

MC EFFICIENCY CONTEST

Proposals

2014

First Round Winners

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Lori Kelman, Professor of Biotechnology, Germantown Campus

Description of the proposal: Resource conservation using a clear recycling policy

Problem: MC's current recycling policy is unclear, and recycling containers have confusing labels

1. Signage of current (and future) recycling bins can be improved so as to be more specific. Current recycle bins on the Germantown Campus (I have not investigated other locations) are labeled inconsistently, probably simply because the bins are purchased from different vendors and are therefore labeled differently. A campaign to educate employees, students, and visitors can be as simple as signs at key locations, a webpage with the recycling policy and FAQs about recycling, and a bi-annual e-mail reminding students/employees of current policy.

Paper recycling: some bins are marked "paper", while others say "white paper" or some variation of specifying the type of paper to be recycled. Common questions include: can colored paper be recycled? Can cardboard be recycled? Can the paper/cardboard have any tape/staples/"windows"? Compliance can be increased by answering these common questions (I believe the answer to all is "yes"). Signage should indicate that containers labeled "white paper only" are actually able to accept all paper/cardboard. To minimize the cost of implementing the signage, an e-mail could be sent (perhaps around Earth Day 2014) asking employees to print and label an attached sign to nearby paper recycle bins. Enough interested employees can label most of the bins, freeing facilities workers from having to locate and label bins.

Commingled containers: labeling of these recyclables is problematic, as some "3-part" recycling/trash containers are labeled "paper/cans/waste". The "cans" bin is likely actually a commingled container bin, and a simple educational campaign (signage/website/e-mail reminders) can increase recycling. Questions to be answered include: What can be recycled? I have not found a specific MC answer to this question but, assuming MC follows Montgomery County guidelines, might define "commingled materials" as: Commingled materials: Plastics marked 1, 2, 3, 4, 5, 7. Plastic bags/wraps labeled 2 and 4. Cans/glass/aluminum products. NO paper/cardboard in this bin. NO polystyrene/Styrofoam. Please, NO syringes or sharps.

Montgomery County does not recycle polystyrene (recycle code 6), and if MC doesn't, either, then the "waste" containers can be clearly marked, as well: "Waste: Dirty paper/napkins/tissues. Polystyrene/Styrofoam (recycle code 6). Other non-recyclable waste."

I also suggest that other recyclable materials (batteries, electronics, toner cartridges) be left near the recycle/trash bins, with the understanding that facilities staff will have the additional responsibility of transporting these and other "voluntary" recycling materials to what I presume is a central storage location where MC holds these materials (if we do not have such a holding area/large bin I suggest we identify/add one at each location).

Impact

2. Positive impact: Increased compliance with county and other regulations; increased perception of MC as a leader in environmental causes; increased awareness of recycling for students and staff; "setting a good example" for the community, less confusion about current recycling efforts (inconsistency in labeling of recycling bins). I could not find specific information on how much money it costs MC to remove waste or recycling, but internet research suggests businesses are saving money by recycling.

3. Negative impact: It takes a little time to sort recyclables, and some are unwilling and may grumble about "more work". Some students/employees/visitors will not comply and will dispose

of recyclables with waste (or continue to litter and not use bins at all). Compliance with recycling efforts is and will continue to be voluntary.

4. Resources required: The education campaign will require time to assemble, but once the descriptions of recycled materials is made clear and a list of FAQs is compiled, the list can easily be uploaded to the college web site and sent to the college community by e-mail twice a year. Updating the website will occur whenever the county changes recycling policy or once a year. Labeling existing bins will be a significant one-time effort with some cost (paper and tape), but if the campaign is successful employees will know to label new bins as they are acquired (and the website and twice-yearly e-mail will remind them).

Costs/savings

5. Costs can be calculated by comparing the costs of waste removal and recycling removal each year. According to several internet sources (in other states, like California), recycling removal costs less, and so increased recycling should save money. As long as waste removal and recycling removal are separate line-items in the budget, they can be easily retrieved and compared. MC tracks recycling now (in order to comply with county regulations), and will continue to do so, so the data required to track the costs and savings of this effort are already being gathered (although I was not able to access them online). The percentage of disposables recycled should increase and the relative cost of waste versus recycling disposal should shift towards recycled material. If companies reporting on the internet can be believed, this will save the college money.

Feasibility

6. This effort depends on each building at MC having one or a few concerned employees who think recycling is worth the effort. I think they exist. A few weeks' effort by facilities (or whomever is in charge of waste and recycling) to gather and present the current college recycling policy, with a few well-written FAQs and an e-mail publicity campaign should be enough to get these key recycling-friendly employees to bring their buildings up to compliance. Bi-annual reminders will keep the effort going, and recruit new students/employees to the effort. While with effort this campaign may be launched in April 2014 (Earth Day), this can surely be researched, designed, and implemented by the start of the Fall 2014 semester. The choice of start date is yours.

Environmental benefits

7. The environmental benefits should be immediate and large. MC will increase its compliance with recycling effort because properly labeled bins will educate students/employees with garbage at the moment they need the information. It is my observation that, with the 3-part "cans/paper/waste" bins, glass and plastics are not being recycled by people who recycle cans and paper. Many of our students and employees want to recycle but our choice of bins is confusing them. Clarifying the policy would result in immediate change by these people. The benefits of recycling to the environment have been documented elsewhere but include reducing waste in landfills. MC, as one of the largest employers in Montgomery County, should take the lead on protecting the environment.

Filseta Ameha, Student, Rockville

Description

Our college's cafeteria uses paper plates and containers that have a great deal of contribution to the landfill waste. Instead of using paper plates and containers we should replace them with reusable containers. I propose that we use reusable containers in our college cafeterias. Students will purchase the reusable containers from the cafeteria along with their food.

Impact

Using reusable containers will decrease spending for both the college and the students. Students can feel comfortable about taking their meals around the campus. Since the container is reusable students won't throw away the container. They will have to return that container for their next purchase to get a token to get another container while the other one is washed and sanitized for the next use.

Savings

Our college has 60,000 students, if the containers were ordered two times a year according to the amount of students that attend the college and each container cost 50 cents the college would be spending \$60,000 per year. If the school changed to the reusable containers and cost a dollar, the school would spend \$70,000 per year. They are reusable the college doesn't have to order twice a year because they won't run out. Students would be charged \$5 to get the containers. The school would be receiving \$280,000 that they could put towards other sustainability projects.

Feasibility

This project can be implanted in less than a year. It is very easy to purchase the machine that washes the containers and order the containers from the company that provides them. It is as easy as washing the containers to maintain this project. It does not

ask a lot from people. The students just return the container and get another one; it is just a simple cycle.

Environmental Benefits

This will prevent the students from discarding the container and add more landfill waste that could harm our environment. Even though the containers in the school are made from renewable resources these containers don't have to go waste for a long time. They can be used at many times as wanted.

John Phillips, Professor of Building & Construction Technology, Rockville Campus
Shorieh Talaat, Professor of Architecture, Rockville Campus

Montgomery College's FY2014 Resource Conservation plan shows an incredible increase in utility costs since 2002. The list of utilities the college consumes includes electricity, natural gas, fuel oil, propane, and water and sewer. We have gone from several years of steady costs, regularly spending just over \$2,000,000 per year since at least 1997, to an almost \$8,000,000 per year bill. Of that amount, 82%, or \$6,254,507, is attributed to electricity consumption. No other individual commodity is above 6% of the total utility cost, so there can be no doubt that the rise in the cost of electricity is the primary contributor to the college's nearly 400% cost increase over the last decade. The growth of the college, expanded facilities, and regulatory and market forces all play a role, but whatever the reason, no serious energy conservation plan at MC would be complete without a significant change in how we use and get electricity.

The college has been taking several steps in the direction of increasing energy conservation and decreasing consumption, retrofitting to higher efficiency lighting, and designing new buildings to LEED standards, for example. These initiatives alone cannot sufficiently create opportunities to reduce our utility costs in any meaningful way. Any efforts toward conservation must involve a serious and concerted effort to reduce our reliance on utility-company provided electricity. Montgomery College has the ability to produce a significant amount of electricity by simply adding solar photovoltaic (PV) technology, commonly called solar panels, to our existing facilities and utilizing empty and unused space all over the Rockville campus, primarily on rooftops. With this proposal, we hope to provide MC with the framework it needs to begin its most aggressive push, to date, toward energy sustainability, resulting in significant electrical, financial and environmental gains.

According to utility data within the FY2014 Resource Conservation plan, MC uses approximately 40 million kilowatt-hours (kWh) of electricity per year, at a cost of approximately 15 cents per kWh, or about \$6,000,000. This expense can be greatly reduced with the installation of approximately 3000 250-watt solar panels. This would give the college a 750 kW PV system. In this geographic area, we can expect an average of 4.7 hours per day of power-producing sun, resulting in yearly production of around 1.3 million kWh of electricity. At the current rate of 15 cents per kWh, this will result in yearly savings of at least \$200,000 per year, which will increase as electricity costs rise. A system this size will also generate enough Solar Renewable Energy Credits (SRECs) to produce an additional \$65,000 - \$500,000 per year in revenue, depending on SREC market conditions. MC can expect to save at least \$250,000 per year, which could go as high as \$700,000,

more than 10% of our yearly electric bill, as well as lowering our fossil fuel generated electricity by over 3%. Keeping in mind that a PV system can easily operate for as long as 30 years with minimal maintenance, the long-term financial and environmental benefits are staggering. There will certainly be an initial period where any gains would need to first offset the initial installation cost of the system, and MC can expect to recoup those costs within the first 5-7 years, with the help of financial rebates and grants. Using a generic average of 1 pound of carbon per kWh generated, this system will reduce MC's carbon footprint by 1.3 million pounds per year, or 39 million pound over the life of the system, as well as providing millions of kilowatt-hours of "free" electricity. Additionally, the college could install several thousand more kilowatts of solar PV through the use of pole-mounted systems in parking lots and similar spaces. The impact on the MC facilities staff will be minimal as maintenance and repairs would be handled by a professional solar contractor, most likely through a formal maintenance agreement.

We intend to provide a complete proposal, which will include drawings of Rockville campus buildings with solar equipment installed and an electrical production and cost savings schedule for each. Such a project, while large and extensive, is not complicated technologically and MC could see it completed in less than a year.

Sarah "Katie" Herrington, Student, Rockville Campus

Proposal Description:

Montgomery College has the opportunity to become the local leader in ecological renovation. I believe that this should begin with the campus restrooms. Paper towels should be replaced with hand dryers. Hand soap should be replaced with electronic sensor dispensers. Just as can be found in Building III at The Universities of Shady Grove dual flush toilets and aeration on sinks should be installed in all restrooms throughout the campus. Lastly, water fountains should be replaced with filtered water.

Proposal Impacts:

A campus-wide restroom renovation would impact students and college personnel as each building/floor/bathroom was closed for renovation and then reopened. Noise factors would need to be considered to time projects with as little impact to classes. A major positive impact would be in the reduction of illness. Using automatic soap dispensers reduces passing germs. Also, depending on the type of hand dryer selected such as the Dyson Airblade that has a HEPA filter bacteria-free air is blown onto the hands and reduces the spread of bacteria by completely drying the hands. In specific, "the Dyson Airblade hand dryer reduces the spread of bacterial by up to 1,000 times."

Savings Generated:

Universities of Shady Grove report that their dual flush toilets and aeration on sinks saves "40% on potable water use." They also report that "filtered water fountains reduce the amount of plastic bottles on campus by allowing visitors to re-fill a drinking bottle with filtered drinking water."

"The Dyson Airblade hand dryer offers significant dollars saved over paper towel, electricity, and maintenance costs. The Air Blade hand dryer saves up to 98% in paper towel costs while saving energy and the environment. At just 100 uses per day, the Dyson Airblade will cost just \$18 per year to operate. In comparison, paper towel at 100 uses per day would cost about \$730. The Dyson Hand Dryer will pay for itself in just months depending on the volume of your restroom traffic. For example, at 400 uses per day, the Dyson Airblade would cost about \$67 per year to

operate. Paper Towel usage would cost around \$2,920 for the year. The Airblade will save thousands of dollars in paper towel costs over the life of the hand dryer.”

COST ANALYSIS FOR A UNIVERSITY	
Paper Towel Usage	3,850 CASES
Total Paper Costs	\$288,750
Hand Dryer Operating Costs	\$3,080
ANNUAL SAVINGS	\$285,668
Payback Time	3 MONTHS

Project Feasibility:

The most feasible route for Montgomery College to take would be one similar to the Universities of Shady Grove and decide one or two buildings were ecological test sites. Depending on what other environmental studies and measures were included in the building it could be incorporated into aspects of the curriculum and enhance student education. It would make most sense to do this in the newer buildings on campus. Attempting to completely remodel all of the bathrooms campus-wide especially in the older buildings would not be feasible. It would be feasible to make small changes in all bathrooms such as switching the soap dispensers and changing to air dryers. I would expect that these small changes could be accomplished over a 2-3 year time period to spread costs over the budget. A larger remodel would need to be planned into the budget and would take a longer time period and need to occur in stages with the least interruption to class schedules as possible.

Environmental benefits:

This proposal would lead to a reduction in water, energy, paper towel, and plastic bottle usage. Also, a reduction in illness would lead to better productivity from both students and staff.

Sources:

<http://www.shadygrove.umd.edu/about/campus-sustainability/campus-goals>

<http://www.handdryerdistributor.com/Hand-Dryers-Save-Money-s/1824.htm>

Kimberly Ventura, Student, TP/SS Campus

Background/Proposal

According to Montgomery College's research conservation plan FY 2014, the college is committed to implementing and maintaining a sustainable life cycle cost-effective, low risk resource conservation program (page iii). This conservation plan also describes in calendar year 2011 the College was able to recycle nearly 72% of their waste stream and exceed the County's 50% recycling goal (page 15).

Recovering food scraps has been identified as "the next frontier in recycling." Recovering food scraps can reduce the amount of waste sent to landfills or incinerators. Composting reduces waste sent to landfills, reduces the college carbon footprint and reduces college costs.

Benefits and Challenges

Relevant, educational experiences for students

Reduces MC's cost for disposal of waste

A tool to inform faculty and students of the importance of composting

Possible challenge - Location on campus if college decides on-site composting or contract with composting farm

If composting on campus best type of composting system to meet college needs for example static windrow, mechanically aerated windrow, in-vessel composting etc. Possible answer to challenges – grant money for composting program

Time Frame – approximately 3 years to implement

- Simple waste audit to determine the food service waste stream
- Conduct waste audit on Rockville Campus (dining services) Implement on other campuses after results are known
- Calculate amount of solid waste and waste cooking oil generated
- Analyze costs for current waste system in place
- Price per ton/cubic yard for disposal and tipping fee
- Consider college community – Ready and willing to separate food waste
Communication of program to students, faculty, dining service employees
Compost bins, Compost units – compost on campus or send to farm?
- Consider self-service dining – like utensils that decompose or use smaller utensils

Suggested chronology...

2014-- Organic waste audit

2014-- Aerobic in-vessel, rotary drum food scraps system designed (if determined best for MC)

2015--January - food scraps recovery program begins

2016--Possible Introduction to Composting course developed / Possible composting laboratory

2016 – Introduction to Sustainability course developed

Environmental Benefits

- Renewable compost eliminates the need for chemical fertilizers (by having a good balance of micro nutrients, it can replace fossil fuel based fertilizer)
- Nitrogen's slow release form in compost has minimal impact upon surface and ground water supplies
- Reduces Carbon footprint of CO₂ and helps prevent pollution
- Food waste can be kept out of landfill
- Work towards a carbon neutral campus –Greenhouse gas emissions result from "rotting" organic waste in landfills bring about public health and climate change concerns.

Document the Savings – College Success Stories

Taken from *Food Scraps Recovery at Kean University*

(Kean has approximately 190 acres /15,000 students and Montgomery College has approximately 333 acres/18,000 students.)

Kean University - the total energy cost (electricity) to process one ton of food scraps \$7.50. Disposal cost prior to composting was \$148/ton. Composting saves the college \$140.50 for every ton of food scraps composted. At 378 days, the college processed 282,000 pounds of food scraps – saving the campus \$20,000. This converts all food waste on campus into mulch.

Responsible for the avoidance of more than 13 metric tons of CO₂ equivalent emissions and more than 38 million BTUs of energy use.

“The compost system behind Robertson Field (Allegheny College, PA) saves the college an estimated \$51,000 annually by reducing food waste.” Each day Allegheny composts approximately 800 pounds of food, compostable paper and plastic and landscaping materials making a nutrient rich material for use on campus lawns. Taken from <http://alleghenycampus.com/2012/02/17/composter-reduces-waste-cuts-costs/>

Additional Social, Economic and Environmental Benefits for Montgomery College

Montgomery College reduces the amount of topsoil purchased, reduces the amount of mulch purchased, provide hands-on opportunities for students interested in sustainability – all by recovering food scraps and composting them on campus into soil amendments in an efficient, safe and economical manner.

Works Cited

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