United States Environmental Protection Agency New England

Waste Management

UMass Amherst is in the Business of Recycling

Updated January 2007

UMassAmherst

Summary: Most universities would be content with total recycling rates greater than forty percent, but the waste management staff at the University of Massachusetts is hardly satisfied. Since the early nineties when they converted an old barn into an intermediate processing facility, UMass Amherst has been at the forefront of recycling efforts at higher education. "We run a business with an environmental mission." says John Pepi, manager of the Waste Management Office. Living by the adage "you manage what you measure," the department generates substantial data on tonnage, percent recycled and processing and disposal costs for a wide range of discarded material. This summary focuses on their marketing and sales efforts to change student behavior in the dorms and illustrates their substantial commitment to financial and performance data to guide decision-making.

Campus Profile

University of Massachusetts Amherst
Amherst, MA
FT Students: 24,000
FT Faculty/Staff: 5,780
# of Buildings: 350
GSF of all buildings: 9.7 MM
Campus Area: 1,430 acres
Plant Operations Budget: 36.5 MM
Budget for Solid Waste Management: 1.25 MM

Green Activities

UMass Amherst has been a leader in a number of environmental areas, including transportation demand management system, community outreach and environmental research

Project Goals

- Divert waste from landfill.
- Save money through avoided landfill costs and recycling revenue.
- Implement an integrated solid waste management plan.
- Meet an institutional goal of recycling 50 percent of the campus waste stream.
- Promote reuse through salvage and surplus reuse. Evaluate "garbage" as a unique blend of discarded materials with specific characteristics and properties that make each material more or less suitable for reuse, recycling, compost and disposal.
- Create and sustain a recycling culture on campus.
- Make recycling easy.

Description

University of Massachusetts Amherst generated a substantial quantity of solid waste. Much of this waste, ranging from beverage cans to fly ash from the power plant, could be recycled. On campus, dorms created a disproportionate amount of waste relative to their total square footage. Waste audits showed that 25-50% of dorm trash was recyclable and that greater than 50% of "traditional solid wastes" on campus originated in the dorms.

During this project, there were 40 dorms in 5 complexes on campus. This population included more than 11,000 residents with a range of 100-535 students per dorm. Blue and red recycling bins are located in each student's room, which students empty at the recycling collection points typically located on each floor.

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Pre-Project Considerations

- Know your audience.
- Know your students and how they make decisions.
- Know your costs.
- Know the markets.

Steps Taken

The following actions were taken to improve and expand a campaign to promote increased recycling in the dormitories.

- Developed a unifying theme, image, and slogan. The campaign appealed to student's higher instincts (social and environmental responsibility) and perceived self-interest (cost of education).
- Communicated the theme, image, and slogan everywhere.
- Published and distributed recycling guidelines. Among other methods, UMass Amherst used the UMass Daily Collegian with a readership of 18,000. The cost was $1,500.
- Offered the "It Only Takes a Minute-Man" (the UMass Mascot) Recycling Game – a one minute exercise to show knowledge of recycling. The game was used as an educational and interactive display at some campus events. The game included restaurant and food gift certificates.
- Built "Mount Recyclemore" to focus on and visualize daily dorm-student waste. The monument included a representation of the 33,500 lbs. or 18 cubic yards (cy) of recyclables generated daily by the dorms.
- Used the campus bus system for advertising space, which included exterior bus ads, bus stop ads and interior bus ads with two different messages. The total cost was $4,500.
- Set up recycling table tents at dining commons. More than 10,000 students saw these informational tents over the course of a year. The cost for the tabletop displays was $400.

- Advertised on the University's fleet of waste collection vehicles.
- Developed recycling/environmental benefits section on the waste management web page.
- Printed and distributed recycling bookmarks at campus centers/bookstore and/or distributed via student mail. The cost was 20 cents per bookmark.
- Hosted dormitory recycling competitions. Winners received pizza and runner-ups received a bagel brunch (lots of noise and high approval ratings by RAs, but staff determined that recycling rates did not improve).
- Used student Resident Assistants (RAs) as principal informational and survey contacts.
- Provided incentives and rewards (gift certificates) to RAs associated with successful programs.
- Placed table displays and bulletin boards in dorms and promoted student outreach teams and the signing of recycling pledges at these tables.
- Experimented with dorm recycling pilots, including door to door recycling pickup, "carry out" recycling bin liners and doubling of recycling capacity in targeted recycle collection points.

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Participants

The Waste Management staff includes 25 people or 0.0001 person per student. The staff provides the following services.

# of Employees	Services
3	Processing/transfer of materials at the Integrated Processing Facility (IPF)
4	Faculty & staff moving/surplus
5	Administration, management, education and outreach
12	Collection of materials

The staff works closely with custodial staff, trade workers, housing services, and the RAs in dormitories. In addition to the staff, the 18,000 square foot Intermediate Processing Facility (IPF) at UMass includes:

- three loading docks
- seven 40 cy roll-offs for dedicated materials (e.g., mixed containers, paper, cardboard)
- weigh scale
- electronic demanufacturing area
- surplus material area
- cardboard bailer
- confidential paper shredder

Performance and Benefits

Project Costs

UMass Amherst tracks operational expenses (including labor costs, building maintenance, utilities, small equipment, containers, supplies, and vendor contracts) and capital expenses (including building construction, vehicle purchases, large equipment, and university overhead).

Table 1. Project information and costs for Fiscal Year (FY) 2003

	Tons Handled	Operational Expense per ton	Capital Expense per ton	Total Cost per ton – Net Revenue
Trash	3,389	$142	$20	$159
Compost	1,645	$57	$16	$55
Mixed containers	139	$449	$183	$561
Mixed paper	590	$141	$47	$175
Higrade Paper	281	$134	$53	$180
Cardboard	371	$249	$81	$283
Mixed Scrap	322	$58	$33	$82
Electronics	260	$145	$117	$255
Miscellaneous materials for recycling	1,474	$89	$13	$102
TOTALS/AVERAGE	8,471	$113	$33	$146

The chart points to the wide range of recycling costs and the financial challenges associated with the current markets for mixed containers and cardboard. Handling costs are minimized by the revenue that UMass receives from some of its recyclable materials.

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Benefits

Dorm recycling rates increased as a result of the participation campaign, although some dorms and students remain unaffected. In the six largest dormitories, representing more than 10,000 students, the Office of Waste Management measured an average percent improvement of 25% in FY 02.

Table 2. Campus-wide recycling performance for Fiscal Year (FY) 2002.

Materials	**Tons Managed**	**Percent Recycled**	**Materials**	**Tons Managed**	**Percent Recycled**
Animal bedding	767.0	9.0%	Ballasts/PCB	0.3	0.0%
Batteries	5.2	0.1%	Books	59.5	0.7%
Cardboard	370.8	4.3%	Clothing	5.1	0.1%
Concrete	1,273.0	14.9%	Electronic scrap	45.0	0.5%
Fluorescent lamps	10.8	0.1%	Fly ash	333.6	3.9%
Food waste	550.0	6.4%	Glass, plate	0.0	0.0%
Greenhouse waste	49.2	0.6%	High grade paper	281.0	3.3%
Leaves/Yardwaste	312.9	3.7%	Magnetic media	1.9	0.0%
Mixed containers	139.5	1.6%	Mixed low-grade paper	589.4	6.9%
Paint	6.4	0.1%	Scrap metal	322.4	3.8%
Scrap wood	79.4	0.9%	Tires	15.8	0.2%
Toner cartridges	1.4	0.0%	Wood chips	0.0	0.0%
TONS MANAGED	8,559	100.00%			
TONS RECYCLED	5,219	**61.0% Total Recycled**			
TONS DISPOSED AS REFUSE	3,339	39.0%			

Lessons Learned

1. Know your infrastructure and user's perception of the program (e.g., the ease of recycling), in order to avoid mistaking an "attitude" issue for an "access" problem.
2. Run small experiments or pilot projects with different facets of programs (e.g., bin types, signage, sorting requirements) until you understand participation barriers.
3. Develop multiple approaches to motivate students (e.g., money, ecology, college budget). Students' values and behaviors may vary significantly.
4. Use grass roots marketing techniques to sell the program and change behavior at the individual level: mass media, graphic displays, person-to-person, and opinion leaders.
5. Attend to measurement issues such as surveys and data collection. This information can verify or disprove perceptions and misperceptions.
6. Commit your institution to the long haul. There will be peaks and valleys in recycling rates. The markets are beyond your control. You will also be disappointed when trying to change human behavior.

Further Information or Resources

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College and University Recycling Council http://www.nrc-recycle.org/councils/CURC
RECYC-L Listserv: An email and web-based discussion list dedicated to the discussion of recycling programs at colleges and university campuses, and related topics of interest. To subscribe, send a message with the subject "SUB REQUEST" to <RECYC-L@listserv.brown.edu. In the message, include a brief introduction about yourself and your program for the benefit of the listserv subscribers.

Association of Higher Education Facilities Officers (APPA) at http://www.appa.org

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Other Recycling Programs and Resources

Many colleges and universities have excellent recycling programs. The following list of schools presents a good starting point for someone interested in reviewing some effective recycling programs.

Brandeis University
Catholic University of America
Harvard University
Miami University
Tufts University
University of Vermont
University of Washington
Brown University
Hampshire College
Keene State
Middlebury College
University of North Carolina
University of Virginia

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