is striving to be ecologically sound, socially just, and economically viable now and for future generations.

The Campus Sustainability Advisory Committee will serve as an advisory body to the President and/or his designees regarding university actions and practices that promote sustainability, with a strong focus on student and faculty involvement. Within one year, the Campus Sustainability Advisory Committee, in concert with existing campus groups, organizations, committees, and/or offices, will:

- Complete a comprehensive inventory of CMU's past and present energy use, greenhouse gas emissions, and building growth.
- Develop a comprehensive plan to stabilize and reduce long-term energy and utility costs while recognizing future growth needs of CMU.
- Draft an energy-efficient appliance purchasing policy for adoption by the President that promotes the purchase of ENERGY STAR certified products.
- Formalize sustainable design and operations policies so that all new campus construction and major renovation projects are built to LEED specifications.
- Develop an institutional action plan with target dates, goals, actions, and mechanisms for tracking the progress of CMU's sustainability efforts.

Beyond the first year, the Campus Sustainability Advisory Committee will:

- Determine the appropriate level and recommend a target percentage of electricity that should be purchased or produced from renewable energy sources. Recommend a deadline for which CMU should achieve the target.
- Determine and recommend the target percentage by which CMU should reduce greenhouse gas emissions. Recommend a deadline and strategies for achieving the target.
- Complete a comprehensive review of additional initiatives and activities that will further CMU's commitment to sustainability.
- Partner with senior leadership to model appropriate behaviors, raise public awareness, and integrate sustainability into the institutional culture.
- Engage and encourage academic leadership to integrate sustainability into the curriculum.

- Incorporate sustainability concepts into existing purchasing policies and practices.

Through the Campus Sustainability Advisory Committee, CMU will seek relationships and partnerships regionally, nationally, and internationally that will further the stated objectives for sustainability, and will strive to serve as a model institution of efforts that ensure the future sustainability of our shared planet.

APPENDIX 3: Institutional Action Plan (2008-2010)

Central Michigan University Institutional Action Plan for Campus Sustainability

Goal 1: REDUCE CAMPUS ENERGY CONSUMPTION PER GSF BY 20% BY 06/30/2013 (Includes electricity, natural gas and wood - track and display all 3 separately) (FY 2007 baseline = 130.5 kBtu/gsf; FY 2009 to date = 133.8 kBtu/gsf)¹

FY 2008-2009 Initiatives

- Replace Moore Hall windows (*complete*)
- Replace Dow Science heat exchanger (*complete*)
- First LEED structure - EHS Building (*construction completed*)
- Install wood boiler combustion air pre-heater (*complete*)
- Hold electrical energy usage reduction competition in five Residence Halls—Campbell, Kessler, Kulhavi, Celani and Fabiano (*completed*)
- Replace Moore Hall TV studio lights to reduce electric and cooling load (*complete*)
- Replace Engineering and Technology Building atrium lights(*complete*)
- Refurbish steam absorption chiller to offset the operation of an electric chiller (*complete*)
- Install six 18' diameter ceiling fans in Indoor Athletic Complex (*complete*)
- Installed 1142 temperature control valves in Beddow, Thorpe, Sweeney and Merrill Halls (*complete*)

FY 2009-2010 Initiatives

- Evaluate the feasibility of other energy saving projects across campus (*ongoing*)
- Implement cost-effective retrofitting and construction project to maximize energy savings on campus (*ongoing*)
- Explore expansion of biomass co-generation power plant (*ongoing*)
- Hold energy competition in five Residence Halls—Campbell, Kessler, Kulhavi, Celani and Fabiano Halls (*ongoing*)
- Certify First LEED Building - Education Building (*certification in progress*)
- Ronan Hall renovation (*complete*)
- Brooks Hall MEP renovation (*complete*)
- Install temperature control valves in Troutman, Carey, Cobb and Wheeler Halls (*68-72°F range--ongoing*)
- Install kitchen vent hood side curtains in all campus dining commons kitchens

- *(complete)*
- Install motion sensors for Anspach, Grawn, Dow, Moore, and Pearce Halls *(complete)*
- Install variable frequency drives on motors in Engineering and Technology Building *(ongoing)*
- Installed 134 occupancy sensors in Grawn classrooms, conference rooms and restrooms *(complete)*
- Replaced 16 inoperable outside air dampers in Rose Center *(complete)*
- Take advantage of energy reduction rebates offered by DTE and Consumer's Energy *(rebate requests for \$8,200 complete)*

FY 2008-2009

The EHS Building was completed, which is expected to achieve certification under the United States Green Building Council's —Leadership in Energy and Environmental Design (LEED) program at the Gold Level, the second highest level of achievement. Energy consumption in the EHS building is running even lower than the initial estimates of a 30% reduction from conventional construction.

Studio lights in the Moore Hall TV studios and atrium lighting in the Engineering and Technology Building were replaced with more efficient units, which reduced energy consumption and the cooling load on HVAC systems. Windows in Moore Hall were also replaced with more energy efficient windows. Six 18' diameter fans were installed in the Indoor Athletic Complex to provide better air circulation and reduce HVAC costs. Individual room temperature control valves (n = 1,142) were installed in rooms in Beddow, Thorpe, Sweeney and Merrill Residence Halls to allow a range of temperature control resulting in significant energy savings from reduced heating costs. A more energy efficient heat exchanger was installed in the Dow Science Hall.

FY 2009-2010

FM created the position of Director of Energy Conservation to assure continued evaluation and implementation of other energy saving projects across campus. The director is compiling a list of future projects and ranking them for implementation based on costs and returns on investment. This list is included in Appendix 5. An evaluation is being conducted to determine the benefit and feasibility of expanding the existing biomass co-generator plant. The use of solar panels for supplemental heat for the EHS Building is one major demonstration project scheduled for this fiscal year.

The Brooks Hall mechanical systems and HVAC systems were revamped along with renovation in Ronan Hall. Individual room temperature control valves were installed in Troutman, Carey, Cobb, and Wheeler Halls (n=1,188). Room motion sensors, which shut down lighting and minimize heating and cooling when rooms are unoccupied, were installed in offices and classrooms in the following halls: Anspach, Dow, Moore, Brooks, Grawn, and Pearce. Variable speed drive motors were installed in the Engineering and Technology Building. Sixteen inoperable outside air dampeners in Rose Arena were

replaced. Plexiglass curtains were installed in residential restaurant food preparation areas to focus the amount of air flow to ventilation hoods from cooking areas and reduce air flow from dining areas.

Information Technology has implemented a pilot green computing program using software to remotely shut down computer equipment when not in use. The original pilot program included all six colleges, ProfEd, Office of Information Technology, and Auxiliary Services. The pilot resulted in net energy savings of approximately \$50,000 annually. Extension of this program to the entire campus would conservatively result in \$200,000 in energy savings each year. CMU also takes advantage of the program provided by Apple Inc. to recycle e-waste for those electronic components that cannot be resold as surplus or sold at auction. CRT monitors are being replaced as resources permit with more efficient LCD monitors. Digital imaging systems are already in place in Financial Aid and Payroll Accounting and are being added to other areas such as University Admissions.

These energy conservation measures have resulted in a 12% overall reduction in energy use per gross square foot of building space from the FY 2007 baseline. Approximately 2,000,000 kWh of electricity is being saved annually due to these improvements. The following charts from FM illustrate these reductions. Total purchased electricity was reduced by 5.7% from FY 2007 (baseline year) to FY 2010. This reduction of 3,807,376 kWh equates to cost savings of approximately \$266,500 at our discounted purchase rate from the electric cooperative of \$0.07 per kWh.

At the Central Energy Facility, a combustion air pre-heater was installed on the wood boiler combustion system. The facility continues to use waste wood chips from Michigan's forest product industry in its electric/steam co-generation system. A steam absorption chiller was refurbished to offset the operation of an electric chiller, which is expected to generate \$584,000 in purchased energy cost savings per year. FM is also securing all available energy rebates from our energy suppliers. Thus far, rebates are totaling \$45,049.

¹ Figure consists of the energy value of all fuel sources in thousands of Btus (kBtu) divided by the campus gross square footage (gsf).

**Goal 2: REDUCE WATER CONSUMPTION PER GSF FROM MUNICIPAL SOURCES
BY 6% BY 6/30/2013** (FY 2007 baseline = 29.0 gallons usage/gsf; FY 2009 = 35.6 gal/gsf)

FY 2008-2009 Initiatives

- Implement trayless dining in residential restaurants (*complete*)
- Anspach Hall domestic water line low-flow fixture replacement (*complete*)
- Foust Hall domestic water line low-flow fixture replacement (*complete*)
- Low-flow fixture installation in dining commons (*complete*)
- Installed 0.5 gpm aerators on 4,500 faucets across campus (*complete*)

FY 2009-2010 Initiatives

- Monitor aquifer levels to gather data to assist in decision on well installation (*ongoing*)
- Explore campus landscaping options that incorporate plants which require less frequent watering, such as rain gardens and xeriscaping (*ongoing*)
- Installing low-flow flush water valves (*ongoing where feasible*)
- Continue trayless dining in residential restaurants (*ongoing*)

FY 2008-2010

Low-flow fixtures were installed on domestic water lines to Anspach Hall, Foust Hall, and the Merrill Dining Commons. Approximately 4,500 faucets across campus were fitted with 0.5 gallon per minute (gpm) flow aerators reducing flow rates by anywhere from 50% to 75% of the unaerated flow. Low-flow flush valves were installed in restroom facilities where feasible, resulting in further water conservation. Residential restaurants began to institute trayless dining resulting in significant water savings from not having to wash tens of thousands of cafeteria trays each day. An additional benefit of the trayless dining program is a reduction of approximately 34% in food waste. Campus landscaping operations are being reviewed for improvements in sprinkler system management and the inclusion of xeriscaping and rain gardens, which require less frequent watering. FY 2009-2010 saw the continuation of improvements in campus water management. Savings in the cost of purchased domestic water from these initiatives are estimated at \$69,250 annually.

**Goal 3: INSTITUTIONALIZE PURCHASING PROTOCOLS/PRACTICES WHICH
FOSTER IMPROVEMENTS IN CAMPUS SUSTAINABILITY**

FY 2008-2009 Initiatives

- Stock environmentally friendly products in University Stores for use in campus operations (*ongoing*)

- Develop purchasing practices which discourage unnecessary purchases, provide for inter-departmental reuse of materials, and require purchase of products with the highest content of recycled materials and highest energy efficiencies (e.g. ENERGY STAR appliances) feasible (*complete*)
- Promote the use of sustainable materials in campus operations

FY 2009-2010 Initiatives

- Formalize sustainable purchasing practices (*complete*)
- Continue purchasing practices which discourage unnecessary purchases, provide for inter-departmental reuse of materials, and require purchase of products with the highest content of recycled materials and highest energy efficiencies (e.g. ENERGY STAR appliances) feasible (*ongoing*)
- Maintain purchasing programs to assure that approximately 80% of custodial products used in campus buildings are environmentally friendly (*ongoing*)

FY 2008-2010

The Contracting and Purchasing Services Department has developed a purchasing philosophy and protocol to support sustainable purchasing practices. All computers, printers, copy machines, and other office machines must carry the latest ENERGY STAR ratings. A copy of CMU's purchasing policy can be found in Appendix 6. Across CMU there has been an increased focus on developing purchasing practices, which discourage unnecessary purchases. All departments are encouraged to reduce, recycle, and reuse office furniture and office supplies. Purchasing is incorporating sustainable evaluation criteria in bid documents where feasible. The criteria may include recycled material content percentages and energy efficiency ratings.

University Stores continues to evaluate products and stock the most environmentally friendly, green products available that will meet performance criteria and are competitive in price. Approximately 90% of all cleaning products used in custodial operations are now green products. University Stores has also purchased the reusable Tyga Box System for use in moving offices. This product makes the process of packing and moving much more efficient and eliminates the purchase and discard of cardboard banker's boxes when faculty and staff relocate or when office files are moved.

Surplus materials and furnishings are first made available to units on campus and then the residual materials are sold to the general public at monthly CMU Surplus Sales. This process diverts thousands of pieces of furniture and technology from the landfill each year. Certain high-value surplus items, such as vehicles, scientific equipment, power tools, kilns, and boats, are sold at either traditional auction or online auctions. At the end of each fiscal year a large public auction is held. The June 2010 auction alone raised approximately \$20,700 for CMU. Surplus sales throughout the year returned approximately \$47,400 to CMU. Pallets and pallet wood are reused or recycled as appropriate and scrap metal is sold and then recycled.

Goal 4: INCREASE RECYCLING ON CAMPUS BY 30% BY 6/30/2013; ACHIEVE 0% GROWTH IN MUNICIPAL SOLID WASTE (MSW) BY 6/30/2013.

(Recycling - FY 2007-2008 baseline = 455.5 tons)

(MSW - FY 2008-2009 baseline = 2,466.8 tons)

FY 2008-2009 Initiatives

- Add 11 recycling dumpsters to campus (*8 added*)
- Place 500 paper recycling containers on campus (*complete*)
- Place 250 bottle/can recycling containers on campus (*complete*)
- Place 1850 individual recycling containers in residence hall rooms (*complete*)
- Establish baseline of waste stream generation and establish goal (*ongoing*)
- Hold a recycling competition between residence halls during fall semester (*complete*)
Results: Recycled just under 20 tons; average 817 lbs/day and 6.5 lbs/student
- Participate in second annual national Recyclemania competition on campus during spring semester (*complete*) Results: #79 out of 189 total schools and #1 in the MAC conference
- Investigate economic feasibility of cardboard/paper pelletizer in the Central Energy Facility (*ongoing*)
- Installed 44 high-speed hand dryers in high traffic restrooms, replacing paper towels. (*complete*)
- Made curbside recycling pick-up available to all CMU apartment complexes (*complete*)
- For FY 2008-2009, recycling = 579.7 tons, a 25.9% increase

FY 2009-2010 Initiatives

- Evaluate the use of wood ash waste as a soil amendment (*ongoing*)
- Evaluate options for composting on campus (*complete*)
- Reduce bottled water consumption on campus and the purchase of bottled water by departments (*ongoing*)
- Cooperate with the Chemistry Department research project on the feasibility of generating biofuel from discarded campus cooking oil (*ongoing by Professor Dale Lecaptain*)
- Explore options to promote and/or convert to network printers (*ongoing*)
- Educate the campus community on defaulting copiers to print double-sided (*ongoing, Library and TEPD policies are examples*)
- Recycling rewards program in Residence Halls – being organized by Res. Life (*ongoing*)
- Pilot Schupan, Inc. project for collecting recyclable material at campus events (*complete*)
- Offer recycling services to on-campus apartments (*in place and ongoing*)

FY 2008-2009

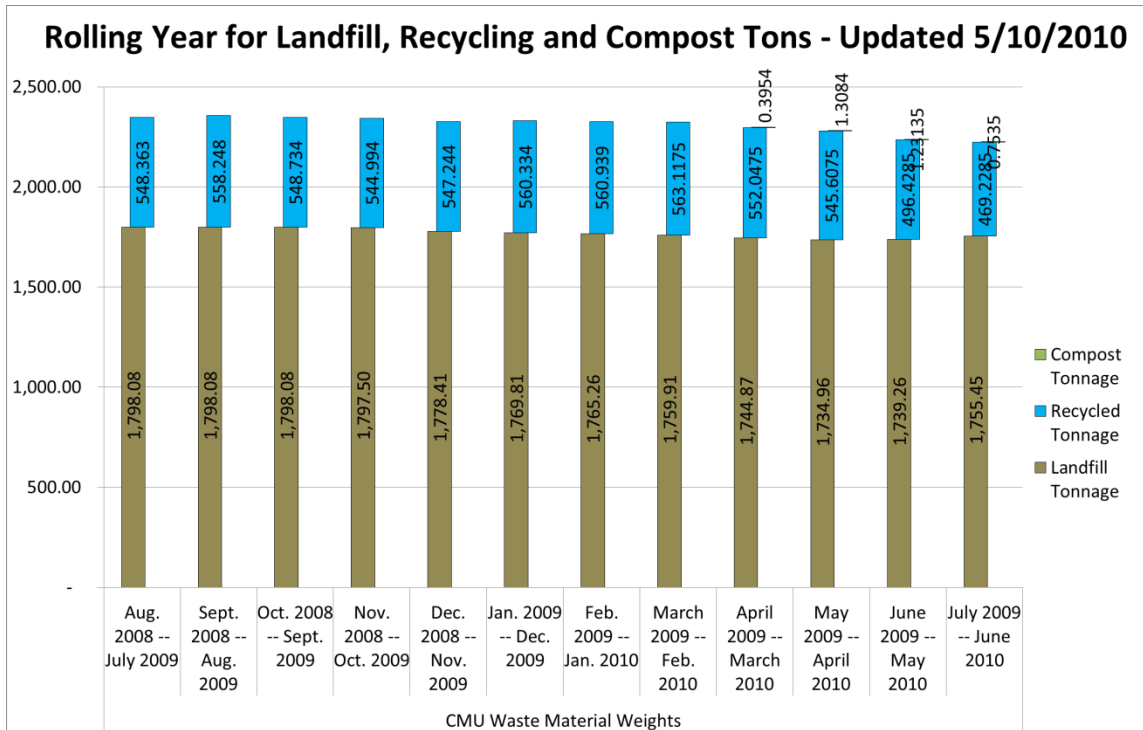
Eight additional recycling roll-off tanks were added at strategic locations across campus. An additional 500 paper recycling containers were placed in offices, residence halls and classroom hallways on campus. Two hundred and fifty plastic bottle and metal can recycling receptacles were installed to collect non-deposit beverage containers for recycling. Individual recycling bins were placed in 1,850 residence hall rooms to make recycling more convenient for residents. Curbside pickup of recycled waste from campus apartments was instituted.

To reduce paper towel waste, high-speed hand dryers were installed in 44 high-traffic restrooms on campus. The Recycling Office initiated participation in the national Recyclemania competition among college campuses across the nation. CMU placed 79th out of 189 total schools and had the best per capital recycling rate of schools in the MAC in our first year in the competition, averaging 817 lbs per day, totaling slightly less than 20 tons (approximately 6.5 lbs per student). For FY 2008-2009 these efforts resulting in recycling of 579.7 tons of material, a 26% increase over the base year.

FY 2009-2010

In FY 2009-2010, energy facility staff evaluated the use of wood ash generated by the biomass co-generation plant as a soil amendment. They also evaluated the purchase of a pelletizer system to allow cardboard to be turned into a biofuel. Both of these evaluations are ongoing. FM is cooperating with Dr. Dale LeCaptain of the Chemistry Department to assess the feasibility of generating bio-diesel fuel from discarded campus cooking oil. Pilot testing of outdoor receptacles for recyclable material collection was conducted in a joint venture with Schupan, Inc. This led to the purchase of 100 additional recycling receptacles for deployment and use in FY 2010-2011.

Support was given to the student group Campus Grow, which conducted a pilot-composting program on campus. To date CMU has composted over 8,800 lbs of prep-food scraps. Student recyclers prepared brochures and other material to encourage more recycling on campus and provide information about reusing non-recyclable materials. Results of the 2010 Recyclemania competition place CMU 99th out of 346 participating schools with a gross tonnage collected of 178,697 lbs (4th out of all Michigan colleges and universities participating).



Goal 5: ENCOURAGE USE OF MASS TRANSIT, CAR POOLING, AND HUMAN-POWERED TRANSPORTATION BY UNIVERSITY STUDENTS, FACULTY AND STAFF.

FY 2008-2009 Initiatives

- Install 50 bike racks to encourage alternative transportation (*complete*)
- Install 6 new bus shelters (*complete*)
- Maintain carpool/rideshare computer bulletin board for faculty and staff (*complete*)
- Widen Washington Street and installed bike lanes on each side (.5 miles) (*complete*)
- Increased ICTC ridership from all campus apartment complexes nearly 1,127% since 2005
- Install bike lanes on each side on West Campus Drive (1.5 miles) (*complete*)
- Added bike lanes on Ojibway, Ottawa, and Calumet Court (*complete*)

FY 2009-2010 Initiatives

- Develop practices and facilities which encourage use of mass transit, carpooling, and cycling on campus according to the CMU transportation master plan (*ongoing*)

- Evaluate limits on new personal vehicle parking spaces, possibly through premium rates (*ongoing*)
- Add additional bicycle racks and facilities for cycling commuters as need arises (*ongoing*)
- Work with local public transit systems (ICTC) to increase ease of bus use by students (*ongoing*)
- Work with the city of Mount Pleasant to incorporate bicycle lanes on area roads to improve safety for bicycle commuters (*ongoing*)

FY 2008-2010

Bicycle lanes were installed on West Campus Drive, Ojibway, Ottawa, Calumet Court, Franklin Street (between Preston and Bellows) and a small portion of Bellows Avenue. An additional six bus shelters were installed on campus, resulting in further increases in ICTC ridership to and from off campus apartments. Throughout FY 2009-2010 CSAC members continue to work with Union Township, the City of Mount Pleasant and ICTC to ensure safe means of alternative transportation for students, faculty, and staff.

FY 2008-2009

FM installed an additional 34 bicycle racks and six new bus shelters on campus to encourage the use of alternative transportation. Since 2005, the ridership on ICTC buses increased by 1,127%. An online carpool and ride-share bulletin board was developed for faculty and staff. A physical ride-share board is maintained for students in the main lobby of the Bovee University Center

Goal 6: REDUCE UNIVERSITY'S CARBON FOOTPRINT BY 10% BY 6/30/2013

(FY 2007 baseline = 32.6 pounds CO₂e/gsf)

FY 2008-2009 Initiatives

- Purchase electric pickup truck (*complete*)
- Switch to B20 biodiesel fuel (*complete*)

FY 2009-2010 Initiatives

- Review flex-time policies to accommodate alternate work arrangements for staff, as appropriate, without negatively impacting campus operations or student services (*ongoing*)
- Educate the campus community about idling cars in parking lots and the impact on carbon footprints (*ongoing*)
- Conduct Biomass Cogeneration Facility feasibility study (*ongoing*)
- Determine Carbon Footprint of CMU FY 2009 data (*complete: see 2010-2012 Institutional Action Plan*)
- Implement Green IT program across all computing platforms on campus by

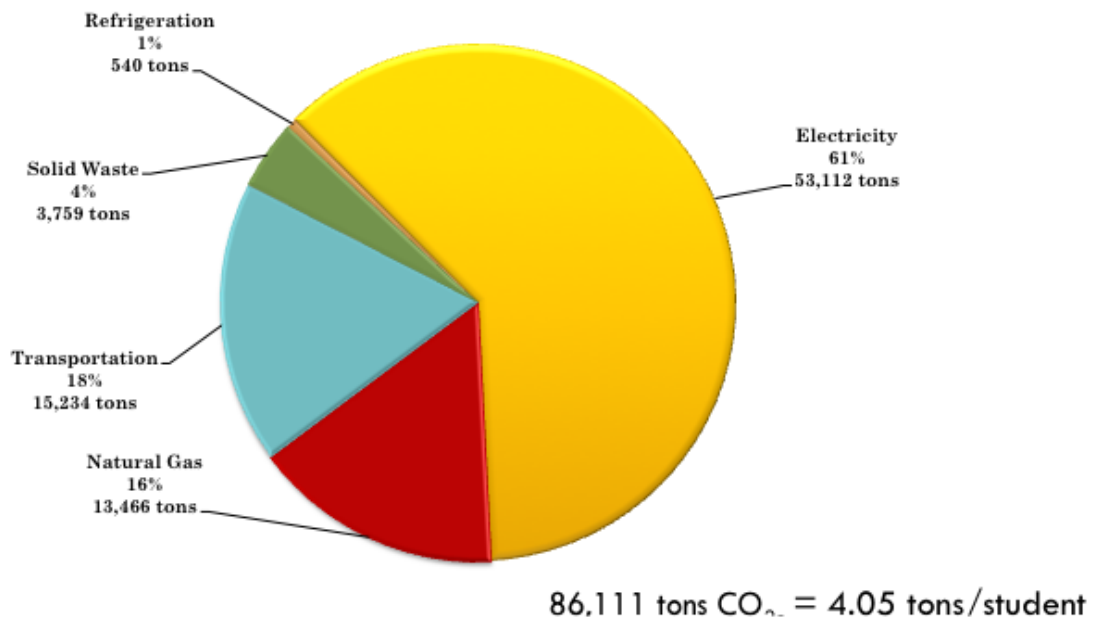
encouraging the following (*ongoing*):

- Turning off personal workstations when not in use
- Turning off workstations and other equipment in labs and mediated classrooms when not in use
- Replacing CRT monitors with more energy efficient LCD monitors
- Reducing energy use in data center operations
- Leveraging CMU technologies in conjunction with FM systems to reduce campus energy use
- Taking advantage of e-waste recycling programs offered by manufacturers
- Complete the installation of a digital imaging system to hand all applications for admission and other student documents in a paperless system (*ongoing*)

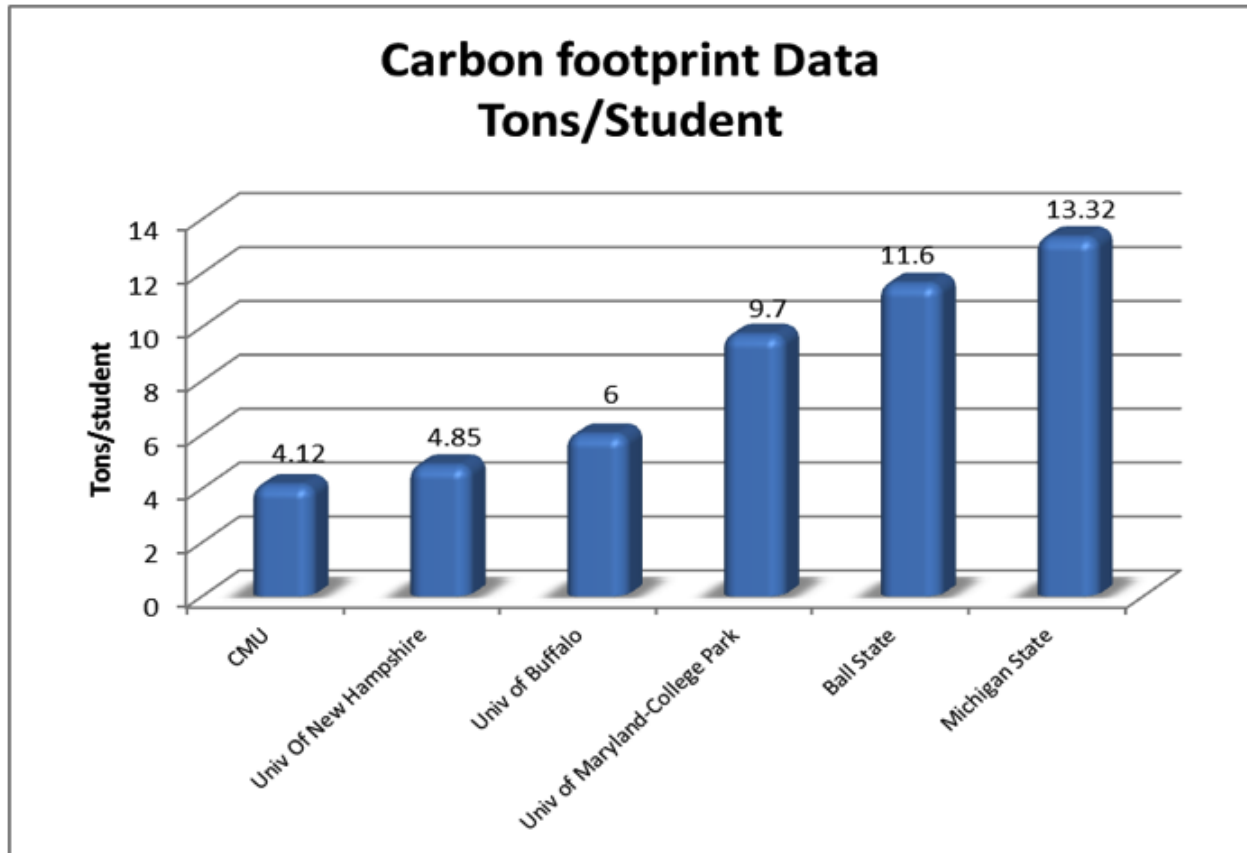
FY 2008-2010

The total carbon footprint of CMU was determined based on data from 2007. These data will be used as our baseline to assess future progress in reducing our total CO₂ equivalent emissions. CMU's total emissions equate to 81,938 tons of CO₂. Roughly 80% of those emissions result from the combustion of fossil fuels for energy production, either by CMU directly or by its suppliers. Transportation contributes approximately 15% of the total and the remaining 5% is generated by a variety of sources including waste disposal and refrigeration.

Emissions by Major Categories FY 2009



To reduce CMU's carbon footprint, significant attention is being given to reducing energy consumption as noted in Goal 1 above. To meet our goal of a 10% reduction by the end of FY 2012-2013, we will need to reduce emissions by approximately 8,200 tons of CO₂ equivalents. In FY 2008-2009, CMU switched to a B20 biodiesel fuel for use in motorized equipment and purchased one electric vehicle to evaluate their use. The biodiesel transition worked well, but the electric vehicle was not functional for large periods of time.



To reduce the contribution of transportation emissions, CMU began the review of flex-time policies to accommodate alternative work arrangements for staff, as feasible, without impacting campus operations or student services. This evaluation continues. Campus employees, as well as suppliers, have been educated about the impact of idling vehicles on CO₂ emissions. FM continues to evaluate expansion of the biomass co-generation power facility to reduce our dependence on power purchased from fossil fuel sources.

Goal 7: IMPLEMENT LEED PRACTICES FOR DESIGN AND OPERATIONS ON ALL CAMPUS PROJECTS AND BUILDINGS; ACHIEVE LEED CERTIFICATION ON ALL NEW BUILDINGS, ADDITIONS AND MAJOR RENOVATIONS

FY 2008-2009 Initiatives

- Convert Brooks, Anspach, Dow, Park Library, Charter School, ProfEd, Indoor Athletic Facility, Ronan, Woldt, Emmons, Saxe, Herrig, Celani and Fabiano Halls to green cleaning (*complete*)
- Institutionalize sustainable design and construction by developing and implementing policy on:
 - LEED building certification (*ongoing*) - included in AE contracts via the CMU design standards
 - Green cleaning (*ongoing*)

FY 2009-2010 Initiatives

- Complete LEED NC training for PEP project managers - all PEP project managers, the director and the project administrator completed lead NC training. Two project managers chose to write the test and achieved LEEP AP credentials (*complete*)
- New Goal/Proposal - Hold CMU Campus LEED charter and establish minimum expectations for future LEED NC projects (*complete*)
- Develop standards for all future projects (*complete*)
- Continue to leverage sustainable design and construction practices by incorporating them into CMU's design and construction standards. This has occurred through flooring, low-flow fixtures, TVSS units (*ongoing*)
- Obtain Gold Level LEED certification on the EHS Building (*ongoing*)
- Establish project plans to obtain LEED certification on these projects (*complete*):
 - University Events Center
 - UC Renovation
 - Ronan Hall Renovation
 - Health Professions Addition - School of Medicine

FY 2008-2009

CMU began to formalize sustainable design and operation policies so that all campus construction and major renovation projects are built to LEED specifications. The EHS Building was completed to meet at least LEED silver status and will likely be certified at the LEED gold level when the certification process is completed. LEED standards for green cleaning were implemented in Brooks, Anspach, Dow, Ronan, Woldt, Emmons, Saxe, Herrig, Celani, Fabiano, Park Library, EHS, and the Indoor Athletic Facility. All custodial staff has been trained in green cleaning and recycling.

FY 2009-2010

CMU intends to develop plans to achieve LEED silver or higher certification for the University Events Center, Ronan Hall renovations, Bovee University Center renovations, and the Medical School addition to the College of Health Professions. All project managers have completed LEED training for new construction and a minimum of two project managers will become certified as LEED professionals. An honorable mention Green Cleaning Award, from American School and University Magazine, was earned in 2010 for advancements in green cleaning practices at CMU.

Goal 8: INCORPORATE PRINCIPLES OF SUSTAINABILITY INTO UNIVERSITY CLASSES, CURRICULA AND SERVICE LEARNING OPPORTUNITIES.

FY 2008-2010 Initiatives

- Emphasize sustainability concepts in existing courses (*ongoing*)
- Encourage sustainable practices in the classroom and laboratory (*ongoing*)
- Support Sustainability minor in the College of Business Administration (*ongoing*)
- Integrate campus sustainability culture into the First Year Experience program (*ongoing*)
- Increase the percentage of service learning projects focused on sustainability issues (*ongoing*)

FY 2009-2010

A subcommittee of the CSAC reviewed and evaluated existing courses that covered some aspects of sustainability and compiled a working list of those courses. To provide additional opportunities for students who are interested in gaining academic credentials in sustainability, the Environmental Studies program opened up the Environmental Studies minor to all majors.

A certificate program in Sustainability and Environmental Awareness is being developed by academic departments to be offered through ProfEd. A minor in International Business and Sustainable Development was established by the College of Business Administration.

The Chemistry Department continues their development of green chemistry practices in their courses. Both the First Year Experience program and the program to train Residence Hall Advisors and Multi-cultural Advisors now include training in sustainability on campus. The curriculum subcommittee will evaluate courses on sustainability for potential inclusion in the courses of study offered by all colleges.

Goal 9: INCREASE THE AWARENESS OF SUSTAINABILITY AMONG STUDENTS, FACULTY AND STAFF OF CMU.

FY 2008-2010 Initiatives

- Create an award program for suggestions and actions which improve campus sustainability (*ongoing*)
- Promote sustainable actions through creative public relations and marketing campaigns (*in place and ongoing*)
- Promote the CMU sustainability pledge at campus events, such as Earth Day (*in place and ongoing*)
- Promote environmental ethics in all aspects of campus life (*ongoing*)
- Explore regular column in Central Michigan Life showcasing campus sustainability efforts (*ongoing*)

FY 2008-2010

University Communications has promoted sustainability on campus by producing articles, videos, and print materials on the topic. These products have helped to increase awareness of sustainability on campus as well as promoting the image of CMU as a sustainable campus to outside interests. The CMU Sustainability Pledge is online and has been promoted at CMU events, such as the annual Earth Day celebration held in Warriner Mall. Graphics and inspirational posters have been developed by the Art Department, working with CSAC, and were deployed at various campus locations in 2010.

FM has placed stickers on light switches encouraging energy conservation. Various student groups are working to promote recycling, energy conservation, and reduced vehicle use on campus. Members of the CSAC continue to bring awareness of the importance of sustainability to their colleagues.

Goal 10: ENCOURAGE COMMUNITY LEADERS AND PRIVATE INDUSTRY IN MOUNT PLEASANT, ISABELLA COUNTY AND THROUGHOUT MIDMICHIGAN TO COOPERATE WITH UNIVERSITY SUSTAINABILITY INITIATIVES

FY 2008-2009 Initiatives

- Purchase materials, supplies, and food from local vendors where feasible (*ongoing*)

FY 2009-2010 Initiatives

- Conduct a local sustainability forum, and other outreach activities, with community leaders that emphasize university and community partnerships in sustainability (*completed; second conference being planned*)
- Work to provide safer lanes for cycling commuters on- and off-campus (*ongoing*)
- Provide support for the Mount Pleasant Food Project's Campus Grow demonstration gardens on campus (*ongoing*)
- Added bike lanes on Ojibway, Ottawa and Calumet Court (*complete*)
- Widened Washington Street and installed bike lanes on each side (*complete*)
- Installed 1.5 miles of bike lanes on West Campus Drive (*complete*)
- Increase ICTC ridership from off campus apartment complexes. Ridership is up 1,121% since 2005 (*ongoing*)

FY 2008-2010

Campus dining has increased the percentage of local food purchased from Michigan vendors and promotes sustainable practices in all dining operations. Fair trade coffee is served at residential restaurants and campus coffee shops. Dining staff all receive specialized training in sustainable practices and dining facilities are evaluated with a sustainability checklist developed by Aramark.

In FY 2008-2009, the Environmental Studies Program and the Human Environmental Studies program held the inaugural conference on sustainability at CMU. In FY 2009-2010 this conference evolved into the Global Think-In on sustainability and was sponsored by the First Year Experience office. These conferences provided information to students, faculty and staff on-campus about sustainable operations and showcased student research and service learning projects. GLISS is also inaugurating a Sustainability Speaker Series on campus.

CMU has representatives on both the Union Township Sustainability Committee and the Mount Pleasant Vision 2020 work group to promote sustainability in the surrounding community. Part of this work includes partnering with local authorities to assure safe bicycle lanes and adequate public transportation services to reduce personal vehicle miles driven. The student Campus Grow project is linked to the Mount Pleasant Food Project. Local sustainable vendors, such as GreenTree Cooperative Grocery, participate in the annual Earth Day event on campus. Earth Day events are free and open to the public and attract many community residents each year.

Goal 11: IMPROVE CAMPUS STORM WATER MANAGEMENT BY 6/30/2013

FY 2008-2009 Initiative

- EHS vegetated roof on 55% of surface (*complete*)

- Install SEF roof storm water collection for chilled water make-up (*ongoing*)
- Establish vegetative roof standard for future construction and rehabilitation projects` (*ongoing*)

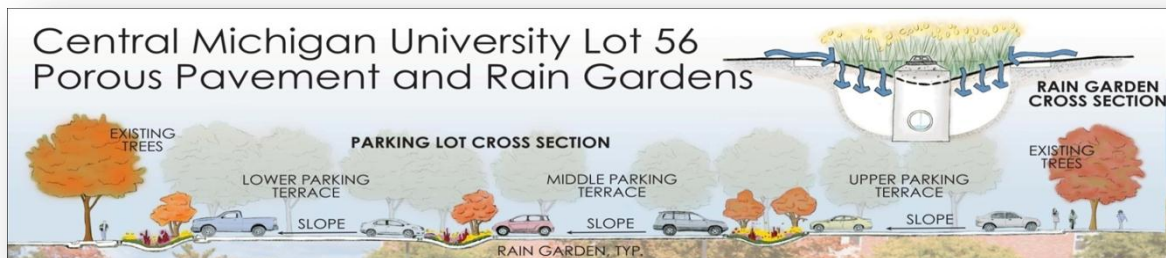
FY 2009-2010 Initiative

- Construct EHS permeable surface parking lot with rain garden (*complete*)

FY 2008-2009

A vegetated roof, consisting of a complex of several different species of Sedum, was installed on approximately 55% of the roof surface of the EHS Building. This roof system assists in storm water management and reduced energy consumption for heating and cooling. This system is being used as a model for the development of a vegetative roof standard for future construction projects.

The Secondary Energy Facility is being fitted with a precipitation collection system on its roof to supply make up water to the chilled water system. This will reduce the need for purchased water supply. CMU's first permeable pavement parking lot was installed adjacent to the EHS Building. Precipitation percolates through the porous lot surface and is collected in a pea gravel reservoir below grade. Water in the reservoir is slowly released to rain gardens in islands in the parking area.



Goal 12: ENCOURAGE CAMPUS VISITORS TO ACTIVELY PARTICIPATE IN SUSTAINABILITY EFFORTS WHILE THEY ARE ON CAMPUS

FY 2008-2010 Initiatives

- Provide educational materials to persons attending events on campus regarding CMU's Campus Sustainability Initiative (*ongoing*)
- Provide ample and convenient facilities for recycling of materials from university events (*ongoing*)
- Promote recycling at major athletic events on campus using electronic scoreboards

- and other means as appropriate (including Schupan contract) (*ongoing*)
- Develop educational materials for posting in residence halls and classroom buildings (*complete*)
 - Promote CMU's sustainability efforts via AASHE and in national publications such as the Sierra Club magazine (*ongoing*)
 - Use CMU's sustainability initiatives as a recruiting tool in attracting new students to campus (*ongoing*)

FY 2008-2010

CMU is committed to providing ample and convenient facilities for recycling on campus. FM has added a substantial number of additional recycling containers over the past two years as noted above. This fall, the Recycling Office is adding 100 additional outdoor recycling receptacles in high traffic areas to promote recycling on campus. Signage is posted to alert visitors to green cleaning practices, energy and waste savings projects, and other aspects of campus sustainability.

University Communications is developing additional informational materials to promote sustainability on campus for posting in public areas. They assist the CSAC in reporting on and promoting CMU's sustainability efforts in national media such as the Sierra Club magazine, AASHE publications, the Princeton Review and other media outlets. CSAC representatives communicate with staff of the Admissions Office to provide them with information that might be of interest to potential students who choose a university based, at least in part, on its level of sustainability.

Appendix 4: The Great Lakes Institute for Sustainable Systems

The Great Lakes Institute for Sustainable Systems at Central Michigan University

Mission and Enduring Principles

Mission Statement:

The mission of the Great Lakes Institute for Sustainable Systems at Central Michigan University is to promote academic programs, research, community outreach, and campus operations that are dedicated to the advancement of sustainable systems. The institute will promote these goals through interdisciplinary collaboration within the University and through complementary external partnerships to benefit the community, the Great Lakes region, and the world.

Enduring Principles:

Our mission rests on the foundation of a systems approach to sustainability, recognizing the interconnectedness of natural and human processes. Our work will highlight the need for and promote the development of sustainable systems within the environment, across societies and communities, in economic development, and in energy utilization. Central Michigan University will demonstrate principles of sustainability through its operations, management, teaching and research. This approach recognizes that current actions, education, research, and community activities will impact future generations.

Defining Sustainability:

While sustainability can be defined in many ways, the broadly accepted definition as outlined in [Our Common Future](#), a report of the United Nations World Commission on the Environment published in 1987, is the one used by the institute. Sustainability consists of meeting the needs of the present generation without compromising the ability of future generations to meet their needs. Sustainable systems are those which foster stewardship and wise management of natural resources and energy that allow the needs of the current day to be met while ensuring that vital resources and energy supplies will be available to meet the needs of future generations. How this institute and Central Michigan University as a whole will work to meet these goals is summarized in the following narrative.

Narrative:

- Universities are a microcosm of the larger society and can serve as a laboratory for development of innovative operations. The campus of Central Michigan University will be used to demonstrate the value of

energy and water conservation programs; waste reduction, recycling, and composting projects; educational activities; and the development of a culture of sustainability on campus. Innovative academic programs focusing on sustainability will be incorporated into the curriculum. CMU will form partnerships with local, regional, national and international entities to advance principles of sustainability wherever possible. The institute will help Central Michigan University lead by example.

- Natural environments are a critical component of sustainable systems. Thus, the institute acknowledges that ecosystem integrity, biodiversity, landscape fragmentation, and watershed protection, among others, as important concepts. Efforts are necessary to further public awareness and education regarding the implications of these concepts. Educating students to be future leaders in sustainable systems is also necessary to assure environmental quality, fiscal responsibility, and social equity through the implementation of targeted programs.
- The development and installation of sustainable energy systems is necessary to assure future energy demands are met and that communities in the Great Lakes basin will rely increasingly on renewable energy sources. The institute will serve as a focal point for research and development activities that promote energy conservation and alternative energy solutions for the future. Interdisciplinary research and development work will be fostered by the institute.
- Sustainable development will provide a framework for the majority of successful business models in the future and the institute will promote and test these systems. The Institute will test and assess current models including balanced performance measurements, as well as develop new sustainable solution portfolios. The scope of the initiatives considers the full range of for-profit business and not-for-profit value chains addressing the domains of human resources, process, product, and technology. Academic programs in international business and sustainable development will be added to the curriculum. Graduate programs in sustainability and sustainable development will be developed. The institute will serve to promote these programs and to advance the training of our students and faculty.
- Internationally, many countries, particularly those in Scandinavia and northern Europe, have made advances in sustainability that could be applied in the Great Lakes basin. The institute will establish connections with international environmental organizations and serve as a repository for data and reports on successful sustainability work from Europe and other areas of the globe. It will also serve to facilitate partnerships between North American and European businesses, researchers, educators, and communities to promote technology transfer and the application of successful systems at new locations.
- Surface and ground waters are critical resources not only in the Great

Lakes basin, but throughout the world. These resources will require significant attention in order to manage them sustainably in the future. Central Michigan University is particularly well-positioned to support research and education in this area. The location of the institute in the center of the Great Lakes basin, home to 20% of the surface freshwater resources of the world, puts us in a position to be leaders in water research, water resource management and water conservation. Many research and teaching initiatives are underway in the sciences that involve sustainability and the institute will promote these efforts. The Michigan Water Research Center on campus will be available to perform water analyses for the community to monitor water resources. Research in water quality and fisheries ecology as well as in microbial pollution detection and heavy metal remediation are being conducted to address problems in the Great Lakes region and beyond. The institute will facilitate partnerships between CMU and private industry to conduct research and pilot programs involving water resources.

Sustainable communities engage their citizens to protect and enhance the community's natural and human resources for present and future generations. To reach this goal, the institute utilizes partnerships, outreach endeavors, and solution-focused research projects to foster quality of life and facilitate corporate social responsibility efforts in organizations, communities, and citizens of the Great Lakes region. These efforts allow for a greater understanding of how assets and resources can be managed in sustainable ways.

Appendix 5: Energy Projects at Central Michigan University

Energy Projects					
Project name	Buildings	Cost	Est. Annual Savings	Rebates	ROI
Motion Sensors	Anspach, Dow, Foust, Engineering/Tech, Grawn, Indoor Athletic Center, Moore, Music, Pearce	\$312,900	\$98,885	\$57,697	39%
Residence Hall Radiator Valve Installation	Merrill, Thorpe, Beddow, Sweeney, Carey, Wheeler, Cobb, Troutman, Robinson, Larzelere, Calkins, Trout, Emmons, Herrig, Woldt and Saxe Halls	\$473,940	\$227,491	\$77,648	48%
Restroom Exhaust Fan Replacement	1600+ restroom suites in residence halls	\$85,173	\$94,827	\$25,000	157%
Replace pneumatic thermostats with wireless radio controlled	ET Building and Combined Services Building	\$28,934	\$7,000		24%
Reduce kitchen hood exhaust rate	All dining commons	\$50,000	\$26,534		53%
Install aerators on faucets	4,500 faucets throughout ampus	\$9,000	\$58,000		640%
Install low flor flush valves on toilets & urinals	650 toilets/220 urinals	\$17,500	\$11,250		65%
Install steam absorption chiller	Power House	\$45,000	\$584,000		1298%
Install demand control ventilation which monitors CO2 levels in occupied spaces	98% of campus buildings	Average cost per air handler - \$700			100% or less than one year
Replace T-12 to T-8 lights	SAC Gym, Rose, Campus, Power House, Special Olympics, Grawn, Grounds South	\$246,500	\$51,711	\$26,061	36%
Replaced incandescent buildings with LED lights	Kessler, Kulhavi & Campbell Halls	Changed 42 lights from 90 watt to 8 watt in hallways for 91% reduction and 18 lights from 20 watt to 6 watt in desk area for a 70% reduction			
	Park Library	Changed 107 lights from 50 watt to 6 watt in Auditorum, Extended Hours area and Elevators for 88% reduction			
Compact Fluorescent Lights	Alumni House, Anspach, Dow, Grawn, Moore, Rowe, University Center, Warriner, Campbell, Kessler and Kulhavi Halls	Before: 43,800 watts After: 7,592 for an 83% total wattage reduction and annual savings of \$26,318			

Appendix 6: Central Michigan University Sustainable Purchasing Policy

Reads as follows:

“Central Michigan University (CMU) desires to comply with the levels of sustainability found within the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) program. Vendors are therefore, encouraged to offer as alternates; products, services, or processes that are sustainable and environmentally friendly if available and have not been specified in CMU bid documents.

All alternates to CMU’s specifications must be clearly identified by the supplier. The environmental benefits must be clearly identified with supporting documentation included. Examples of such environmental benefits include but are not limited to: energy star rating, reduced life cycle costs, reduced energy consumption, recycled content, recycling, extended product life, and decreased maintenance.”

November 1, 2010
Central Michigan University
Mount Pleasant, MI 48859

Acknowledgements

This report is the product of collaborative efforts and contributions by many members of the Central Michigan Community. Specifically the: Campus Sustainability Advisory Committee (CSAC), Energy Optimization Committee, Living and Learning Work Group, and others who contributed to the document. Members of these groups who contributed materials for this report are listed below.

Staff from a number of operational units in FM implemented the improvements in campus operations noted in this report. We thank them for their great work.

Mr. David Burdette and the office of the Vice President for Finance and Administrative Services provided support for the CSAC and preparation of this publication.

We thank Dr. George Ross, President; Dr. E. Gary Shapiro, Provost; Dr. Pamela Gates, Dean of the College of Humanities and Social and Behavioral Sciences; Charles Crespy, Dean of the College of Business Administration; and Dr. Dale-Elizabeth Pehrsson, Dean of the College of Education and Human Services for their continued support of CMU's work in the field of sustainability.

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This report should be cited as:

Fiani, S. M., & Rohrer, T. K. (Eds.). (2012). *Sustainability is Central: 2010-2012 Biennial Report on Sustainability at Central Michigan University*. Mt. Pleasant, MI: Central Michigan University.



Great Lakes Institute for Sustainable Systems

The Great Lakes Institute for Sustainable Systems at Central Michigan University promotes academic programs, research, community outreach, and campus operations that are dedicated to the advancement of sustainable systems.

The work of the institute is built on four foundational pillars:

1. Promoting sustainable management of natural resources and the environment.
2. Promoting sustainable economic systems.
3. Promoting sustainable communities and societies.
4. Promoting sustainable energy systems.

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