



# **Sustainability is Central**

## **Volume III: 2012 – 2015**

**Edited by:**

**Thomas K. Rohrer and Meghan L. Marx**

**Great Lakes Institute for Sustainable Systems  
College of Humanities and Social and Behavioral Sciences  
Central Michigan University, Mount Pleasant, MI 48859**

**September 2015**



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[www.cmich.edu](http://www.cmich.edu), keyword: GLISS.

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# **Sustainability is Central: 2012-2015 Biennial Report on Sustainability at Central Michigan University, Mount Pleasant, Michigan**

## **Campus Sustainability Advisory Committee: 2008-2015**

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, FY 2009-2010, and FY 2011-2015 CSAC developed institutional action plans to meet the listed goals. The goals are listed in the Institutional Action Plan (starting on page 7) together with specific accomplishments under each of them. Efforts from FY 2012-2015 are detailed in the narrative below; those from 2008-2011 are included in Appendix 3.

## Going Green Saves Resources

Someone once quipped at a sustainability committee meeting that "Going green saves green". It is certainly true that actions at Central Michigan University taken to conserve energy and water use and to recycle and reuse materials have not only saved planetary resources but have also resulted in significant economic savings over the past eight years. The table below summarizes some of the more significant savings. The CMU energy budget has remained fixed for the past five years and facilities are being managed in such a manner that energy savings and cost avoidance are approaching \$1.5 million annually. The programs and projects described later in this report have resulted in over \$10 million in total savings for the University.

### Summary of Sustainability Savings 2008-2015

Initiative	FY 2014	Total 2008-2015
Energy Savings and Cost Avoidance	\$1,340,000	\$8,440,000
Energy Project Rebates	\$250,350	\$675,350
Municipal Water & Sewerage	\$150,670	\$693,342
Surplus Sales	\$132,784	\$875,000
Cardboard Recycling	\$2,400	\$4,800
Office Paper Recycling	\$1,200	\$12,400
Copper Recycling (wire and plumbing)	\$40,000	\$40,000
Composting of Organic Waste*	\$48,000	\$96,000
Tyga Reusable Moving Box Systems*	\$2,400	\$8,500
<b>TOTAL</b>	<b>\$1,967,804</b>	<b>\$10,845,392</b>

Primary categories based on actual measured costs and receipts.

\*Latter categories are estimated based on expected cost savings

## Awards and Recognition

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

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 43<sup>rd</sup> in 2009 and 96<sup>th</sup> 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.

Campus Grow, a student organization that runs the on-campus community garden was recognized by the Association for the Advancement of Sustainability in Higher Education (AASHE) in its August 2010 electronic newsletter.

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.



In 2010, CMU won Capital Area Transportation Authority's Clean Commute Challenge. In 2012, CMU received a 2<sup>nd</sup> place award.

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



CMU was listed in the Princeton Review's Guide to Green Colleges in 2013 and 2014. In 2015, CMU was again listed in the Princeton Review's Guide to Green Colleges for the third year in a row.



In 2015 CMU was recognized by the Michigan Department of Environmental Quality and Governor's Recycling Council with its Excellence in Recycling Award for recycling education and outreach. The physical award was produced by the Architectural Salvage Warehouse of Detroit and is made of slate roof tiles from historic building on Wayne State's campus, antique oak beams from a home in Huntington Woods, and steel from the former Cadillac Stamping Plant.

Dan Wyant, Director of the Michigan Department of Environmental Quality, presenting Jay Kahn, Director of Facilities Operations, with the 2015 Excellence in Recycling Award for recycling education and outreach.



## **The 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 promotes 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](http://www.cmich.edu/sustainabilityinst)

[www.cmich.edu](http://www.cmich.edu), keyword: GLISS







# *Four Pillars of Sustainability*

**Environmental Protection and  
Resource Stewardship**

**Economic Viability and Cost  
Savings**

**Social Justice and Community  
Viability**

**Energy Conservation and Carbon  
Footprint Reduction**



# Institutional Action Plan for CMU

## *Goal 1: Reduce Campus Energy Consumption*

**New Target:** Continue progress in reducing campus energy consumption as measured on a kBTU/GSF basis using the 2012 baseline of 136.9 kBTU/GSF.

### **2010-2012 Target:**

#### **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 2013 = 161.9 kBTU/GSF (24% increase)

*Note: Target goal was not met due to the addition of medical facilities, laboratory, large volume (high ceiling) venues, and classroom space with higher than average rates of energy consumption.*

### **FY 2010-2012 Initiatives**

#### **From 2008 to present, the Central Energy Fund (CEF) has carried forward funding for 101 energy projects such as:**

- Retro-commission 20 buildings for energy efficiency
- T-12 to T-8 lighting upgrade in 78 buildings (ROI 40.5%)
- Occupancy lighting control in 25 buildings (ROI 31%)
- Demand Control Ventilation (CO<sub>2</sub>) in 43 buildings (ROI 120.7%)
- Self-contained heating valves in 17 residence halls (ROI 35.1%)
- Campus lighting upgrade to LED lights, 512 wall packs (ROI 16.1%)
- Exhaust fan upgrade, 17 residence halls, 105 fans (ROI 147.1%)
- Installation of 46 Variable Frequency Drives (ROI 400%)
- Dow Science fume hood controls project, upgraded 177 hoods (ROI 91%)
- **Total invested in these projects: \$2,961,287**
- **Utility rebates: \$675,350**
- **Net project cost: \$2,285,938**
- **Average ROI: 24.06%**
- **Utility savings to date from these projects: \$1,879,911**
- **Starting in August 2015, record keeping on energy projects began to be done through the Green Revolving Investment Tracking System (GRITS) to help track the project progress and its paybacks (*ongoing*)**  
*“The Green Revolving Investment Tracking System (GRITS 1.2) web tool is designed to help institutions better manage and analyze project-level energy, financial and carbon data. GRITS provides an intuitive interface to better track performance data from energy efficiency and other resource conservation measures.”*

- 64 solar panels installed on the Education and Human Service Building continue to generate sustainable energy (ongoing)

Sixty-four evacuated tube solar panels are installed on the Education and Human Service (EHS) Building. These panels continue 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.

- Apply for rebates from Consumer’s Energy and DTE (ongoing)

CMU has applied for and received over \$675,350 in rebates from Consumer’s Energy and DTE Energy since FY 2011.

- Exploring the addition of passive cooling to the Greenhouse (ongoing)

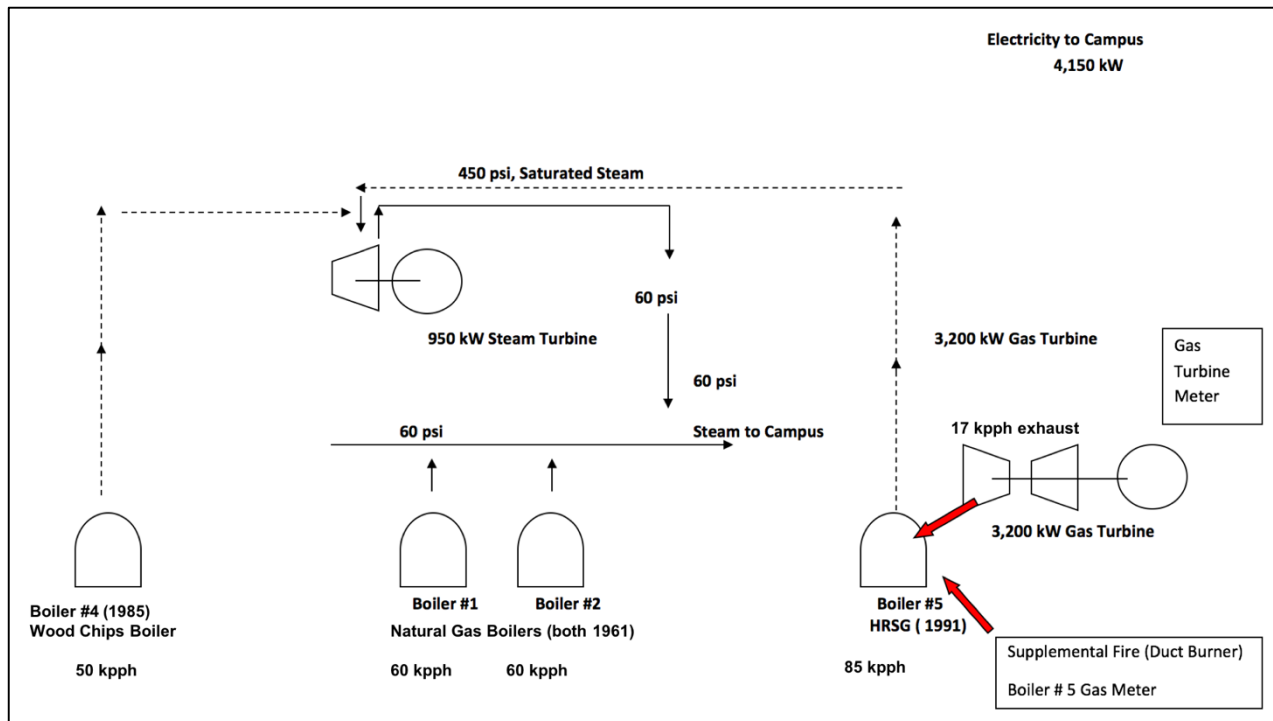
Installing automatic passive cooling vents at the peaks of the Greenhouse would reduce the energy costs of the Greenhouse by reducing the need to run the large fans that are currently the primary cooling

- CMU continues to generate much of its own electricity (ongoing)

Below is a schematic outlining the operations of CMU’s Power House system.



Inside CMU’s Power House

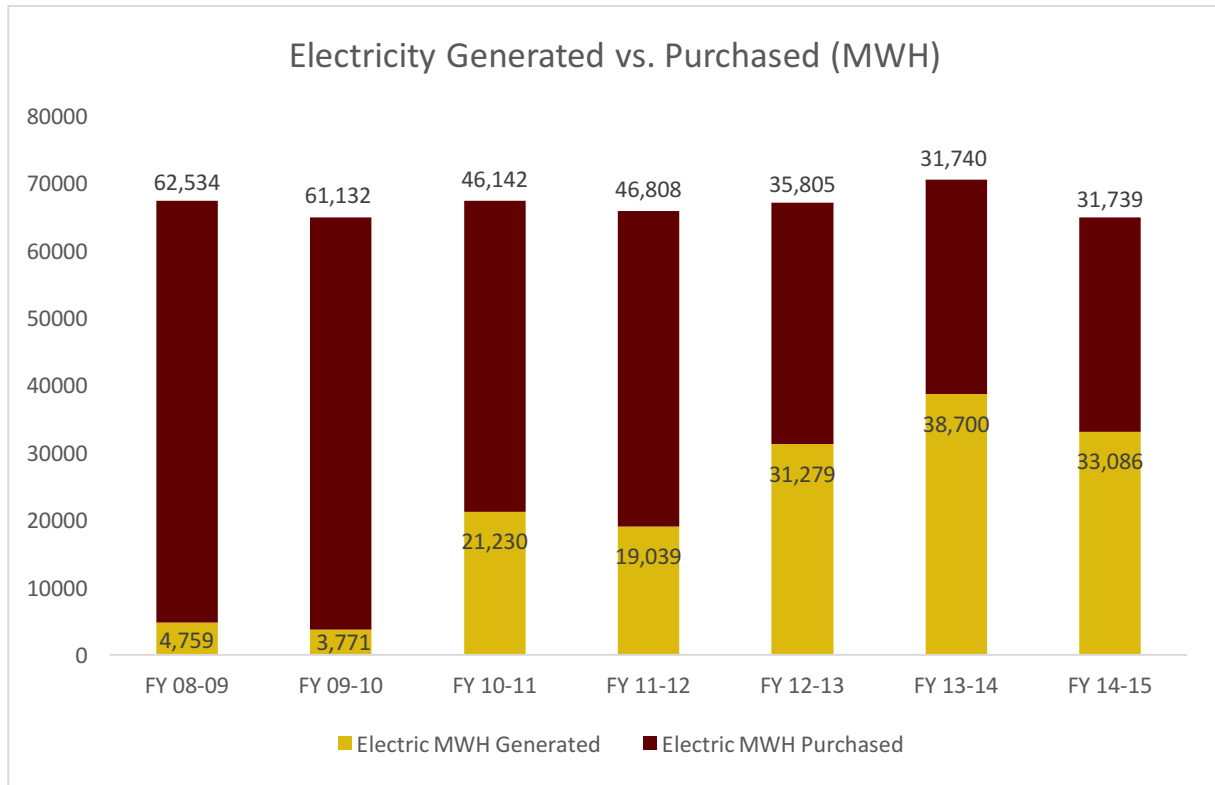


With the wood chip burner turning off on December 11, 2012, CMU’s Power House now runs entirely on natural gas. In FY 2014 the Power House produced 55.15% of the electricity for Main Campus.

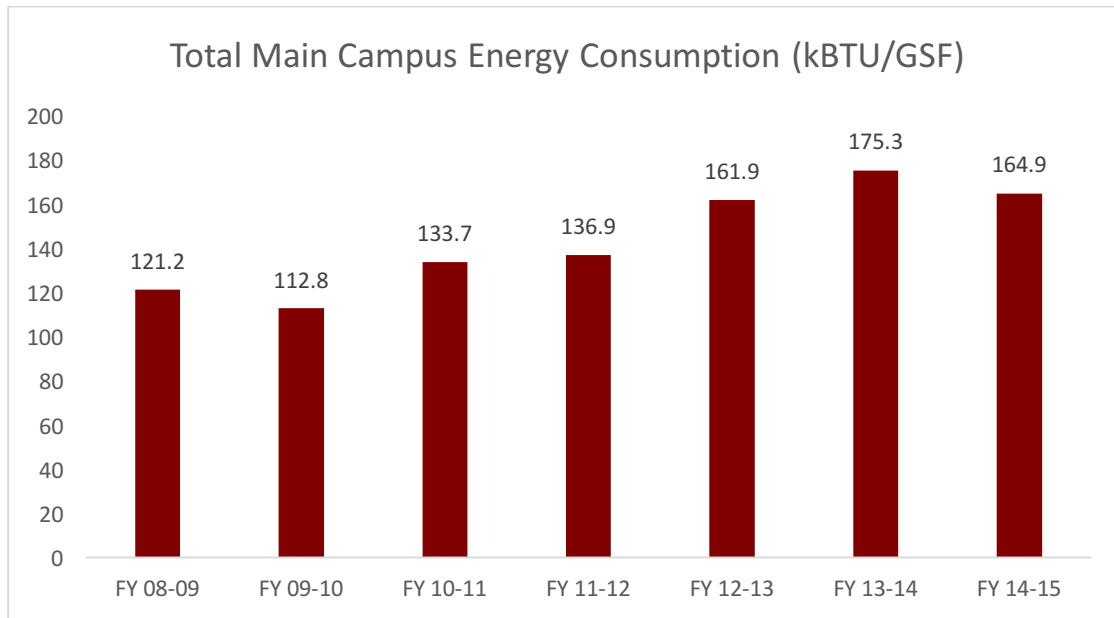




Solar thermo panels on the roof of the EHS Building



The total electricity produced on-site has increased by 566.93% while the total electricity purchased from outside sources has decreased by 49.24% since FY 08-09.



The graph above illustrates total main campus energy consumption in kBTU/GSF from FY 08-09 to FY 14-15. Though total energy consumption has risen since 2008, the cost of energy has actually decreased \$0.16 per square foot due to decreases in the cost of natural gas and the growth of on-site energy production, resulting in significant savings.

## Goal 2: Reduce Water Consumption

**New Target: Continue progress in reducing campus water consumption from municipal sources (City of Mt. Pleasant) on a gallons/Gross Square Foot (GSF) basis.**

FY 2015 water usage = 21.9 gallons/GSF (10.2 % decrease from 2008 base year)

**2010-2012 Target:**

**Reduce water consumption per GSF from municipal source by 6% by 6/30/2013**

FY 2008 baseline = 31.0 gallons/GSF

FY 2013 = 21.9 gallons/GSF (29.4% decrease from baseline)

**Current Water Consumption:**

FY 2015 = 21.9 gallons/GSF (29.4% decrease from baseline)

### ***FY 2012-2015 Initiatives***

- 🌍 **Trayless dining in residential restaurants (*implemented in 2008, ongoing*)**  
*Trayless dining continues in all residential restaurants saving water, energy, and reducing food waste.*

- 🌍 **Reduction in onsite well water consumption**

Well water is used in the Powerhouse and to irrigate the band field. Well water consumption has been reduced by 16.4% since 2011.

**Installation of storm water detention systems**

As defined by Contech Engineered Solutions, storm water detention systems “are employed on a site to reduce the quantity of stormwater runoff leaving a site by temporarily storing the runoff that exceeds a site’s allowable discharge rate, and releasing it slowly over time.” Two of these systems will be installed on campus: one in the Lacrosse Field and one in the Freshman Parking Lot. These systems are projected to exceed existing standards.

**Bottle filler water fountains installed around campus (ongoing)**

In an effort to minimize plastic bottle waste, installation of bottle filling stations on new and existing fountains across campus is ongoing. Currently, there are approximately 60 stations located on campus.



Dual flush handle and label

**Air conditioning systems converted from water-cooled to air-cooled systems**

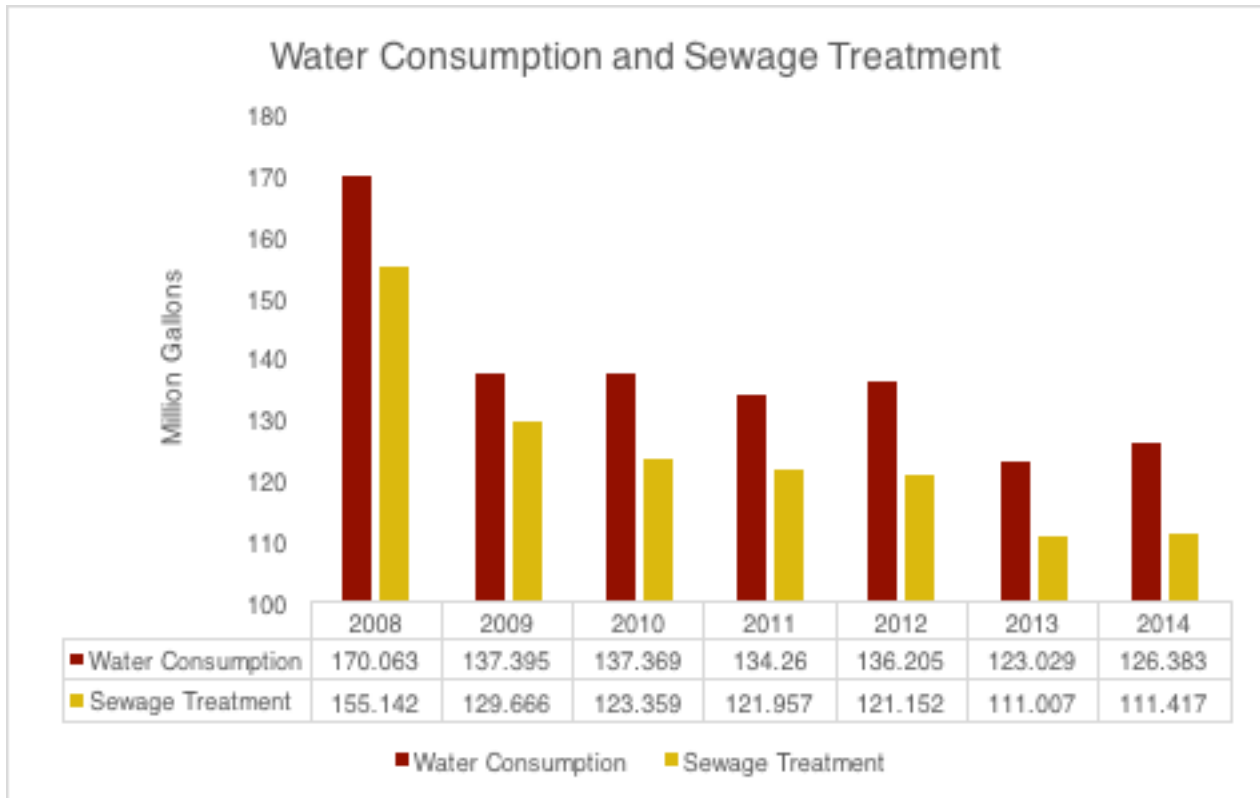
Air conditioning systems in Dow Science were converted from water-cooled to air-cooled systems, saving significantly on water.

**Explore campus landscaping options that incorporate plants which require less frequent watering, such as rain gardens and xeriscaping (ongoing)**

Facilities Management (FM) is continuing to explore the use and placement of plants that reduce the amount of necessary watering.

**Install low flush or dual flush toilets and low flow faucets (ongoing)**

Low flush toilets and low flow faucets continue being installed on campus.



## Goal 3: Sustainable Purchasing Protocols and Practices

**New Target:** Maintain existing institutional purchasing protocols and practices which foster improvements in overall campus sustainability including reuse and resale of surplus materials.

**2010-2012 Target:** Institutionalize purchasing protocols/practices which foster improvements in campus sustainability.

### 2012-2015 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)**
- **Residential restaurants, Meals 2 Go, and Express Grab programs use biodegradable packaging (ongoing)**  
*Residential Restaurants, Meals 2 Go, and Express Grab programs continue to 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.*
- **Stock environmentally friendly products in CMU Stores for use in campus operations (ongoing)**
- **Residential restaurants eliminate Styrofoam® products (ongoing)**  
*All Styrofoam® products, stored in the Residential Restaurants in the event of a dish machine malfunction, have been eliminated and replaced with paper products, and products manufactured from plants, modified with starch. Straws and stir sticks have been eliminated from the Residential Restaurants. Reusable bags are available for purchase at the P.O.D. Market. Retail locations and the Catering department are also using compostable and biodegradable products and have reduced the use of plastic and foam.*
- **Purchase ENERGY STAR rated appliances, computer, and printers (ongoing)**
- **87% of custodial products purchased and used in campus buildings have EPA or Green Seal certifications (ongoing)**  
*There has been a 4% increase in the use of such custodial products since 2012, at which point 83% of custodial products purchased and used in campus buildings had EPA or Green Seal certifications.*
- **Cage-free eggs purchased in by Campus Dining when possible (ongoing)**
- **Campus Dining continues to explore purchasing of sustainably sourced tuna (ongoing)**
- **Campus Dining investigates possible changes in their purchasing policies to further their sustainability efforts (ongoing)**  
<http://cmu.campusdish.com/Sustainability.aspx>

- **Purchasing department works with all other departments to source more sustainable products (ongoing)**  
*In addition, when given the viable option, products with less packaging or more sustainable packaging are chosen.*
- **Transition to more sustainable toilet paper options, such as coreless toilet paper (completed)**
- **Tyga Boxes purchased to replace cardboard boxes in moving operations and utilized since 2012 (completed)**  
*Tyga Box stand-alone plastic containers not only reduce the amount of cardboard used during moving operations, but reduce the costs of moving as well.*
- **CMU Printing Services uses paper with high post-consumer recycled content**  
*The paper suppliers for CMU Printing Services are Forest Stewardship Council (FSC) certified, Forestry Sustainable Initiative (FSI) certified or both.*
- **CMU Printing Services uses vegetable oil based ink and toner**  
*Over 90% of the printing inks and toners used at CMU Printing Services are made from vegetable oils instead of petroleum. “[The oils] are renewable resources and carbon neutral. They emit no volatile organic compounds into the atmosphere.”*  
<http://www.print.cmich.edu/prtservices.htm>

## *Goal 4: Waste Diversion, Recycling, and Municipal Solid Waste (MSW)*

**New Target:** Maintain existing campus waste diversion programs and develop methods to improve waste diversion. Municipal solid waste in calendar year 2013 was 2,220 tons with a diversion rate of 30.9%. By 2020, we aim to increase the diversion rate to 40%. We plan to continue programs to generate revenue from the sale of surplus cardboard and office paper instituted in 2013.

### **2010-2012 Target:**

**Increase recycling on campus by 30% by 6/30/2013; achieve 0% growth in total MSW by 6/30/2013.**

MSW – FY 2009 baseline = 2,346.8 tons

Recycling – FY 2008 baseline = 455.5 tons

MSW 2013: 2,238.48 tons (approximately 4.61% decrease from baseline)

Recycled 2013: 302.38 tons (approximately 33.62% decrease from baseline)

*NOTE: Though CMU’s recycling tonnage has decreased in relation to the 2008 baseline, those numbers do not account for the compost, cardboard recycling, and paper bale recycling programs implemented since 2008. Added together with general recycling these programs generated 704.41 tons of diverted waste in 2013 – a 55% increase from the 2008 recycling baseline, exceeding our goal by almost 25%.*



## 2012-2015 Initiatives

### **Partnership with Waste Management for recycling cardboard continues (ongoing)**

*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. In 2014, 184.73 tons of cardboard were recycled.*

### **Northern 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)**

*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.*

### **Explore disposal cost of textbooks and develop alternatives to reduce costs (ongoing)**

*CMU offers multiple sources for textbook disposal. Selling on the web is our most common means of disposal of books that we have no need for on our campus. When we are unable to clear stock on the web we use companies that pay us a fixed amount by the disposal box. The CMU Bookstore has a successful textbook rental program. Since the inception of textbook rental in 2010, the CMU Bookstore has rented over 78,000 units of textbooks, amounting to about 15% of all course materials transactions. Through our partnership with digital distributor Redshelf the Bookstore has sold over 1,500 digital textbook units. This is still a very small category, but unit sales continue to increase every semester.*

### **CMU Printing Services recycles all leftover material**

*According to their website "CMU Printing Services helps sets the standards in recycling at CMU - from the aluminum plates to the paper trimmings, to packaging material – [they] recycle it all!"*

### **Ink cartridges collected for recycling (ongoing)**

*Ink cartridges collected to be recycled at O-ink in Mount Pleasant, MI.*

### **Toner cartridges recycled or reused with Renu**

*Toner cartridges are either recycled parts of the cartridge, such as the plastic and powder, or refilled for reuse.*

### **Participate in RecycleMania (ongoing)**

*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.*



## CMU 2015/2014/2013 Results for RecycleMania

	Year	Result	Rank	# of Participating Schools
<b>Grand Champion (Recycling Rate)</b>	2015	24.721%	160	232
	2014	27.18%	141	256
	2013	26.993%	150	274
<b>Per Capita Classic (Pounds Per Capita)</b>	2015	8.167	180	307
	2014	7.45	221	331
	2013	8.706	215	361
<b>Gorilla Category (Pounds Recycled)</b>	2015	207,420	93	308
	2014	170,741	109	336
	2013	184,980	109	365
<b>Food Service Organics</b>	2015	4.78	69	187
	2014	0	147	147
	2013	1.011	123	156

\***Grand Champion:** (Weight of Recyclables ÷ Weight of Recyclables + Trash) multiplied by 100

\***Per Capita Classic:** Weight of Recyclables ÷ Campus population

\***Gorilla:** Highest gross tonnage of combined paper, cardboard, bottles and cans; regardless of population

\***Food Service Organics:** Weight of Food Service Organics ÷ Campus population

### **Items that are no longer useful to CMU are sold at Surplus Sales through the Purchasing Department (*ongoing*)**

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.

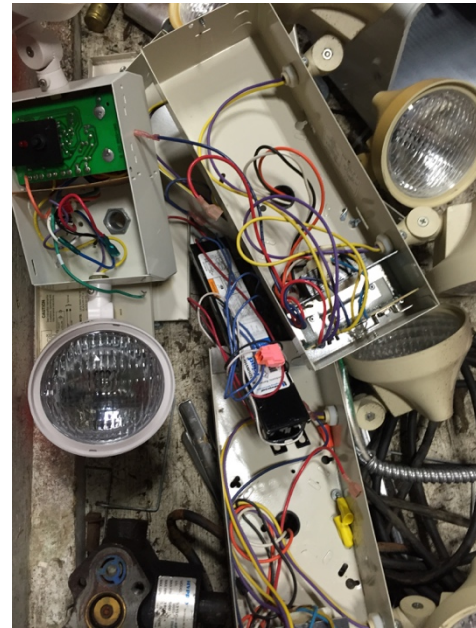
Bicycles, lab equipment, classroom and office furnishings, and athletic equipment, are some of the common items at Surplus Sales. At public Surplus Sales events, there are usually between 100-150 people in attendance. This saves CMU money, reduces MSW disposal, provides the community benefit of purchasing 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. In FY 2015 the Surplus Sale generated \$132,784 in revenue.



The Surplus Sales not only generate revenue from reusable items, but also divert waste disposal costs. A win-win for the University and the environment.

[https://www.cmich.edu/fas/fsr/cps/Surplus\\_Sales/Pages/default.aspx](https://www.cmich.edu/fas/fsr/cps/Surplus_Sales/Pages/default.aspx)

- University e-waste sold or scrapped**  
*University generated e-waste is put up for sale at the Surplus Sales. Items not sold are scrapped for all of their components and recycled.*
- Pilot program in place to test a recycling program that includes all types of plastics**  
*The county MRF only collects Plastics 1, 2. They are allowing CMU to collect all plastics in an attempt to roll out the same program to the rest of the county. CMU is first!*
- Copper recycling program implemented**  
*Since the beginning of 2015, the Maintenance Mechanic's shop has sold \$40,000 of scrap copper.*
- Zero-waste program in Campus Dining Locations (ongoing)**



E-waste separated for recycling

*This program collects and composts or recycles pre- and post-consumer waste from our four residential restaurants and from University Center operations. Coffee grounds from Java City continue to be composted as well. The compostable material is transferred to a local facility, Morgan Composting, in Sears, MI. Morgan Composting "promotes sustainable practices and [is] an innovat[ive] provider of economical & healthy soil practices." In 2014, 246.04 tons of waste were diverted from the landfill to be composted.*

- Pilot composting transportation program managed by Facilities Management**  
*As of 2015, transportation of the compostable material from campus to Morgan Composting began to fall under the jurisdiction of Facilities Management. This is made possible with the investment in a new dump trailer, hydraulic lift, and a growing supply of 64-gallon bins to store the material prior to transfer.*



Don Long of Facilities Management collects compost from the Residential Restaurants using the new hydraulic lift.

- Investigation of pilot program to make campus sporting events zero-waste events (ongoing)**  
*Approximately 90% of items that go across the counter at sporting events are compostable. These compostable materials include, but are not limited to: straws, cups, lids, food waste, etc.) Meetings have been held to explore a pilot program at Kelly-Shorts Stadium in Fall 2015. This program will focus on consumer recycling; guided by signage and student assistants, guests will be able to help decrease the environmental impact of our home games.*



- **Reduce bottled water on campus and the purchase of bottled water by departments (ongoing)**

*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.*

- **Encourage textbook rental and use of electronic textbooks (ongoing)**

- **Increased recycling tonnage by 54.64% from baseline**

*When accounting for general recycling, compost, cardboard recycling, and paper bale recycling combined, landfill diversion tonnage increase by 54.64% from the 2008 baseline.*

- **Reduced MSW by 4.61% from baseline**
- **Expansion joints in new sidewalk replacements made from recycled rubber**

- **Recycle paving materials with Central Asphalt**

*Materials such as concrete and asphalt are recycled from on-campus paving projects through Central Asphalt.*

- **New signage developed for recycling bins (complete)**

*Bins are now clearly distinguishable with maroon lids for paper recyclables and gold lids for plastic and aluminum recyclables. Accompanied by new labels as well, these modifications will guide users to sort their materials appropriately.*

- **Batteries collected for recycling (ongoing)**

*Batteries collected to be recycled at Batteries Plus of Mount Pleasant.*

- **Lead batteries collected for recycling (ongoing)**

*Lead batteries collected to be recycled at Fair Salvage Company in Clare, MI.*

- **Received 2015 Excellence in Recycling Award**

*CMU received the 2015 Excellence in Recycling Award from Michigan Department of Environmental Quality and Governor's Recycling Council for recycling education and outreach.*

- **Residence colleges facilitate periodic recycling competitions (ongoing)**

*Residence colleges periodically take the initiative to facilitate recycling competitions between one another. For example the Health Professions and Science and Technology residence colleges facilitate such competitions.*



Paper waste is compacted into bales and prepared for recycling



New signage makes recycling even easier

- Old mattresses recycled at the end of every school year (ongoing)**  
 At the end of the year all of the residence hall mattresses are inspected and replaced as necessary. All old mattresses are then collected and sent to be recycled at Bay Area Recycling for Charities in Traverse City, MI. Mattresses take up a lot of space in a landfill and take decades to break down, but when they are then recycled individually. Bay Area Recycling, the parent company of Michigan Mattress Recyclers, utilizes every part of our bulky waste: “the used foam can be turned into carpet underlayment, the wooden frames are chipped and used as fuel for a power generating station, the cotton is used in industrial machinery and other textile applications, the steel in the springs is recycled as metal scrap, and the fabric ticking is turned into archery targets.”
- Floor strippers no longer used in the Music Building or Events Center (ongoing)**  
 The floors in the Music Building and Events Center are no longer waxed, eliminating the need for chemical floor strippers. Rather, they are now polished to a shine as needed. This procedural change saves time, labor, and the use of toxic chemicals.
- Residence Life works to collect items for re-use upon move-out (ongoing)**  
 Items are collected from residents in each residence hall during spring move-out every year. These items such as clothing, hygiene products, cleaning products, and more are collected, sorted, and donated to various common causes such as the Women’s Aid Shelter.
- CMU is a tobacco-free campus as of July 1<sup>st</sup>, 2014**  
 “Central Michigan University is committed to providing students, faculty, staff and visitors a healthy environment for living, learning and working. CMU’s campus expanded its current smoke-free indoor policy to become completely tobacco-free July 1, 2014. CMU is one of nearly 1,200 American colleges and universities with a smoke-free campus. A smoke free environment assures cleaner air and also reduces littering and waste on campus from tobacco products and packaging..  
<https://www.cmich.edu/fas/hr/tobaccofree/pages/default.aspx>







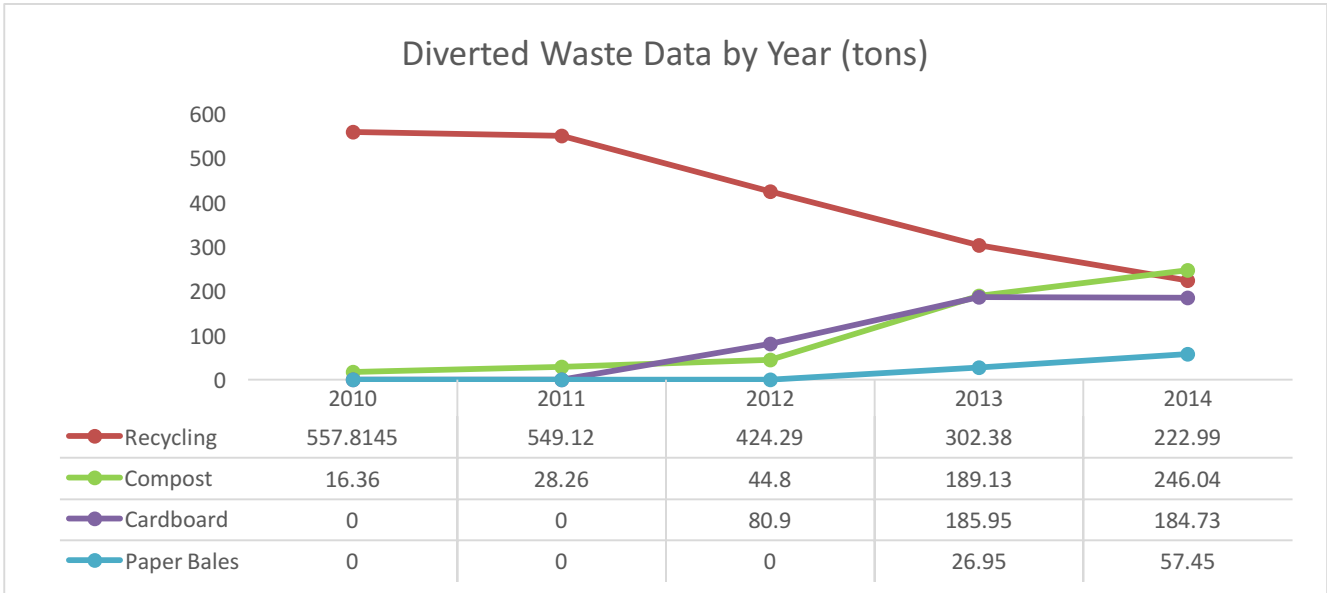
Cardboard recycling tanks



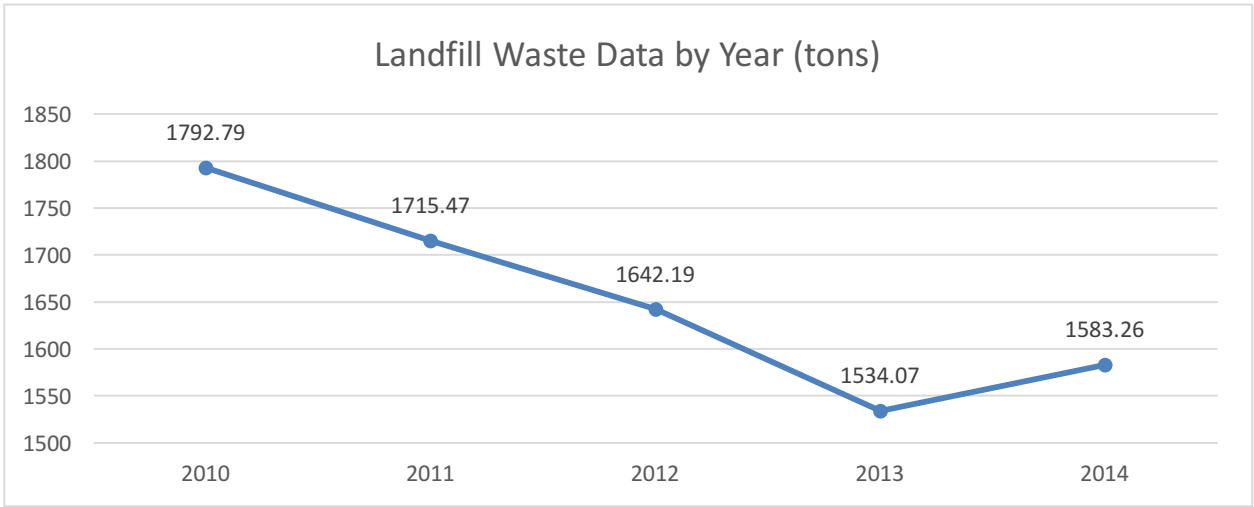
CMU's outdoor recycling bins



Copper recycling program implemented:  
Since the beginning of 2015, the Maintenance Mechanic's shop has sold \$40,000 of scrap copper.



Though general recycling tonnage has declined in recent years, this has been caused, and supplemented, by new programs such as composting, cardboard recycling, and paper bale recycling. These new programs continue to increase our total landfill waste diversion rates.



Total landfill waste has decreased by approximately 11.7% between 2010 and 2014.

## Goal 5: Sustainable Transportation

**New Target:** Continue encouragement of use of mass transit, carpooling, and ride sharing opportunities and use of human-powered transport by university students, faculty, and staff. Emphasize walking and cycling paths in the new University Master Planning process in 2014-2015.

### 2010-2012 Target:

Encourage use of mass transit, carpooling, and human-powered transportation by university students, faculty, and staff.

### 2012-2015 Initiatives:

- **New areas prepped for future bike path installation**

*Bike path preparation is planned for areas on East Campus Drive south of Broomfield as well as on the west side of the new Biosciences building.*

- **Isabella County Transportation Commission (ICTC)/iRide shuttle bus provided 281,743 rides for the 2014-2015 academic year**

*ICTC provides the shuttle bus, iRide, to CMU. These buses travel to several apartment complexes that are student oriented. In the 2014-2015 academic year, iRide shuttle bus provided 281,743 rides, a 14% increase from the 2010-2011 academic year.*

- **CMU Police Department (CMUPD) has officers trained and patrolling on bicycles (ongoing)**

*CMUPD officers train and patrol on bicycles around campus to display and promote safe cycling practices.*

- **CMUPD provides educational pamphlets about safe riding practices online, in their office, at special events, and with bicycle registration (ongoing)**

*These pamphlets, composed by the League of Michigan Bicyclists and entitled "What Every Michigan Bicyclist Must Know," are distributed year-round online, in the CMUPD office, at Freshmen Orientation and in residence halls, as well as with every bicycle registration.*

- **Campus map updated to include all bike lanes (complete)**

- **Hold bicycling education courses on campus for CMU and surrounding community (ongoing)**

- **Adding additional educational signage (ongoing)**



A bike friendly campus goes side-by-side with the goal of overall sustainability.

● **Direct transportation to/from CMU, Detroit and Chicago through Compass Coach**

*CMU students now receive discounted bus tickets to and from Detroit and Chicago. Direct travel is available at the beginning and end of every semester, in addition to Thanksgiving, Winter and Spring breaks.*

● **Enterprise CarShare Program instituted in 2014 (complete)**

*Enterprise CarShare rental cars are located in Lot 42 and Lot 27 and are available for short-term use. Having a CarShare program on campus can help eliminate the need for students to have their own personal vehicle. Knowledge that there is access to a personal vehicle when necessary encourages people to rely on other forms of transportation such as biking, walking, and public transit for everyday travel.*



● **Safe Rides Program expansion (ongoing)**

*In 2013 Safe Rides was expanded by adding vans to their vehicle fleet; 2014 brought extended hours (now 6pm-2am); plans for 2015 include the addition of yet another, larger van. These vehicle additions and hour extensions provide safe alternative from personal vehicle use. The van additions, especially, encourage carpooling and eliminate many personal vehicle uses every evening.*

## *Goal 6: Reduce the Overall Carbon Footprint of CMU*

**New Target:** Reduce the overall carbon footprint of the university by 10% by 2020 using the 2012 baseline of 34.11 pounds CO<sub>2</sub> equiv./GSF.

**2010-2012 Target:**

**Reduce university's carbon footprint by 10% by 6/30/2013.**

FY 2008 baseline – 34.78 pounds CO<sub>2</sub>e/GSF

FY 2013 – 45.24 pounds CO<sub>2</sub>e/GSF (30% increase from baseline)

FY 2014 – 40.51 pounds CO<sub>2</sub>e/GSF (16.5% increase from baseline)

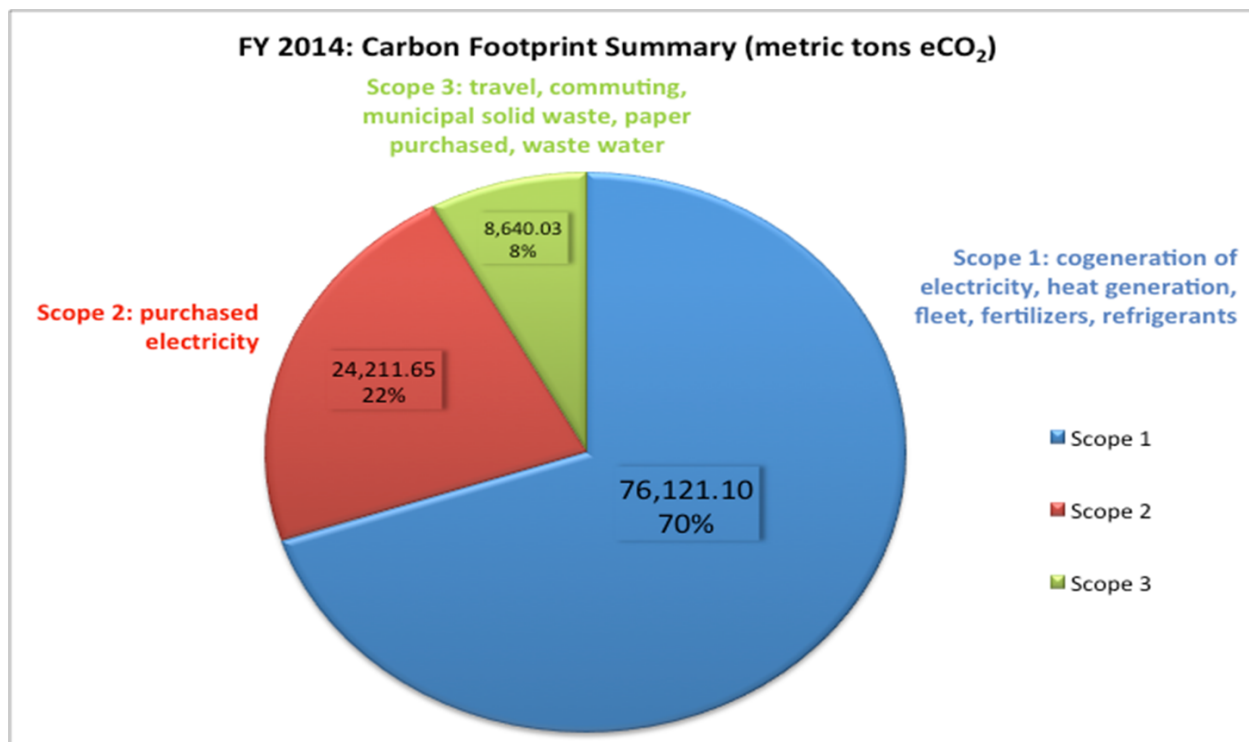
**2012-2015 Initiatives**

● **Implement Green IT program across all computing platforms on campus by encouraging the following (ongoing):**

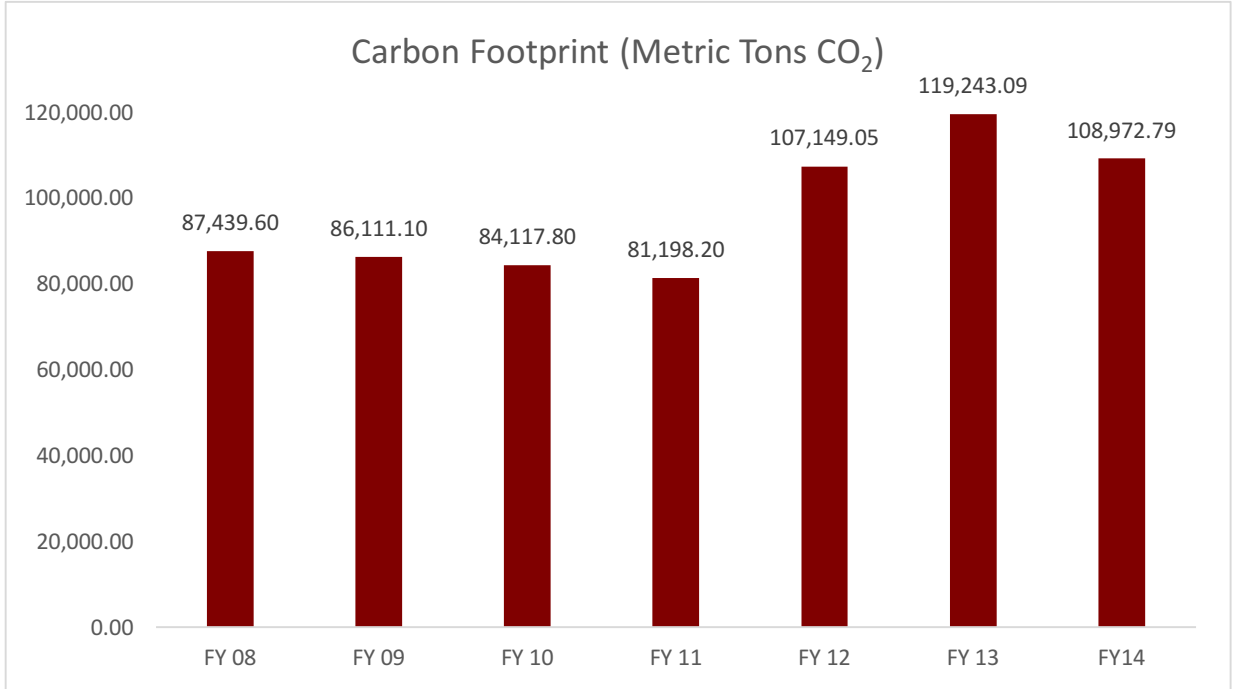
- Turning off personal workstations when not in use
- Turning off workstations and other equipment in labs and mediated classrooms when not in use
- Replacing CRT monitors with more energy efficient LCD monitors,
- Reducing energy use in data center operations



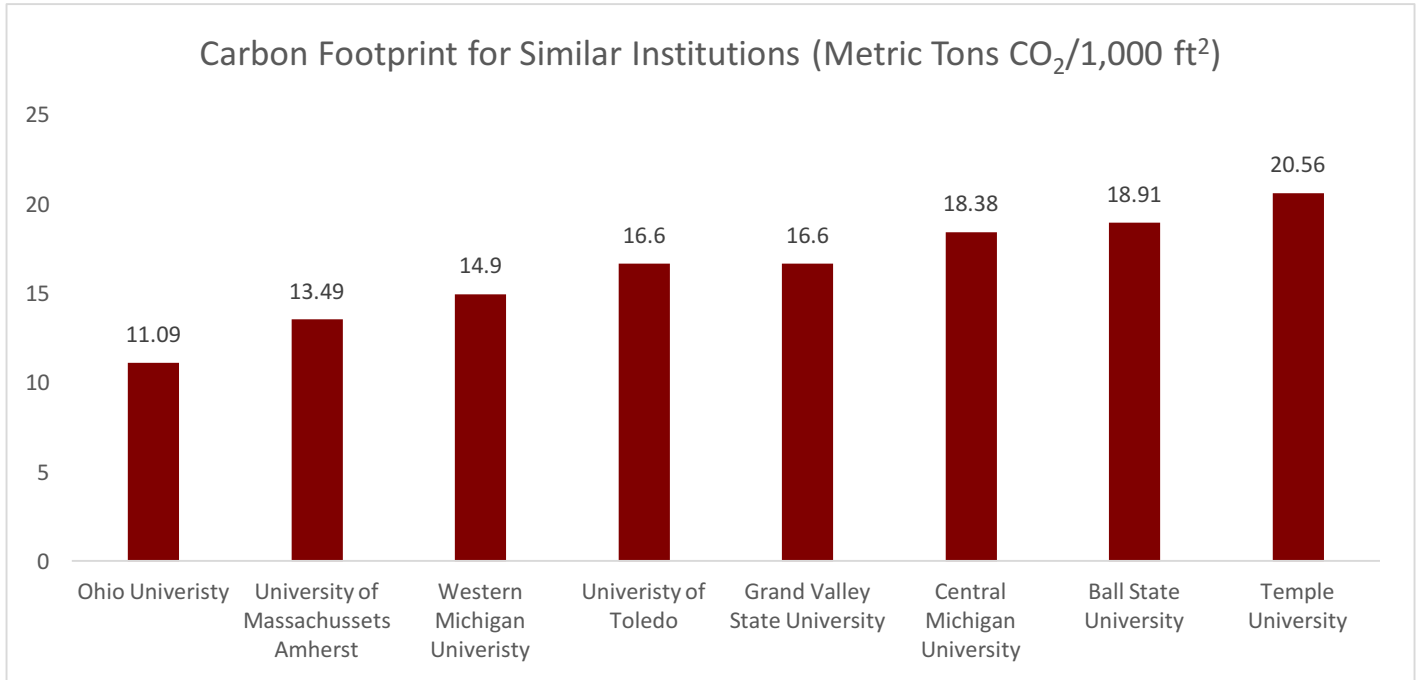
- Leveraging CMU technologies in conjunction with FM systems to reduce campus energy use
- Taking advantage of e-waste recycling programs offered by manufacturers
- Complete the installation of a digital imaging system to hand all applications for admission and other student documents in a paperless system
- **Review flex-time policies to accommodate alternate work arrangements for staff, as appropriate, without negatively impacting campus operations or student services (ongoing)**  
*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 CO<sub>2</sub> emissions. FM continues to evaluate expansion of the biomass co-generation power facility to reduce our dependence on power purchased from fossil fuel sources.*
- **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)**



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



The graph above illustrates how CMU's carbon footprint has changed since FY 2008. Increases have occurred due to high energy consumption academic space.



The bar graph above depicts CMU's carbon footprint in relation to other universities, FY 2014.



## Goal 7: Implement LEED Practices

**New Target:** Continue implementation of Leadership in Energy Efficiency and Design (LEED) practices in the design, construction, and operation of all campus projects and buildings. Achieve LEED certification on all new buildings, significant additions, and major building renovation projects.

### 2010-2012 Target:

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.

### 2012-2015 Initiatives

#### ● Pursue LEED certification for completed construction projects (*ongoing*)

##### ● Biosciences building approved, construction underway

*Approval for the project by the CMU Board of Trustees was granted on April 11, 2013. The groundbreaking of the site took place on September 17, 2014.*

*Construction is set to be completed by the Fall of 2016. According to the Biosciences Building Updates “the building is scheduled to exceed the requirements for LEED Silver certification. The design will balance the safety needs of a modern science building with energy efficiency; for instance, using frit glass windows to reduce solar heat gain.” Serving as a hub for scientific research and learning, the four-story, 169,000 square foot building is sure to complement, enhance, and expand the university’s existing programs.*



#### ● CMU Design Standards to follow LEED criteria for all new construction and major renovations

*Since 2012, CMU has received LEED certifications from the United States Green Building Council on the Education and Human Services Building (Gold), the University Center renovation (Certified), and both the East and West buildings of*

*Graduate Housing (Platinum). The Platinum Graduate Housing certification was the first of its kind in the mid-west, making history as the first Platinum level multi-family residential project in the region. CMU has submitted applications for the Events Center and Phase I of the East Campus Project, aiming to achieve Certified level and Silver level for each respectively. There are several construction projects planned for CMU which were developed using LEED guidelines. These projects include: Bioscience and the Lacrosse Athletics Renovations. The table on the below details which stage of the LEED certification process each construction projects has reached.*

- **Universal paint palate created for campus projects (complete)**  
*The creation of a standardized paint palate for campus projects has eliminated a great deal of wasted paint. Having standardized colors means that paint from one project may always have the opportunity to be used in another.*
- **Pervious pavement considered in all new projects (ongoing)**  
*Pervious pavement is considered in an effort to improve storm water retention management.*
- **Design team committed to a “culture of sustainability”**  
*- Linda Slater, Director of Plant Engineering and Planning*
- **Use green cleaning practices in campus buildings (ongoing)**  
*Custodial staff members are required to participate in 24 hours of training per year and FM has 30 hours of workshops available. Approximately 87% of cleaning products are certified green and green practices are implemented across campus.*

### 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
CMED Addition	New Construction (NC)	Silver
Education and Human Services	New Construction (NC)	Gold
University Center Renovation	Commercial Interiors (CI)	Certified
Graduate Housing	New Construction (NC)	Platinum

THE FOLLOWING ARE SUBMITTED TO THE USGBC AND ARE IN THE PROCESS OF BEING EVALUATED:		
LEED Building Project	LEED Program	Targeting
Events Center	New Construction (NC)	Certified
East Campus Project - Phase I	New Construction (NC)	Silver

THE FOLLOWING BUILDINGS HAVE A GOAL TO ACHIEVE:		
LEED Building Project	LEED Program	Targeting
Bioscience Project	New Construction (NC)	Silver
Lacrosse Athletics Renovations	New Construction (NC)	Certified

Updated 7/28/2015

## Goal 8: Sustainability in the Academic Curriculum

**New Target:** Incorporate principles of sustainability into university classes, curricula, and service learning opportunities as appropriate. Develop a minor in Sustainability and Environmental Policy for consideration of the Academic Senate by 2015-16.

### **2010-2012 Target:**

Incorporate principles of sustainability into university classes, curricula, and service learning opportunities.

### **2012-2015 Initiatives**

- **Develop new sustainability-related courses as needed (ongoing)**
- **New interdisciplinary minor program developed, Sustainability and Environmental Policy, designator SEP (complete)**

*On November 11, 2014, the CMU Academic Senate gave formal approval to the SEP designator for "Sustainability and Environmental Policy." This is a revision of the Environmental Studies Minor to become the Sustainability and Environmental Policy minor.*

- **International Business and Sustainable Development minor continues in the College of Business Administration and is available to business and non-business students (complete)**

*Bulletin Description:*

*This course of study provides the student with a broad understanding of sustainable development, which is viewed as encompassing three dimensions – ecological, social, and economic. By including all three dimensions in the sustainability concept, the likelihood of achieving a sustainable earth, as specified in the Brundtland report (1987), becomes feasible.*

- **Environmental Health and Safety major continued (ongoing)**

*Bulletin Description:*

*Environmental Health and Safety is an interdisciplinary major that prepares students through academic coursework, laboratory, and internship experiences for a career in environmental health professions. The required courses have been selected to develop students' critical thinking, life-long learning, and problem solving skills. Graduates of the program will diagnose and investigate health problems and hazards in the community, enforce laws and regulations that protect health and ensure safety, monitor the health status of communities, and evaluate effectiveness and quality of environmental community services.*

- **Approximately 30+ courses that cover sustainability are on the books (complete)**  
*Courses ranging from disciplines such as biology and chemistry to economics and philosophy cover sustainability in their curriculum.*

- **Honors course on sustainability, HON 321S, on the books for future use (complete)**

*Course Description:*

*As we pass the seven billion mark in the human population of our planet, the need to act as wise stewards of the earth's resources becomes imperative. Sustainable living and development of sustainable systems are vital to our survival as a species and to*

*maintain a healthy planet. This course surveys the basic principles of environmental science and policy focusing on the key actions required to develop sustainable systems. Students will develop an understanding of and appreciation for sustainable resources management, sustainable economies, sustainable societies and sustainable energy systems. This class will be interactive and participatory, with students developing innovative solutions to problems of resource management and energy use. From the science behind resource management and energy systems to the social science of sustainable economies and societies, students will be encouraged to put lessons of the class into practice by designing their own innovative solutions to problems of resource management and energy use.*

🌍 **Interdisciplinary course, Water as Life, Death, and Power (ANT/BIO/CHM 250), offered in Spring 2015 (complete)**

*This course, designated as an anthropology, biology, and chemistry course, was taught every day by an instructor from each department. The students were guided to explore problems of water access, water-borne pathogens, water treatment, and power relationships in global cultures from anthropology, biology, and chemistry perspectives, via lecture and seminar. Throughout the term students developed their own grassroots campaigns to address water issues that were then presented at the Student Research and Creative Endeavors Exhibition (SRCEE).*

🌍 **Courses in sustainable systems and development continued in Masters of Business Administration curriculum (ongoing)**

🌍 **New course, Sustainability and Environmental Policy (SEP 300) to be offered in Spring 2016**

*Bulletin Description:*

*This course uses quantitative reasoning and analyses to explore and evaluate sustainable systems and critical environmental issues of the day from an interdisciplinary perspective.*

🌍 **Assist in transferring the successful operations of CMU's program to other campuses and communities (ongoing)**

*For example, students Meghan Marx and Parker Reitler presented their work – Soaring to a Greener Tomorrow: Improving Waste Management Practices at the Soaring Eagle Casino at Michigan State University's Fate of the Earth Symposium, winning Best Undergraduate Poster. GLISS staff continue to work with the Saginaw Chippewa Tribal College on sustainability issues.*

🌍 **Students connect with programs abroad to further their education in environmental and sustainability issues (ongoing)**

*CMU has connections with programs and universities worldwide that connect students with opportunities to enhance their education with experiences abroad. The study abroad office works diligently to connect students with programs appropriate to their needs and interests. Study abroad for environmental science at CMU has affiliated programs in Australia, Costa Rica, Denmark,*



Senior Meghan Marx explores wind energy in Copenhagen, Denmark



Ecuador, Japan, Scotland, and South Africa. In the summer of 2014, undergraduate student Meghan Marx travelled to Denmark's Danish Institute for Study Abroad to take their Renewable Energy Systems course. With a study tour to Germany, the program offers an examination of "the technical, economic, political, and social aspects of renewable energy. Different renewable energy technologies (wind, solar, hydro, biomass, etc.) are explored, and the strengths and weaknesses of different policy options (feed-in tariffs, quotas, etc.) are discussed." This is but one example of the amazing experiences offered through CMU's affiliated programs abroad.

● **Extensive opportunities offered at CMU's Biological Station on Beaver Island (ongoing)**

Beaver Island, the largest island in Lake Michigan, is home to CMU's very own Biological Station. The station is a host to students from high school age to graduate students and to researchers of all backgrounds. Students are immersed in specialized programs and accelerated classes while gaining hands-on experience in biology. The island is relatively undeveloped and is home to some unique ecological systems. The island is a wonderful setting for field work, but the station is also outfitted for lab work, making it a nucleus of scientific study.



● **Greenhouse serves as educational hub and promoter of organic practices (ongoing)**

Open from 8am to 5pm, the Greenhouse is a place where students can explore plants from different regions of the world. Classes from a wide range of disciplines including art, biology, creative writing, geography, microscopy, and more use this space to enhance their educational experience.

The Greenhouse practices Integrated Pest Management (IPM) which, as defined by the University of California, "is a process you can use to solve pest problems while minimizing risks to people and the environment." Practices include biological controls, hand picking, soap and water, and other organic solutions. No non-organic approved pesticides have been used in recent years. Their goal has been to eliminate pesticides and allow biodiversity to take care of it's problems should there be any. As stated by greenhouse and botanical garden director, Patti Travioli, "when things are working it's an amazing system."

● **CMU Fabiano Botanical Garden acts as an educational space for a variety of disciplines (ongoing)**

Established in 2008, the Botanical Garden continue to serve as an educational space for a variety of classes. A space filled with biodiversity and managed with organic practices, the Botanical Garden make a wonderful outdoor classroom for students across all disciplines.

- **Brooks Habitat Garden hosts bees (*complete*)**  
 For the purpose of educating students on the importance of protecting pollinator populations two bee hives have been installed in the Brooks Habitat Garden.
- **Participate in CMU's New Venture Competition with sustainable ventures (*ongoing*)**  
 Staff continue to mentor any teams that pursue sustainable initiatives or technology in their projects. Solar cycle lights won the 2013 top prize in the NVC.

## Goal 9: Increase Awareness of Sustainability on Campus

**New Target:** Promote a culture of sustainability on campus which increases the awareness of sustainability and best practices for maintaining a sustainable campus among students, faculty, visitors, and staff of the university.

### **2010-2012 Target:**

Increase the awareness of sustainability among students, faculty, and staff of the university.

### **2012-2015 Initiatives**

- **Sustainability Committee within the Student Government Association continues to work (*ongoing*)**  
*Instituted in 2012, this committee continues to draw a diverse group of students to work on multidisciplinary sustainability projects.*
- **Develop signage to promote CMU's sustainable efforts and to educate public about sustainability (*ongoing*)**
- **Prepare videos describing CMU's sustainability achievements (*ongoing*)**  
*More videos are in the works to be developed. Check out this "Sustainability Spot" from 2013: <https://www.youtube.com/watch?v=tkVYBLN-TUY>*
- **Residential Restaurants host an Earth Day table at all 4 locations (*ongoing*)**  
*Organized by Campus Dining, the tables have given away Michigan apples, provided recycling games and trivia, and generally raised awareness about environmental issues. The restaurants also celebrate by dimming their lights at dinner time on this day.*
- **Residence halls promote sustainability to their residents (*ongoing*)**  
*Promotion of sustainability takes place at floor and hall meetings and through committees such as Larzelere Hall's Sustainability Committee, which serves as a advocate of hall and campus sustainability throughout the academic year.*

● **CMU Fabiano Botanical Garden certified as Monarch Waystation and Pollinator Habitat**

*These certifications and their posted signage help educate the campus community of the importance of habitat preservation.*

*As certified by Monarch Watch: “This site provides milkweeds, nectar sources, and shelter needed to sustain monarch butterflies as they migrate through North America.”*

*As certified by The Xerces Society for Invertebrate Conservation: “This area has been planted with pollinator-friendly flowers and is protected from pesticides to provide valuable habitat for bees and other pollinators.”*



● **Plants and Society Garden installed in 2014-15 (complete)**

*The Plants and Society Garden includes plants that are a part of our everyday living and used for food, human health, clothing, shelter and entertainment. The area is complemented with a raised berm which serves as an amphitheater for special gatherings. The hardscaping was completed in fall of 2014 while planting began in the spring of 2015. A portion of the food produced by the garden is donated to the local soup kitchen.*



● **Registered Student Organizations Campus Grow, Take Back the Tap (TBTT), Student Environmental Alliance (SEA) work for the promotion of sustainability on campus and in the community (ongoing)**

*Campus Grow’s mission is to offer the community healthy and sustainable alternatives to the industrial food system through access to fresh local food and educational gardening opportunities. The organization manages the Campus Grow Community Garden located on West Campus Drive behind Theunissen Stadium. The Garden is home to 61 community garden plots available for rent by students, staff, and community members alike. This organic-only community garden began in 2008 and is “growing strong.” In addition to the garden, Campus Grow works year round to promote sustainability on campus and in the community. In 2014 they hosted a “100 Mile Meal” event to celebrate Food Day. All materials for the menu were sourced within 100 miles. In addition to the local meal, guests of this successful event were informed about the importance of eating local by Chris Swier of Swier Family Farms located in Remus, MI.*





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 Main Stage 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.

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.

● **CMU's Recycling Office participates in several events on campus (ongoing)**

CMU's Recycling Office participates in Main Stage, 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.



● **First Campus Farmer's Market launched by Real Food Grows in association with Campus Grow in the Fall of 2015**

In an effort to connect students, faculty, staff, and community members with the importance of local farmers and food, local non-profit Real Food Grows has partnered with student organization Campus Grow to launch the University's first ever Campus Farmer's Market.



CMU's first Farmer's Market held on October 7, 2015 at the corner of Broomfield and West Campus Drive



## Goal 10: Promote Sustainable Community Involvement

**New Target:** Work with community leaders, the Saginaw Chippewa Indian Tribe, and private industry in Mount Pleasant, Isabella County, and throughout the mid-Michigan area on cooperative ventures which promote community sustainability and support university sustainability initiatives.

### 2010-2012 Target:

Encourage community leaders and private industry in Mount Pleasant, Isabella County, and throughout mid-Michigan to cooperate with University sustainability initiatives.

### FY 2012-2015 Initiatives

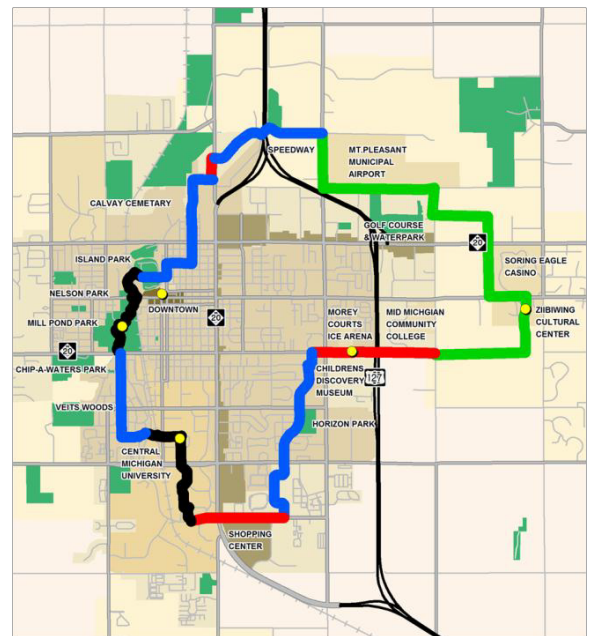
- Develop comprehensive Non-motorized Transportation Plan in partnership with Union Township, City of Mt. Pleasant, Saginaw Chippewa Indian Tribe, and Isabella County (*complete*)

*As stated in a press release by the City of Mount Pleasant on July 15<sup>th</sup>, 2015, "through the adoption of the Complete Streets ordinance, the city is institutionalizing the vision established by the 2014 Master Plan and the Greater Mount Pleasant Area Non-Motorized Transportation Plan. The ordinance ensures the community will continue to build upon its existing assets and become an even better place to live, whether you travel by car, bike, or on foot." GLISS graduate student Samantha Fiani Jones helped prepare this plan as part of her thesis work.*

- GLISS Director and Associate Vice President of FM participate in Union Township's Sustainability Committee (*ongoing*)
- Participate in Great Lakes Bay Regional Alliance (*ongoing*)

*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*



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

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.



- **CMU's Museum of Cultural and Natural History to educate participants about environmental research in the Great Lakes as a part of their Tour Tuesday program (complete)**

*The Museum of Cultural and Natural History opened their new exhibit, **Changing Waters: Environmental Research in the Great Lakes** in July 2015.*

- **Students continue to work with the Soaring Eagle Casino and Resort to develop a more environmentally friendly waste management plan for the betterment of the organization and the community (complete)**

*As advised by GLISS Director Tom Rohrer, students Meghan Marx and Parker Reitler developed a report that was presented to and accepted by the Saginaw Chippewa Indian Tribe Tribal Council in 2014. Through observation, consultation, discussion, and deliberation, the team developed an evaluation of the waste management practices at the Soaring Eagle Casino and Resort as well as a springboard for improvements that would make the operation more environmentally, and perhaps even economically, sustainable.*



The exhibition of environmental research is made accessible to children through and accompanying "Great Lakes Adventure" gallery that provides hands-on activities.

## 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

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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)<sup>1</sup>

#### ***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.

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<sup>1</sup> 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.

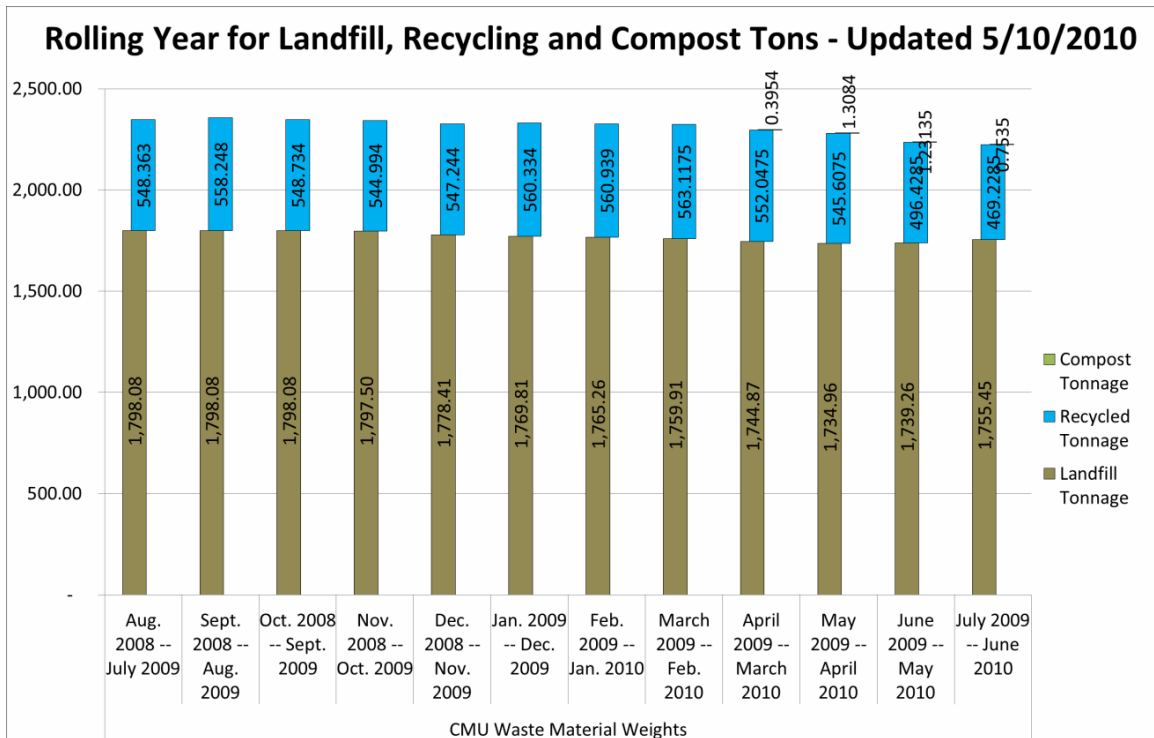
To reduce paper towel waste, high-speed hand dryers were installed in 44 high-traffic restrooms on campus. The Recycling Office initiated participation in the national Recyclemania competition among college campuses across the nation. CMU placed 79th out of 189 total schools and had the best per capital 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 99<sup>th</sup> out of 346 participating schools with a gross tonnage collected of 178,697 lbs (4<sup>th</sup> 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 CO<sub>2</sub>e/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

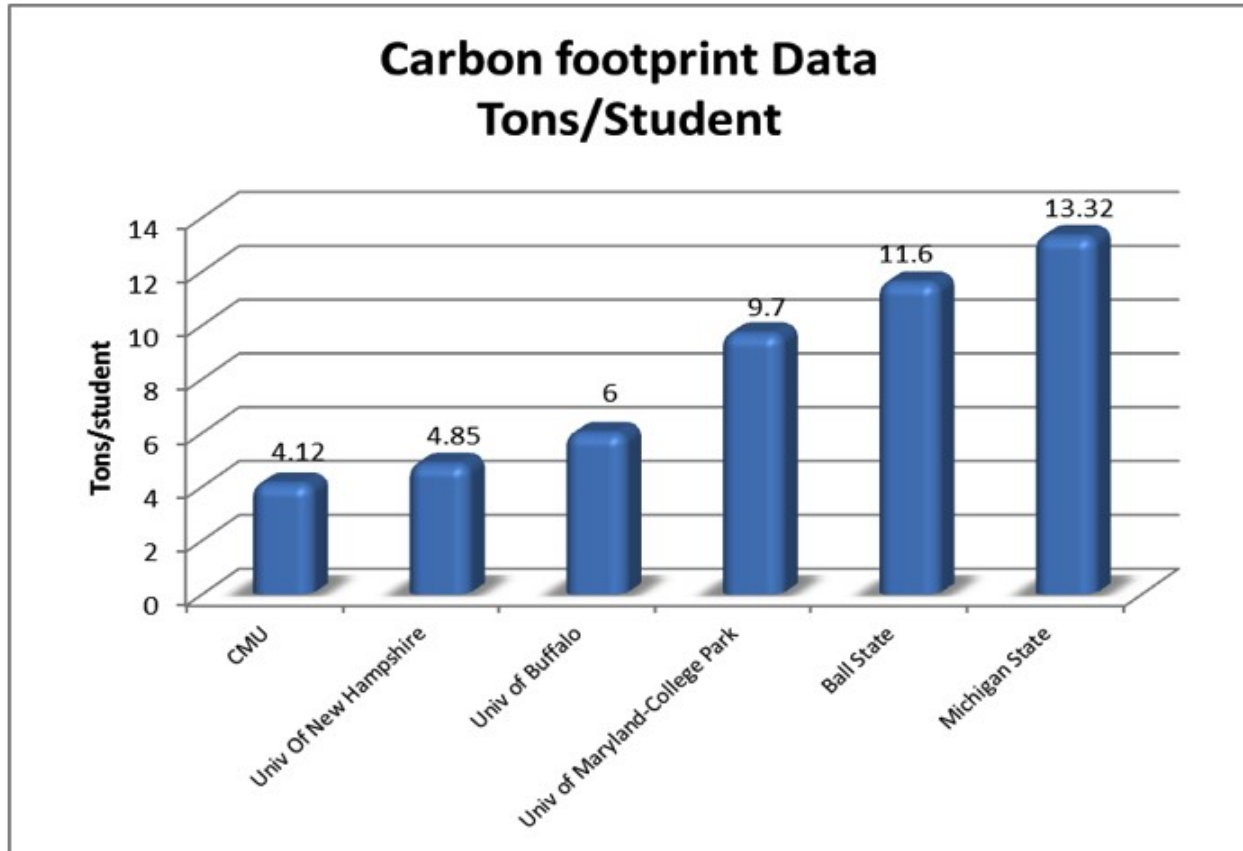
encouraging the following (*ongoing*):

- 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 CO<sub>2</sub> equivalent emissions. CMU's total emissions equate to 81,938 tons of CO<sub>2</sub>. 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.

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 CO<sub>2</sub> 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 CO<sub>2</sub> 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*)

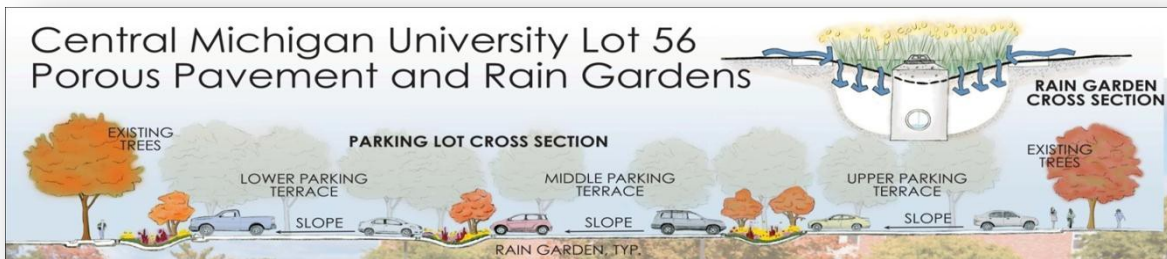
***FY 2009-2010 Initiative***

- 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

<b>Energy Projects</b>					
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 campus	\$9,000	\$58,000		640%
Install low flow 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 Auditorium, 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



## **Appendix 7: SUSTAINABILITY AND ENVIRONMENTAL POLICY COUNCIL Bylaws**

### **1. Program Goals and Objectives**

Sustainability and Environmental Policy is an interdisciplinary program focused on the study of sustainability and the environment and the policies and economics of implementing sustainable systems in modern societies. The registrar-assigned designator for Sustainability and Environmental Policy is SEP.

The academic objectives of the Sustainability and Environmental Policy (SEP) Program are as follows:

- a) Students will demonstrate an understanding of the complex, multi-disciplinary nature of environmental policy and sustainability.
- b) Students will be able to think critically about environmental problems and suggest appropriate, sustainable solutions to these problems.
- c) Students will be able to apply the research methodologies from a number of different disciplines to the solution of real world environmental problems.
- d) Students will be able to make effective use of modern technology in designing sustainable systems.
- e) Students will be suitably prepared for careers in sustainability, environmental management or environmental policy in public and private sector positions.
- f) Students will be suitably prepared for further education in sustainability and environmental policy.
- g) Students will recognize the interrelationships among scientific, social, economic, and political aspects of environmental issues. Specifically, students will understand environmentalism, basic ecology, population dynamics, natural resource issues, and the social, economic, and political issues involved in development of sustainable systems and viable environmental policies.
- h) Students will be able to participate effectively in interdisciplinary problem-solving.
- i) Students will be able to communicate effectively their positions regarding sustainability and environmental policy issues.

### **2. Council Charge**

The Sustainability and Environmental Policy Council is charged with general oversight of the interdisciplinary Sustainability and Environmental Policy Program. Specific activities of the council include the following:

a) Curriculum

The council will initiate and approve curricular changes, including approval of courses comprising the minor in SEP and any new courses and certificates for inclusion in the program. Curricular items approved by the council will be sent forward to the College of Humanities and Social and Behavioral Science Curriculum Committee, and from there to the Undergraduate Curriculum Committee. Affected departments will be notified of curricular changes as required in the curricular authority document.

b) Program director

The council will recommend appointment of a program director to the Dean of the College of Humanities and Social and Behavioral Studies, according to the established requirements (see below). The program director serves as the chair of the Sustainability and Environmental Policy Council and as the primary academic adviser for Sustainability and Environmental Policy (SEP) students.

c) Faculty

The council will recommend faculty to teach SEP courses.

d) Student requirements

The council will make decisions regarding student requirements, including review and approval of student internship applications.

e) Program procedures and guidelines

The council will assist and advise the program director in program review. The council will also approve student outcomes assessment plans and reports prepared by the program director.

### **3. Council Membership**

The Sustainability and Environmental Policy Council consists of a minimum of six faculty representing departments providing courses in the program plus the program Director. At least three faculty representatives will be drawn from the College of Humanities and Social and Behavioral Sciences. One faculty representative will represent the College of Science and Technology and one faculty representative will represent the College of Business Administration. One faculty member will represent the College of Education and Human Services. New or replacement council members are recommended by their respective departments or by council members or by the Deans of the respective colleges. The Assistant Dean or other person overseeing curricular matters for the College of Humanities and Social and Behavioral Sciences will serve as an ex-officio member to advise the Council.

### **4. Program Director -- Duties of the director**

The Sustainability and Environmental Policy program director is responsible for the day-to-day operation of the program. The program director is advised by the other members of the council, and reports to the Dean of the College of Humanities and Social and Behavioral Sciences. Duties of the director include the following. Currently, the Director of the Great Lakes Institute for Sustainable Systems holds the position of Director of the Sustainability and Environmental Policy program.

- i. Convene meetings of the Sustainability and Environmental Policy Council as needed, but no less than once per academic year.
- ii. Serve as a voting member of the Council.
- iii. Schedule courses with the registrar in the SEP designator.
- iv. Advise students, including students election the SEP minor, students who are interested in interdisciplinary environmental programs, and prospective CMU students.
- vi. Supervise SEP independent study projects.
- vii. Assist students with finding internship opportunities. Coordinate internship approval and evaluation activities with the Sustainability and Environmental Policy Council.
- viii. Implement student outcomes assessment activities and prepare the annual assessment report.
- ix. Conduct program review as needed, in consultation with the Sustainability and Environmental Policy Council.
- x. Conduct necessary day-to-day administrative duties.
- xi. Report council activities and program progress to the Dean annually.

## **5. Program Review Procedures**

Program review will be coordinated by the program director, with the advice and assistance of the council members, in accordance with university policy and schedule.

## **6. Student Academic Outcomes Assessment Procedures**

The Sustainability and Environmental Policy Council will advise the program director regarding assessment activities. The council reviews and makes recommendations concerning the Environmental Studies Student Learning Outcomes Assessment Plan. The director implements assessment activities, collects assessment data, and prepares annual assessment reports for the review of the council.

## **7. Procedures for Amending these By-laws**

Any proposed amendment(s) to these by-laws will be announced in advance as an item on the agenda for the Council meeting at which the amendment(s) will be considered. A majority vote of the Council is required for approval of any amendment.

*Approved in 2014 by the Dean of the College of Humanities and Social and Behavioral Sciences*

*Dr. Pamela S. Gates*

## Sustainability and Environmental Policy (SEP) Minor (To replace *Environmental Studies Minor*)

### **Sustainability, Ethics, Law and Policy Core Courses – 12 hours**

- SEP 300 – Sustainability and Environmental Policy (3) <QR pending>
- PHL 118 – Moral Problems (3)
- PSC 514 – American Public Policy Making (3)
- PSC 516 – Environmental Policy and Politics (3) OR PSC 522 – Regulatory Process and Administrative Law (3)

### **Business, Law and Economics – 3 hours**

- ECO 301 – Environmental Economics (3) OR
- BLR 521 – Environmental Law (3)

### **Electives – 5-6 hours selected from the following (in consultation with academic advisor):**

- ANT 370/SOC 370– Global Environmental Issues (3)
- GEL 380 – Hydrogeology (3)
- BIO 365 – Environmental Contaminants (3)
- BIO 208 – Microbiology (3)
- BIO 361 – Water Conservation (1)
- BIO 362—Forest Conservation (1)
- CHM 250 – Water as Life, Death and Power (3)
- COM 352 – Communication and Social Influence (3)
- ENV 310 – Environmental Issues Management (3)
- RPL 209 – Recreation and Leisure for Diverse Populations (2)
- RPL 370 -- Leave No Trace Ethics (1)
- RPL 470 -- Park and Natural Resource Management (3)
- RPL 552 – Environmental Interpretation (3)
- RPL 570 -- Wilderness Issues and Policy (3)
- ENG 303 – Technical Writing (3)
- HST 302 – Environmental History (3)
- HST 322 – Westward Movement in America (3)
- HSC 352 – Environmental Health (3)
- MET 240 – Meteorology (3)
- IET 327 – Industrial Safety (3)
- IET 525 –Hazardous Materials Technology (3)
- IET 680 – Sustainable Technologies (3)
- GEO 203 – Intro. to Geographic Information Science (3)
- GEO 303 – Geographic Information Systems (3)
- GEO 305 – Remote Sensing of the Environment (3)



- GEO 335 – Biogeography (3)
- GEO 345 – Political Geography (3)
- PSC 411 – Organizational Theory (3)
- PSY 537 – Organizational Behavior Management (3)
- MGT 312 – Introduction to Management (3)
- SEP 395 – Special Topics in Sustainability (1-4)

**TOTAL = 20-21 credit hours**

TKR/tr

2 June 2011 draft for Kurtz

V. 2.1 Rev. 13 September 2012

V. 3.0 Rev. 10 October 2012 w/comments from GLISS Working Group

V. 3.1 Rev. November 2012

V. 4.0 Rev. March 2013

V. 4.5 Rev. November 2013 - SEP Minor only

V. 5.0 Rev. December 2013

V. 6.0 Final March 2014

v. 7.0 April 2015

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**The final version of this report was compiled and edited by Meghan Leigh Marx, Research Assistant for GLISS, and Thomas K. Rohrer, Director of GLISS, with significant contributions from the following individuals:**

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# 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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