

# University of Missouri Environmental Sustainability Report 2008

MU Environmental Affairs Committee

October 2009

## ***INTRODUCTION***

In April 2003, the Environmental Affairs Committee released its initial study, “The Impacts of Campus Activities on the Environment.” This initial report was the Committee’s first attempt to address resource use and environmental issues at the University of Missouri (MU) in a comprehensive manner. Each year since, questionnaires have been distributed to various campus departments in the early months of the year to collect follow up information from the initial report. Attempts have been made to collect data comparable to that collected in the initial report. In addition, survey questions have been updated to better define resource usage and impacts. In 2008 the committee decided to change the name of the report from “The Report on the Impacts of Campus Activities on the Environment,” to, “University of Missouri Environmental Sustainability Report,” in order to better reflect common terminology and to more accurately describe the report’s purpose. This report contains the data for calendar year 2008. In some cases, data is shown for the fiscal year instead.

## ***FINDINGS—GENERAL CAMPUS STATISTICS***

There are at least two ways of interpreting environmental information. One way is to look at gross resource usage statistics. Another way is to normalize information based on statistics such as number of students, number of employees, number of buildings, budget and other factors.

General statistics for 2008 are as follows:

- Number of students (enrollment Fall 2008): 30,200
- Number of faculty and staff (full-time equivalents): 12,233 (includes student full time employees, but excludes Hospital employees)
- Total campus expenditures (excludes Hospital): \$947,590,675
- Total Hospital expenditures: \$596,704,993
- Gross square feet of campus buildings<sup>1</sup> (excludes Hospital): 13,853,987
- Gross square feet of hospital<sup>2</sup>: 998,590

## ***FINDINGS—RESOURCES***

### ***Energy***

Campus Facilities, through its Energy Management department, is responsible for providing energy to campus. The service area is the Columbia campus. Steam, but not electricity is provided to the VA Hospital. Ellis Fischel Cancer Center and Columbia Regional Hospital obtain electricity from the City of Columbia and natural gas through Ameren UE and energy marketers.

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<sup>1</sup> Campus square footage does not include the farms and research centers off campus.

<sup>2</sup> Hospital square footage includes all of the buildings associated with the main Hospital located on the MU campus. However, it does not include the clinics, Columbia Regional Hospital or Ellis Fischel Cancer Center.

In 2008, the campus consumed 247 million kilowatt hours of electricity, a 3.9% increase from the previous year. The campus consumed 3.16 billion pounds of steam, a 9% increase from the previous year. Compared with 2000, these numbers represent increases of 26% (electricity) and 21% (steam), respectively.

In 2008, energy was provided from the following sources: coal – 82%, natural gas – 2%, tire derived fuel – 2%, purchased electricity – 13% and 1% was provided by biomass.

Campus Facilities has a continuing program of energy conservation projects. In 2008, a project at McReynold installed wireless fan coil controllers, which are inherently more efficient than traditional units because they allow the fans on heating and cooling units to cycle on and off as needed. The expected annual energy savings of this project is \$25,000, and within five years will pay back the entire investment.

Energy conservation efforts since 1990 were calculated to result in a \$4.3 million cost savings during the past year.

Campus Facilities has taken a proactive approach to conserving energy and reducing energy costs. Initiatives such as the tire derived fuel Program, implementation of chilled water looping technology, installation of digital power plant controls, efficiency modifications to boilers and fans, and maximization of the use of cogeneration at the MU Power Plant, all contribute to lowering the cost of energy.

In conjunction with these energy and cost saving efforts, Campus Facilities -- Energy Management is working to increase the use of biomass fuels used at the MU Power Plant. A project is underway to replace an existing coal fired boiler with a new biomass boiler. This boiler is necessary to reliably meet the steam needs of the MU campus, and will be fueled by biomass fuels, potentially including wood waste, grasses and waste paper. It's anticipated that on site construction will begin late in 2010, with the boiler being operational early in 2012.

In 2008, MU was one of three state facilities recognized by the Missouri Waste Control Coalition with its Outstanding Achievement award in the Government category for their joint "tires to energy" recycling program. This program provides a disposal outlet for tires removed from illegal tire dumps and save MU up to \$300,000 annually in fuel costs.

Also in 2008, MU was recognized by the National Wildlife Federation with the Energy Efficiency award following the Federation's national competition, "Chill Out" Campus Solutions to Global Warming. MU was one of eight colleges and universities to win an award. Jason Fox, an MU student, nominated MU and was awarded a \$1,000 grant to be used for a research project on biodiesel.

### ***Water and Wastewater***

Campus Facilities, through its Energy Management department, uses five deep wells to supply potable water for the main MU campus. Wastewater is discharge to and treated at the City of Columbia publicly owned treatment works.

In 2008, 745,996,000 gallons of water were used, a 7% decrease from the previous year. However, between 2000 and 2008 there was a 4% increase in water usage. The decrease in water use in 2008 may have been related to the wet conditions experienced throughout the year. Of the water consumed, 445,358,000 gallons were discharged to the sanitary sewer, a 3% increase over the previous year.

A recent water conservation project at the MU Power Plant uses recycled waste water from the plant's water treatment system to reduce the potable water supply for the plant's cooling water system. Reject water from the reverse osmosis equipment, which is normally sent to the sanitary sewer, is being redirected to the plant's cooling towers. This new process will reduce the volume of waste water, and lower the amount of potable used in the production of steam and electricity. In addition to reducing plant water use by 3-5%, the annual cost avoidance is expected to be approximately \$30,000 - \$50,000. Because of the success of this water saving program, the design of the new cooling tower currently being erected on the power plant site, allows for additional use of recycled water, which will increase the savings even further.

Energy saving technologies and water/wastewater efficiencies are incorporated into new designs to reduce water use, discharges to the sanitary sewers, and operating costs for the life of the building. Energy Management staff are also evaluating the possibility of additional gray water capture and reuse in the power plant to further reduce potable water use.

**Food**

Campus Dining Services (CDS) is the primary organization for residential and retail dining services at MU. CDS operates 10 retail locations and five all-you-care-to-eat residential locations. Examples of residential locations include Plaza 900 and Eva J's. Retail locations include Wheatstone Bistro and Starbucks in Memorial Union, Catalyst Café in the Life Sciences Center, Bookmark Cafe in Ellis Library, the j-Café in the journalism school, and four convenience stores (Mizzou Markets). CDS registered over 3.7 million transactions in the year ending June 30, 2008. The number of transactions is split between residential locations, with about 2.09 million transactions, and retail locations, with about 1.63 million transactions.

CDS uses a competitive bid system to locate a supplier and then purchases items as needed from the bid winner. With the bulk of purchases from that supplier, cost of goods sold (all food and non-food items) totaled over \$6.4 million for the FY2008. Item selection is based on customer needs and desires and the best values available. CDS, however, has recently started to emphasize finding supplies of food that satisfy customer, economic, and environmental standards.

Local food purchases are generally considered more sustainable because they travel less distance and therefore have less of an environmental impact. CDS purchases many products on a regular basis from their primary distributor, located in St. Louis, and from several locally-based (Missouri/Illinois) suppliers including:

- 18,542 pounds of Louisa pasta products
- 3,292 pounds of Savage meats
- 57,205 pounds of burgers and pork fritters from Holten Meat, Inc.
- 5,338 pounds of Lasco mixes
- 380 pounds of Brevé Coffee
- 3,480 dozen cage-free eggs
- 23,317 dozen assorted San Luis tortilla
- 4,055 pounds of Companion Bakery cheesecakes

CDS purchases some local produce through a distributor in St. Louis including 100 lbs of apples and 2,360 pounds of zucchini. Coffee shops managed by CDS purchased 3,565 pounds of coffee from Kaldi's, a St. Louis roaster and 2,200 pounds of coffee from The Roasterie, a Kansas City roaster. They also purchased over 513 pounds of tomatoes, peppers, squash, cucumbers, 125 assorted melons and 25 dozen sweet corn from the University of Missouri's Bradford Farm. In October, CDC hosted an Apples Galore special event and purchased 550 lb of apples from Blue Heron orchard. Other miscellaneous local purchases included 40 pounds of pecans from Wilson's pecans, 31 tubs of Tiger Stripe Ice cream from MU Buck's, 132 bottles of sparkling grape juice from Les Bourgeois Winery. CDS purchased 37,000 gallons of milk, 1200 gallons of cream, 16,000 pounds of sour cream and cottage cheese; 15,000 pounds of yogurt and 3,000 gallons of ice cream from our local Prairie Farms/Central Dairy company. Also purchased, was 24,000 loaves of Bread and 34,000 dozen buns and rolls produced by Interstate Brands in Missouri.

Few requests have been made to CDS for organic foods, therefore organics are not specifically pursued. There are no items offered in residential dining that would be considered 100% organic. Mizzou market convenience stores offers an organic line of health and beauty aids (hair products, deodorants), a line of organic Healthy Valley soups as well as selling a few protein-type bars and some cereals that indicate they are made with some organic ingredients.

In addition to daily vegan and vegetarian menu choices in all residential dining locations, Campus Dining Services has been increasing the variety and quality of vegetables available. More fresh vegetables and a variety of cooking techniques are being incorporated that have been received well (e.g., Roasted Cauliflower & Red Onions, Limas with Artichoke & Cumin, etc.).

Environmental successes during the past year:

- Continued recycling of fluorescent light bulbs, estimated at 200 bulbs annually
- Sold approximately 6,000 reusable drink and coffee mugs (excluding Starbucks products)
- Sold approximately 7,000 beverage refills, resulting in no additional packaging/cups
- Used recycled-paper napkins in all facilities
- Avoided use of Styrofoam packaging in the department
- Recycled cardboard in seven Campus Dining Services locations
- Purchased several "Energy Star"-rated pieces of kitchen equipment, including a dishwasher (j café) and refrigeration (j café and Rollins)
- Established the "Energy Czar" Committee made up of operations representatives. These representatives conducted energy audits in their facilities and identified energy conservation steps to implement, such as:
  1. Monitoring of exhaust hood use (limited run time for menu production only)
  2. Restricted lighting during non-service time periods
  3. Reduced lighting levels during all daylight times, when appropriate
  4. Reduced pre-warming times for heating equipment (wells, ovens, grills, fryers, etc.)
  5. Restricted water usage in dish rooms during slow and non-use periods of time
  6. Continued reduction of HVAC use based on building use, hours of day, academic breaks
- Sold waste oil from Campus Dining Services units to a recycling company for re-use
- Used motion sensor lighting controls in several operations (with recent renovation/construction)
- Converted the Pavilion at Dobbs from disposable to non-disposable silverware, reducing refuse going to the landfill
- Used instantaneous heating system in several locations for elimination of hot water storage tanks
- Operated pulper in Rollins dish room, which created biodegradable pulp from napkins, paper cups, and food waste; provided pulp to Sustain Mizzou for use in the Sustain Mizzou and community gardens
- Expanded selection and improved displays of organic food in Mizzou Market convenience stores

- Tracked plate waste in the five all-you-care-to-eat residential dining facilities and posted the results of average waste for each month of the academic year (for customer review)
- Conducted a one-week plate waste awareness campaign (“Can the Waste”) that featured the impact of food waste in the residential dining facilities
- Continued to purchase local products (e.g., apples, fresh produce, pasta, tortilla shells) from local growers and manufacturers
- Used window film and blinds to decrease heat transfer through windows in summer and cold in winter
- Installed petroleum-spill containment and clean-up kits in all locations; updated related training with management staff
- Recycled used office paper, telephone books, and other paper waste, as well as ink cartridges

Campus Dining Services received no environmental awards during 2008 but was featured in several high-profile news and magazine articles related to the utilization of Rollins pulp through the partnership with Sustain Mizzou.

Working with MU dietetic students, the Residence Hall Association, and Sustain Mizzou, Campus Dining Services is providing educational information in the residential dining facilities to educate students about the implications of plate waste. This past year, CDS tracked and posted the amount of plate waste that occurred in the all-you-care-to-eat residential dining facilities, and plan to continue to focus on strategies for reducing plate waste. A joint study of “going trayless” in residential dining facilities was conducted by Campus Dining Services and the Residence Hall Association (RHA). Students were overwhelmingly opposed to “going trayless”; therefore, Campus Dining Services has made no change. Instead, Campus Dining Services plans to educate students on various aspects of sustainability and encourage them to make conscious, positive decisions related to sustainability (e.g., take only what they will eat and reduce food waste, use refillable mugs). Campus Dining Services’ philosophy related to sustainability is to “work with” students to make positive change, rather than “do something to” students related to sustainability. The sustainability efforts will continue during the coming years.

One driving industry trend that Campus Dining has embraced is the emphasis on cuisine that is nutritionally balanced. Of most importance in this effort is that food items remain delicious and well received by our customers. The focus in this area has been on removing trans-fats, replacing saturated fats with unsaturated fats, incorporating more fresh fruits and vegetables, using healthier cooking techniques (e.g., saute/roast vs. fried), and incorporating more grains and legumes. Many of these items have been achieved with an additional focus on incorporating regional and global flavors.

### ***Solid Waste and Recycling***

Solid waste and recycling services are overseen by Campus Facilities, through its Landscape Services department, for the main MU campus, University Hospital and Clinics, Ellis Fischel, and Columbia Regional Hospital.

A total of 8,042 tons of solid waste was generated in 2008. This was an 8 percent increase from 2007. The amount of material that was recycled is shown in Table 1 below. The overall total recycled increased 4% over the previous year and accounted for 24% of waste generated.

Table 1—Recycling Data for FY2008

<b>Item</b>	<b>Pounds Recycled</b>
Mixed Office Paper	1,915,508
Cardboard	1,055,941
Newsprint	142,580
Electronics	54,762
Steel	319,280
Aluminum	47,815
Plastic Bottles	38,020
Glass	79,972
Grass Clippings	167,000
Used Oil	25,000
Batteries	1,032
Miscellaneous	36,628
<b>Total</b>	<b>3,884,538</b>

Specific projects were conducted in 2008 regarding recycling, and the totals from these projects are included in the above table. For example, the Tiger Tailgate Recycling project, initiated in 2005 as a cooperative project between the Solid Waste and Recycling Coordinator, Campus Facilities, the City of Columbia, the student group Sustain Mizzou, and sponsored by Anheuser-Busch Recycling, gathered 24 tons of recyclable beverage containers at home football games. Each project's results are listed in Table 2.

Table 2—Recycling Totals from Special Projects

<b>Projects (Totals Included Above)</b>	<b>(tons)</b>
Tiger Treasures	17.0
Indoor Beverage Container Recycling	13.4
Tiger Tailgate Recycling	24.0
Drop Off Recycling	69.4
Sidewalk Recycling	11.1
Paper Recycling (academic, administrative, support)	958.3
Cardboard (academic, administrative, support)	528.0
Newsprint (academic, administrative, support)	71.3
<b>Total</b>	<b>1,692.4</b>

In addition to the above activities, MU engaged in several other waste utilization activities. One was the use of 14,732.5 tons of boiler ash at a land reclamation project at a quarry near Hannibal. Another was the use of 2,844 tons of chopped tires as fuel in the power plant. A third was the use of 3,323 tons of wood chips as boiler fuel at the power plant.

***Hazardous Materials***

Environmental Health and Safety coordinates the campus hazardous waste management program. The service area for these programs includes the Columbia campus, University

Hospital and Clinics, Ellis Fischel Cancer Center, Columbia Regional Hospital, University Physicians clinics, off-site research facilities (including farms), and the Missouri Rehabilitation Center in Mt. Vernon.

Table 3 below shows amounts of various types of hazardous materials disposed or recycled by campus both from 2000 to 2008. In previous years, large quantities of regulated waste were produced from remediation activities at University Garage from a leaking underground storage tank and occasional other cleanup activities. In 2006, DNR declared that Garage remediation qualified for a risk-based closure. As a result, there were no longer the significant quantities of regulated wastes being disposed from that project in 2007. Universal wastes consists of batteries and fluorescent lamps, both of which are sent to recyclers.

Table 3—Hazardous Materials Disposal

Material	2000	2004	2005	2006	2007	2008
EPA regulated Hazardous Waste	210,000	129,000	116,700	126,000	117,000	103,000
Medical/pathological waste	325,000	443,000	480,000	486,000	426,600	456,300
Low level radioactive waste	38,000	37,000	20,700	6,700	7,600	19,900
Regulated wastes (special projects)	128,000	227,000	400,000	240,000	0	42,900
Mixed wastes (radioactive/haz waste)	1,100	840	335	208	441	233
Used oil to reclamation	NR	13,800	11,500	13,700	17,600	17,600
Universal Waste to recycling	NR	33,500	33,100	26,700	28,800	22,700
Asbestos	NR	NR	NR	NR	NR	67,000

Notes: All measurements are in pounds. NR=Not Reported

EHS has operated a chemical recycling program that takes unwanted excess chemicals from laboratories and returns them free of charge to other interested campus researchers. In 2008, EHS recycled 3,750 chemical containers, which had an avoided purchase cost, adjusted for MU discounts, of \$150,300. EHS also recycled 273 pieces of lab equipment (mostly glassware) with an avoided purchase cost of \$13,400. EHS also removed 4.5 kilograms of mercury devices from its facilities and replaced them with non-mercury devices.

EHS has developed comprehensive procedures for the safe handling, storage and disposal of various types of hazardous materials, and provides training classes to several thousand employees each year on these topics.

***FINDINGS—INFRASTRUCTURE***

***Purchasing***

Purchasing is centralized under the University System offices; MU is serviced by a campus Procurement Service Center.

For this report (FY08), we were only able to collect data for sales through Corporate Express and OfficeMax. Unfortunately, some data is by quantity and some data is by cost. Further, data is not broken down well between paper sales to Printing Services and to the rest of campus. Data from Office Max

suggests that about 60% of paper sales to Printing Services have no recycled content. However, more research would be required to confirm this figure. Data from Corporate Express showed that over 90% of paper sales have no recycled content.

In FY08 the campus purchased almost \$160,000 worth of remanufactured toner cartridges from Corporate Express. Over 90% of these cartridges had a recycled content of at least 40 percent. MU purchased almost \$10,000 worth of remanufactured inkjet cartridges from Corporate Express, almost none of which had recycled content. Printer cartridges were recycled through a joint project of Sustain Mizzou and General Stores; however, figures were not available on quantities recycled in FY08.

Procurement also oversees the Surplus Property operation. Surplus Property serves MU as well as some local government bodies. Approximately 27 tons of computer monitors, 12.5 tons of scrap metal, and 76.5 tons of automobiles were sold through Surplus Property in FY08. Overall, Surplus Property sold 305 tons of material.

There are currently no policies on recycled content for copier paper; however, in previous years it was reported that for rough paper (paper towels, toilet paper, etc) MU buys only products that have recycled content.

***Printing Services***

Printing Services reported a variety of resource usage statistics for FY2008. For inks, the breakdown was as follows: vegetable/soy – 80%, metallic – 10%, low VOC petroleum based – 10%. This represents a significant change away from low VOC to vegetable/soy. Paper cost was reported at \$1.8 million. According to Procurement records, Printing Services purchased 1,240 cases of paper without recycled content, 840 cases with 30% recycled content and 80 cases with 100% recycled content. Approximately 15% of Printing Services’ business used digital processing; this was about triple the proportion reported the previous year.

In FY2008, the following amounts of materials were recycled: 400 tons of paper, including cardboard and 8.2 tons of aluminum. Printing Services expects to have less recycled tonnage for the next couple years because of the expectation of reduced demand for their services due to economic conditions.

***Residential Life***

Residential Life has provided normalized data for its students for the past several years (Table 4). Though these numbers are based on the best available data, the Committee is not sure that the year to year comparisons are strictly valid.

Table 4—Selected Environmental Data for Residential Life

<b>Statistic</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Capacity of Residence Halls	6026	6033	5800	5805	5910
Gallons of Water per person per day	33	27	40	38	39
Kilowatt hours of electricity per person per day	5.6	5.91	8.05	8.4	11
Pounds of solid waste per person per day	1	1	1	1	1

Residential Life continued its trend of implementing numerous environmental initiatives in FY2008. Residential Life continues to have a recycling program within the residence halls for the students to utilize for paper, aluminum and glass. The fluorescent bulb recycling continues to work well and they continue to use energy efficient fluorescent/low mercury light bulbs and compact fluorescents in residence halls and apartments rather than incandescent bulbs.

Residential Life also distributes a variety of information to educate the students on various recycling and sustainability issues in both the Residence Halls and the apartments.

Residential Life again participated in the Tiger Treasures Rummage Sale with items being donated by students leaving campus to reduce the amount of items going into the landfills. This year students living at University Apartments participated along with students in the residence halls.

In FY2008, Residential Life implemented a number of environmental initiatives, many related to the opening of renovated facilities. These included the following:

- Recycling of cardboard and packaging: During installation of student furniture, all cardboard boxing and packaging was recycled. Over 3 tons of cardboard was recycled from the installation.
- Upholstery from Arc-Com Fabrics: Upholstery purchased from this company was made from recycled content and 100% recyclable. This upholstery was used for furniture in commons areas and lounges in Bingham and Schurz.
- Upholstery from Momentum Fabrics: Upholstery purchased from this company is made from rapidly renewable fiber content. This upholstery was used on chairs, sofas and benches in various locations in Bingham and Schurz.
- Carpet: New carpet in Bingham Common Space, Studies and the Meeting Room contained 85% post consumer recycled material. New carpet tile in Bingham Common space is 100% recyclable. New carpet in the Bingham Music Room and Main Lounge likewise has a small environmental footprint and is recyclable. New carpet in Schurz corridors has eliminated greenhouse gas emissions associated with the entire life cycle of the carpet; all such carpet is recycled in a closed loop manufacturing process.
- Floor tile: Porcelain tile used for entry flooring and restroom walls and flooring was manufactured by a company located with 500 miles of Columbia.
- Teknoflor flooring: Flooring from this company had 80% recycled content, and requires no buffing which eliminates wax particles, dust, bacteria, and odors from finish and strippers associated with normal waxing activities.
- Chairs: Steel products are manufactured using a minimum of 25% recycled content. Steel and aluminum products are protected by a baked on powder coat paint process that eliminates the release of VOCs. Wood products are carved from certified renewable forests. The chairs were manufactured by a company located with 500 miles of Columbia.
- Resolve computer stations: These computer stations in Bingham weigh one-third of traditional work stations. Parts are easily disassembled for recycling; work stations are 86% recyclable and contain 27 % recycled materials. Resolve is GREENGUARD certified.
- Transformations Furniture: Lounge chairs, sofas and ottomans located in Schurz and Bingham purchased from this company are designed in modular fashion to be easily repairable to minimize waste typically generated from used and damaged furniture.
- GREENGUARD certified products: Such products are certified by the GREENGUARD Environmental Institute to define goods with low chemical and particle emissions for use indoors. GREENGUARD certified purchases were made from Laticrete Grout, Staron Solid Surfaces, DuPont Zodiaq Solid Surfaces and WilsonArt Laminate.

### ***Landscape Services***

No new information received.

### ***Building Planning, Design and Construction***

Campus Facilities, through its Planning Design and Construction department, is responsible for master planning, new building design and construction, additions, renovations, and for overseeing construction projects. In FY2008, campus construction totaled \$154 million, about 30% less than the previous year, but still a high figure by historical standards.

In FY2008, the size of the main Columbia campus was 1350 acres, of which 65% is classified as green space.

Several environmental concerns are incorporated into building design specifications:

- Finish materials including flooring, paint, restroom partitions, acoustical fabric panels, electric window shades (both materials and the energy savings produced), furniture including tables & chairs. The majority of items for Horticulture and Agroforestry Research Center (HARC) from the interior standpoint were environmentally friendly/sustainable materials. Other projects utilize most of the same types of finishes.
- For Lowry Hall Second Floor, as part of the carpet bid, Campus Facilities requested reclamation and recycling of existing carpet, resulting in 443 square yards of carpet being recycled instead of going to the landfill.
- For CS&EB (5 floors of new furniture), PD&C requested that all corrugated packaging materials be recycled, resulting in 24,192 cubic feet of corrugated packaging being recycled instead of ending up in the landfill.
- Utilization of the new “Gently Used Office Furniture” Volume Purchasing Agreement resulted in cost savings of over \$30,000 for furniture for the Mid-Campus Housing leased space for HSIRB. Using this “recycled” furniture not only realizes significant cost savings but also reduces the energy and resources required for manufacturing new furniture
- Campus Facilities generally specifies low VOC coatings; lumber that is not fabricated from old growth timber and tries to find material sources that are within 500 miles of the jobsite.
- Campus Facilities uses high efficiency electronic fluorescent ballasts and T-8 (sometimes T-5 HO) lamps.
- Campus Facilities has sample installations using LED lighting, and continue to monitor their rapid improvement in lumens per watt.

Campus Facilities arranged for several special professional development opportunities for staff including:

- Various LEED training sessions and other building materials/products, such as DIRT Architectural Wall Solutions, Tate Access Floors, LED Lighting
- “Modular Interior Construction” explored “the environmental sustainability of reducing material waste, greenhouse gases, energy and real estate footprint during the initial construction of modular interiors” as well as the sustainable benefits of “ongoing reuse of architectural and technology elements.”
- Perry Chapman’s (the campus Master Plan consultant) “Planning Inspirations: Past, Present and Future” included ways MU campus is looking towards a sustainable future, with green spaces, possible food production, etc.
- A USGBC webinar on “Carbon Reduction – Commercial Interiors & Core and Shell” looked at understanding how building design and operations impact carbon emissions, how to establish an emissions baseline and new approaches for reducing emissions throughout a building’s life cycle

- The occasional training in-house from vendors for sustainable products and any conference that has sustainable programs.

Campus Facilities reports the following environmental successes during FY2007:

- Over \$800,000 worth of furniture was ordered for six projects, all of which was built to Greenguard and/or SCS Indoor Air Quality certification standards, as well as Cradle-to-Cradle or recycled upholstery fabrics
- HARC was designed with some sustainable materials and methods in mind (wood framing, cement fiber siding, metal roof, composite wood decking, stained concrete floors in some areas). The HVAC system of the conference room was “right-sized” to work better with the expected loads and not the ultimate design load of 340 people in the middle of August.
- MU Health Care – New Patient Care & Surgery Tower: MU Health Care has made sustainable design a high priority for this project and ongoing design work will include all tasks and incorporation of sustainable concepts required for gaining certification with the US Green Building Council’s LEED program. Current sustainable concepts include a green roof over a portion of the Surgery Floor, water efficient landscaping, storm water quantity and quality control concepts, low-emitting interior materials selections, and reduction of construction wastes through recycling and waste reduction concepts.

Campus Facilities reports that materials are getting a lot easier to come by although everyone seems to hop on the bandwagon, whether they truly have an environmentally friendly product or not (Greenwashing- vendor speak for products that claim to be green but don’t necessary check out as green). Also, it is still a goal in Campus Facilities to reduce our Resource Library to include ONLY products that have a verifiable environmental story.

### ***FINDINGS—EDUCATION***

Formal education in environmentally related topics, issues and skills occurs across the curriculum with relevant coursework offered in at least 40 departments. This includes everything from captive wild animal management, forest fire control and use, bicycle and pedestrian transportation, irrigation and drainage to organizational advocacy, geography and planning, principles of strategic communication and environmental justice. A list of courses offered in Fall 2009 is at <http://web.missouri.edu/~umcsnresiwww/courses.html>

There are 16 majors that lead to environmentally related occupations in Science and Technology: Agricultural Systems Management, Animal Science, Biochemistry, Biological Engineering, Biology, Civil and Environmental Engineering, Chemical Engineering, Chemistry, Environmental Science, Fisheries and Wildlife, Forestry, Geology, Horticulture, Plant Sciences and Soil Science. There are five majors that lead to occupations in the social dimensions of environmental problems: Agricultural Economics, Environmental Studies, Geography, Parks, Recreation and Tourism and Rural Sociology.

In the 2008/2009 MU graduated 67 undergraduate students in Civil and Environmental Engineering, 3 in Environmental Geology, 22 in Fisheries and Wildlife, 18 in Forestry, 31 in Parks, Recreation and Tourism, and 30 in Soil, Environmental and Atmospheric Sciences.

Environmental Education at MU is loosely coordinated by the Environmental Studies Program (<http://web.missouri.edu/~umcsnresiwww/index.html>), which is administratively housed in the School of Natural Resources. The program has one half time faculty member, Jan Weaver. Her

office is in 208 Tucker Hall.

Environmental Studies provides career and major advising for undecided students (and academic advising for students seeking an Environmental Studies major or the 15 hour certificate in Environmental Studies. The program also compiles the list of environmentally related courses (see above), and a list of faculty doing environmental research (<http://web.missouri.edu/~umcsnresiwww/faculty.html>), it puts out a monthly newsletter covering an environmental topic and listing the local environmentally related events, maintains a calendar of local environmental events, helps students find internship opportunities with local organizations, agencies or businesses, and assists with advising Sustain Mizzou and Greeks Going Green.

The program also teaches 3 courses - EnvSt 2110 Environmental Sustainability (Fall), EnvSt 3000 Natural History of Missouri (Spring) and EnvSt 4350 Modeling Environmental Sustainability (Spring), along with a topics course in the fall.

### ***FINDINGS—RESEARCH***

#### ***Research Farms***

No new information received.

#### ***Research Reactor***

Radioactive releases in 2008 to the sewer system totaled 136 millicuries of tritium and 20 millicuries of all other isotopes. These were 5% and 2%, respectively, of the allowable sewer release limits. Air releases in 2008 for Ar-41 totaled 1250 Curies; however, this was only 77% of the Technical Specification limit. Air releases of Tritium totaled 8.5 curies—less than 0.1% of the Technical Specification limit.

Low level radioactive waste shipped from the Research Reactor in 2008 totaled 2,423 cubic feet.

MURR continues to ensure that all persons with unescorted access to the research reactor have hazardous material and radiation protection training. This training is designed to meet all regulatory requirements and to provide the staff and students with the knowledge necessary to perform their responsibilities in a safe manner.

The Research Reactor continues to maintain compliance with all applicable environmental regulations.

On July 1, 2008 the radioactive waste disposal site located at Barnwell South Carolina closed its doors to all low-level waste generated by licensees outside of its regional waste compact. Generators of radioactive waste located in the state of Missouri now have access to only one waste site, the facility located at Clive, Utah. The Utah site can only accept Class A low-level radioactive waste leaving MURR without a place to dispose of the Class B low-level waste that is generated as a result of research activities and routine operations. The volume of this waste is not large and the shipments are not made frequently, one shipment of less than 20 cubic feet every two years. However the long term impact could be significant. Storing this waste for an indefinite period will not result in an unsolvable safety issue but it will consume space and financial resources.

### ***FINDINGS—STUDENT ACTIVITIES***

This section provides a description of student environmental groups and activities.

#### **Emerging Green Builders**

Emerging Green Builders is a club for students interested in sustainable design and green building techniques. This club's members consist of mainly Architectural Studies students; however it is open to anyone who shares these interests. They meet every month to discuss new technologies, systems, and materials that aide the world of green design. They also share how we can use these innovations in project designs to become more familiar with them. This group is made to be an educational experience for members; trips to local buildings and meetings with architects and manufacturers are frequent.

In FY2008, the group met with local architects in Columbia to discuss green design strategies, such as the Eco School House, designed by Nick Peckham. They also met with other local EBG Chapters, which mostly consist of working professionals, allowing the opportunity to network. Trips to Kansas City and St. Louis were frequent to see new design tactics first hand. The group also participated in different charity events, including Habitat for Humanity.

### **Greeks Going Green (GGG)**

Greeks Going Green's primary goal is to educate the Greek community at the University of Missouri about environmental sustainability. They work to reduce the carbon footprint of the Greek chapter houses by implementing recycling and encourage chapters to make lifestyle changes to promote environmental awareness. In 2008, there was record attendance at meetings and moved closer to reaching the goal of having recycling in each house. The local Sierra Club supported the group by purchasing recycling bins and funding recycling for one year in each house without recycling. Currently, only five houses remain without recycling.

The group implemented a point system to encourage participation in 2008. As part of that, GGG began to require a monthly recycling check from each chapter. Chapter delegates are required to have their president sign a checklist and return it to our monthly meetings. In addition, the group rewards chapters for making positive changes within their houses (CFL light bulbs, elimination of Styrofoam, ordering organic cotton t-shirts, etc.) and chapters receive points for participating in various GGG events. One of the events took place during Homecoming, one of the largest events during the year for the Greek community. GGG organized a recycling program to retrieve leftover wood cut-out characters made for skits and donate them to local elementary schools. Seven schools in the area received characters. GGG also partnered with Grade Genie to recycle notebooks at the end of the Fall Semester. Each house had a box in which students could leave their used or unused notebooks. GGG was responsible for removing all of the bindings and recycling the paper. Two carloads of paper were recycled.

### **Sustain Mizzou**

Sustain Mizzou is a student, non-profit environmental organization committed to creating a sustainable way of life at the University of Missouri through public education, local action and advocacy. Sustain Mizzou is non-partisan and entirely volunteer driven, with an emphasis on education, cooperation, local action and leadership development. Sustain Mizzou strives to address all aspects of sustainability on the MU campus.

Sustain Mizzou had 14 running projects during the 2008 academic year. Projects included:

- Notebooks Project- 200 notebooks made of used computer paper and cereal boxes were constructed and sold. As of fall 2008, Sustain Mizzou's notebooks were also being sold in the MU bookstore. Wider community interests led Sustain Mizzou members to hold a notebook workshop at a local elementary school.
- Sustain Mizzou Research Farm- In the spring of 2008 this project transitioned to an urban agriculture project. A pilot study regarding composting food waste from Rollins dining hall was initiated. The study was successful resulting in a \$4000 grant from Information and Technology Fund for fall 2008. An Environmental Studies class (Sustainable Development in Downtown Columbia) was created in conjunction with the new garden and composting project. During 2008,

approximately 2100 volunteer hours were recorded and during the fall semester 19,000 pounds of food waste was collected generating an estimated 35,000 pounds of compost.

- Stream Team- In the spring of 2008, 425 native tree seedlings were planted along the bank of the Hinkson Creek. Water quality monitoring events performed the same day discovered the creek to be in fair condition. Sixty hours of volunteer service was recorded. During fall 2008, two litter pickup/water quality monitoring events were conducted resulting in a total of 90 volunteer hours, 50 bags of trash, 20 tires and other waste items.
- Tiger Tailgate Recycling- TTR is collaboration between Sustain Mizzou, Landscape Services, the City of Columbia, Anheuser-Busch and Mizzou Athletics. Volunteers distribute recycling bags to tailgaters, maintain 250 recycling bins and provide recycling education. Results include 19.22 tons of beverage containers, 560 volunteer hours from 70 different volunteers in the six games of the 2008 season.
- Food Drive- The food drive collects donations around campus for one week and is used to buy fresh food from local farmers to be donated to the Central Missouri Food Bank. In fall of 2008 \$1500 was collected and over 100 volunteer hours logged.
- Footprint- Footprint is a sustainability magazine with the purpose to teach the public, especially students, how to live a more sustainable lifestyle. Footprint mostly focuses on environmental action through the individual and how they interact with their community.
- Outreach Table- Every Wednesday Sustain Mizzou hosts a table to educate students about sustainability, provide volunteer opportunities and sell sustainable products such as Sustain Mizzou's notebooks.
- Talk Sustainability- Talk Sustainability was created fall 2008 to increase knowledge of sustainability and initiate conversation by recruiting speakers to discuss sustainability/environmental issues before general meetings.
- Recycle Mountain – Educates students on recycling by representing the recyclable materials that are thrown away every day at Mizzou with a mountain of bailed plastic, aluminum and paper.
- Bike Fest- Sustain Mizzou collaborated with Pednet and local bike shops to host a two event of promoting biking and bike safety with booths and free classes.
- Recycle Mania- This is a national competition raising awareness of recycling on college campuses.
- T-shirts- Sustain Mizzou utilizes pre-used, donated t-shirts to make shirts given to all members.
- RecycleInk- Sustain Mizzou collaborates with MU General Stores to provide the opportunity at various sites across campus to recycle most ink cartridges.
- Sustainability Student Fee – Sustain Mizzou worked with MSA and other student groups to create a one dollar per student per semester fee that would be used to pay for student workers and funding sustainability related projects.

More information can be found at <http://students.missouri.edu/~sustainmizzou/>

### **Environmental Science Club**

Environmental Science Club seeks to connect aspiring environmental scientist, develop professional, academic, and research skills and contribute to the improvement of the environmental quality of the community. During 2008, Environmental Science Club hosted several stream clean-ups and monitoring events of the Hinkson Creek. The Club also organized a Water Quality and Conservation Week in collaboration with an employee of City of Columbia Storm-water Division. Initial plans were discussed for an on-going more in-depth monitoring of the Hinkson Creek as well as a microclimate monitoring station.

### **MSA Sustainability Committee**

The MSA Sustainability Committee actively works to connect students, faculty, and staff, increase sustainability education, and advocate for environmental sustainability at the University of Missouri. This committee has the following goals:

- Promote and facilitate communication between administration and students in regards to environmental sustainability
- Educate students, faculty, and staff on environmental sustainability issues
- Assist in the dissemination of information about environmental sustainability on campus
- Connect the various groups, organizations, and individuals working on environmental sustainability on campus
- Monitor and track student-driven environmental sustainability movements

The MSA Sustainability Committee (MSASC) was created in March of 2009 under the Department of Student Services. The committee was created to act as an umbrella organization for the numerous sustainability organizations present at the University of Missouri. Seats were offered to members of student environmental organizations and other interested students.

The MSASC is going to play a very important role in the future of sustainability at MU. This semester's work has primarily been aimed at laying the foundation for the future and ensuring an organizationally sustainable structure. There have been guest presenters at each meeting speaking about various aspects of sustainability at MU. This is in hopes of making the MSASC the most knowledgeable students about sustainability at MU. The MSASC will act as the voice of the student body, so the committee is aiming to have a broad and diverse makeup.

The bi-monthly meetings of the MSASC brought together between four and ten students to teach, learn, and discuss sustainability issues. Members expressed a desire for better

### ***SUMMARY, CONCLUSIONS AND RECOMMENDATIONS***

This report is intended as a supplement to the report issued in April 2003. It is intended to provide information about the environmental impacts of MU activities and to stimulate discussion about these impacts and projected trends. The Environmental Affairs Committee notes that there are many success stories contained within this report. On the other hand, the report points toward opportunities in a number of instances. The Committee welcomes feedback about the data collected, the way the material is presented and any conclusions that are drawn.

The Committee has usually refrained from making recommendations and has done so again for this report. Last year an administrative leadership group was given the task of developing a campus sustainability plan. A draft plan is expected to be released by the end of calendar year 2008 and will be addressed in next year's report.

### ***ACKNOWLEDGEMENTS***

Information presented in the report was provided by the following persons; Peter Ashbrook, Todd Houts, Jack Crawford, Roger Riddlemoser, Dennis Elmore and Rebecca Bergfield, Environmental Health and Safety; Julaine Kiehn, Campus Dining Services; Steve Burdic, Ken Davis, Larry Hubbard, and Bob Unrath, Campus Facilities; John Ernst, University of Missouri Research Reactor; Bill Cooper, Sherri Wood, and David Silvey, University of Missouri, System, Business Services; Jan Weaver, Environmental Studies; Rick Wise, Printing Services; and Rita Houg, Residential Life. This report was assembled by Peter Ashbrook with assistance from John Gardner and Lauren Hasler of the student group, Sustain Mizzou.