

University of Missouri: Balancing Solid Waste Management and Recycling Costs With Community, Business and Volunteer Inputs.

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Executive Summary

The University of Missouri at Columbia is a major land grant institution on the cutting edge of research in many disciplines. As such it is a large bureaucracy with many demands on a budget facing increasing costs from every sector. Managing increasing solid waste transportation and disposal costs is challenging. Demands for meaningful recycling activities come from every University sector. The University is finding ways to hold down solid waste costs by increasing recycling activities through public/private cooperation that includes business, local government and student donations of funds and labor.

While many threads hold this system together, one common thread is the need to dispose of the by-products of over 35,000 people coming together to live, work, teach and learn. The need to hold down costs, to demonstrate efficiency with student fees and tax funding and to protect the environment to the greatest extent possible has led to a new modern environmental movement at MU. This movement looks at cost benefits, individual participation, public/private partnerships, business development and the goal to be productive in an increasingly competitive world economic system.

The Coordinator, Solid Waste and Recycling is a new position put in place after a petition signed by over 10,000 students requested such a position be established. The position languished somewhat until new managers hired the current coordinator, tasked him with finding and making partners both within and without the University, when and where it made sense, to hold down the cost of solid waste management by implementing recycling activities that increased the efficiency and productivity of the University.

The Best Management Practice discussed here is the empowering of a recycling coordinator to cut through red tape, institutional barriers, meager budgets, and frankly low levels of interest in solid waste as a glamour issue and put together a sustainable coalition of diverse supporters that have formed the core of a new management vision at the University of Missouri.

Introduction of the Organization

Solid waste and recyclables at the University of Missouri have been hauled by two contractors for the past ten years. The city of Columbia has hauled the solid waste and provided limited collection and processing of recyclables. The contract is based on a schedule of service for a flat fee. The flat fee is a comparatively good deal for the University but it is not flexible enough to provide a monetary incentive to recycle. In 2006 through this contract, 5,374 tons of solid waste are hauled and landfilled at a cost of \$67/ton. As additional buildings are built this cost increases. The contract is coming up for renewal soon and ten year's worth of cost increases will increase the solid waste cost by as much as 50%.

Civic Recycling has hauled paper and cardboard from the University for over ten years. The cost of this contract was \$25,000 per year. Over 1,052 tons of paper and cardboard were collected last year by Civic at a cost of \$24 per ton. Beginning in 2008 Civic has dropped the \$25,000 charge because recycling markets have been consistently high. The paper and cardboard picked up by Civic is "post consumer" meaning that students, faculty and staff have voluntarily found the recycling containers provided by Civic.

In more "industrial" type settings like Printing Services and Records Management 507 tons of mixed paper were recycled last year. These departments are able to clearly see the value of holding down waste disposal costs by having recyclers pick up their recyclable scrap paper.

Environmental Health and Safety is the department charged with managing toxic and hazardous materials. However, this department has led the way with recycling by showing how to reduce the disposal cost of materials like florescent bulbs (13 tons) lab glass (2.1 tons but worth \$28,000 in avoided purchasing costs), chemicals (\$137,000 in avoided purchasing costs),

over 1000 pounds of batteries and 1500 gallons of waste motor oil. These materials if not recycled would be tremendously more expensive to dispose of.

The Energy Management Department produces heat and energy for the University. Last year they were able to recycle nearly 30,000 tons of boiler ash in a beneficial composting operation near Hannibal Missouri. This material was previously landfilled. Energy Management also recycled 100 tons of steel and copper.

Landscape Services recycled over 30 tons of grass clippings and brush last year. The resulting mulch is used as a soil amendment and ground cover that reduces the need for water and trim mowing.

Surplus Property recycled nearly 20 tons of computer monitors, 10 tons of steel and 40 tons of scrap autos in addition to many tons of University owned property that was too good to throw away.

The University recycles over 26% of its solid waste. The avoided cost of landfilling these materials was \$103,631 in 2006. The avoided cost of purchasing recovered chemical and lab glass was \$164,904 for a total of \$258,536. The collection of recyclables and their cost offset is complex due to several different departments' involvement. Recycling at the University of Missouri needs to be supported by policy initiatives from the central administration as well as individual department actions. The recycling system needs to be "branded" and seen as a Campus wide process that welcomes input on implementation, and uses the good will people have for recycling to maximize recovery rates.

The Solid Waste Contract with the city of Columbia is administered by Campus Facilities, Landscape Services. A recent (2003) waste audit identified an additional 25 % of the Campus solid waste that could be recovered and reused. A series of recommendations were made

of how to accomplish this task. One recommendation was to hire a solid waste and recycling coordinator to administer the Solid Waste Contract, fine tune solid waste collection and recycling activities. However, even though solid waste and recycling activities touch the lives of every faculty, staff and student at the University of Missouri there was not a coherent policy or reducing waste and increasing recycling activities. Budgets were not available to purchase additional recycling containers, mount public relations campaigns to increase awareness or disseminate information on the existing system, let alone what it would take to recycle the next 25%.

Representatives from the (infrastructure related) departments that recycle like those named above have been meeting as a recycling committee for many years. They are primarily responsible for the existing level of recycling activity through the years. However there was never a concerted effort to publicize the savings realized by recycling, pull these departments together with the individual College's recycling aspirations or the student's demands for recycling.

The equivalent of a modest sized city, the University of Missouri's infrastructure embodies many of the disciplines that are taught here. Researching and solving the problems of making the most of the University's wastes, including that information in course work to teach today's students and tomorrows leaders how to make ends meet is a vital function that has been muted in today's academic atmosphere.

Statement of the Problem/Initiative

Campus Facilities with Landscape Services providing the lead determined to bring the diverse yearnings and programs for recycling together into a coherent policy that could be branded, promoted and unified. While budget amounts were meager, a combination of volunteer

effort, community collaboration, private business support and involvement; and local and state government funding established programs that enhanced the recovery of recyclables in innovative and fun ways that captures the imagination of the faculty, staff and students at MU and in the city of Columbia.

In addition to increasing the amount of recyclable collected, these programs instilled a conservation ethic in everyone who participated. It is difficult to measure but in order to attract today's progressive students and faculty the University must embrace the green ethic that says so much about efficiency and productivity.

Design

Sidewalk Recycling Containers

While the paper and cardboard collection system was working at an acceptable level, there was little in the way of beverage container recycling on Campus. An early effort purchased 110 sidewalk beverage recycling containers from the Student Capital Improvement Funds. These containers were placed in high traffic areas that had enhanced visibility. Since the city of Columbia had just lost their beverage deposit program that paid 5 cents per container, students, faculty and staff were grateful to have an easy method to recycle beverage containers. The city of Columbia services these containers at a reduced cost compared with the cost of sidewalk trash containers. In 2006 25 tons of beverage containers were collected through the sidewalk recycling project

Tiger Tailgate Recycling

A recycling initiative was started three years at home football game tailgate parties. The tailgate parties are a popular tradition, well attended and festive. "The Green Team" was formed to collect recyclables at these games. This team, consisting of Sustain Mizzou, a student

volunteer group, with the assistance of Anheuser Busch Recycling, Campus Facilities, MU's Intercollegiate Athletic Department, the city of Columbia, the Mid Missouri Solid Waste Management District and mainly the FANS has been collecting increasing amounts of recyclables each year. Bags and Bins were donated by Anheuser Busch, Campus Facilities and the Waste District. Hauling and processing of the recyclables were furnished by the city of Columbia as a donation. Campus Facilities provided logistical support and collection vehicles. Sustain Mizzou provided over 900 volunteer hours of labor in 2007 and by their efforts in organizing and staffing the event makes this project possible.

Comment [P1]: What about Sustain Mizzou???

The first year 11 tons was collected, the second year 19 tons and in 2007 the combined public/private partnership collected 25 tons of recyclables. An estimated 25,000 people participate in the tailgate activities. Volunteers circulate through the parking lots, passing out recycling bags, pointing out the 250 event recycling containers and urging the fans to participate. The city of Columbia provides the recycling containers that haul away the collected materials and they process the cans and bottles for eventual sale.

Publicity has been great, both in the press and on the field where the "Green Team" has been honored by the Athletic Director during half time ceremonies. However, the most impressive part of this project is the response of the fans. You can tell how happy people are by their comments as they reach for the recycling bags. Both Athletic staff and Landscape Services personnel have commented on how much cleaner the parking lots are after the games now compared with what happened before Tiger Tailgate Recycling.

Tiger Treasures Rummage Sale

Many people are aware of the materials thrown away when residence hall students move out in the spring. They have very little room to take home furnishings and clothes that have

accumulated over the year. With finals and then room clean out deadlines falling shortly after finals students make full use of dumpsters that are provided.

In the spring of 2007 a community event was held that collected 15 tons of donated clothing, appliances, household goods and electronics. With the leadership of Campus Facilities and Residential Life a coalition was formed to collect, sort, price and sell the materials. The coalition included the city of Columbia, United Way, Salvation Army, Inter Collegiate Athletic Department, The Food Bank and Sustain Mizzou, a student group. Hundreds of volunteers participated in the preparation process. The sale was held in the MU football stadium. Publicity for the sale was enormous and thousands of people attended the sale. Over a ton of food was collected for the local Food Bank. The Salvation Army collected over \$10,000 from the proceeds of the sale.

Comment [P2]: Need to include the amount of money that was earned and what was done with the proceeds and benefits to community

Beverage Container Recycling

The city had deposit legislation for many years. Each empty beverage container was redeemable for five cents. Consequently, empty beverage containers were collected at high rates by everyone. Very few ended up in the solid waste stream. When the deposit legislation ended three years ago there were few formal collection processes in place.

The University's students were very vocal in requesting a system to collect used beverage containers and a coordinator to educate and inform the University community on how to use it. Ten thousand signatures were acquired by the students to support this project. Recycling bins were purchased and put in place. The University negotiated a service contract with the city of Columbia to pick up and process the collected cans and bottles. The price was reasonable because the value of the materials supported the collection process.

Through a grant with the State of Missouri, the University purchased two drop off recyclable containers consisting of 30 cubic yard roll offs with signage directing participants to deposit cans and bottles in one container and paper and cardboard in the other. The city donated the hauling and processing of the materials.

Currently a system is being installed in 150 buildings on Campus to collect aluminum cans and plastic bottles. Funded by a grant from the Mid Missouri Solid Waste Management District with matching funds from Campus Facilities the collection system uses volunteer labor to empty the bins inside the building. Because of cost and labor savings associated with reduced amount of solid waste, Custodians who have not participated in recycling operation for years due to budget cutbacks are now able to take the collected materials out of the building on collection day. Materials are collected by Civic Recycling at no cost to the University. Known as the Indoor Beverage Collection Project (IBRP) the implementation of the system is bringing the Recycling Coordinator into contact with the entire Campus community. This process is enabling the unified promotion and branding of what has now become a Campus wide recycling system. The slogan is MIZZOU RECYCLES and the logo features the Tiger mascot peering out from the traditional recycling arrows. All flyers, press releases, recycling bins and other promotional items feature this logo. The main recycling flyer that explains the Campus wide system lists of the supporters of the system. In addition to the partners mentioned above in the Tiger Tailgate and Tiger Treasures project, other partners include Student Affairs, Greeks Going Green, the Student Senate and the College of Human and Environmental Science.

Composting

Efforts are underway to compost livestock bedding and animal manures from Veterinary and farming operations. Possible inclusion in the raw material mix may include Campus dining

food waste, napkins and landscape wastes. The potential to develop research, education and extension components are being developed. Up to 3,000 tons of organic wastes may be processed in this operation. By solving a waste management problem for the University, solutions for agricultural waste management will be developed for Missouri farmers and landscapers. Resulting compost can be used to nourish the Mizzou Botanical Garden on Campus resulting in cost savings over buying fertilizer and mulch products.

Energy Management

The Campus Facilities Energy Management Department produces electricity and heat for the Campus. In addition to world class conservation techniques, the plant utilizes fuel products derived from waste resources. Coal is being replaced by Tire Derived Fuel, wood chips and switchgrass. The University's carbon footprint is being reduced and costs are being saved. Energy Management is exploring the burning of some of the solid waste components that cannot now be recycled due to contamination or low market potential. Paper towels make up nearly ten percent of the University's waste stream and will make an ideal fuel. The process will further reduce the solid waste cost and will be cheaper and more environmentally beneficial than coal.

The success of the Campus wide program has led to the discussion of the concept of Zero Waste at the University as a goal with the potential to be accomplished in a five year window. This ambitious program will require the University to re-invent itself as a premier model of efficiency and productivity, making wise choices in the management of our infrastructure, maintenance, purchasing policies and construction methods. The University will become a laboratory for the researchers to be creative with a new alchemy that takes our waste products and turns them into the resources of the future.

Comment [P3]: Do we or can we get some numbers for the cost savings and percent of the reduced carbon footprint?

Coupled with the University's extension mission to disseminate best management practices throughout Missouri to community groups, local and state government business development and regulatory agencies and Missouri agriculture makes the Zero Waste goal attainment vital to our enlightened self interest.

Benefits

In past year recycling has been viewed as a costly frill in many sectors, the result of misplaced concern about an environment that could take the punches and keep on going. Some recycling activities are enormously costly with small demonstrable benefits.

At MU we have found a combination of support for recycling that make the process affordable and effective. By comparing the avoided cost of waste disposal to the reduced or negligible costs of recycling we have found the cost/benefit to be very positive. Recycling costs have been held down by strong volunteer support, business donations, local and state government support and funding. The success of the recycling system helps the University make the decision to allocate funds for matching support that might otherwise be difficult to secure. These matching funds effectively multiply many times when the economics of the system are shown.

Perhaps even more important is the life long lessons learned by MU students in efficiency, productivity and volunteerism. In our world today business and trade are more competitive than ever before. Efficiencies learned in waste management and recycling may make the difference in establishing successful enterprises. Students learned team building and leadership skills that bring immediate and long term benefits.

Partnerships formed between the academic community and the logistical/support infrastructure strengthen both sectors. Infrastructure staff seek out and are informed by world

class researchers and the researchers find a convenient laboratory in the infrastructure for research, education and extension activities. University operations are streamlined and made more efficient while offering an opportunity for students to learn in a real world environment.

Last but not least are the environmental benefits of reducing solid waste disposal. Landfilling can be polluting but even more pollution is prevented when fewer raw materials are needed to make our goods. Trees are saved, energy is conserved, air and water are kept cleaner when recyclables are used in the manufacturing process. The University is even looking at adding recycled content and recyclability as part of its new electronic purchasing system.

Really, everyone just feels better about the University and themselves when easy and understandable recycling opportunities are offered and used.