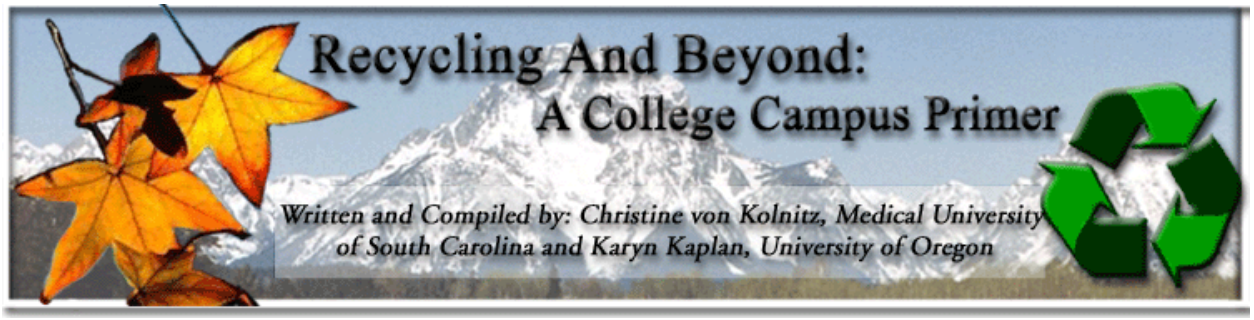

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Introduction

With increasing pressure on our precious resources, college campuses have come to play an important role in environmental stewardship. This guide provides an overview of strategies for the implementation and development of a college campus recycling and zero waste program. It includes tools, resources and success stories to inspire collegiate zero waste advocates everywhere.

There are many challenges in implementing and developing a campus recycling and zero waste program. It is important to remember to start small, initiate pilot projects, and build new bridges while strengthening existing networks. Creating a program that has longevity is an evolving process which takes a lot of dedication and many small steps.

Campus Recycling and Zero Waste Programs are leading colleges in positive directions by creating hands-on experiences for students, developing sustainable and conservation-focused practices, working towards smart economics, and creating positive public images.

The sections of this book can be read in any order; each chapter can stand alone and still be relevant. The book begins with the basics of starting a program and subsequent chapters go on to describe more specialized forms of waste management and reduction. Pick and choose chapters or read the book cover to cover.

Each chapter concludes with a list of substantive online resources. Some of the links will lead to other relevant pages and information about additional resources not found on the web. If a link is no longer working or you know of a website that should be included, send an email to: knowaste@uoregon.edu

This handbook is a compilation of experiences and insights from college campus recyclers and zero waste programs. Fellow collegiate recyclers/composters/zero waste advocates, are the best resource. If they do not have the answer, they will probably be able to refer you to someone who will be able to answer your questions. You can get in contact with fellow collegiate recyclers by going to the College and University Recycling Coalition (http://curc3r.org/), your State Recycling Organization or by calling the State Department of Health and Environment. The EPA website (https://www.epa.gov) may also list valuable contacts. The University of Oregon Zero Waste website maintains a list of college recycling/zero waste/sustainability programs. You will find that networking is indeed one of the greatest assets you have.

Enjoy this guide and thanks for recycling!

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Chapter1

Why Reduce, Reuse, Recycle?

Almost everything creates waste. In order to lessen it, the concept of “Reduce, Reuse, Recycle,” provides a basic decision-making framework that can be used to manage waste streams large and small. According to the U.S. Environmental Protection Agency (EPA), in 2008 Municipal Solid Waste (MSW) in the U.S. totaled 250 million tons, which is approximately 4.5 pounds of waste per person per day. [1] When such waste is generated, systems need to be developed and implemented in order to manage it with the least environmental impact.

Traditionally, waste management in the U.S. has consisted of open dumping into landfills as well as incineration to decrease material volume. During the 1960s and 1970s, a large percentage of garbage was burned, but this practice declined through the 1980s until landfill disposal peaked in 1990. [2] Since this time, the number of MSW landfills in the U.S. has decreased dramatically. In 1988, there were 7,924 MSW landfills and by 1995, this number had decreased to 3,581. In 2007 only 1,754 landfills were reported in the U.S. [3]

In 1989, the EPA published The Solid Waste Dilemma: An Agenda for Action, which established a hierarchy for handling solid waste: Source reduction (or waste prevention) including product reuse and on-site composting, Recycling (including off-site or community composting), Combustion (incineration) with energy recovery, and Landfilling. The report states, “A mix of these options must be molded into an integrated waste management system where each component complements the others to safely and efficiently manage the waste.” [4]

As the most favorable option in the MSW management hierarchy, source reduction (reduce and reuse) is a crucial element in creating a more sustainable campus. While recycling questions and influences *how* products are manufactured, it is not designed to question *why* they are produced. Source reduction does raise this type of question: Is the product absolutely necessary? If so, can it be produced with fewer resources? Can it be produced more energy efficiently? Can it be manufactured using locally sourced materials so as to cut down on transportation impacts and support the local economy? Can it be produced with renewable resources using renewable energy sources? Can it be produced with non-toxic and/or biodegradable materials? Can it be designed to be repaired/reused instead of thrown out? According to Conservatree, “[A] source reduction product' can be defined as a product that results in a net reduction in the generation of waste compared to the previous or alternate version and includes durable, reusable and remanufactured products; products with no, or reduced, toxic constituents; and products marketed with no, or reduced, packaging.” [5]

Effective communication between purchasing departments and the sectors of campus they serve is essential in incorporating source reduction as part of general campus procedures. In addition to resulting in a lower overall impact, source reduction will also compliment other waste reduction strategies on campus by reducing the volume of materials that will need to be handled by the recycling program and trash collection services.

Recycling, as the word indicates, is a cyclical process and is the second most favorable option in the MSW management hierarchy. After purchasing a product and using and reusing it to its full potential, a choice becomes evident: throw it away or recycle it. If there is an available market, choose recycling. In 2007, the recycling rate in the U.S. was 1.54 pounds per person per day. [6] While recycling is preferable to incineration or landfilling, it still has negative associated environmental impacts such as major energy use and pollution from reprocessing materials. However, these environmental costs are much lower than those associated with harvesting and processing raw materials. Recycling is most appropriate when the options for reduction and reuse have been completely exhausted, but a material has enough integrity that it need not be replaced with a virgin material.

Recycling has a variety of benefits such as saving energy and raw materials, thereby reducing dependency on foreign energy and material sources, benefiting the local economy through job creation at recycling depots, and increasing opportunities for innovative product design and manufacturing. It also prevents the pollution generally associated with manufacturing products from virgin materials, conserves natural resources including minerals, timber, and water, and decreases greenhouse gas emissions. [7]

Materials may decompose very slowly in landfills, which is another incentive for recycling instead of landfilling. The following table shows the decomposition rates of common items that are frequently landfilled:

Item	**Amount of Time Required to Decompose**
Paper Bag	1 month
Banana Peel	3-4 weeks
Cotton Rag	5 months
Wool Sock	1 year
Wood	10-15 years
Leather Shoe	40-50+ years
Steel Can (tin lined)	80-100 years
Aluminum Can	200-500 years

Disposable Diaper	500-600+ years
Plastic Jug	1 million years
Styrofoam	Forever? Unknown

Reducing, reusing, and recycling provide alternatives to the harmful effects of incineration and landfilling. Incineration (i.e. combustion) compliments other landfill procedures by reducing volume before materials are landfilled as ash. However, the combustion process is a major contributor to pollution as the byproducts include carbon monoxide, dioxins, acid gases, toxic metal compounds, and toxic ash all of which adversely affect human health and the environment. Landfills are similarly harmful in that the effects can be difficult to contain. They release methane, a potent greenhouse gas, through the decomposition of organic materials. As materials break down, leachate is formed which poses the major threat of groundwater contamination.

Potential environmental and health hazards can be avoided by reducing, reusing, and recycling. However, the three R's also create opportunities for positive outcomes instead of merely avoiding negative outcomes. Implementing programs that incorporate waste reduction and material reuse and recycling requires a community effort. The relationships and alliances formed add a social layer to creating a more sustainable world. Creativity and innovation are encouraged as these connections are strengthened. Many ideas, plans, and actions using the basic structure of "Reduce, Reuse, Recycle" can combine to create positive long-term solutions.

Colleges and Universities play the important role of educating future leaders. Day-to-day operations serve as an example to students and the greater community. Using resources efficiently and effectively, collecting materials to recycle, and purchasing non-toxic recycled-content products will enhance the reputation of the school, while reducing costs and contributing to a better world.

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Chapter 2

Energy and Resource Conservation

College recyclers have been demonstrating that individuals play an important role in campus resource

use. As a result, many college recycling coordinators, managers, directors, and the like are being drawn into discussions about campus resource conservation. College recyclers are being involved in research, brainstorming, and networking with other campuses to learn about what is being done to minimize waste, and to develop educational activities to reduce energy, water, and material resource consumption on campus.

Education is an important tool in reducing campus impact. With increasing pressure on natural resources, conservation education is playing a crucial role in creating and expanding individual awareness. By challenging campus community members to use less and educating about individual impacts, small changes lead to big results.

Students are one of the greatest resources on college campuses. Utilize student energy for internships, class projects, and independent studies. Professors in all disciplines are often seeking relevant and timely class projects. Journalism students can create an advertising campaign. Business students can design and conduct a survey. Environmental Studies students can give “class raps” on resource conservation.

Resource Conservation Education Ideas

- *Make an energy conservation logo.
- *Create a list of ten actions that individuals can take to reduce Campus Environmental Impact. Make a half-sheet flier and distribute it to all campus departments. Ask that it be posted on a bulletin board or other highly visible spot in the office, and include it in all new student and employee informational packets.
- *Make conservation stickers ("Use Wisely") and apply as needed to printers, copy machines, light switches, and above water faucets.
- *Use sticker designs for banners and ads in the newspaper.
- *Advertise on the campus radio station to remind students about resource conservation. Prices for advertising vary campus to campus, but are generally in the ballpark of $10 for 30 seconds.
- *Put energy tips/factoids in faculty/staff newsletters.
- *Encourage the student newspaper to cover global energy issues and focus on what the campus is already doing and what more can be done to help.
    - *Write letters to the editor or op-ed pieces that feature impacts of use and how conservation helps.
- *Install light switch covers to remind people to shut off lights. Add a catchy phrase: “Shut off lights, every watt counts!”
- *Make plastic, no-glue, stick-on decals for surfaces that will occasionally be cleaned (e.g. mirrors).
- *Create and distribute table tents in food service areas and on library tables with factoids and tips about what individuals can do to help promote environmental wellbeing.
- *Put up (and occasionally change) factoid signs by elevators and building entrances.
- *Promote environmental initiatives on a public level. For example, place descriptions below exit signs stating, "This exit sign is run by an LED and uses x% less energy than an incandescent bulb."
- *Make stickers for computer monitors that say: “Use wisely, every watt counts. Help conserve energy. Shut off monitor, printer, and computer when not in use. Thanks for conserving!”

- *Create a general campus brochure about resource conservation on campus. Distribute it in all new employee and student packets.
- *Make portable displays and posters for around campus.
- *Regularly display factoids on the university website.
- *Make a campus energy conservation webpage; display university energy use facts and provide information on how individual actions help. Cite all facts!
- *Write a "class rap" to send to professors and ask them to read it in class or have an intern go around to classes and make a short announcement on the issue of resource use and conservation.
- *Create resource conservation classes and institute campus projects.
    - *Hire students (or enlist a class or student volunteers) to walk around campus and shut off lights and computer monitors. The group can wear t-shirts or buttons with a message promoting conservation.
- *Incorporate placement of decals on light switches, etc., into above mentioned project.
    - *Create a "Report Wasted Energy" decal to put in all classrooms and department offices. List a phone number to call to report energy waste
- *Create a listserv of on-campus staff contacts and send conservation information and updates to all department contacts.
- *Have an energy representative attend department meetings and discuss steps individuals can take to reduce their impact and also explain how to heat and cool areas in a resource efficient manner. This will give folks a chance to ask questions and work as a team to reduce energy consumption.
- *Break down myths. For example: people think that computers have energy saving devices, so why shut off a computer? Even on low energy, computers still draw energy. Shutting computers off reduces the energy use to a trickle.
- *Garner support from the President of the University through a campus directive on energy use, especially limiting abuse of energy systems (e.g. leaving the heat on high all weekend for one person to come in for two hours).
- *Regularly set up interactive informational tables in public areas.
- *Invite the local utility company to contribute displays, coupons/rebates, or free (or low-cost) low wattage compact florescent or LED light bulbs.
- *Complete a campus wide survey to determine where the most education is required.
- *Find ways to tap into energy already being generated on campus. For example, in gym facilities set up all campus exercise bikes to power themselves and feed back into electricity generation for the building as a whole.
- *Turn down all campus hot water heaters.
- *Turn down the thermostats to 65 degrees in the winter and up to 75 degrees in the summer
- *Educate and innovate. Make conservation the rule not the exception (e.g. lock out hot water cycle on all campus washing machines).
- *Work with central administration to encourage telecommuting; even one day a month will make a difference.
- *Create incentives (such as giveaways, reduced-cost parking passes, etc.) for commuters to ride bikes, take the bus, or walk to campus.

Other Ways Universities Can Reduce Energy Use

- *Form a Resource Conservation Team of facilities managers and encourage development and implementation of educational strategies.
- *Form a student government task force to assist in getting the word out to students.

- *Increase maintenance (especially on leaking systems.) This can greatly reduce energy waste through preventing leakage.
- *Implement an exit lighting project to reduce lighting impact.
- *Team up with the local utility to do projects and share costs (such as installing motion sensors on lighting systems in classrooms, bathrooms, hallways, etc.)
- *Install low user sensors on vending machines.
- *Evaluate possible easy solutions to heating and cooling such as adding shades, planting trees, etc.
- *Sponsor energy challenges in the dorms to reduce energy use and award prizes. (See Ohio University energy challenge information below.)

Sample Resource Conservation Tip Sheet for Students, Faculty, and Staff
Ten Things You Can Do To Reduce University of _____'s Environmental Impact

1. Report Wasted Energy and Water
Contact Facilities Services at XXX-XXXX to report any dripping faucets, running toilets, or lights left on.

2. Reduce Paper Use
Do not print large quantities of web pages, report drafts, or class notes. Reuse bags, envelopes, and scrap paper. Make double-sided copies and use route slips and electronic communication whenever possible.

3. Turn Lights Off When Not in Use
Buy fluorescent desk lamps with replacement bulbs instead of large banks of incandescent or halogen lights.

4. Turn Off Monitor When Not in Office or Room
Turn off computer when not in use. Buy energy efficient computer equipment with the Energy Star label.

5. Buy Products Containing Recycled Material….
….so we can recycle the products we buy!

6. Bike, Walk, Carpool, or Take the Bus
Remember, the bus is FREE to the University of _____Community. Just show a campus ID.

7. Conserve Water
When washing your hands, use only enough water to wet your hands and rinse off the soap. Turn off the faucet in between these times. Every drop counts!

8. Regulate Your Own Temperature
Dress appropriately for the season. Wear sweaters during winter instead of turning up thermostats and using space heaters. Use energy wisely!

9. Avoid Disposable Products
Use a refillable mug (available at Campus Recycling). Reuse shopping bags (or buy a canvas one). Select products with minimal and recyclable packaging.

10. Recycle Used Materials
Paper, cardboard, and beverage containers can be recycled in designated sites around the University of _____ campus.

Thank you for conserving resources and recycling at the University of _____.

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Chapter 3

Zero Waste Campus Toolkit

Waste management is an evolving practice that is moving further and further from the garbage can. As a result, there is a strong pull to the next frontier, zero waste. Here is a campus toolkit on what zero waste means to a college campus and what strategies are involved to truly lead to a zero waste system. This is an exciting time with zero waste being an attainable goal that has become a vital part of a net zero campus and efforts to reduce greenhouse gasses. Chapter 4 provides a step by step methodology on how to implement this system on a college campus.

Zero Waste Campus Toolkit: - https://cpfm.uoregon.edu/zerowaste-resources#Toolkit

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Chapter 4

How to Start A Recycling Program

This section outlines a step-by-step approach that will help to establish an effective recycling program on campus.

I. Writing a Proposal

Most college campus recycling programs have developed out of student and/or faculty interest rather than coming from central administration itself. However, *institutionalizing* a campus recycling program is an administrative responsibility. Therefore, it is necessary to write a proposal to illustrate how beneficial an innovative waste management program can be for a school. The following are some general steps for writing a waste management proposal.

1. Research Past Recycling Efforts

Extensive research and planning must go into a proposal for it to be convincing. Before drafting a proposal, check into past attempts at setting up a recycling program and learn from previous mistakes.

2. Identify College, Local and State Laws, Executive Orders and Policies on Waste Prevention and Recycling

It is critical to investigate any applicable ordinances that can be used to help establish a program, including in-house institutional policies, mandates, guidelines and rules. If these exist, identify and utilize them in the process of creating a waste prevention and recycling program. Colleges, as visible community leaders, strive to be in compliance with all laws and policies.

3. Identify Advocates, Allies and Local Programs

Find supporters within the local government, university administration, and community organizations who are willing to advocate for and assist in the establishment of a program. Build alliances and bridges. Networking is one of the most valuable assets and essential steps in creating a successful program.

Connect with other institutions of higher education (including community colleges) in the area to gather information on how other local programs are being funded, structured, and staffed, and how materials are being marketed.

4. Examine the University Waste Stream

Determine the composition of campus waste. Which wastes are recyclable locally, and in what quantities are these wastes being produced? Glass, aluminum, cardboard, office paper, and newspaper are usually the most abundant. Food products and campus ground trimmings also present possibilities

for waste reduction through composting. Be sure to examine offices, classrooms, cafeterias, lounges, and dormitories for the waste stream study. See Chapter 7: Solid Waste Audits of this handbook for waste analysis details.

5. Economic Argument

This is the most important section of a proposal. Recycling as a campus policy makes sense both economically and environmentally. Demonstrate to administrators that the school may save money on disposal and generate income from the sale of recyclables. This is called demonstrating cost-avoidance and revenue potential and is a critical component in creating an economically viable campus recycling program. Review the County Solid Waste Management Plan. Determine how the college fits into that plan and what impact the college has on the local waste stream.

a. Research Markets for Recyclable Materials

Are there recycling markets available in the local area? For what materials do these markets exist? It is a big mistake to collect materials that do not currently have an established market. Instead of recyclables, the end result is waste. Identify local waste management companies that handle recyclables and other recycling processors in the area. Initially focus on high grade office paper (i.e. computer paper) since it brings in the biggest revenue and is usually plentiful on college campuses. Paper brokers may also accept other materials or have information on where to take them. Obtain price lists from local brokers and inquire as to their collection methods; it may be necessary to deliver recyclables to brokers, or materials may be able to be picked up at a central location on campus.

b. Research Current Cost and Methods of Waste Disposal

Determine how waste is handled on campus. Many campuses handle their own waste, while others contract out waste disposal. Examine how to incorporate a recycling program into existing campus waste management operations.

c. Questions to Consider

- *How much does the school currently spend on disposal?
- *Is the charge by weight, volume, or is it a fixed rate?
  (Keep in mind when writing the economic argument for the recycling program proposal that if the charge is by weight or volume, then the economic incentive for recycling is greater.)
    - *Where does the waste go? Is it sent to a landfill? Is it incinerated? (Be sure to include information on the environmental consequences of such disposal practices in the report.)
- *What are the projected future costs of the current disposal system?

Recycling is an effective way to avoid costly disposal fees as landfill space becomes scarcer. Explicitly outline the potential savings for the school. Explain that the cost of waste disposal will decrease as volume decreases, and that money can be generated from the sale of recyclable materials. This money

can be used to help operate and publicize the recycling program, or for incentive and education programs.

6. Decide What Type of Collection Process Will Work Best

Depending on recycling programs in the community surrounding campus, it may be possible to work the program into one that is already established. Otherwise, it will be necessary to shop around for brokers to sell to, and/or businesses that will collect and transfer materials to the brokers. The size of the institution is also a factor, as discussed in section III.

IMPORTANT: ALWAYS SITE RECYCLING NEXT TO A GARBAGE BIN!!!

This is the key to a consistent waste management strategy. When trash and recycling collection is not sited together, recyclables end up in the trash and trash ends up contaminating the recycling. As recycling becomes more prevalent, including trash in the collection system is often overlooked, which creates problems for both the participants and the program.

Some Possible Collection Methods

a. Drop-off Center

This is the easiest to set up from a programming point of view. Arrange for a central site where recyclables can be deposited. The recycling coordinator will have to arrange material shipments to brokers. The problem with this arrangement is that participation may be low, unless the center is in a convenient location.

Beware: public drop-off sites often become dumping grounds. One way to reduce illegal dumping and contamination is to mount a camera (even a non-working one), and request that campus security monitor the area during their rounds. These strategies help ensure the success of a drop-off center.

Another idea is to staff the drop-off sites. Hours would be limited, but the drop-off center will be better managed for everyone: participants can receive on-site education and the program will be more likely to receive well-prepared material.

b. Building Pickups

For greater participation, a weekly pickup at each building or group of buildings is preferable. Containers for each type of recyclable material should be provided to allow for recyclables to be separated accordingly. The pickup process can be made easier by assigning to one person in each building the responsibility of putting the containers outside the evening before pickup will occur. Building pickups simplify materials tracking procedures while presenting opportunities for campus recycling competitions. See Chapter 30: Campus Sustainability for more information about campus waste reduction competitions.

c. In-House Pickup

Depending on how the broker runs the collection system, it may be possible for him/her to collect the containers themselves from each building. Find out if the campus will still receive the proceeds from recyclables if the broker picks materials up directly from sites (as opposed to a campus centralized location). Examine the possibility of involving the custodial staff in the collection. When trash is converted to recycling, the amount of materials handled still remains the same, so the program would not be detracting from current disposal processes.

d. Outside Contractor

There are some companies that will completely run a program, including supplying containers, collection, and maintenance. Sometimes the campus can share in the recycled materials revenue while saving money on labor and disposal costs. Be sure to research creative waste hauling contracts. For instance, many schools have built in contract language that rewards increased recycling by a hauler.

The best way in which to separate recyclables must also be considered as part of the collection process as there is a spectrum of material separation options. Single stream collection involves all recyclable materials being collected in one bin. On the opposite end of the spectrum is source separation which involves separating materials by both type and quality. Commingling falls somewhere in between with materials being separated by type, but not necessarily by grade. For more detailed information about the benefits and drawbacks of these collection system variations and more specific definitions, see Chapter 10: Commingling and Single Stream Collection.

7. Request an Initial Capital Investment to Buy Necessary Materials

Some schools have proposed adding a recycling charge to the student activities fee to help fund the program. Cooperatively funded programs are the most successful (i.e. programs jointly funded by central administration and student fees.) Creating a funding structure that incorporates financial commitments from both the school's central administration and students gives the campus community ownership of the process and also provides extra insurance for the program's financial stability and longevity.

Once the program is running, it will continue to be essential to demonstrate that the program saves money for the college. Depending upon the program resources, there may be an opportunity for the program to be self-sustaining. Self-sustaining college recycling programs are ones that have incorporated a college effort into a recycling processing operation.

At a minimum, college recycling programs require:

- *Containers for separating and storing materials
- *A vehicle for transport (borrowed from college facilities or purchased solely for recycling use)
- *A warehouse to process and stage materials (especially on very large campuses)
- *An established recycling office that manages recycling staff and administrative functions
- *Labor of course!

8. Purchase Recycled Products

It is important to buy products made from recycled materials in order to strengthen the market for recyclables. Although recycled paper is currently more expensive then virgin paper, the price will decrease as the demand increases. Point out that the school will be participating in an environmentally sound practice by encouraging resource and energy conservation, while supporting a market for the materials collected on campus.

Purchasing plays an important role in campus waste generation and provides an opportunity to reduce waste and overall campus costs. Examine campus waste stream costs; on larger campuses, these are in the millions- no small change. Waste reduction and recycling saves college campuses notable amounts of money. Encourage vendor responsibility by incorporating waste reduction, recycled content, and end use take-back recycling into contracts. A relevant example is carpeting contracts. Many manufacturers are creating carpet contracts with colleges that provide recycling of old carpets, recycled-content new carpets, and end use recycling of worn out carpets. This practice alone is saving colleges' money, while reducing the impact on landfills.

9. Develop an organizational structure

Determine a program organizational structure, delineate roles and responsibilities, and establish funding mechanisms. Meet with a core group of organizers to write organizational documents. These should outline the purpose and mission of the recycling program and how it fits into the school's mission as a whole. Include hiring processes and specific guidelines for choosing contractors. These documents should be written broadly enough so as to allow for flexibility as both the market and the program itself will adapt over time to meet the campus's needs. However, the documents should provide enough structure so as to avoid future conflicts/controversy within the program or with contractors or administrators.

The organizational documents should also describe clear responsibilities for staff members at all levels of the organization. This will create ease within the hiring process and provide clear expectations for all workers. Responsibilities and needs may shift within the organization over time, so be sure to allow for the possibility of creating new positions.

The basis for funding mechanisms can be included in the organizational documents, but a separate funding plan should be established as well. Itemize costs and make funding plans and budgets as detailed and clear as possible.

10. Hire a Recycling Coordinator and other staff members

For a program to be successful, it is important to hire employees to be responsible for program maintenance. Establish an institutionalized program with on-going paid staff and supplemental opportunities for volunteers in less critical roles such as assistance at events or educational activities. Volunteers play an important role in a recycling program, but it is difficult to run a recycling program strictly with volunteer help. Hiring paid staff members will help to ensure day to day efficiency and build institutional memory.

Students are a valuable asset to a campus recycling effort and many programs employ students to perform recycling collection and administrative duties. Additionally, there are many opportunities for students to get involved through internships and class projects. Utilize students as resources whenever possible. This is also an opportunity to enhance the college experience by providing an academic hands-on experience for students to compliment traditional classes.

Hire a full-time paid recycling coordinator to keep the program running smoothly. Programs relying on volunteers or short-time student coordinators have low success rates and also provide little security for program longevity and development.

Programs that operate strictly by utilizing custodial staff are also tricky as the recycling coordinator often works secondarily through a custodial supervisor who has other priorities in addition to recycling. Programs with specialized recycling staff are more coherent and focused. Programs utilizing students as recyclers (who do collection, processing and other assorted tasks including program education), have reduced costs and the benefit of providing valuable student jobs with both academic and experiential components.

11. Use RecycleMania as a Pilot Project, Tracking Tool, and Educational Opportunity

The annual RecycleMania Competition provides a unique opportunity for schools to begin collecting recyclables and educating the campus about waste reduction, reuse, and recycling even before an institutionalized recycling program is implemented. Schools competing in the RecycleMania competition strive to collect the greatest quantity of recyclables and to reduce the amount of trash generated on campus. To determine the winners, schools must use a tracking mechanism. This is a perfect way to test different collection methods, tracking procedures, and the effectiveness of educational programs and activities. Pilot projects are essential to creating a solid program because they allow for trial and error so that mistakes can be corrected before a recycling system is put in place on a larger scale. By using RecycleMania as a pilot, a school creates publicity for its efforts and networks with other schools in addition to achieving the goals of a traditional pilot project.

II. Implementing a Program

1. Create a Program Name and Logo

Create a logo that the campus community can identify with the recycling effort. This is a critical tool in implementing a successful program because it adds visibility to the program. The logo is something that can be placed on recycling collection containers, painted on collection vehicles, and printed on t-shirts, stationary, posters, etc.

2. Create a Department Contact List

Make sure to have a mechanism to be contacted and to contact other departments regarding updates on recycling procedures. It is important that the program be easily accessible both by phone and by email. Likewise, setting up a department contact list is helpful in terms of disseminating information throughout campus. Some campuses have designated Recycling Coordinators in each department.

3. Set up a Pilot Program to Ensure Program Longevity
Start small with a representative sample of buildings and a limited amount of materials. This is critical first step. The idea is to build a foundation and grow from there. It may be easiest to concentrate on one or two materials at first as the university community becomes accustomed to the idea of recycling. Consider circulating a questionnaire to receive feedback that will help make the program more accessible.

4. Early Publicity
It is important to publicize the recycling program from its inception to ensure that the population being served is fully aware that recycling is now available on campus. Make it a point to use recycled paper for publicity, information, and other printed materials, and make it known that this is being done. Model the message.

Use the pilot program to address problems as they arise and streamline the collection and transportation processes. Be creative in troubleshooting challenges such as limited storage space, lack of janitorial cooperation in leaving the recycling bins alone, trash being thrown in recycling containers, etc. Make sure to label all bins clearly and consistently so that they are immediately and easily recognizable. (See Chapter 23: Education and Promotion- Getting the Word Out)

Post clear, easily readable recycling guidelines and program contact information at each collection site. This will help to identify the sites and give campus participants an opportunity to help by preparing recyclables properly.

5. Collection Practices
Work with the local recycling markets to determine what materials can be recycled locally. Examine the different marketing possibilities and weigh total costs of collection with potential revenue and cost savings. If possible, utilize a source separated collection system from the start or a dual stream system (i.e. all paper collected together and all glass/metal/plastic collected together). This increases the marketability of the materials (due to higher quality materials with less contamination), reduces labor costs, and encourages individual responsibility and participation. For more information about the collection systems see Chapter 10: Commingling and Single Stream Collection.

A good method of collection is to pick up the full containers and exchange for empty ones. This saves time by eliminating the need to dump and re-bundle the recyclables as separation avoids contamination. In creating a collection program, strive for efficiency. Picking up recyclables in areas that generate small amounts may require less frequent pick-ups.

Not all sites have the same bin type and collection requirements. Additionally, consider back-haul possibilities in all aspects of waste generation. When dropping off items, organize to pick-up other items. This saves resources including money and labor. Creative advertising and incentives (such as prizes or coupons for the building that recycles the most) can greatly increase participation.

6. Track the Waste Stream/Demonstrate Cost Benefits
Tracking the waste stream will allow the program to continually respond to changes in the waste stream as new products are introduced into the market. A detailed analysis of cost benefits (cost savings from

garbage costs and revenue generated from recyclables, savings from volunteer hours, savings from labor costs, other savings from reuse programs, etc...) is critical. It provides valuable information for the program as well as the institution as a whole. This mechanism is the key to justifying a recycling program's existence. See the Tracking section of this guide for more information.

III. Special Considerations

1. Size of School

For all campuses, another approach is hiring a recycling consultant to suggest the best system for the campus. Depending on the specific situation, it may prove easier to hire an outside contractor to handle the whole process. If nothing else, this could be just what is needed to convince the administration to institute a campus recycling program. Here are some specific considerations for small and large schools.

Small Schools (under 3,000 students)

Small schools generally have an advantage over larger schools in starting a recycling program because of the smaller volume of collectable materials and a more consolidated campus. Coordinating a collection program with the surrounding community may also be easier. A separate recycling department or office may not be necessary for a small school as long as there are one or two people to coordinate the program. However, establishing an actual department does add stability and continuity. One possible set-back for a small school is that some brokers will only make pickups for larger volumes of materials, but this will rarely be a problem if materials can be transported to the brokers' site or other groups can be enlisted to assist in the process.

Large School (10,000 students or more)

The large quantity of recyclable materials generated by large schools will be of great interest to recycling brokers. A larger volume of material will also create more jobs for students, which may make it preferable to establish an administrative department for the recycling program which includes a full-time coordinator. A full-time position is necessary to coordinate the multiple routes and pickup days, identify markets for the collected materials, and create opportunities for continued waste reduction on campus. A full-time recycling coordinator will have plenty of work to do besides everyday operations.

Education and promotion, program administration, materials tracking, and employee management are part of the multitude of tasks involved in running a successful recycling program. Additionally, larger schools often have more than one full-time recycling coordinator. As programs evolve, the need for other coordinators (each to focus on specific aspects of the program such as food waste, recycling in housing areas, paper, etc.) becomes self-evident. Professional contractors can be hired to either aid or run a program.

2. Encourage Reduction Practices

Incorporate waste reduction practices into all aspects of the campus recycling effort. Be sure to consider that as waste increases, more resources will be needed to increase recycling recovery rates. Incorporating waste reduction practices into recycling efforts presents an opportunity for a large payoff in reducing the waste before it is produced.

College campuses provide endless opportunities for waste reduction from encouraging double sided copying practices to reducing packaging and vendor waste from contracts. Purchasing and contracting play an important role in campus waste reduction as campus institutional waste is mostly generated from the outside. When looking at the campus waste stream, remember the 3Rs and ask: "Can this be **R**educed? **R**eused? **R**ecycled?" It is amazing how much waste generation can be decreased by reviewing the fundamentals.

3. Recycling and Beyond

As Campus Recycling Programs begin to grow, colleges are finding that establishing campus recycling practices goes beyond the garbage can. In reality, waste generation and consumption are inherent in every aspect of daily life. Recycling opens the door to resource conservation in all areas of campus life from facilities to academics and involves much more than simply creating another place to put garbage. Remember to think beyond the can and be ready for endless possibilities to create a zero waste recycling effort.

Make Recycling a Campus Success!

Establishing a recycling program on campus will provide students and faculty with an opportunity to turn concern for the environment into positive action. Those who have previously been unaware of the need to recycle will receive a practical education on the importance of conserving natural resources, energy and valuable open-space. A recycling program can provide an avenue for anyone and everyone to make a difference.

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Chapter 5

Funding

In a perfect world, central administration on college campuses would jump on board with recycling and other sustainability issues and be fully supportive in providing long-term, stable funding. However, in many cases, this does not happen and recycling programs need initial funding to get started in order to prove that they are a worthwhile entity to keep on campus. Recycling sales will bring in some amount of revenue, but cannot be fully depended upon for operating costs due to market fluctuations. Therefore, other forms of funding need to be secured both to start a program and to ensure its longevity regardless of market trends.

Write a detailed budget in order to be able to be fully aware of each of the costs associated with starting the program as well as maintaining it. A good way to break the budget down is into two umbrella categories: initial (or one time) expenses and operating (ongoing) costs. These can then be divided further into more specific line items. For example, initial costs can include vehicles, sorting tables, and compactors. Operating costs can include ongoing expenses such as rent, water and electric bills, equipment maintenance, and labor. Educational programs can fit under the umbrella of operating costs, but should have separate detailed budgets with sub-categories such as labor, printing and advertising costs, and special events. The more detailed a budget, the better because financial supporters will be able to identify exactly how the money will be spent and why the amount of money being requested is justified. This also shows thoughtfulness, and considerable effort and follow-through on the part of the program organizers- all desirable characteristics in potential funding recipients.

Forms of funding

*Seed money pays for initial costs and will often be in the form of a lump sum at a project's inception, but not renewable over time. Prioritize program needs (bare minimum costs for equipment, labor, etc.) in order to get started. Secure seed money for basic needs and expand from there.

*Grants provide a method of earning seed money or funds for special projects. Few grants are available for operating costs, but some do exist. When researching grants, search for those that closely align with the recycling program's goals. Be sure to include information in the grant proposal about how a recycling program will fulfill the purpose of the grant. Possible sources of grant funding include: government (e.g. EPA, DOE, and State Agencies), foundations, corporations, and non-profits with aligning missions.

Grants can either be solicited or unsolicited. Solicited grants are accompanied by a Request for Proposal (RFP) which clearly states the specifications of the grant such as which individuals or entities are eligible to apply, page limits, amount of funding available, and budget guidelines. Read the RFP carefully as grants can be automatically disqualified from consideration if directions are not precisely adhered to. Unsolicited grants are those written to potential donors when an RFP has not been announced. Check foundation and corporation websites to determine whether or not unsolicited grants are accepted. Be aware of grant schedules (e.g. submission deadlines and award announcements). Some donors may accept grant applications on a rolling basis, while others may have a more structured award system with quarterly, biannual, or annual funding cycles.

Colleges and universities often designate staff members within the Development Office as well as within individual departments specifically for grant research writing. Set up a network with these employees when searching for funding sources. Find out if there is a grant writing class on campus and a student or group of students who may be interested in working on a grant for the recycling program. Check with other departments to find out who has written grants in the past. Even if that person is not currently available to write a grant, he/she may know of someone who is able to be of assistance.

*Matching funds are grants that require a program to already have a certain amount of money available or a plan to fundraise a specified amount of money. This type of funding gives the program leverage in requesting money from other donors because many potential sponsors are more likely to donate if others have done so already.

*Fundraisers are often most effective when a program is already fully established and requires funds for a particular project, but can also be an effective way of raising matching funds to receive grant money. Fundraisers can be large or small scale and take on many forms. Common fundraising strategies include phone banking (calling potential donors and requesting money), benefit concerts, dinners, or dances, raffles, auctions, or the sale of a novelty item such as a t-shirt, button, or mug.

*Becoming part of a department on campus will make the program more financially stable in the long term. While seed money and grants may be part of the overall funding strategy, becoming a recognized campus entity will add to a program's longevity. It could be fully student-funded, fully funded by central administration, or a combination of both. Regardless of the funding model, make sure that contracts and agreements are in place to ensure that the recycling program is on campus for the long haul.

*Campus Recycling Programs have opportunities to generate revenue. In developing a funding strategy, it is important to focus on stable funding. Revenue is not a constant as markets are continually changing. Ideally, revenue should be saved for capital improvements to the program and for special projects.

Funding Plans

A strong funding plan incorporates a variety of strategies so that there are back-ups within the system and the entire program is not hinging on a single income source. Funding plans generally include timelines for securing various sources of funding as well as Memorandums of Understanding (MOUs) from supporting entities (e.g. foundations promising matching funds or on-campus departments agreeing to provide operational funding and oversight). A funding plan is especially important when establishing a program in order to prove that it will be an asset to a college or university. See **Economic Argument** in Chapter 4: How to Start a Recycling Program for further details.

Campus Sustainability Initiatives

Use the college or university's mission, environmental policies, or pledges as reason for a recycling program's existence. Showing how a program can fit into the campus's current operational, as well as social and academic structures, is essential to garnering widespread support. Be convincing. Outline how a recycling program and other sustainability efforts will help to create a positive public image for the campus. These efforts will attract more students while meeting the campus goals of carbon neutrality.

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Chapter 6

Which Materials Can Be Recycled?

Items most often recycled on college campuses include: high-grade office paper, blended office paper or office mix, corrugated cardboard, magazines, newspaper, books, confidential paper, computer paper, chip board, plastic, glass and steel cans, aerosol cans, milk/juice cartons and aluminum. See Chapter 12: Special Materials, Chemical and Hazardous Waste to find out which other materials are recyclable, but not collected as frequently on college campuses. Confirm each material's market stability.

It is important to be as consistent as possible in terms of which materials are collected in order facilitate education on campus. Additionally, be conscious that there are continual changes in packaging and material composition. It is always amazing to see new products showing up that are made with a mix of materials, turning previously recyclable items into trash items. Save samples of new items to show local brokers in order to determine recyclability as market changes follow packaging changes.

Aluminum Cans

Aluminum is a highly recyclable material. Its durability makes it a highly desired item for industrial purposes. Therefore, it has a high resale value and aluminum sales are often essential in raising funds to support recycling programs. Plastic bottles are replacing aluminum cans in vending machines, but there is still an abundance of this metal to be collected on a college campus. Aluminum scrap can be shredded, then melted down and cast into blocks to be shaped into new products.

Aseptic (Drink Box) Packaging, Milk/Juice Cartons

Aseptic (drink box) packaging is gaining markets across the country. Check within local paper and plastic brokers to learn if the material is collected in the area. Aseptic packages are composed of three materials. Paper accounts for 80% of the package, polyethylene 15%, and aluminum 5%. [8] These cartons are recycled using a paper recycling process called hydro pulping that separates the paper from the plastic and aluminum so that the high-quality paper fiber is recovered for recycling into other paper products. In some cases, the plastic/foil residual can be recycled into high-end plastic lumber products.

Other types of milk and juice containers are made of paper and wax and do not contain plastic. These can sometimes be recycled as low-grade paperboard. Other recycling programs may collect them for composting, especially if organic materials are being processed at an industrial composting facility.

Paper

Paper is one of the easiest materials to collect and market when establishing a recycling program (See Chapter 9: Marketing Recyclables). Paper can be recycled in many different ways. Identifying markets is very important when considering which types of paper to recycle and how to recycle it. For example,

one university may be able to recycle a blend of paper that includes high-grade white paper, colored paper, newspaper, envelopes, sticky notes, fax paper, card stock, and magazines. Another university on the other side of the same state, may only be able to recycle paper when it is separated into distinct categories such as white paper only, books only, newspapers only, magazines only, etc. Be aware of market specifications for materials and disseminate information updates to all staff members so that materials are prepared properly for deliveries. This will increase program efficiency and generate the greatest income as the receiving recycling company will have a decreased workload and a higher quality product.

Plastic, Glass, and Steel Cans

The combination of recyclable commodities is called commingled recycling. See Chapter 10: Commingling and Single Stream Collection for more information about commingling and single stream collection. A common commingled collection for college campuses is called PGS or plastic, glass, and steel cans recycling. Each commodity is described separately below. As always, check with the local market before starting to collect and process these items because there are major differences in how brokers want these materials prepared.

Plastic

Number and letter combinations such as #1 PET, #2 HDPE, #4 LDPE, and #7 Other are called resin codes and are imprinted on plastic items in order to identify the type of plastic that is contained in a product. These resin codes were developed by the Society of Plastics Industry (SPI) and are strictly regulated by state law as mixing resins can cause serious manufacturing problems and undermine the efficiency of the coding system. [9] Keep in mind that if a plastic item is printed with a resin code, it does not necessarily mean that the product can be recycled. It identifies the *type* of plastic, but *not* its recyclability.

The most commonly recycled plastics within both campus and municipal recycling programs are #1 PET (polyethylene terephthalate, which is used for pop bottles and is blow molded) and #2 HDPE (high density polyethylene, which is commonly used to make milk jugs). Plastics need to be sorted by type before being remanufactured because certain resins are incompatible in recycling processes. Plastic may be shredded, baled, or chipped before it is shipped to the reprocessing plant depending on the plant's specifications. Plastic resins are then melted and remolded into new products. As of 2007, only 11.7% of plastic containers and packaging was recovered through recycling. [10]

PET and HDPE, are the only plastics that currently have widespread recycling markets and therefore account for most of the plastics that are recycled. The existence of numerous resins causes obstacles in identifying plastics for recycling and the plastic manufacturing industry does little to establish and stabilize markets for viable plastics recycling. Unfortunately, even when a market exists, plastics undergo a process called down-cycling in which the material has a limited lifespan because it is converted into a lower quality item that can only be recycled a few times if at all. This applies to all plastics recycling including block styrofoam, meat trays, and styrofoam cups.

Meet with local brokers to determine processing specifications to make materials acceptable to recycling markets. Consider working with the campus purchasing department to choose products that minimize plastic waste. Paper, metal, aluminum, cardboard, and glass are relatively stable in terms of consistency in recyclability. There is a perception that plastics are indeed being recycled and therefore a good environmental choice. An increasing amount of consumer goods are made from and being packaged in plastic. Unfortunately, the plastic markets have never been stable and as the fossil fuels used to create plastics are a finite resource, reduction and reuse of plastics is always preferable to manufacturing new plastic, even if it will be recycled.

Of note: The plastics industry has been changing rapidly as more companies are wanting to be green and thus creating fossil-fuel free packaging that is plant based but still marketed by the manufacturer as recyclable plastic. Check with local markets to determine the recyclability of these new resins. Unfortunately, packaging manufacturers are not working with recycling end markets to ensure continued waste recovery of these new materials.

Glass

A mechanical processing system breaks recycled glass into small pieces called cullet. Magnets, screens, and vacuum systems remove metals, labels, bits of plastic, and caps. The cullet is blended with silica sand, soda ash, and limestone. The mixture is melted and blow-molded into new glass containers. It is important to know what kind of glass the industry needs. Check with the local market to find out how to sort and prepare glass for recycling. Glass is commonly collected with plastic and steel cans. If it has to be separated from other materials, remember that cullet must meet four criteria. It should be:

- *Separated by color
- *Contaminant free
- *In accordance with market specifications
- *Container glass only

Recycling glass reduces energy consumption, raw materials use, and wear and tear on machinery. Ensuring a steady supply of recycled glass, or cullet, has become crucial to the recycling industry's success. Other uses for recycled glass containers include fiberglass and other construction uses such as pipe-bedding and trench backfill in place of virgin rock aggregate and recycled glass sand in place of conventional sand in pool filters.

Steel Cans, Aerosol Cans

Steel is the most recycled commodity in the world on an industrial scale as well as in the home. [11] In fact, steel scrap is a necessary component in the steel manufacturing process. Tin cans are actually tin-coated steel cans. These are used as containers for food, coffee, paint, and aerosol. Removing lids from cans and flattening them makes reprocessing easier. The tin coating on steel cans is removed with a caustic de-tinning solution through electrolysis. The remaining steel is rinsed, baled, and then sold to a steel mill. The tin is also a valuable ingredient in many products. Remain in tune with the market to find out how to prepare materials for sale.

Other/Specials Materials

There are many more recyclable commodities. Those listed above are just a few of the most commonly recycled ones on college campuses. Please visit Chapter 12: Special Materials, Chemical and Hazardous Waste to find resources about other recyclable commodities.

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Chapter 7

Solid Waste Audits

In 2008, approximately 250 tons of Municipal Solid Waste (MSW) was generated in the U.S. and of this, about 135 tons was transported to landfills. Recycling efforts recovered about 61 million tons and composting another 22.1 million tons. [12] Per capita waste generation in the United States is on the rise, but recycling and composting rates are increasing as well. [13] The proliferation of waste can be attributed to the growing use of packaging, convenience items, and disposable products. Campuses generate large quantities of waste, much of which can be reduced, reused, recycled, or composted.

Waste Audits are a Valuable Tool

Waste audits are one of the most valuable tools for college recyclers in helping to identify the types of waste being generated on campus Identifying potentially valuable materials is an important step to take before searching for markets. Waste audits are useful for: demonstrating the need for creating a recycling program; doing cost benefit analyses of trash versus recycling; creating awareness about waste on campus; gaining publicity for recycling efforts, and also for use as a public education tool.

There are many types of waste audits that vary in complexity. A general dig through the garbage is a great way to get an initial idea of the true picture of the campus waste stream. Waste streams may vary depending on the area of campus so it is valuable to conduct sample waste audits at locations that may differ in terms of the types of materials being generated. For example, dining areas will generate food waste, paper towels, and napkins, all of which can be composted. Art studios may generate a wide range of materials that can be used in future projects, while dorms are likely to generate office paper, bottles, cans, food wrappers, junk mail, old notebooks and other recyclables.

How to Conduct a Campus Solid Waste Audit

The timing of a solid waste stream study is important. Conduct the waste analysis during a time that reflects the average level of campus activity (mid-semester or quarter, and mid-week). Remember that

the time of year will also affect the research results. For example, more yard waste will be generated in spring and fall than in winter.

Materials/Resources Needed to Conduct a Waste Audit

- *Sorting tables
- *Large scale for weighing the waste
- *Bins for all sorting categories
- *Gloves
- *Calculator
- *Tally sheet (see sample below)
- *Volunteers

1. Select Campus Areas

Select three to six areas on campus that represent distinct waste generation locations, such as Residence Halls, Food Services, Administrative Buildings, Student Union, and Academic Buildings. Separate physical sciences and liberal arts (if possible) as waste streams will differ.

2. Perform a Trial Waste Audit

Prior to the actual audit, conduct a preliminary audit, using a small sample of garbage (five bags, for example). This will help to determine appropriate waste categories and improve methodology for the more extensive waste audit.

3. Collecting Garbage

Randomly collect a minimum of five bags of garbage from dumpsters at each one of the campus locations prior to the daily waste pick-up. Label each bag according to its collection point.

4. Calculating Weight and Volume

Once all of the garbage has been transferred to the sorting site, calculate the total weight and volume collected from each location before sorting into separate categories. Remember to weigh the sorting containers before putting garbage into them so that tare weight can be subtracted from the gross weight in order to determine the net weight for each category. Carefully sort each bag of garbage into categories. Once the sorting for one location is completed, weigh the containers of material (subtracting the tare weight) and record the figures. The volume (V) can be determined by multiplying the area of the base (A) of the waste container by the height (H). For round containers, $A= \prod r^2$, where r=radius of the circle, so $V=\prod r^2 H$. For rectangular containers, A=LW, where L=the length of the container's base and W=width, so V=LWH.

5. Separate Waste into Categories

Sort the waste into the categories listed below. Categories can be expanded to reflect a more detailed analysis of recyclable waste. For example, the technology exists to recycle steel-plated tin cans, phone books, and lower grades of paper. However, there may not be existing markets for these materials in the area surrounding campus.

6. Using the Information

If the total amount of waste that a particular area generates is unknown, represent figures as a percentage. For example, newspaper might represent about 15% of the waste generated within food service areas on campus. If the total weight of all food service wastes is known, multiply that percentage by the total weight to estimate the weight of each waste category. It is important to use both weight and volume figures because weight figures can be misleading. For example, spilled liquids can make paper, particularly newspapers, weigh significantly more than they would if dry.

Only a small amount of the total campus waste stream can be analyzed in a single day. Use figures conservatively. This will provide important information about the general types and quantities of waste the campus generates. Also, ask the campus and/or local newspaper to cover the waste audit; it is a great photo opportunity.

Sample Collection Tally Sheet

Building: _____
Type of Facility: _____
Total Weight: _____
Total Volume: _____

Waste Category	Weight	Volume	% Total Weight	% Total Volume
White Paper				
Colored Paper				
Computer Paper				
Low Grade Paper				
Newspaper				
Magazines & Books				
Plastics				
Glass				
Metals				
Drink Boxes				
Corrugated Cardboard				
Food Waste				
Trash				
Total Materials				

This can also be done in groupings such as paper, kitchen recyclables, and bottles and cans. Waste audits in public areas are great for educational purposes. For example, take a sample of three bags of garbage from five buildings on campus and sort them in a public area. This sampling could be used to increase public awareness and media attention as well as discussions with potential allies regarding consumption and waste in the community. Publish the results so that they can be easily accessed by a wide range of people.

Food Waste Audits

Food waste audits are conducted to assess food and napkin waste generation in dining halls. This works best with food service areas in residence halls. Enlist a team to monitor the audit, preferably during a meal. Create informational table tents that students can read while they eat. This information should include an announcement of the event and statistics and tips on reducing post-consumer food and napkin waste: Take what you need; you can always go back for more!

Station barrels and volunteers in front of all of the entrances/exits to the dish room. Label the bins: food waste, napkin waste, and trash. Help people sort into these containers before placing dishes in the dishwasher. At the end of the meal, weigh each bag and formulate a report for the cafeteria. Consider per meal and per day extrapolations when adding this up as it will provide good information to support a food and napkin waste reduction campaign including educational activities and potentially composting. This information can be used to complete a cost benefit analysis for handling material as waste versus recycling/composting.

Mini Waste Audit as a Presentation Tool

Another idea is to take a small waste basket and fill it with items that would commonly be found in an office's waste stream. For the presentation, label four boxes: reduce, reuse, recycle, and trash. Pull each item out of the garbage can and ask the audience to interact and decide into which category each item fits. Take for example a paper cup. The audience would ideally say that is reducible because a refillable container can be used instead. This exercise encourages people to think of the 3 R's throughout the day.

Questions to Consider

- *How much solid waste does the campus generate?
- *What is the composition of campus waste?
- *Are landscape clippings mixed with or separated from other campus wastes?
- *Does the campus use landscape clippings as compost or mulch?
- *Who is in charge of solid waste disposal contacts?
- *Do different entities on campus (e.g. fraternities, sororities, residence halls, medical center) have separate contracts with waste haulers or is the entire campus covered under one contract?
- *What are the total costs of disposal per year, the cost per ton, and the disposal fee structure?
- *How much have those costs increased in recent years?
- *Where does campus garbage go? How much is landfilled, incinerated, recycled, and composted?
- *Does the campus have a recycling program? If so, what is the current percentage of materials removed from the waste stream?
- *Does the recycling program generate any revenue?
- *Is the program run by students or the university administration?
- *Does the city operate a recycling program? If so, is it voluntary or mandatory?
- *What programs exist on campus to promote source reduction and reuse in order to reduce the quantity of waste generated?
- *How do the campus's waste management practices compare to those of other institutions?

To Gain Perspective, Get Information

- *Conduct a campus waste stream audit as described in the beginning of this chapter.
- *Contact the facilities maintenance department for information about garbage volumes, costs, collection processes, and disposal contracts. Specific contract arrangements may be the purchasing office's responsibility.
- *Talk with representatives from the waste hauling company. They will provide information about waste costs, quantities, and collection procedures. Custodial staff members are also a valuable source of information.
- *Contact the facilities department to find out who is responsible for landscape maintenance in order to obtain information on yard waste and composting.
- *Request information from food service managers regarding the use of plastic, polystyrene, paper, and other disposable service ware items in campus cafeterias.
- *Contact the community's Public Works Department, local recycling centers, environmental groups, and the state solid waste management board for information pertaining to local and state solid waste disposal issues.
- *Contact your campus and local community newspaper(s) to determine the volume of newsprint distributed on campus.

Source Reduction and Reuse

A successful waste management policy supports a resource-conserving hierarchy: source reduction, reuse, composting, and recycling first, waste-to-energy incineration next, and land filling last. Encourage food services to sell reusable mugs, offering a discount on coffee and cold beverages if a reusable container is used. Use metal table ware in food services or reusable plastic ware when possible. Offices can reuse corrugated cardboard, file folders, interdepartmental envelopes, and other office supplies. Establish photocopying guidelines that encourage the use of half-sheets and double-sided copies to reduce paper waste. Utilize campus purchasing contracts to create specifications that reward waste reduction in purchases, service and vendor contracts.

Recycling

A campus-wide recycling program, supported and managed by the administration and students, should include an extensive system of source separation for a variety of materials (white and colored bond paper, computer paper, glass, aluminum, recyclable plastics, corrugated cardboard, etc.) The program must target students, staff, faculty, and visitors and should not rely solely on volunteer labor.

Composting and Mulching

Yard wastes and some kitchen wastes can be composted and used as mulch on campus or sold to landscaping businesses off-campus.

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Chapter 8

Tracking Materials and Cost Benefits

Tracking the campus waste stream and cost benefits of recycling is an important component of managing a recycling program. Tracking the breakdown of the waste stream into garbage, hazardous material, compost, and recyclables is a valuable method for monitoring the efficacy of the program. Other information that is valuable to track includes: revenue generated from selling recyclables, savings from reuse programs, use of volunteers and academic interns, and cost avoidance from reducing trash costs. This information is invaluable in terms of keeping records for program monitoring and improvement, legitimizing funding needs, demonstrating the success of the program, projecting budgets, and being able to compare to other colleges.

Utilize tracking mechanisms in reporting to the campus administration and state. Share and compare this information with other colleges, especially locally, in an effort to assess how well the program is doing. Critically review tracking records in order to assess progress, labor requirements, and areas of potential program improvements.

Tracking is a laborious process and requires a regular time commitment. Build tracking into a paid position so that one staff member is responsible for maintaining the program tracking system. This is a technical duty.

Creating a Tracking Mechanism

Microsoft Excel is a good software program to utilize when developing a tracking mechanism. If possible, create a "program staff only" shared file on the server. Within that folder, create a "tracking" folder where all of the relevant information can be easily located. Besides a folder on tracking, this shared file can contain endless folders relating to other valuable program information that the staff needs to access.

Tips for Creating a Program Waste Stream Tracking Template

- *Determine what is being tracked
- *Research which areas generate which materials
- *Track waste reduction through annual comparisons of overall waste generated campus wide. It is impressive to see the results of educational campaigns on recycling and waste reduction. Remember that waste reduction overall saves the college garbage costs (hauling and dump fees, vehicle maintenance, dumpsters, etc.)
- *Track as many separate areas as possible, for example: housing, administration and student union buildings, and architecture studios. The more information you can keep track of, the better you will be able to monitor your program, access costs, determine labor needs, program strategies and long range goals.

- *Take totals from the following categories to make up several charts and graphs that reflect various combinations of information:
    - Separate materials (chart for paper, another one for kitchen recyclables, dorm recyclables etc.)
    - General Recyclables bar chart with different materials represented in several bars per year
    - Comparative chart with recyclables vs. garbage
    - General Recyclables bar chart with different materials represented in several bars per year
    - Collective charts reflecting all years of operation
    - Revenue, cost avoidance, and savings charts
    - Individual program charts (i.e. if you have a reusable office supply exchange, you can track cost savings monthly and make a chart for annual and long term savings.) This type of chart is added insurance for program longevity.
    - Contract areas. This will help you assess actual charges realistically and give customers a true understanding of where their costs are coming from
- * If a tracking mechanism is being developed, it is helpful to incorporate formulas that demonstrate greenhouse gas mitigation from waste recovery.

These are just a few examples of the infinite possibilities for creating an extensive tracking system for a campus recycling program. The more tracking, the better. Utilize tracking to internally benchmark the campus recycling program to meet program, university, state, and federal goals. Spreadsheets, charts, and graphs will be important tools for demonstrating program success.

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Chapter 9

Marketing Recyclables

Marketing recyclables requires knowledge of the material itself. Knowing the markets will provide invaluable information about what types of materials are recyclable in the area and will indicate specifications for collecting, processing, and transporting material. Marketing recyclables, to reduce costs of garbage and supplement a recycling effort, is an important key to managing a recycling/waste reduction program. In order to decide which materials to recycle it is important to analyze the waste stream to determine what types and amounts of waste materials are generated on campus. See Chapter 7: Solid Waste Audits for details on conducting an audit.

Identify existing markets for recyclables. It is a big mistake to collect materials that do not have a ready market. Instead of recyclables, the end result is waste. Identify local waste management companies that handle recyclables and other recycling processors in the area. Obtain a list of prices from local vendors. Find out what the vendors' collection methods are and determine whether the campus has the ability to collect, process and deliver materials to local vendors, or if a contractor will need to be hired.

Be aware that recycling markets are not consistent across the country and that markets fluctuate. Due to market fluctuations, do not rely on materials purchase for funding general operating costs. Money from selling more valuable materials will certainly benefit the program and should be included in the budget, but are not consistent enough to be able to fully cover expenses such as rent, salaries, utilities, transportation and other ongoing necessities. Be creative in the lean years and put money aside to carry over. Set up stable collection programs. Once a recycling collection system is well-established, it is more difficult to change it, scale it back, or remove it. Create systems that are in synch with municipal residential recycling programs so that the program can benefit from local educational programs.

Creating a collection system can be tricky. Each area of the country has different variables determining what can be collected and how it must be prepared for market. Many municipal recycling programs are implementing commingled or single stream recycling collection systems and many colleges choose to follow the same model as what is available to city residents. Commingling requires an entirely different marketing process and can cost money to recycle but can save labor. Some schools are choosing to implement dual stream systems where all paper is collected separately from glass/metal/plastics. Most commingling or dual stream systems require glass to be collected and processed separately. With a dual stream system, money can be made (value added) from collecting paper separately. Weighing the variables will provide the needed information to develop what is best for the campus as a whole.

Determine economic feasibility and benefits of recycling different items; some materials might make money, others might break even, and certain materials will cost money to recycle. Complete a cost benefit analysis on collection costs versus benefits from sale or diversion of materials from the landfill to determine if the benefits are worth the effort.

Determine areas where large amounts of materials are generated and identify easy ways to capture materials. Next, determine how to collect, process, and store materials before transport to the market. Assess processing needs such as sorting, grinding, and crushing for the market once materials are collected. Incorporate these procedures into program operations.

A program's ability to maximize revenue from recyclables is dependent on the resources at hand. Many colleges are fortunate to have large warehouses to accommodate balers and storage of recycled materials for bulk sale as well as storage of low market recyclables to wait out the market. Identify program priorities and resources. Collecting and processing is a number one priority, but becoming a recycling processor to maximize marketability might not always be feasible. The better job a team does in preparing non-contaminated recyclables for market, the more recycling markets will work to accommodate maximum revenue.

If markets are not available for specific materials generated in large quantities, find ways to encourage waste reduction prior to waste generation. Institute waste reduction strategies for these materials. Design and implement contract procedures that encourage waste reduction and “recycling” for materials that do not have available markets.

Consider markets in waste/recycling contracts. Research what other campuses are doing with Requests for Proposals (RFPs) to maximize recycling revenue and efficient collections while reducing garbage costs. Insert contract language that requires suppliers to provide products and services in reduced packaging by having a take-back and accountability program. For instance, the vendor can be obligated to take back the packaging and end-use product for recycling. Include requirements for accountability on recycling, including quantities recycled. As a last resort, if materials are left in university waste stream, ensure through the contract that materials are reduced and recyclable packaging is utilized.

Do the necessary research and network with other recycling programs in the area to stay on top of the many existing markets and new possibilities for marketing campus recyclables. A good place to find local recycling market information is from the local city or county sanitation service. Visit the landfill and/or the local recycling center. This can help to provide accurate information which could lead to assistance in setting up a campus recycling program.

Form partnerships with other local waste generators to collect and recycle materials that can be recycled in larger quantities than an individual campus can generate or store. Often markets are available for materials generated in large quantities. These markets do not necessarily exist for smaller quantities of materials.

Keep campus location in mind when identifying markets and starting a program. In rural communities, contact the nearest metropolitan area to learn about existing recycling services and procedures. If the campus is located in a town, work with town officials to obtain grants and services to provide recycling drop-off centers both on campus and off. Large rural campuses may have to be prepared to store large quantities of materials to be able to market them. For campuses in large urban areas, look in the phone book or online for recycling market information. These locations have a better chance of being on the route for general recycling collection as well as being nearby drop-off locations for unusual or more difficult to recycle materials.

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Chapter 10

Commingling and Single Stream Collection

Many options exist for collecting recyclable materials, but commingling and single stream collection strategies are becoming increasingly common amongst both municipal recycling programs and campus recycling programs. The terms “single stream” and “commingling” are sometimes used interchangeably to refer to all recyclables (bottles, cans, paper, etc.) being collected in a single bin. “Commingling” may also refer to materials grouped together by category. Office-grade white paper, colored paper, and low-grade paper collected together, or PET, HDPE, PC, and other plastic resins collected together, but still separated from other types of materials are examples of commingled collection systems. For the purpose of this book, single stream collection and commingling will not be used interchangeably. Single stream collection will signify all materials being collected together, while commingling will signify separating materials into similar groups.

On the opposite end of the spectrum from single stream collection is source separation. This method separates materials by type and grade (i.e. quality) prior to collection. Commingling can be thought of as somewhat of an intermediary between specific source separation and single stream collection. There are benefits and drawbacks to each system depending on the composition of the waste stream, previous success with collection techniques, amount of community support and participation, and available work force and technological options. One size does not fit all when it comes to recycling collection systems, so all of the pros and cons of the entire lifecycle of the system should be evaluated before making a decision.

There are a few key points to keep in mind when establishing a collection system. Remember that there is a difference between recycling and collecting recyclables. Most colleges are involved in collection, whereas manufacturers are actually recycling materials. This ties into the second point: remember the recycling mobius when determining which system is best for the campus and the environment as a whole. The three arrows chasing one another have traditionally stood for reduce, reuse, recycle. Now, the mobius can also signify collection of recyclable materials, manufacturing using recycled materials, and purchasing and using recycled products that can be collected at the end of the life cycle to begin the recycling process again. In order for this process to continue, the materials collected need to be of a high enough quality to feed back into the manufacturing cycle and prevent “downcycling.” Otherwise, the materials may be diverted temporarily from landfills, but will not truly be recycled.

A major benefit of single stream collection is that a higher volume of material is collected. However, this material may be highly contaminated and often unfit for use in manufacturing. This is why the waste stream needs to be carefully assessed. Single stream collection may be more viable in a municipal setting as the recyclable materials that are collected are often of a low quality to begin with. This is not

the case on a college campus where copious amounts of high quality paper can be collected and will only retain a high quality level if separated from other materials. Paper is an easy material to collect, separate, and sell in order to generate revenue for a college recycling program. Including paper in single stream collection can greatly inhibit a recycling program's ability to profit from recyclable sales. As the market fluctuates, varying degrees of paper quality will be acceptable, but producing a high quality product regardless of market trends will be beneficial in the long term. It is easier to switch to commingling or single stream collection than to begin with single stream and switch to source separation because participants will not be accustomed to separating materials and contamination will occur.

Contamination of recyclables, due to single stream collection, can take on a variety of forms. Trash or organics can be mixed into the recyclables. Another major concern is the effect of single stream collection on valuable paper sources. Broken glass shards are a major hazard to the paper manufacturing process because they significantly increase wear and tear on equipment. If the glass is not fully separated out during the manufacturing process, it may become embedded in the paper and pose a hazard both for employees and future customers. Paper can also become contaminated by liquids left in containers collected as part of a single stream system. Although all plastic and glass containers would preferably be cleaned by the consumer prior to being placed in a recycling bin, there is often leftover liquid in these containers. This skews the weight measurements as wet paper is heavier than dry and also lowers the quality of the paper, sometimes rendering it completely unsuitable for recycling. In this event, what was originally high quality paper becomes waste. While single stream collection may increase the quantity of material collected, it also increases the amount of contamination and therefore trades quality for quantity.

Due to lower quality, costs will be increased at some point in the recycling process. If paper recyclers are receiving huge amounts of low quality materials, they will need to remedy this by placing some of the financial burden back onto the recycling collectors. This could be in the form of increased pick up fees, extra charges to help compensate for damage to equipment from contaminated material, or lower prices per pound of material collected.

Contamination will also make tracking systems more difficult and less reliable. Recyclables are generally measured in weight and volume, but high levels of contamination will skew these results. The weight and volume of contaminants need to be subtracted from the total weight at the time of collection in order to determine the percentage of contaminants and the percentage of recyclable materials. In a single stream system, the collectors (campus recycling programs) will have to rely on manufacturer receipts in determining contamination levels and will not be able to determine which materials to target for increased recycling. Clear material tracking is essential to proving the cost effectiveness of a recycling program as well as identifying educational needs based on what is already being recycled on the campus and what could be recycled, but ends up as waste. Single stream collection also skews tracking systems by counting contaminants as recyclables. There is a major difference between landfill diversion and recycling. Recycling is an ongoing process, whereas waste diversion is temporary. Contaminants will still

be landfilled, but will be diverted temporarily. Single stream collection undermines the valuable aspects of material tracking.

It is also important to track where the recyclables from campus are going after being collected. Are materials processed locally? Or, are materials sent overseas for processing? Paper manufacturers in the U.S. are less likely to accept contaminated material, but manufacturers in China have recently been buying lower quality material, which needs to be supplemented by virgin resources due to high contamination levels. [14] Consider the total environmental impact of collecting paper, shipping it thousands of miles away, putting energy into processing the paper, landfilling that which cannot be recycled, then selling some locally and shipping the rest abroad. This practice is clearly unsustainable and requires enormous amounts of energy and natural resource consumption. Work with local paper manufacturers whenever possible to meet their quality specifications. If manufacturers are not receiving enough high quality material, they may resort to using virgin fiber sources, breaking the recycling chain. [15]

Another factor to keep in mind is confidential documents. These cannot be included in single stream collection because they need to remain private. It is inefficient to collect only one type of item separately while single streaming the rest.

Despite the numerous quality and life-cycle drawbacks to single stream separation, many college administrators across the country are clamoring for recycling programs to switch from source separation to single stream collection in order to save upfront collection costs, simplify the system for consumers in order to increase participation, and decrease worker injuries through automating collection processes. While these reasons are valid, they may not be sufficient to justify changing a fully functional source separation system which produces high quality materials to a seemingly simpler system which leads to lower quality items and waste. If pressured or required to switch to a single stream system, compromising with commingling may be an option. For example, paper could be commingled (office grade/white paper, colored paper, and low grade all together) but separated from glass and plastics. While commingling may still lead to a decrease in quality, it will not lead to as significant a decrease as single stream collection.

Commingling should also be considered in composting processes. Just as quality of recyclable materials varies, the quality of compostable materials varies as well. For example, food scraps and yard waste will produce a much higher quality end product than compost made primarily of paper food boats and polylactic acid (PLA) containers. See Chapter 15: Bioplastics for more information about PLA containers. Again, the type of collection depends on the destination of the end use product. If the campus is planning on producing an extremely nutrient rich compost to be used as a soil amendment in campus gardens, it may make sense for food scraps to be collected separately and composted on campus. Since PLA containers will not decompose quickly in a basic compost system and require industrial processes to biodegrade, they could be collected separately from food scraps and sent to an industrial composter. Again, the size of the campus is a major factor in determining the best system. Source separation of organic materials would be feasible on a small or medium sized campus, but sending all organic waste

(from food scraps to yard waste to PLA containers) to an industrial composting facility may be the only cost and time effective option on a larger campus.

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Chapter 11

Buy Recycled and Environmentally Preferable Products

Make your motto: *Buy recycled products so we can recycle the products we buy*.

For a long time, recycled materials have been used in production of new materials, and yet, this was not a recognized effort. Products like paper bags, newspapers and cardboard, have always contained some recycled content, though they were never labeled as such. This recycled material came from collecting newspapers for fundraisers and other similar sources. That seemingly insignificant effort kept recycled content included in items in minimal proportions. These fundraisers generated a small amount of material that kept the price of recyclables at a level that helped community groups. At that point, recycling markets were not really an issue. It is amazing that recyclables were collected before markets were fully developed and, therefore, incredible that recycling survived.

As more people jumped on the recycling bandwagon, markets became taxed as the traditional uses for recycled materials were saturated. Truly, sales of recycled material would be easier to negotiate if markets were developed along with recycling collection. In order for this to happen:

- *Industry must work towards developing products containing recycled content that meet the same or better product specifications than current products and develop technology to utilize recycled materials.
- *Consumers must not only accept, but demand recycled content in packaging and products.

With the increased pressure and growth in recycling collection, recycling will only work if there is a market for the products that come from the reprocessed recyclables. This is directed by consumer demand for recycled products.

These efforts also must be supported through legislation. Recycling legislation is becoming more common in states while the federal government is also taking steps toward legislation. Such laws typically establish community “opportunity to recycle” rules. The recycled product purchasing portion typically relates to government (including state higher education institutions) purchases. It usually

includes an acceptable price variance for choosing recycled content over virgin materials. These laws are guided by the recycling symbol.

The symbol that represents recycling features three arrows chasing each other. This "loop" illustrates how recycling is dependent on consumers to not only recycle what they use, but also to purchase recycled products. The arrow is coming to mean: “market development, purchasing, and recycled materials collection” in addition to its traditional meaning of “Reduce. Reuse, Recycle.”

Colleges and universities purchase millions of dollars’ worth of products and services annually. This in turn generates millions of pounds of garbage. In establishing a campus recycling effort, it is important to support markets for recyclables through purchasing, while reducing waste through vendor contract specifications. Another bonus is that the environmental responsibility is being extended beyond waste reduction to create a safe environment through purchasing non-toxic products.

Purchasing on college campuses is an action in which waste reduction can play a vital role in reducing costs for managing a recycling program, while stimulating a demand for recycled content, packaging, and products. Reducing costs in areas other than disposal fees will also create an opportunity to demonstrate smart economics by incorporating waste reduction and recycling into college practices.

Here are some things you can do to stimulate the purchasing of recycled, recyclable, and environmentally preferable products on your college campus:

- *Remember that waste prevention or reduction is the most vital part of a college recycling effort.
- *Research state law and university policies. If there is a recycling law, it probably contains a section about price preference on recycled content materials, especially paper. Contact state procurement officials with any questions about purchasing laws as well to see if there is any legislation regarding purchased recycled content/environmentally preferable purchasing.
- *Be familiar with these laws and also check with other colleges in the area to learn about other local collegiate recycling programs. The more information gathered, especially related to economic benefits, the easier it will be to convince the college to take steps to support sustainable practices.
- *Build alliances with the college's purchasing managers and print shop managers.
- *Work with campus purchasing managers to consider purchasing recycled content and environmentally preferable products through education, contracting, tracking, and working with vendors.
- *Work with campus purchasing managers to invite vendors to showcase environmentally preferable and recycled content products. Holding an annual showcase with a guest speaker and discussion is an excellent way to encourage vendor responsibility and educate college purchasers.
- *Start with paper as there are many quality 100% post-consumer recycled papers currently on the market. Post-consumer content is preferred as this is the material that comes from collected recyclables. Pre-consumer content connotes industrial scrap generated before it goes to the consumer, which is lower impact than using virgin materials, but does not support campus recycling efforts.
- *Encourage student initiated projects such as researching available recycled content products.

- *Work to create a campus environmental policy that addresses the purchasing of recycled and non-toxic products.

Sample Environmentally Responsible Purchasing Policy
The University of _____ recognizes that one of the primary methods of exercising its commitment to environmental responsibility is through its purchasing choices. The University will strive to obtain maximum value for its expenditures and will work towards obtaining the "best value," balancing short and long term costs, maintenance, life cycle, and environmental costs in purchasing goods and services.

A. The University acknowledges that environmentally responsible purchasing choices will help create and sustain markets for environmentally responsible and recycled content products.

B. The University commits to the goal of making environmentally and fiscally responsible purchasing choices that consider life cycle costs, long term implications, and relative environmental harm of products.

C. Purchasing policies will encourage obtaining products that minimize waste products, have high recycled content, use environmentally conscious production methods, and demonstrate maximum durability, reparability, biodegradability, energy efficiency, non-toxicity, and recyclability.

Sample College Recycled Paper Policy (University of Oregon)

Title: Recycled Paper Policy
Purpose: This policy coordinates University use of recycled paper with statewide executive orders.
Policy: As a sub policy of the University of Oregon's Campus Environmental Policy, it is the policy of the University of Oregon to purchase and use recycled paper products in its operations in accordance with Executive Orders EO-98-07 and EO-00-07. This policy requires the purchase and use of paper products made from post-consumer waste materials when such products are of a quality to satisfy applicable specifications, are available in the desired quantity within a reasonable period of time, and are priced competitively.

For the purposes of this policy, "recycled paper products" include "tree-free" paper content and must contain one or more of the following environmental characteristics:

a) High levels of post-consumer waste (PCW)

b) Any virgin fiber used is Forest Stewardship Council (FSC) certified and does not come from forests that are endangered or threatened

c) Sourcing from mills employing the cleanest possible production including Process Chlorine Free (PCF) methods

Any University of Oregon request for bids or quotes for purchase of paper products, including authorized printing from outside vendors, shall include a solicitation of bids or quotes for recycled paper

and papers that have not been bleached with elemental chlorine or other hazardous materials. No specification shall require the use of paper products made exclusively of virgin materials, nor specifically exclude the use of recycled paper or tree-free products.

Unless otherwise specified, University Printing and Mailing Services will provide and use elemental chlorine-free (ECF) recycled paper with 100% post-consumer content. At a minimum, all University paper products shall consist of t least 30% post-consumer content and be elemental chlorine-free (ECF).

The purchasing of 100% post-consumer content paper is encouraged for sustainability. 100% PCW paper is competitive in price, and compatible with all copiers purchased through the State of Oregon contract. Use of heavily dyed and neon papers is discouraged and damaging to the environment and recycling process.

University Printing and Mailing Services shall have the authority to specify the minimum recycled content standard in bid solicitations to accomplish the purpose of this policy. The default for all university office equipment that uses paper, such as copiers, printers and fax machines, shall be set to comply with this policy (minimum 30% PCW and ECF), and be in compliance with the State of Oregon policy guidelines.

Every effort will be made to eliminate excessive or unnecessary paper use. Strategies for doing so include:

- Electronic mail or other paperless communication
- Double-sided copying and printing
- Half-sheets of paper for all brief, printed on-campus communications
- Short distribution and targeted mailing lists to reduce volume
- Reduce printer margin defaults

In accordance with the guidelines stated above in this policy, the official stationery program as shown in "Graphic Style of the University of Oregon" shall be determined by the Office of Design and Editing Services and University Printing and Mailing Services, with approval by the Environmental Issues Committee. The use of heavily dyed paper, or other paper which requires special handling for recycling, will be subject to additional charges.

Actions that Purchasing Managers Can Take

- *Consider life-cost accounting in all purchases.
- *Ask questions such as: Is this product made for longevity? Can separate parts be replaced when something breaks, or does it need to be discarded? How much waste is generated in the acquisition of the products or services? Can the product or service be provided with minimum or no waste generated in the process? Is the packaging recyclable through the college recycling program? Will the vendor take the packaging back for recycling? Is the item recyclable and repairable once it has completed its use?
- *Choose nontoxic products for a safer, healthier work place.
- *Spend a little more money at the onset in order to choose quality, longevity and recyclability. This results in savings in the long run. This indeed ties directly in with attaining “best value.”

- *Choose products that reduce impact on the University and global resources: many choices are available for energy and water conservation. Items such as energy saving copy machines, computers, printers, lights, washing machines, etc. are not only available, but are sometimes less expensive than items without energy/resource conservation features. As new products and technology becomes part of daily life, the impact on energy and water costs are astronomical. Consider purchasing items that reduce the impact on precious resources and make conservation the rule rather than the exception.
- *Buy products made from recycled materials so that we can continue to recycle the products we buy! There are numerous products on the market that not only meet the performance standards of virgin products, but are cost competitive. Some items and services are beginning to incorporate waste into purchasing contracts as well
- *Research purchasing through co-operatives and partnerships.
- *Add a clause regarding waste generation in all contracts for vendors' products and services. Request that packaging be minimal and recyclable. Give preference to vendors who take back recyclable packaging waste and choose durable products with replaceable parts. This is called Extended Producer Responsibility (EPR) and is a practice in public policy, that has been practiced in Europe for decades. All products coming into Germany, for example, must be manufactured in such a manner as it can be easily deconstructed and recycled. Often EPR requires companies to take back their used products and recover every piece.

Remember: waste management is an expensive operating cost for all institutions. Items are brought in from outside the college, so reducing waste management costs is a true savings.

- *Inform vendors of the purchasing policy and the school's interest in sustainable items and practices. More companies are incorporating life cost accounting into their products. This includes: producer responsibility for their waste, building products that last, incorporating recycling materials into products and purchasing products that promote resource conservation.
- *Work to create a recycled/environmentally friendly product tracking mechanism on all purchasing forms.

Unfortunately, garbage costs are usually accepted without question. Many administrators see recycling as an extra cost instead of a savings. Additionally, waste generation is not factored into profit oriented items sold on campus. For example, when a student union negotiates a contract for a particular item, the student union receives the profit and the college recycling program picks up the tab for the waste generated. Some colleges are implementing vendor waste taxes on for-profit items on campuses in order to create and increase vendor responsibility.

Purchasing practices have a huge impact on the waste stream. Working with purchasing managers to recognize this economic impact is critical in bringing college recycling full circle. Recycling is still just one step away from the garbage can. College recycling programs need to consider waste reduction, reuse and waste generation in order to maintain effective recycling efforts.

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Chapter 12

Special Materials, Chemical and Hazardous Waste

What is this item? What does it do? What materials does it contain? Can it be recycled? Is there a reuse opportunity? Does it need to be disposed of in a landfill? Does it need to be disposed of as a special waste?

Waste management and recycling require research to find answers to this type of question. It is important to ask questions and learn where the resources can be found. Fortunately, there are many experts to consult and college campuses have a plethora of information on many aspects of the issues facing college recyclers.

Most campuses have a Department of Health and Safety or Environmental Health and Safety which typically oversees chemical, nuclear, biohazardous, and other waste known as universal waste. Recycling coordinators are increasingly being asked to handle universal waste and therefore need to be well informed as to how to safely dispose of it.

Fostering a positive relationship with the Procurement Department will also be beneficial because staff members will be knowledgeable about what the campus is purchasing and where most materials are located on campus. A procurement official can help set up contracts for recycling and disposal of various materials. If possible, locate recycling/reuse markets for as many materials as possible. Recycling materials may save money and reduce the hassle of paperwork. Universal waste is not always recyclable but proper disposal of "special wastes" is important in reducing toxins in landfills so that soil and water sources remain contaminant free.

Asphalt, Brick and Concrete

See Chapter 13: Construction and Demolition Recycling for detailed recycling information.

Scrap Metal

A wide variety of scrap metals will be generated on a college campus, but the most prevalent will be steel. According to the Steel Recycling Institute, steel has the highest recycling rate of any material in North America and in 2008 the world steel recycling rate reached an all-time high of 83.3%.

Steel is a major component in a wide variety of products including appliances, automobiles, food containers, rebar and other structural supports for buildings. All steel has recycled content, but the proportions of recycled content depend on the type of steel-making furnace used in the manufacturing process. There are two kinds of steel making furnaces: basic oxygen furnaces (BOF) and electric arc

furnaces (EAF.) The basic oxygen furnace uses 25-35% recycled steel to manufacture new steel. The electric arc furnace uses more than 80% recycled steel.

Recycling steel saves valuable energy and landfill space as well as natural resources. Recycling one ton of steel conserves 2,500 pounds of iron ore, 1,400 pounds of coal, and 120 pounds of limestone.

More specialized metals such as silver, gold, copper, and brass are also generated on college campuses and can be sold for recycling. Price yields will vary depending on the type and grade of the metal. These metals generally need to be separated from one another for marketing. Silver is usually generated in movie and photo studios through film processing practices as well as in radiology labs for x-ray film processing. Devices can be attached to the sinks in these areas which will separate silver from waste liquids so that is may be recovered for recycling. Dental departments regularly recycle gold fillings and some fillings may contain lead amalgam as well. See the **Chemical and Hazardous Waste** section of this chapter for more information about handling and recycling lead. Gold can be found in art studios as well. Both pure copper and brass (which is an alloy typically made from copper and zinc) are prominent materials in electrical wiring and can be recovered during construction, demolition, and remodeling of campus buildings. These materials are also present in machine and auto shops as well as art studios.

Contact a local metals recycler to determine the process for recycling this material and the most cost effective collection and delivery methods. Some campuses manage the collection, maintain the area where the material is collected, and haul materials to market. Other options include negotiating an arrangement in which a metals processor provides a dumpster and regularly collects the material from a centralized location on campus. This method is efficient and probably more cost effective than the Campus Recycling Program taking responsibility for hauling the material to the processor. The campus maintenance division and construction contractors will be generating and handling most of this material.

Automotive (tires, batteries, oil, antifreeze, oil filters)

Campus transportation shops may perform in-house maintenance on campus vehicles, manage service contracts so that local automotive shops are responsible for campus vehicle maintenance, or a combination of both. Fortunately, there are specific regulations for disposing of special waste generated in auto shop operations, thus reducing the need to monitor this at off-campus sites.

For in-house campus auto shops, work to find markets/outlets for recycling tires, batteries, oil, oil filters, and antifreeze. The Occupational Health and Safety Administration (OSHA) Department (sometimes located within the Environmental Health and Safety Department) on campus is responsible for monitoring and regulating any hazardous materials generated in auto shop areas.

Request records of the amounts of materials recycled in campus auto shops to add to campus waste tracking. Create and distribute monthly tally sheets that can be submitted to the recycling program that track how the material was handled. Utilize conversion factors to determine how much each item weighs. If the item is not on conversion charts, determine a weight to be used in tracking by weighing a few similar versions of an item and calculating an average.

Auto parts in general provide many reuse and recycling opportunities, but tires in particular have been recycled a variety of ways in recent years. They are recycled to manufacture alternate fuels, speed bumps, mats, cushioning, flooring, tiles, irrigation tubes, decking, office supplies, planters, sound barriers, swings, and truck bed liners. One of the most promising uses is asphalt rubber which is made from ground or "crumb" rubber mixed with asphalt concrete. This technology prevents tires from being disposed of in landfills and also reduces the need for mining new materials for concrete.

Most tires are recycled through local tire dealers. For community collection opportunities, contact the local waste management division to find a drop off location. Though each state has different procedures, collections areas are frequently available in tire stores and automotive service stations. In some states, there is an advanced recovery fee charged when purchasing new tires. Unfortunately, many consumers are unaware of this and thus illegal dumping often includes tires.

Oil is another commonly recycled item. Some areas only have oil filter recycling while other locations are able to clean and recover the oil itself. Places that recover oil often recover antifreeze as well. Contractors handle these items and auto shops have storage containers for collection of these materials.

Pallets and Wood Waste

College campuses generate large quantities of pallets and other wood waste. As with any material, try to reuse wood products as much as possible before recycling them as this is a resource and energy intensive process. Paper recyclers often take pallets for reuse and in the instances when recycling becomes necessary, fortunately, wood waste recyclers are plentiful and should be easy to locate nearby campus. Collecting wood waste separately often can be less expensive (and is definitely a better environmental alternative) than landfilling. Local garbage companies will often provide commercial drop boxes specifically for wood. The campus recycling program could also work directly with a wood waste processor or forest products company. Determine the most efficient and cost effective method for collection. Be aware of the rules regarding what is acceptable as wood waste. Typically, cedar, laminate, particle board, pressure treated lumber, and pallets containing plastic are not accepted. Post a sign on the wood waste dumpsters and alert staff members and contractors to proper wood waste handling.

Some pallets are made from precious rainforest wood and others are made from less valuable wood. In any case, these are packaging items that are often viewed by the sender as disposable, but in some cases they are valuable to shipping companies. Some companies actually take them back and reuse them, which is great step toward more sustainable business practices. Work with the campus Procurement Department to include "take back" of pallets into vending contracts. Certain types of pallets can be sold for reuse or ground up and sold as biofuel. If the campus owns a tub grinder, it is possible to grind up pallets on site to be applied as mulch on campus grounds. Collect pallets in a central location for reuse and recycling.

At the University of Oregon, the Campus and Grounds Department has been milling trees that have had to be taken down due to wind storms or disease. This beautiful wood is being incorporated into campus

projects from wall covering to shelving and even a desk for the University President. Remember: everything is a resource until it ends up in the garbage can.

Phone Books

Campus communities receive phone books once or twice a year: one campus directory and one local telephone company directory. Encourage the campus telephone services department to print the campus directory on white paper so that it can be recycled through regular recycling collection. Determine which category of paper the phone directories can be recycled with and alert the campus regarding proper recycling procedures.

Local telephone books are usually made from recycled low grade newspaper. Work with the local phone book distributor to establish recycling collection for outdated books and check with a paper broker in order to determine how the books should be prepared prior to marketing.

Through the campus telephone services, determine if the phone book distributor will take back the books directly, thus reducing the burden of marketing phone books as a special material. Consider that a crew on campus (typically a facilities crew) gets paid by campus telephone services to deliver new phone books. Create a similar arrangement with the recycling program so that the recycling program will not be responsible for labor and handling costs.

Collecting phone books from campus is a labor intensive effort. If the recycled paper broker charges for these to be recycled, then the cost needs to be passed along to campus telephone services. In some cases, the local phone company will work with the recycling process to absorb any recycling costs on the "disposal" end, but internal costs need to be dealt with through campus telephone services.

Most likely, telephone books will need to be collected in a separate toter or gaylord in order to be accepted for market. Coordinate with the crew delivering the phone books to deliver a memo to each department along with the phone books that explains how to recycle the phonebook when it becomes outdated. An easy way to handle these is to have departments call for a pick-up of 25 books or more. Schedule a weekly route to pick these up and taper off the collection after a month. Typically, the paper broker will set a limit on the length of time these will be accepted for as phone books are marketed and recycled as a special seasonal market.

Some campuses are reducing hard copy phone books by offering an online form that can be filled out to opt out of campus phone book delivery, thereby reducing paper and printing demands. Some campuses are issuing CD's of phone books and other campuses are choosing to eliminate phone book deliveries all together. With access to computers and cell phone directories, campuses are taking the opportunity to reduce this annual waste stream.

Junk Mail

College campuses, including housing areas, receive unsolicited bulk mailings from off-campus entities. This mail costs a substantial amount of money to receive, deliver and dispose of or recycle. By reducing

unsolicited bulk mail, recycling programs are assisting campuses in reducing costs and increasing efficiency.

For mail received by campus personnel and departments, work with the campus Printing Department to create a printed postcard that requests removal from mailing lists. Leave enough space on the postcard to paste the mailing label from the unsolicited mail or address the postcard to the appropriate company and send it through department mail. Departments can supply these postcards to staff.

Confidential Paper

College campuses generate large amounts of paper materials that include confidential information. Handling confidential materials is a serious matter and should not be overlooked in handling recyclables (especially paper). One option is to have an in-house operation. This is a labor intensive process that requires keeping the material separate, a high-speed shredder and plenty of room to store loose shredded paper or bales for market. Collecting pre-shredded materials from departments is a cumbersome and expensive method of managing these materials. Shredding is labor intensive for departments, a drain on campus electricity, expensive for recyclers to handle high volume/low density material, requires special equipment, and is an inefficient method for collecting this valuable paper resource.

Another option is to pay a contractor to come to campus and shred the material either on-campus in a special shredding truck or off-campus in a secure facility. This is the best method for cost-effectiveness, security and efficiency. Some contractors will even pulp the material after it is collected. It is each department's responsibility to follow all state and federal rules pertaining to document retention. When establishing a program for handling confidential documents, it is best to defer to the Records/Archives Department to determine the best management method. Be sure to request monthly totals to be included in waste tracking of recovered paper.

Electronic Waste/Computers

The issue of electronic waste or e-waste, especially from computers, is growing. College campuses upgrade computer equipment regularly, thus generating an impressive waste stream. Due to the numerous toxic metals contained in computer equipment, more colleges are looking at responsible strategies for managing this waste stream.

Computers are no friend of the environment. Though the PC industry is sometimes thought of as “green,” in reality, the very nature of this industry involves pollution. Computers contain hundreds of environmentally degrading metals, acids, and plastics. Proper disposal of computers is a crucial step to take toward reducing environmental impact from the toxic materials contained in these items.

One strategy is to work with the campus Procurement Department to encourage computer manufacturers who sell their products to the college to adopt “take-back” or “buy-back” programs. If possible, add language in computer equipment vending contracts to address this issue. Include take-back and responsible disposal by the company in the purchasing agreement. Grassroots campaigns

encouraging take-back programs are also a strategy that will get students on board with supporting such programs on campus.

Computers can also be donated and reused. Old computers are often thought of as "junk" but schools and community based organizations can get good use out of an old computer, thereby extending its life span and preventing it from becoming landfilled. Used working computers are valuable, so avoid disposal whenever possible. If disposal is the only option, it may be necessary to remove the toxic elements prior to disposal. Do this with great caution. In addition to hazardous materials, computers carry an electrical charge in the power supply long after being unplugged. Tampering with such devices may cause serious injury due to electric shock.

Some Campus Recycling Programs have full-scale computer and electronics recovery/recycling programs where machines are dismantled into various components for reuse and recycling. To institute this type of program, make sure to work with the campus Environmental Health and Safety Department. Demanufacturing projects can be incorporated into technology-based education programs. Of course, re-building computers by swapping parts is the best strategy to reduce the actual final waste going into the landfill. As this issue grows, more opportunities are evolving to capture e-waste from plastic casing to the more valuable metals.

As states are developing electronics take-back programs, local non-profits are emerging that take electronics and either refurbish or recycle the equipment. Check for such resources within the local area.

Cell Phones

In recent years, a number of organizations have begun to collect cell phones for reuse by victims of domestic violence. Emergency numbers are preprogrammed into the phones so that help can be called easily. Phones are also collected for reuse by soldiers stationed overseas and disaster relief workers. Some cellular telephone companies have programs to collect old phones, some of which are salvaged and donated, while others are recycled. The **Resources** section of this chapter offers contact information for specific charities and companies that reuse or recycle used cell phones.

Cassette Tapes (Audio and Video), CDs and Diskettes

Cassette tapes (audio and video) CDs and diskettes are also frequently included in college campus waste streams. Research options for recycling these items locally. Recycling companies that are already handling materials diverted from the campus waste stream may be able to recycle tapes, CDs, and diskettes as well, or may be able to offer suggestions as to another company that may be able to handle the waste. There are organizations that accept these types of materials for reuse in craft projects. CDs have the best recovery through plastic recyclers, while cassette type tapes and smaller computer disks can be recycled through the companies listed in the **Resources** section of this chapter.

Film (Transparencies, Radiology, Print Shop, Art Studios, etc.)

Transparency film can be recycled. Check with local sources to locate any recycling opportunities in the

area. If nothing is available locally, encourage campus departments to ship material directly for recycling. See the **Resources** section of this chapter for contact information for the 3M Transparency Recycling Program. Small amounts can be collected through the recycling program, but be cautious about accepting this material in large amounts as it is heavy and shipping is expensive. Radiology departments, print shops, and art/movie studios produce film that can be recycled using highly specialized processes. To locate a recycling company for this material, contact the company that produces the film. Be sure to determine if different types of film can be recycled together or if they need to be separated to increase marketability.

Office Supplies

Surplus reusable office supplies can be donated to an on-campus Reusable Office Supply Exchange (R.O.S.E.) or Office Supply Collection and Reuse (OSCAR) program. Establish a self-serve area that employs students for shelving materials and general maintenance tasks. See Chapter 29: Reuse Exchanges and Waste Reductions for more information on establishing and maintaining an R.O.S.E. program.

Furniture, Office Equipment, Miscellaneous

Check with the surplus department to find out how campus property is discarded and managed. Many college recycling programs end up working with, or fully managing, certain surplus items. Reuse these items whenever possible. Below is a list of ideas for redistributing surplus items so that they can be reused on campus.

- *Create a department surplus property listserv where departments can post items to give away or sell. This is a great opportunity for the campus to share resources.
- *State colleges typically run leftover items through a state surplus operation where items get sold at a public auction. However, it often costs the campus to ship item to state surplus locations, so reusing items on campus is preferable.
- *Many campuses have created on-campus surplus operations which include a store and/or auction. Warehouse space and personnel are necessary. On-campus surplus operations can generate enough revenue to operate and generate a profit to feed back into on-campus recycling programs.
- *Establish a small space for a free on-campus furniture/equipment exchange. This can save departments money in furnishing an office space and restocking office supplies. The space can be open as little as an hour two or three times per week, thus costing a minimal amount to manage while generating major cost savings for campus.

Envelopes (Tyvek, Padded and Other)

College campuses generate large quantities of envelopes. Encourage reuse of padded and other envelopes for both on and off campus mailings. Campus mail services may also be willing to accept envelopes for reuse. Surplus letter envelopes can be reused as scratch paper.

Padded envelopes can be lined with low grade recyclable fiber or plastic bubble wrap. The latter is not recyclable, so continue to find ways to reuse such envelopes as many times as possible. Save any bubble-wrap lined envelopes that may be put into recycling bins by mistake. As these build up, make sure the campus community is informed of the surplus as it is likely that padded envelopes will be in

demand somewhere on campus. They can also be placed in the campus Reusable Office Supply Exchange (R.O.S.E.) See Chapter 28: Reuse Exchanges and Waste Reduction for more information about establishing an R.O.S.E. program. There are also recycling programs for Tyvek envelopes through DuPont™ Tyvek®. Shipping is paid by the campus, but the material is recycled at no additional charge. See the **Resources** section at the end of this chapter for more information about DuPont™ Tyvek® recycling programs. If envelopes are generated in a large quantity in one area on campus, work with that area to collect and send envelopes recycling. If there are smaller quantities, send the envelopes through campus mail, collect them in recycling, and send off as needed.

Imaging/Copier Supplies

Laser printer, inkjet, copier, and fax machine imaging supplies can be remanufactured. Programs range from donating to exchanging empties for credit towards a purchase of a new or remanufactured item, to being paid outright for returning the item for remanufacturing. Departments can often work directly with a contractor to recycle or refill cartridges. For items that are not exchanged or credited, the recycling program can receive payment for cartridges collected from campus. This is an excellent opportunity for the program to receive revenue with little effort.

Ideally, departments will close the loop by purchasing remanufactured cartridges (which saves money) and returning empty cartridges to be remanufactured. When initiating a program, educate the campus community about the cartridge recycling process and encourage the purchase of remanufactured cartridges. Make sure the remanufacturing company is reputable and that the remanufactured cartridges perform well. Solicit feedback from faculty and staff members who use the remanufactured cartridges to ensure product quality. Inkjet cartridges can be collected through campus mail, or contractors may provide small collection containers for departments. Other options include providing departments with pre-paid shipping mailers or labels so that cartridges may be sent in for recycling.

Styrofoam Peanuts, Block Styrofoam, Bubble Wrap, and Six Pack Rings

Styrofoam (polystyrene) peanuts are plentiful on college campuses, but unfortunately are rarely able to be recycled. The good news is that this type of material is easily reused. Collect styrofoam peanuts and offer them to campus departments, mail services, and the college bookstore. Local mailing companies and product distributors may also be able to reuse packing peanuts. Purchasing styrofoam peanuts is expensive and there are many options for local reuse.

While styrofoam (also called expanded polystyrene or EPS) is not a highly recyclable item, there is an emerging recycling market. Recycled expanded polystyrene is now being used as an aggregate material to manufacture light weight concrete. If there is no local processor for block styrofoam, the material is trash unless it can be reused in campus art projects or to ship fragile materials. It is extremely problematic because it does not break down in the landfill and is unwieldy to place in campus dumpsters.

In hospitals and labs, specimens are shipped in styrofoam boxes that usually have a pre-paid mailing label attached. Educate researchers and staff about the label and encourage its use. There may be some

options for secondary use within departments as certain departments sometimes have to buy these boxes. Keep campus departments informed about the availability of items like styrofoam blocks as there may be an occasional request for such items.

Another waste management method is to encourage departments to return styrofoam items back to the original vendor with a note requesting that the material is reused or recycled. Unfortunately, often computers and other items are purchased without bids or vendor agreements. Work with the campus Procurement Department to include a contract clause encouraging waste reduction of packaging in vendor contracts and services. Include language that requires vendors to provide reduced waste packaging/products, with a preference for products/ packaging that will be taken back and reused by the vendor or at a minimum, can be recycled compatibly with the campus recycling program. If purchasing is de-centralized, keep departments informed on opportunities to reduce campus waste through purchasing.

Bubble wrap is another packing material that is in demand for reuse. Contact mailing services and campus departments before disposing of bubble wrap as it is expensive to purchase new and is often wanted somewhere on campus. Network with departments to identify those that frequently generate bubble wrap and those that are currently purchasing bubble wrap.

Six pack rings can also be collected and recycled. These are generated through the campus vending contract in campus kitchens and small campus convenience stores. Work with managers in these areas to encourage vendor take-back as part of the purchasing agreement. Hi-Cone is a packaging company that manufactures six pack rings and will send pre-paid mailing slips to schools wishing to participate in the Ring Leader Program so that rings can be sent directly back to the company. See **Resources** list for website information.

If the recycling program ends up handling six pack rings, work with the vending company to collect and centralize these. Contact the processor that handles campus plastics in order to determine if there is a market locally. As always, research possible reuse options as well. Local schools, on campus child care centers and other organizations may be able to use the six pack rings to make pot holders, snowflake decorations, and even volleyball nets or other craft projects.

Clothing and Canned Food
(See Chapter 25: Housing for more detailed information.)

Clothing and canned foods can be collected throughout the year at central drop-off locations. During the spring when students move out of on-campus housing, special collection points may be necessary to accommodate larger volumes of material and to provide easy access to students wishing to donate materials for reuse and recycling. Contact local charities to create collection sites and to determine types of items that are most needed by community members.

Collection sites will need to be monitored to ensure that garbage is not thrown in with reusable items. Another option is to have a vendor set up permanent and/or temporary central drop-off locations that are staffed. Publicize special collections to encourage maximum participation.

College residence halls and family housing areas are the best places to site this type of collection. Especially during move-outs, students are in a hurry to dump items. The amount of reusable products and materials that can be recovered is staggering. These collections benefit the local community while reducing the impact on the landfill.

Some schools have created "yard sales" where students can sell or trade items they want to get rid of. Another option includes collecting items that are reusable and reselling them to new students in the fall. This can be a fun activity that can reduce impact on the campus waste stream while involving the campus community in being responsible for items that they are no longer using.

Penn State University has created a Trash to Treasure program that involves the United Way. The campus and local community embraces end of the year move-outs with a highly visible effort involving hundreds of campus, local community and United Way volunteers. They collect items, bring it to Beaver Stadium, sort and display items and open the stadium to the community to purchase items collected from campus reuse efforts. The money made goes to the United Way and the average earnings from this amazing project is over $50,000 annually! [16]

Other schools such as Ohio University work to set-up extensive reuse collection in campus neighborhoods during the end of the year move-outs from campus and local residences. [17] These programs are priceless in creating collaboration to help low income families receive supplies to assist them in their time of need, while reducing the waste stream.

Campus food drives are another opportunity to help the community at large and to educate the campus on waste reduction. Cooked food or raw food waste can be recycled or donated. Some schools have established programs with local charities/food banks to donate leftover prepared, but not served, food. Direct collection from the kitchens can be set-up with the food bank. Federal and state food preparation rules need to be followed in order to ensure that all food products being donated are safe for consumption. The campus kitchen manager or food bank manager should be familiar with the rules governing this practice. Otherwise, consider composting leftover food waste and yard waste. See Chapter 14: Composting for more information.

Cooking Grease

Cooking grease is a common item that is recycled on a local level. Ask campus kitchen managers if cooking grease is currently being recycled. If not, look in the phone book or online for the nearest dealer or contact local restaurants to determine where and how local cooking grease is being recycled. Be sure to collect cooking grease at athletic events and other campus events that serve food.

Some schools have created on-campus biodiesel processors which can utilize campus cooking grease to fuel campus vehicles.

Appliances

Appliances often require special handling because, in addition to scrap metals, hazardous chemicals (including ozone depleting substances) may be present and require special handling in the recycling or disposal process. Appliances may contain refrigerant, foam, plastic, glass, PCBs, mercury, and oil. Many state and local waste management specialists have developed programs for disposing of appliances such as refrigerators, freezers, and air conditioners, and dehumidifiers. The EPA Responsible Appliance Disposal (RAD) Program partners with local organizations such as utility companies, manufacturers, universities, and other interested groups. [18] Some waste management companies will offer rebates for certain appliances which can offset some of the collection costs necessary for recovering appliances.

Collection is typically done in a 20-yard dumpster or larger. More valuable materials (such as certain metals) may need to be separated and stored in a locked facility to prevent theft. Make sure that all rebates are made by check, not cash, and collect all receipts.

Chemical and Hazardous Waste

Campuses generate chemical and hazardous waste through campus operations such as construction and demolition and through academic classes that perform research and laboratory experiments. Campuses also generate chemical and hazardous waste in art studios, photo labs, engineering departments, campus hospitals, and through agricultural practices.

Many campuses are placed in the high-volume generator category for chemical and hazardous waste. Thankfully, more and more recycling programs are becoming available to safely deal with specific types of hazardous waste. Find out how the campus Environmental Health and Safety Department is managing these chemicals and hazardous materials. This department should have records on what chemicals are produced and where they are located on campus. Some of these chemicals are probably already being recycled. Even if the recycling program does not directly handle such materials, the program should still be aware of proper handling procedures and advancements in recycling these materials. Typically, departments contact the Environmental Health and Safety Department for pick-up on items that need to be disposed of. Materials are collected according to hazardous material handling laws which include storage regulations.

The program should track these materials along with other recyclables to create a complete picture of materials are being recycled on campus. Encourage campus departments to buy what they need as over purchasing will lead to expensive disposal fees for unneeded materials.

Campuses work with local hazardous material contractors to dispose of toxic wastes. Perform reference checks on contractors and require certificates of disposal to track the amount of waste generated and note whether material is recycled or disposed of as hazardous waste. For example, though lead is a scrap metal, it may be necessary to handle it as a hazardous/special waste. It is sometimes contained in

paint, pipes, and wall linings. Medical facilities generate lead in various practices; even lead aprons used for X-rays will become part of the waste stream when they have reached the end of their life cycle. The lead from these aprons can be recycled if it is removed from the plastic and accompanied by a certified letter stating that the lead is radiation free. Before collecting lead items, network with scrap metal dealers as many do not collect lead items.

Mercury, another scrap metal, is also a hazardous waste. It is found in light bulbs, thermostats, thermometers, blood pressure devices, esophageal dilators, batteries, automobile switches, etc. Check with the campus Environmental Health and Safety Department to learn about the programs that are currently in the place to recapture mercury from its source. Options are growing for mercury recovery, while laws are being created to reduce the use of mercury in products and practices. Lead and mercury use should be discouraged whenever possible. These materials are expensive to manage in the disposal process.

Compact florescent light bulbs (CFLs) contain mercury and, as they are becoming more prevalent in campus and municipal waste streams, many communities have begun to set up special collection sites to handle them. Household hazardous waste collection facilities will generally accept CFLs. Consider working with the local MSW collector to establish periodic collection days for CFLs and other items containing mercury.

Work with the Environmental Health and Safety Department and the facilities auto shop to ensure that motor oil, anti-freeze and other gas mixtures are being recycled. Campus automotive areas (including academic shops) are full of potential recyclable items including: auto parts for scrap metal, fluids like oil and anti-freeze, batteries, and tires.

Universal Waste

Universal Wastes are items that are federally designated by the EPA as being hazardous, and therefore requiring special handling for recycling or disposal. These wastes include batteries, pesticides, mercury containing equipment, and bulbs/lamps. Federal regulation (administered by the EPA) governs the collection and management of such wastes. Management and treatment of universal waste may vary state by state. [19] See “Universal Waste” in the **Resources** section at the end of this chapter for both federal and state regulatory information.

Recycling programs are frequently designated the responsibility of handling the disposal of universal wastes. It is common for recycling program employees to collect, store and monitor these wastes. Consult with the campus Environmental Health and Safety Department to ensure that the program meets all state and federal guidelines for universal waste handling, treatment, and disposal. It can be very expensive to dispose of these wastes and not all universal wastes can be recycled, but there are plenty of contractors available to manage this specialized waste stream. Make sure to work with a reputable contractor; visit the recycling facility and obtain a certificate of disposal to ensure that items are being disposed of or recycled properly. This will allow the recycling program to minimize the risk of a contractor illegally dumping universal waste.

Tracking

When managing many of the special materials described above, a main part of the job will be tracking the amount of materials generated in which locations and determining disposal methods. Establish a variety of tracking systems that include comprehensive documentation of the campus waste stream while separating specific areas (e.g. housing, dining, and facilities) and materials (hazardous wastes, organics, reusable supplies.) Record both recycling/disposal costs and revenue paid. Tracking is the most important documentation for a recycling program as it provides endless information that will support the continued existence of the program by proving cost effectiveness. See Chapter 8: Tracking Materials and Cost Benefits for more information.

Getting the Word Out

It is sometimes difficult to get the word out about all the recovery opportunities available through the campus recycling program, but this is especially important when dealing with less easily recyclable materials. Encourage awareness and inspire campus participants to ask the question: Can it be recycled or reused?

Create a departmental contact email list (which includes student groups) and post important program resources annually, or more frequently if there are any programmatic changes. Create and promote a materials recovery list that is accessible from the program website. Target areas that generate special materials and keep personnel informed on new markets and handling procedures. See Chapter 23: Education and Promotion- Getting the Word Out for campus outreach ideas.

Resources

General Information

How Can I Recycle This?
http://www.recyclethis.co.uk/

University of Massachusetts Amherst
https://www.umass.edu/wastemanagement/

Asphalt, Brick, and Concrete
See Chapter 12: Construction and Demolition Recycling Resources section

Scrap Metal

Brass Recycling- Action Recycling Center
http://actionrecyclingcenter.com/brass-recycling/

Copper Recycling- Action Recycling Center
http://actionrecyclingcenter.com/copper-recycling/

Institute of Scrap Recycling Industries
http://www.isri.org

Precious Metal Recycling- Action Recycling Center
http://actionrecyclingcenter.com/gold-recycling/

Steel Recycling Institute
http://www.steelsustainability.org/

Automotive (tires, batteries, oil, antifreeze, oil filters, etc.)

Automotive Service Equipment- Antifreeze Recycling
http://www.asedeals.com/other-tools-and-equipment/fluid-system-service/antifreeze-recycler/

Battery Council International
http://www.batterycouncil.org

Call2Recycle- Rechargeable Battery Recycling
https://www.call2recycle.org/

Used Oil Management Association
http://usedoilrecycling.com/why-recycle-used-oil-materials/

Pallets and Wood Waste

CHEP- Pallet and Container Pooling
http://www.chep.com/

USDA Forest Service- "Successful Approaches to Recycling Urban Wood Waste"
http://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr133.pdf

Junk Mail

The Federal Trade Commission (FTC)
https://www.consumer.ftc.gov/

The Mailing Preference Service (MPS)
http://www.stopjunkmail.org.uk/guide

Confidential Papers

University of North Carolina at Chapel Hill- Confidential Paper Recycling
https://facilities.unc.edu/operations/building-services/waste-reduction/campus-recycling/confidential-paper/

Shred-It
https://www.shredit.com/en-us/home

Electronic Waste/ Computers

Apple Recycling Program
http://www.apple.com/recycling/

Dell Computer Recycling and Exchange
http://www.dell.com/learn/us/en/uscorp1/dell-environment-recycling?c=us&l=en&s=corp&cs=19&redirect=1&pcatid=cr-dell-earth-recycling

Computer Recycling Centers by Location
http://search.earth911.com/?what=computers&where=&latitude=&longitude=&country=&province=&city

EPA eCycling
https://www.epa.gov/recycle/electronics-donation-and-recycling

The Green Guide to Recycling Appliances and Electronics
http://www.partselect.com/JustForFun/Guide-to-Recycling-Appliances-and-Electronics.aspx

National Cristina Foundation (Computer Donations)
http://www.cristina.org/

Nonprofit Recycling and Reuse Network
http://nonprofitrecycling.net/

Orion Blue Book Online
http://www.usedprice.com/index.html

Cell Phones

Don't Trash Your Cell Phone- Recycle It!
http://www.recyclemycellphone.org

Eco-Cell
http://eco-cell.com/

Cassette Tapes (Audio and Video), Diskettes, CDs and DVDs

CD Recycling Center of America
http://cdrecyclingcenter.org/

Far West Fibers
http://www.farwestfibers.com/

GreenDisk
http://www.greendisk.com/

Polymer Recovery Systems
http://www.prsi.com/

Recycle for Breast Cancer
http://www.recycleforbreastcancer.org/

Envelopes (Tyvek, Padded, and Other)

DuPont™ Tyvek® Nationwide Recycling Program
http://www.dupont.com/products-and-services/packaging-materials-solutions/industrial-packaging/articles/recycling-information.html

Imaging/Copier Supplies

Cartridges for Kids
http://www.cartridgesforkids.com/

Styrofoam Peanuts, Block Styrofoam, Bubble Wrap, and Six Pack Rings

Earth911- Recycling Mystery: Expanded Polystyrene
http://earth911.com/news/2009/03/09/recycling-mysteries-styrofoam/

ITW Hi-Cone- Six Pack Ring Recycling
http://www.hi-cone.com/index.php?id=39

Clothing and Canned Food

Gleaning, Emerson Good Samaritan Food Donation Act
http://www.usda.gov/news/pubs/gleaning/appc.htm

Goodwill Industries International, Inc.
http://www.goodwill.org/get-involved/donate/

Salvation Army
http://www.salvationarmyusa.org

Society of St. Andrew Gleaning Network
http://www.endhunger.org/gleaning-network/

Appliances

Appliance Recycling Centers of America
http://www.arcainc.com

The Green Guide to Recycling Appliances and Electronics
http://www.partselect.com/JustForFun/Guide-to-Recycling-Appliances-and-Electronics.aspx

Jaco Environmental Inc.
http://www.jacoinc.net/

PG&E Recycling Rebate Program
http://www.appliancerecycling.com/weborder/rebatex.aspx?ProgramID=1

Chemical and Hazardous Waste

EPA Hazardous Waste Recycling
https://www.epa.gov/hw/regulatory-exclusions-and-alternative-standards-recycling-materials-solid-wastes-and-hazardous

CBG Biotech (Solvent Recycling Company)
http://www.cbgbiotech.com/

Clean Harbors Environmental, Energy, and Industrial Services
http://cleanharbors.com/

Universal Waste
https://www.epa.gov/hw/universal-waste

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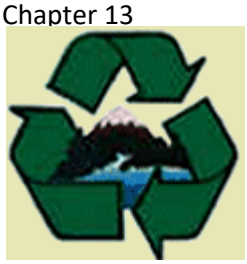

Construction and Demolition Recycling

Construction and demolition (C&D) wastes are the debris generated during construction, renovation, and demolition projects. These include a variety of materials such as: wood, scrap metal, tile, concrete, brick, asphalt, carpet, vinyl, laminate, sheetrock, ceiling tiles, air filters, wiring, yard waste, soil, glass, roofing materials, and insulation. Make sure to define what types of wastes are created. Most of these products are not harmful to the environment in their original state, but once adhesives, laminates, fasteners, paints, caulk, and other hazardous chemicals are applied, these same materials can leach hazardous waste from a landfill, potentially contaminating nearby soil and water sources.

Reducing C&D debris conserves landfill space, reduces the environmental impact of manufacturing new materials, and can decrease overall building project expenses through purchase/disposal cost avoidance. Recycling construction wastes reduces disposal and landfill costs and can generate income. Assess current C&D waste management procedures on campus and determine what can be changed in order to be more sustainable.

Many campus construction projects are controlled by outside contractors, but it is important to manage *all* waste generated on campus. This can be done through contract specifications and education. Work with the construction department to incorporate waste reduction language into contracts that require projects to reduce, reuse, and recycle all waste generated by construction and demolition. Create an educational brochure outlining local options for reuse and recycling. Encourage construction project managers to consider donating items such as lockers and cabinets for reuse during the demolition process or to reuse existing items in new construction/remodels. Constantly look for opportunities to reduce waste generated from campus construction projects, reuse materials, and maximize recycling of those materials that cannot be reduced or reused.

Incorporate project waste into the campus waste stream whenever possible. For example, if there is a campus cardboard contractor, work with this contractor to provide services to C&D projects. Fees for the cardboard service may be appropriate depending on the volume of material that is generated at the C&D site. Offer on-site paper and bottles/cans recycling for free to the construction company. This goodwill gesture will indirectly encourage the contractor participation in C&D recycling of.

When drawing up contracts, be sure to include language requiring a reporting mechanism. This serves the dual purpose of ensuring that waste is being handled appropriately and creating an opportunity to demonstrate the effectiveness of campus recycling and waste reduction efforts. The material generated in these large projects is noticeable and the impact of waste reduction supports the recycling effort. If possible, make presentations on this issue at the pre-construction meetings as is done for fire safety and

hazardous material generation. Be sure to provide contact information for further assistance. More and more contractors are seeing waste recovery as a way to save money in disposal fees.

Remember to provide campus construction and maintenance shops with well labeled recycling bins. These areas can produce large quantities of waste and manage most campus remodel projects. Educate, educate, educate!

Wood

Wood from C&D can be in many forms including trim ends, plywood scrap, solid lumber from cabinet and furniture construction, crates, spools, saw dust, wood chips, and shavings, plywood, oriented strand board, particle board, fiberboard, laminated beams, shingles, I joists, and treated wood such as decking, utility poles, marine pilings, and fence posts. During remodeling, wood could be in the form of items that can be reused such as finished pieces of furniture, doors, or cabinets. Recycling wood is not straightforward. Many areas have local wood recyclers. Be sure to clarify exactly which types/forms of wood are acceptable and how they must be prepared for recycling. Label collection bins and educate users on what types of material are acceptable.

Sawdust, chips, and shavings are easily composted with yard waste. Make sure to keep treated wood waste separate from compost. Composting operations can use ground particle board or plywood as bulking agent for compost. Dimensional lumber is often ground for landscape mulch.

Charity organizations such as Goodwill and the Salvation Army will accept furniture and cabinets for reuse. The campus carpentry shop may already be reusing cabinets and doors on campus on a regular basis. The local landfill might have a section specifically designated for C&D recycling. There also might be local companies that accept wood for recycling. Another option is to find a company that accepts scrap wood for use as a biofuel.

Additionally, work with the Campus Grounds Department to recover usable wood from campus restoration and tree cutting that can be milled for campus construction projects.

See Chapter 12: Special Materials, Chemical and Hazardous Wastes.

Land-Clearing Debris

Land-clearing debris contains a lot of wood as trees. Trees can be sent to wood processing plants to manufacture particle board, chip core, or laminates, animal bedding, mulch, or decorative landscaping material, pulp and paper products or composting material. Dirt is also sometimes classified as debris in the C&D process and is often sent to landfills to use as cover material or to other construction sites for use as fill. Other debris, like shrubs, grass, and flower material should be composted. Check with local forest product processors to determine if there is any opportunity to compost and/or reuse the material.

Asphalt Pavement and Shingles, Brick and Concrete

Concrete is made up of cement, water, and aggregate, such as crushed stone, sand, or grit. Mixed with cement, crushed concrete can be used for projects that call for a cement stabilized base. This recycled material is less expensive than crushed rock alternatives, and it helps preserve the environment by reducing the need to mine new materials. Larger pieces of crushed concrete can be used as rip rap or 3" to 5" bull rock.

Brick can be taken to a landfill where it is crushed to make roadbed material around the landfill. Brick can also be reused if whole brick is intact. Contractors frequently incorporate recycled asphalt paving into new asphalt mixes. Asphalt shingles are recycled into new shingles or pavement products. There is likely to be local company or landfill that will recycle these products.

Ceiling Tiles

Ceiling tiles generally are easier to recycle if a large volume has already been generated. The Armstrong Commercial Ceiling & Walls Recycling Program will pay freight costs for shipments of 30,000 ft^2 or more anywhere in the U.S or Canada, but campuses will be required to pay shipping fees for smaller amounts. In order to avoid these fees by generating enough material, communicate with other institutions that may have ceiling tiles that need to be disposed of as well.

Polyvinyl Chloride (PVC) Piping

Polyvinyl chloride (PVC) is a difficult material to recycle because of the high quantity of additives that are used during the production process. It also has the potential to interfere with recycling other resins if commingled because of PVC's unique chemical makeup. While identifying a local facility with the capacity to recycle PVC may be difficult, there are a number of companies that are now accepting PVC for recycling.

Scrap Metal, Paint Cans, Aerosol Cans

Steel has the highest recycling rate of any material in North America; more steel is recycled annually than aluminum, paper, glass, and plastic combined. All steel has recycled content, but the proportions of recycled content depend on the type of steel-making furnace used in the manufacturing process. There are two kinds of steel making furnaces: basic oxygen furnaces (BOF) and electric arc furnaces (EAF). The basic oxygen furnace uses 25-35% recycled steel to manufacture new steel. The electric arc furnace uses more than 80% recycled steel.

Recycling scrap metal from a construction site is usually a day-to day occurrence. Provide campus construction managers with a permanent scrap metal dumpster for smaller construction jobs. This dumpster can be put on a schedule or called in when full, thereby establishing a very economical way to handle this type of waste. Local scrap dealers often have collection systems in place for large scale scrap recycling. The material is cheaper to collect than garbage and often yields revenue, making it a valuable financial and environmental asset to a college recycling program.

Hazardous Waste

Campus construction projects generate notable amounts of hazardous waste including asbestos, mercury, polychlorinated biphenyls (PCBs), chlorofluorocarbons (CFCs), lead, oil, and lab chemicals. Make sure all hazardous waste is handled properly during deconstruction. Many campuses have Environmental Health and Safety Departments to manage these types of wastes. See Chapter 12: Special Materials, Chemical and Hazardous Waste.

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Chapter 14

Composting

Composting is nature's way of recycling. It is a controlled biological reduction of organic wastes to humus and is a simple, low-impact process which reduces greenhouse gas emissions, resource consumption, and waste. The end product, compost, is used as a soil amendment that enriches soils by providing plants with nutrients, supporting beneficial soil life, reducing soil diseases, increasing water retention in sandy soil and adding drainage to clay soils, promoting weed and erosion control, and providing a safe and sustainable alternative to petrochemical fertilizers. Organics in general, make up a significant portion of a municipal and campus waste stream. With expanding opportunities in composting, campuses can make a significant reduction in waste, while reducing campus GHG emissions, through composting.

For a campus there are opportunities to:

- collect and process campus yard debris on site, with the resulting product being usable on campus grounds. This reduces the need for pesticides and also saves money in re-purchase of soil amendment.
- campuses produce large volumes of food waste and potentially compostable food service disposables that can be collected and diverted to a composting system. Many campuses are looking at on-site operations while local areas are finding processors are becoming more available to manage this material locally.

Benefits of Composting

Organic materials make up a large percentage of a university waste stream. This includes campus yard debris, food waste, compostables (requires changing the inputs from wasteful disposables to food items that are compatible with an on-campus or off-campus compost processing system.

Composting provides an alternative to incineration or landfilling organics, which can be quite dense, have a high per ton disposal cost, and release significant sources of methane when decomposing in a landfill, thereby contributing to global warming. Compost improves soils water retention, aeration, and

adds lost nutrients. Composting can save money in disposal costs and the campus grounds department money on buying mulch, fertilizer, and pesticides. The system may be worked into the curriculum of courses such as sustainability, biology, soil science, and ecology.

Compostable Materials

Compostable materials include organics such as grass, leaves, tree limbs, shrub waste, non-hazardous animal lab waste, hand towels, paper plates, napkins, wax and paper cups, wax and non-wax cardboard, pre and post-consumer food waste such as coffee grounds, tea bags, egg shells, and fruit vegetable, and grain waste.

College campuses have countless opportunities for collecting compostable materials**:** yard and leaf waste; pre-consumer food prep; post-consumer food, and compostable food ware. Building composting systems into campus operations is a vital part of reducing campus waste and greenhouse gas emissions. Incorporating composting into all campus grounds operations, campus food service areas, catered events and other campus festivals, conferences, and athletic events is an important part of minimizing the campus waste stream.

Contractors and Farms

Hiring a contractor to manage a college composting program could be a possibility depending on where the school is located and if such contracting services exist. Farms may accept yard waste for composting. Hog farms have been known to accept food waste as feedstock. Contact the local City or County; some areas have composting programs set up especially for yard waste. More and more communities are implementing local composting programs that will also take pre and post-consumer food waste and compostables (such as paper food ware and compostable bioplastics). Local food banks may accept donations of food for the hungry and take food that has cooked but was not served. In any of these cases, the most important thing is to make sure the organic material is separated correctly and meets the accepting entity's specifications.

Specifications

Control the following parameters of a compost pile: carbon and nitrogen inputs, size, surface area, moisture, air, volume, and temperature. The compost pile is full of microbes such as bacteria, protozoa, and fungi. Microbes need food, air, and water for survival.

The optimum carbon to nitrogen ratio is 30:1 by weight. Examples of materials with high carbon content are often brown in color and include dry leaves, straw, bark, paper, wood chips and sawdust. Examples of materials with high nitrogen content are often green in color and include food waste, grass clippings and manures. The latter could potentially create odor and vector (rodent) issues.

Shred the material before placing it in a compost pile. This will speed up the decomposition process by increasing the amount of surface area on which the microbes have to work. The material should be moist but not saturated. Too much water will eliminate needed air space. Squeeze a handful of the material to make sure it is like a damp sponge. The optimum moisture level is approximately 40-60%. Water should be mixed evenly into the pile. Composting is an aerobic process. If the pile is not turned, it will become anaerobic (without oxygen). Anaerobic conditions will cause odors and create chemicals that are toxic to plants.

Piles should be between 27 and 125 cubic feet. If a pile is too small it will not generate and hold enough heat for the composting process to occur and if it is too large it will not be aerated enough for microbes to receive sufficient oxygen. Optimum temperatures range from 90-140 F (32-60 C). Most microbes die when temperatures rise above 160 F, whereas pathogens are usually destroyed around 131F (55 C).

Composting Methods

What and how you choose to compost depends on many factors including space, funding, local land use regulations, and available labor. Composting space requirements can vary from as large as several acres to as small as a parking space. Common methods include grasscycling, hot or cold piles, long rows (windrows), in-vessel, and vermicomposting.

When grass is cut and left on the lawn, it is called grasscycling. The cut material simply decomposes on site adding beneficial organic matter to the soil, reducing the need for fertilizer, and reducing water evaporation. This will not create a thatch problem. Thatch is a mixture of roots, dead leaves and rhizomes that decompose slowly. Grass is a rapid decomposer. Keep the mower blades sharp, mow more often cutting less than one inch off the leaf, mow dry grass, and do not over-fertilize.

Piles can be any size and either contained or uncontained. It will take a longer time for a smaller pile to decompose because it will not generate as much heat as a larger pile. Make the pile no taller than the person working on it unless heavy equipment will be used. The pile will shrink and spread out over time. To contain it, build or buy a compost bin. A circle of chicken wire will work, as will a more elaborate wood bin, or store-bought plastic or wood bin from a garden store. Piles are usually used for small scale composting although they can be as large as cars. Depending on what is put into a pile and how it is managed, a pile it can take up to a year to yield finished compost, but generally produces finished compost on a much shorter time frame.

Aerated piles are made the same way regular piles are made except these piles have systems to facilitate more air flow. Such systems can be as simple as a pallet under the bin or as elaborate as PVC tubing with forced air inserted into a compost pile. More air generally speeds up composting processes.

Windrows can handle tons of organic matter. This type of pile is usually long, narrow, and at least four feet high. When implemented on a large scale, heavy machinery such as a front-end loader and/or windrow turner is usually required. Windrows can be covered or uncovered. This method is often used for large institutions, cities, and counties.

Tumblers are composting containers that rotate or turn. Some work is done manually; other work utilizes a motor. These units work by allowing the contents to heat up rapidly and retain moisture. Air is limited, but present. This method is best for small-scale, fast composting. Tumblers are available for purchase at garden stores and home improvement centers.

In-vessel composters can compost anywhere from a few hundred pounds to over 60 tons a day. Organic waste including meats, oils, fish, and dairy products are placed in the container and mixed, shredded,

and fluffed by the composter. Some composters are fully automated with sensors to monitor temperature, oxygen, and moisture. Biofilters are used to reduce or eliminate odors. This method is most appropriate for institutions that generate large quantities of organics.

Vermicomposting uses red wiggler (*Eisenia foetida*) worms to do the work of composting. Vermicomposting requires air, water, and food the same way aerobic composting does, but in this case the worms (rather than the heat produced by the microbes) do the bulk of the composting work. The worms eat the organics and leave behind castings which can be used as nutrient rich plant food. These systems are available in a variety of sizes. A ten-gallon container can handle a small department's food waste. A continuous flow system could handle a large institution's food waste.

Collection and Transportation

Once a composting method has been selected, the next step is to determine how to transport materials from the source to the composting operation. For yard waste, determine what is currently happening with the material, the amount generated, and how the campus grounds crew collects and transports yard waste. If grass is currently bagged, how will it be incorporated into the composting system? The grounds crew might have a routine for the entire year that can be reviewed to determine how much and what kind of material is generated. For example, lots of tree or bush cuttings are typically generated at one time of the year and more grass and flower waste during other times. Is there enough carbon material to mix with the nitrogen material? Some composting operations have to find alternative sources of carbon and nitrogen. Collection systems will depend on volume. Regular trucks (including trash and dump trucks) may be utilized to collect and haul material.

If there is an opportunity to compost food waste and animal lab waste, find out how the waste is currently handled and determine how much waste is generated. Determine whether the system will handle only pre-consumer food waste or both pre and post-consumer food waste. Determine what type of animal lab waste is acceptable for composting. Make sure to only collect *non-hazardous* animal lab waste. Research any regulations concerning this type of waste.

Select sturdy bins that have lids and wheels and place the bins in strategic locations in order to collect the greatest amount of material. With a small amount of material, the collection system can be very low-tech. A 30 or 40-gallon bin with a lid and wheels would probably do the trick for collection. Depending on the situation, a can liner may need to be used in the bin.

Keep in mind safety issues concerning lifting because food (including lots of liquid) and animal waste can be heavy and awkward to move. Make sure to designate a place to clean out bins between uses. Color code and label bins clearly. For bin transport in a vehicle, make sure the lid is on tight and the bin is strapped in. For large-scale operations, use larger bins such as 60 or 90-gallon containers with lids and wheels. Assess the need to use heavy machinery and hydraulic systems. Examples include but are certainly not limited to: using a rear, top or side loader sealed trash truck to set up an all-organics collection route, using a dump truck for yard waste, using a hydraulic lift on a truck to empty 90 gallon carts, and having a tank full of water on the truck for cleaning out empty carts on site. Regardless of how

the waste is collected, be reliable in picking it up. Food and animal waste cannot sit around waiting to be collected. Set a schedule and stick to it.

Education

To institute a composting program in a dining hall that feeds hundreds of students, education is the key to success. Signs are a must and adding photos can help as well. During the first few weeks of school, designate a volunteer to stand by the collection bins to explain the new program. For events composting, station volunteers at sites for monitoring and educate the public about what is acceptable for campus composting. In campus kitchens, educate staff and managers. Provide periodic refresher presentations because of changes in the student body and staff. Brochures and posted guidelines are a helpful reminder as well. Include materials in new student trainings and orientations. If possible, take the staff (especially anyone who is involved in the composting process) out to the composting site to explain the process, savings, and resulting applications.

If hand towel waste is integrated into the composting collection process, remember to train the housekeeping staff and to include faculty and administrators in education efforts. Depending on the size and complexity of the recycling and composting processes in cafeteria areas, it may be helpful to create a small training or reference booklet or flyer for staff members. Remember to include faculty and administrators in education efforts. Articles in the school paper, e-mail, posters, and bulletin boards are all effective ways to spread the message. Provide the campus with updates on the progress of the program. This serves the twofold purpose of creating good PR while also reminding the campus population about the collection process. Post signage in a prominent garden that explains how compost made on campus from materials found on campus provides nutrients to the site. This is a great way to educate the campus community about the benefits of closed loop systems.

Compost Usage

Finished compost should be fine, dark, sweet smelling, have a pH that is 7.0-9.0, and no longer be heating up. Depending on the methods used and the materials composted, it may be necessary to screen the compost to take out larger pieces that have not fully decomposed. Determine how fine to make the end product based on its intended use. Compost can be used as mulch around shrubs, trees, flowers and on paths, as soil amendment to break up clay type soils or bind sandy soils, as a lawn top-dressing, or for potting soil for house plants. Many people use compost in gardens instead of chemical fertilizers to provide nutrients to plants. It is also commonly thought that using compost can reduce or eliminate the need for chemical pesticides. Placing finished compost in a cloth bag and soaking it in a bucket of water for three to five days makes compost tea, a nutrient rich, liquid plant food.

Special Considerations

Funding is usually the first concern for any project. How much to budget will depend on the degree of technology to be used. Site concerns are important especially in urban areas. Be sure to educate the neighbors; let them know what is happening, why there is a composting site, and invite them to participate if possible. Controlling odors is very important. Composting will not create unpleasant smells it the piles are managed correctly. Research the regulations that may apply to performing a composting

operation on the chosen site. State or local ordinances may allow composting, but only using certain methods. Compost can be tested to assess the variety of nutrients in the finished product. This will help to determine correct concentrations when applying compost and will also be a useful aid in trouble-shooting any problems that may arise.

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Chapter 15

Bioplastics

As concerns grow about dwindling landfill space and petroleum scarcity (and therefore the future availability of plastics and other petroleum based products) manufacturers have begun to explore alternatives to traditional resins. With climate change and zero waste initiatives at the forefront of environmental concerns, industry is reacting by designing new products that are petroleum content free and compostable, thus seemingly reducing environmental impacts through consumption choices. These choices provide consumers with the opportunity to be part of the solution.

There are two main types of biodegradable plastics or bioplastics. The first is polylactic acid (commonly referred to as PLA) which is a completely new resin. The second type of biodegradable plastic is standard resin with additives to promote biodegradability. These bioplastic resins are made from corn, potatoes, sugarcane, or other plant cellulose sources. It is the organic nature of these manufactured polymers that increases end use biodegradability. It should be noted that besides petroleum, which is also plant based, traditional plastic resins also commonly contain additional plant based additives such as cellulose.

The main benefit of PLA containers is that they can be composted and therefore should not take up landfill space if disposed of properly. PLA containers also use less petroleum through manufacturing processes than conventional plastic containers. According to Natureworks LLC, a leader in biopolymer manufacturing, the corn based products created by the company use 65% less petroleum and contribute 68% fewer greenhouse gas emissions to the atmosphere than traditional resins. [20]

Despite the potential environmental benefits of PLA containers and other biodegradables, they are not an end all solution to waste. To the contrary, bioplastic manufacturing processes are energy intensive and bioplastic products are generally designed for single use rather than durability. When working

towards campus sustainability, it is important maintain a broad view of waste management and remember: “Reduce, Reuse, Recycle,” when making decisions. PLA products fit into the recycling/composting category, but do not address issues of consumption and if single use containers are necessary in the first place.

It is important to comprehend a product's properties in order to determine how best to deal with it at the end of its life cycle. Generally, only bioplastics that are 100% PLA are compostable through industrial composting processes. Bioplastics made from mixed resins (such as a combination of PET and PLA) are frequently touted by manufacturers as recyclable, but are typically viewed by recycling companies as contaminants. As new products appear on the market, be in continuous communication with local recyclers and composters in order to determine what can and cannot be collected for reprocessing. Otherwise, items that are collected with no available market become waste.

If bioplastic containers are collected with other compostable materials (such as food scraps), ensure that the materials are collected in biodegradable bags. A typical plastic bag will contaminate the composting process. The Biodegradable Products Institute (BPI) lists products that are generally accepted at industrial composting facilities. There are a variety of bioplastic items that contain plastic polymers that are not compatible with industrial composting processes. As specifications may vary, make sure to double check with the local industrial composting facility before choosing a product, even if BPI lists it as biodegradable. Be aware that biodegradable bags and containers will degrade over time and cannot be stored indefinitely, especially at higher or continually fluctuating temperatures. Such products should be utilized within eight months of purchase for best results.

While bioplastics will biodegrade over time, they require special handling procedures in order to fully decompose back into a useful end product and will not readily decompose if placed in a landfill or basic home composting system. Industrial composting processes are required to melt PLA plastic back into reusable components because typical home composting systems do not reach high enough temperatures to break the polymer chains. PLA generally requires temperatures of at least 150° C in order to break down. While industrial composting facilities with these capabilities exist, they may not be readily accessible to local recycling and composting programs or may not have the capacity to handle the amount of PLA waste generated by a large institution such as a university. As with any recyclable item, an existing market is required before the Campus Recycling Program starts collecting. Assess the feasibility of collecting and processing PLA containers before purchasing such items for use on campus. Use durable food ware whenever possible, or items that are inherently biodegradable, such as paper plates or food boats without plastic coatings.

If the campus *does* decide to begin purchasing bioplastic products as replacements for traditional plastic items, be selective in the types of containers that are purchased and establish clear collection and disposal guidelines. Work with the campus Purchasing Department to choose compostable containers (100% PLA) that are easily distinguishable from non-compostable containers. This will make composting guidelines far easier to explain to consumers. For example, containers with a bright green stripe or that read, “Biodegradable” will be easily identifiable in the waste stream. Currently, many bioplastic

containers look very similar to conventional plastic containers. However, PLA is different from conventional plastics with respect to both physical and chemical properties. If not properly separated, PLA will act as a contaminant to PET, HDPE, and other resins, and will undermine the integrity of the new products created with these plastics. Similarly, standard resins, or mixed PLA/PET blends, easily mistaken for 100% PLA, will contaminate composting processes. This can result in major health and safety concerns as well as significant financial losses on the part of the recycling and composting facilities processing the materials. Therefore, PLA containers should be used only as a last resort in a highly managed waste stream. Otherwise, contamination occurs, and highly recyclable plastics are replaced with a material that becomes a lasting burden in a landfill despite its claim to biodegradability.

Consider staffing waste stations in order to educate the campus community regarding what is acceptable for composting, what can be recycled, and what is considered trash. Be available to answer questions. This is especially important when new biodegradable products are introduced into the campus waste stream as it will significantly decrease contamination.

Be aware of a product's entire life cycle before introducing it into the campus waste stream. While PLA products use less petroleum than conventional plastics, they do not have the durability or recyclability of PET or HDPE. Identify which sectors of campus would benefit from PLA products and which would benefit more from traditional plastics recycling. In addition to low-durability, there are other factors to consider in assessing a PLA product's life cycle. Was it made with genetically engineered corn which increases soil erosion, contaminates air, water, and soil with biocides, disrupts local ecosystems, and cross-contaminates nearby non-GMO crops with new biological material? What sort of energy source was used to manufacture the product? How much energy will be required to heat the product in the industrial composting process in order for it to biodegrade? The same types of questions need to be asked more frequently with regards to PET and any other materials, but are especially important when deciding whether or not to replace an existing waste management system with a new one.

The best application for bioplastic is as a replacement material for single use trash items. Consider all implications of replacing a highly recyclable item such as PET plastic bottle with a bioplastic container. This may lead to consumer confusion and can promote the misconception that traditional plastic is compostable or that bioplastic is recyclable within existing processes. If previously recycled items are replaced by bioplastics, be certain of the new product's chemical composition. For example, if a product is marketed as a bioplastic, make sure *all* components are PLA (instead of a mix of PLA and traditional resins) before composting. Thoroughly research the benefits and drawbacks of any product or process before introducing it on campus.

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Chapter16

Legislative Compliance

Recycling legislation has become an important component of successful recycling programs. It is highly encouraged to research any and all possible legislative action concerning recycling within all levels of government. Continue to follow legislative changes that effect recycling and solid waste. There are laws that govern recycling/composting and waste management that affect how campus programs are operated. Additionally, the law can be helpful in supporting a campus recycling effort. Federal laws have an opportunity to affect recycling through market development in a much broader manner than state law.

Resource Conservation Recovery Act (RCRA)

The best-known national solid waste legislation is the Resource Conservation and Recovery Act (RCRA) 42 U.S.C. §6901 et seq. (1976) which specifies how materials need to be managed for disposal. [21]

RCRA Goals

1. Protect from the hazards of waste disposal
2. Conserve energy and natural resources by recycling and recovery
3. Reduce or eliminate waste
4. Clean up waste, which may have spilled, leaked, or was improperly disposed

Other Recycling Laws

State recycling laws usually include language that requires counties and state agencies to reduce and recycle a certain percentage of their waste stream. These laws can also include recycled product purchasing goals, bottle bills, market development, up front environmental fees for items purchased that are harmful if disposed of improperly (usually called advanced disposal fees), reporting, and grant programs.

Most federal and state laws will be in the form of unfunded mandates, so it becomes the responsibility of state and local governments to follow the new rules and figure out ways to fund programs to comply with new legislation. Money often drives decision-making on this level. Local ordinances usually describe how solid waste and recycling programs will be implemented and funded. An example of an ordinance that encourages recycling is called the pay-as-you-throw system.

Pay-as-you-throw systems require residents to pay for solid waste by the bag or by the volume of the container. Recycling usually does not require a fee. Other funding options often applied include general taxes where the amount of money paid is rolled up into a larger amount and not broken out for the consumer to see, and solid waste fees that show up as a separate line item in the property tax bill. The

latter options encourage neither waste reduction nor recycling. Some communities pay private haulers directly for collection services. The private haulers usually bid on the government contract.

Many state systems of higher education and individual schools have implemented policies that require recycling waste as well as buying recycled products. These policies are often called recycling, sustainability, or environmental policies. The student policy arm, Student Government, can also have a major effect on the administration by passing bills that support starting or improving recycling programs, buying recycled products, or increasing student fees for recycling.

Though legislation is an important tool in supporting the institutionalization of recycling programs, its implementation is dependent upon the support and desire of folks willing to work toward a law's success. Passing a law does not guarantee the success of recycling. Laws of this genre must be accompanied by incentives and consequences to support the changes in action that the law is mandating. Find out if the state or local government has a recycling law. Utilize laws and policies to support campus efforts in establishing, implementing, and augmenting recycling programs. These laws have been very successful tools for establishing recycling programs at universities and colleges. Laws that require reporting are also helpful in supporting materials tracking. Tracking materials, performing cost benefit analyses, and using legislative compliance for further leverage are very powerful tools in establishing and maintaining recycling efforts.

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Chapter 17

Policies

Policies are written guidelines that help to influence and determine decisions and actions. In order to be effective, they must be agreed upon, followed, and enforced. Creating a Campus Environmental Policy will be extremely beneficial to any recycling or other sustainability efforts on campus because it will formalize the university's commitment to inspire future sustainability and environmental stewardship, and support existing campus environmental efforts.

Policies, like laws, are not as effective unless enforceable, but nevertheless provide valuable mechanisms for building bridges and ultimately protecting and strengthening campus environmental programs. Having an overarching, or “umbrella,” environmental or sustainability policy in place will open the door for more specific sub-policies in the future. Policy implementation requires extensive

networking through notification and follow-through, but ultimately, education is the key element in making conservation the practice instead of the exception.

MAKE CONSERVATION THE RULE AND WASTE THE EXCEPTION!

Ten Steps for Developing a Campus Environmental Policy

1) Find out how the campus is governed. There may be a clear path for policy writing and approval or the path may be very convoluted.

2) Research existing environmental policies on other campuses for more ideas.

3) Enlist the Campus Environmental Issues Committee or other interested organizations on campus to help create environmental policies.

4) Determine whether a general policy or a comprehensive policy will be most appropriate for the campus.

5) Research any existing federal, state, and local laws that support the need for a campus environmental policy and cite them in the policy.

6) Submit the policy to the appropriate campus entities (generally administrators and the board of directors) for approval.

7) Encourage student government to pass a campus "bill" in support of a policy in order to continue to influence the administrators who will ultimately decide whether or not to adopt a campus environmental policy.

8) Make a plan to implement the policy. This plan can be included as part of the policy or can stand alone as a separate document. Include the following in the policy implementation plan:

- Purpose
- Detailed description of goals
- Strategies for implementation, including educational programming and outreach

9) Treat the policy and plan as a living document. Sustainability efforts must be flexible in order to be effective: periodically review and update the policy so that it adheres to any new environmental laws and sustainability trends and revisit the strategies in the plan in order to increase effectiveness over time.

10) Continually remind and educate the campus community about campus environmental policies

IMPLEMENTATION COMES FROM EDUCATION!

Chapter18

Contracts

Before starting to analyze and create contracts, find out how the campus operates all existing garbage and recycling/composting programs. There is no cookie cutter strategy for waste management as all campuses have different challenges that ultimately determine how these operations are managed. Some campuses contract everything and others keep all of the work in-house. Hybrid programs where the garbage is contracted out and the recycling is done in house can also be successful.

If the campus collects garbage and recycling using in-house labor and vehicles, assess the process's cost effectiveness. Determine the cost per unit of existing practices and compare that to local contractors' costs per unit. If the campus contracts garbage and recycling services, make sure that the services outlined in the contract are being fulfilled.

It is feasible to change an entire system from in-house to contracting or vice versa. If the campus is considering a change to a system that has been in place for a long time, create a comprehensive plan to make this transition. Remember, there may be resistance to change from the administration and/or employees.

Generally, a contract is written for a good or service when the price exceeds a specified limit. The limit will be different for each state or private entity. As with any new program implementation, research how other campuses are managing garbage and recycling. Evaluate the campus variables and maintain a broad perspective in creating contracts. There are many components that are essential to the efficacy of the recycling/waste reduction effort that are not self-evident in creating these contracts.

Do not to sell the campus short on any of these issues. Contracts, also called solicitations, usually go out for bid every three to five years. Start making changes to a contract a year in advance. Within government run entities, there are rules to comply with that can slow down the contract process. Think ahead and allow for plenty of time to finalize the contract. Read the campus procurement code and speak with procurement officers regarding any additional questions to determine the procedures for changing a contract and bidding.

Contracts generally follow a pattern. There is a cover sheet that includes information such as the school's name, address, and phone number, a description of the solicitation and time period, a due date, and a bid opening date. The next several pages are called the boilerplate and contain information that is standard for all contracts. The requirements are commonly known as the specifications. Certain sections of the specifications can be standardized, so if a contract is being created from scratch, request copies of several contracts that have already been bid and awarded by campus procurement officers.

There are several methods of procurement. Here is how many state colleges manage contracts:

1) Competitive Sealed Bidding is a written or published solicitation issued by an authorized procurement officer for bids to contract for the procurement or disposal of stated supplies, services, or construction. This generally results in a contract award to the lowest responsive bidder that meets all of the contract specifications.

2) Request for Proposal (RFP) is a written or published solicitation issued by an authorized procurement officer for proposals to provide supplies or services. The contract award is made on the basis of evaluation factors (which must be stated in the RFP) that result in a contract that will be most advantageous to the school.

3) Competitive Best Value Bidding allows factors other than price to be considered in the award determination for specific goods or services based on predetermined criteria identified by the school.

4) Competitive On-line Bidding is essentially the same as Competitive Sealed Bidding (above), but the process is accomplished online. This could be very effective for a recycling contract since it encourages paperless communication from the start.

Imagine what the process for garbage and recycling collection will look like from beginning to end and make a flow chart. Be creative with contract specifications to establish incentives for waste reduction and recovery. The following information lists came from the power point presentation, “ABCs of Trash Contracts,” written by Laura Pergolizzi, Recycling Coordinator for the University of South Carolina in 2003. Minor changes have been made to adhere to this book's format.

Prioritize Campus Needs

- Reliability of service
- Cost of service
- Flexibility of service
- Aesthetics of dumpsters and collection sites
- Weight or volumes of trash generated
- Length of contract

Think About Containers

- Ask vendors to go over all options for containers.
- Lease, own, or lease to own?
- Who does maintenance?

- Who sanitizes the containers and how often?
- Do you want to change the size, style, or color of dumpsters or recycling bins?
- Does pick-up frequency need to be altered?
- Do site/bin signs need updating?
- Ask for pressure gauges on compacting dumpsters to know when they are full.
- Make sure that all equipment meets OSHA safety standards.

Decide What the Program Wants from the Vendor

- A designated liaison?
- Weight or volumes reported on a monthly basis?
- A daily, weekly, or monthly log from the vendor that documents problems?
- A weekly or monthly meeting with a designated vendor liaison?
- A monthly invoice formatted to program needs?
- Two-way communication with the driver?
- Designated time and days of service and/or on-call service?
- Designated response time for on-call or emergency pickups? (Confirmation #)
- Cleanup of dumpster sites?
- Assistance with annual or semi-annual waste audits?
- Call campus police to tow cars that block containers?
- Dedicated truck or route?
- Name of recycling facility, landfill, transfer station, MRF, or incinerator used for contract?
- Pay a flat fee, fee per pickup per size, fee per ton or volume?
- Pay the landfill or incinerator fee to the landfill or the contractor?
- Revenue from the sale of recyclable

Have a Pre-Bid Meeting

- Review contract expectations with bidders
- Require bidders fill out a questionnaire stating how the requirements of the bid would be met
- Take bidders on a tour of campus facilities

Provide an Out

- If contractor fails to meet contract needs
- If the service needs to be changed

Create Operating Seasons

- Academic (38 weeks)
- Winter (2 weeks)
- Summer (12 weeks)

Performance Guarantee

- If a vendor meets certain requirements, consider creating a bonus for exceeding the expectations of the contract.
- If vendor fails to meet the minimum requirements, one option is to establish an agreement that the vendor will issue a credit to the University.

Provide the contractors a list of internal contract managers and all contact information including the address to which invoices need to be sent. The final section of a contract is a price sheet. It should be a list of all expenses including service and equipment and prices. For example:

Dumpster Location	# of Containers	Size	Days of week collected	Rate per Month	Rate per Year
Science Building	1	8 yds.	MWF		
Dorm #1	1	30 yds. comp.	TTHS		
Student Center	4	90 Gallon Recycling	MWFS		

The total of the yearly rates would be the price of the contract. A more complicated price sheet would request prices for all services present and future such as dumpsters the program currently has and dumpsters that may be needed in the future due to plans for more development on campus, changes in building use, or changes in campus population demographics. Create a price sheet asking for the price of all dumpsters at all frequencies. It is important to know how prices will be affected by future events.

Keep in mind that even with fixed costs for a service, total monthly costs may be variable depending on how much material is generated and, therefore, how much service is required. For example, a 30-yard compactor may have a fixed cost of $100 a month for the lease rate, steam cleaning may be fixed cost per cleaning and, similarly, haul rates and landfill disposal rates may be fixed per load. Therefore, the total cost will vary monthly depending on how many times the dumpster is emptied that month.

One way to handle this would be to ask to be billed an average monthly price. Another way to handle this is to have two price sheets. The first price sheet will be the basic sheet asking for monthly and yearly rates. The second sheet will have the detail for the monthly break down costs. Make sure to differentiate between recycling containers and garbage dumpsters in the specifications.

Finally, the procurement officer may request a bidders list. Look in the phone book or online to find available bidders. Three is typically the minimum number required by procurement officers for a bidders list. It is ultimately the responsibility of the bidder to find the contract solicitation, but identifying reputable contractors to invite to the bidding process can be advantageous to the program. If a detail is left out of the original contract specifications, a change order can be added. Always remember to keep the lines of communication with procurement officers open in order to ensure that all contracts adhere to campus procurement code regulations.

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Chapter19

Involving Students, Faculty, and Staff

A college campus is an optimal place for a waste management effort. Besides generating of multitude of materials, it is a microcosm of office, industrial, and commercial entities. An educational institution also has the benefit of being an enclosed community with internal communication networks and a variety of resources not typically available in these other sectors. These resources are the campus community itself.

Creating alliances and giving people the opportunity to make a difference in a school and workplace setting is invaluable. Besides involving people and creating communication networks, it is important to integrate recycling and waste reduction practices into every aspect of campus daily life. Communication, offering academic experiences, and maintaining high quality customer service are some of the important aspects of campus community involvement. Gathering information from the campus population is also an important tool in assessing program needs.

Including recycling program information in all new student and employee orientations and issuing recycling collection containers and refillable mugs to new students and employees are important strategies in building and sustaining a college recycling effort. There are many opportunities to involve the campus community in numerous aspects of a college waste reduction and recycling effort while integrating it into the mission of the university.

Students

Student employees are an excellent resource on a college campus. They are in school to learn and a job in a college recycling program provides them with real-life experience in environmental coordination and program management. Students also provide an inexpensive labor force, especially when hiring work study funded student employees. They are also enthusiastic about doing something that makes a difference. Students often seek out volunteer and internship opportunities that will earn them academic credit. Campus Recycling has a wealth of opportunities for engaging students in amazing projects. Some ways students can get involved include: working on PR campaigns, spearheading grassroots efforts to draw attention to an issue, assisting with event recycling efforts, performing research and analysis, conducting surveys, and building educational displays. The possibilities are endless.

Make sure to include commuter, masters, and doctoral students as well. The institution probably has special ways to communicate with them. Masters and doctoral students may interact with the program in the same way that faculty or staff would.

Faculty

With the expansive curriculum at colleges, there are endless opportunities to integrate environmentally focused projects into course study. Many professors offer a large portion of a term grade based upon a term project or research paper. These requirements usually encourage on-campus projects. Identify possible projects and find a professor who can propose these to student or a class. Possibilities for productive projects benefit college recycling programs and involve anything from creating a business plan to launching advertising campaigns. The beauty of a college campus is that there are many opportunities to access quality input from talented faculty members who are also in a position to motivate students.

The faculty also make-up an influential part of the campus community and can serve as allies for development and support of a campus recycling effort. Building alliances with faculty can create advocacy for many aspects of a campus recycling program including encouraging recycling and waste reduction practices within faculty offices and departments. College faculty members are large waste generators and an important group to involve in a recycling effort.

Faculty members are also influential in implementing recycling and waste prevention strategies in the classroom. Presenting to classes is also another mechanism for educating the campus community. Instructors are usually amenable to class presentations or quick announcements in classes. Let faculty know about the many opportunities that a college recycling program can offer to enhance the educational experience.

Remember, these are the folks who are part of a world outside of campus. They take that knowledge and help to build and continue these efforts in their homes, among their families, and in the greater community. Not only are they an invaluable resource, but a college recycling program also becomes their resource for building a better world. Do not forget to let them know...THANKS FOR RECYCLING!

Staff

Every college has a large population of staff that is involved in every aspect of waste generation. These folks interface with the campus community in various capacities from one-on-one interactions to having communication accessibility with the entire campus. The staff often is the group that is directly involved with departmental management from purchasing to disposal.

Building bridges with campus staff is critical to the effectiveness of a college recycling effort. Establishing a communications network with staff is one of the most valuable tools for getting the word out to the campus community. With entire campuses on computer networks, it is easy to establish a listserv to post pertinent information about campus recycling efforts. These are the people on the front

lines who can get the word out to students, faculty, and administrators. Establishing recycling contacts in each department to be on the listserv is another important mechanism in involving the campus.

Remember, just like faculty members, staff members are an invaluable resource and part of a world outside of campus that they can influence with the knowledge they gain on campus. Their participation in recycling efforts is essential to building a better world. Remember to let them know…THANKS FOR RECYCLING!

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Chapter20

Committees

Committee involvement is an important component of establishing and maintaining a campus recycling effort. Establishing campus committees to address waste, resource consumption, campus sustainability, climate action plans and other environmental issues can be valuable in many ways. These committees can work to create and implement action plans, advocate and offer other support, and generate funding for college recycling programs.

Committees are an effective way to garner support for campus-wide environmental policies, sustainability guidelines, and other waste reduction/resource conservation efforts. Additionally, these committees play a valuable role in educating and involving the campus community. Many schools are forming committees to deal with recycling, waste management, resource conservation and environmental issues.

- Here are some examples of college committees:
- Solid Waste Advisory Board
- Environmental Issues Committee
- Recycling Committee
- Waste Management Board
- Campus Sustainability Committee
- Green Team

Official college committees are typically created by the president's office and require faculty, staff, and administrative participation. Some schools include students on these committees as well.

There are also opportunities to create internal or informal committees that are not necessarily sanctioned by a college president. The ones sanctioned by a college typically have chain of command, a

formal structure of membership, and a charter. Additionally, these committees have reporting requirements. Informal committees can be just as effective in making recommendations and supporting campus environmental stewardship. The key is to involve influential, dedicated contributors.

In addition to college recycling committees, it is worthwhile for a recycling program to be represented on city, county, state, and national levels and within professional committees that deal with waste management and college operations. Check within the local area to identify committees that exist to address these issues. As a college, it is important to be represented within these committees.

Government or policy related committees will provide current information and updates on laws, operations, changes, future plans, etc. that could affect the way in which a college recycling program is operated. Professional types of committees provide an opportunity to network and partner with other professionals. All of these committees help a college recycling program gain visibility, take an active role in waste management, help stimulate recycling practices in the greater community, and provide access to resources and networking, all which enhance a college recycling effort. All of these committees also give a recycling program a chance to be represented and open the door to influences beyond the campus community.

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Networking and Outreach

Communication with professionals in the same field is essential to keeping up to date on current recycling industry and education developments. Countless opportunities will arise for recycling program expansion and efficiency by learning about how other colleges and universities are handling collection and processing operations, community outreach and education, and responding to changes in recycling markets and technology. Networking can exist on a local level with other schools and recycling industry professionals in the state or region, or on a larger scale through national and global organizations.

Committees, Professional Organizations, and Partnerships

Involvement in professional organizations and committees is an important opportunity for recycling professionals as these groups provide professional information, resources, support, and networking possibilities. The individuals that participate in such groups can also provide valuable input relating to a wide variety of disciplines. On-campus committees (such as an Environmental Issues or Sustainable

Development committees) and local or regional professional organizations are a great place to start, but it is also valuable to connect with a wider range of people in order to broaden the scope of knowledge and resources that can be offered through the campus recycling effort. Partnerships can form when stakeholders, from manufacturers to recyclers to consumers, work toward the common goal of waste reduction and material recovery.

The Association for the Advancement of Sustainability in Higher Education (AASHE) is the premier organization for networking among colleges and universities. AASHE holds an annual conference as part of its professional development program as well as workshops, webinars, discussion forums, and events co-sponsored with AASHE partners. AASHE is also responsible for hosting the reporting tool used to track the progress made by American College & Universities Presidents Climate Commitment (ACUPCC) signatories. For more information about the ACUPCC see Chapter 30: Campus Sustainability.

Listservs

A listserv is an online forum that allows the user to enter into a dialogue with other listserv users after subscribing. There are several environmentally focused listservs available at no cost for participation. These communications are commonly available either in per posting format or as a weekly digest.

With numerous participants in a listserv from a variety of fields (depending on the scope of the forum) there may be discussions that will not be relevant to a recycling program on a given campus. However, topics may be relevant to other departments on campus and many of the topics will be applicable if an appropriate listserv is chosen. Do not give up on a listserv if an occasional irrelevant topic comes up.

Conferences

Conferences provide a way for professionals to meet in person, increase dialogue and create mutually beneficial communication structures to maintain after the end of the conference. Coalitions and working groups can be formed to collaborate with recycled material manufactures, lawmakers, environmental non-profit leaders, and other stakeholders. Key note speeches, panel discussions, workshops, and small group brainstorming sessions are all ways to stimulate informed discussion during and following conferences.

Publications

Magazines, organization newsletters, and professional journals provide another way of staying up to date on recent trends and advancements in waste management. Reading a broad range of materials sparks creative ideas for expanding the scope of a recycling program beyond on materials collection. Scholarly publications offer peer reviewed information that can then be relayed to the public at educational events.

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Chapter 22

Grassroots

Grassroots organizing is an effective way to get the word out and provide support for college recycling efforts. In a grassroots effort, it is important to keep folks involved in pertinent issues because all actions are community based and build up a working structure through a strong social base. Many collaborative opportunities can arise through grassroots activities such as co-sponsorship of events, publications of educational materials, and local political campaigns. A wide range of factors impact a campus's ability to be involved in recycling (especially relating to markets for recycled content materials) and other environmental issues. Grassroots efforts span the spectrum from local to global issues that have a direct impact at home.

Ideas for Campus Grassroots Efforts

- Build a recycling program through grassroots efforts in the form of petitions, surveys, letter writing campaigns, phone calls to administrators, newspaper coverage, etc. Students have been catalysts for many college recycling programs starting through grassroots efforts.
- Large quantities of bottles and cans are generated on college campuses. Assist with waste reduction by jumping on the Bottle Bill bandwagon through grassroots political pressure.
- Colleges purchase millions of dollars' worth of copy paper each year. Grassroots education, action, and activities help inform folks about the importance of purchasing recycled content paper so that a market is provided for the materials collected on campus. This also creates a prime opportunity to let the campus printing department know that the community is supportive of purchasing recycled content paper. Although this seems simplistic, many colleges resist purchasing/selling recycled content paper even though it is a vital step in supporting recycled materials collection at colleges.
- Encourage producer responsibility on electronics and packaging waste. Garner grassroots support for manufacturer buy-back agreements and/or waste fees in campus purchasing contracts. This will assist in responsibly managing all materials generated on campus and gain revenue in the process.
- Work with central administration to install bottle refill spouts on all campus drinking fountains and to ban bottled water on campus. Educate students and staff on local and global water issues, and campus spending on bottled water.

There are endless opportunities to educate and activate folks and a college campus is a great place to do it. Grassroots efforts play an important role in providing a voice on campus and global environmental issues. People on college campuses are interested in taking steps to support environmental issues. It is all about education to action. See Chapter 24: Education to Action for more ideas about how to implement grassroots strategies.

Chapter 23

Education and Promotion - Getting the Word Out

Promoting the idea of recycling/waste reduction as part of the recycling program is essential to the success of sustainable waste management practices. Unlike most operational sectors, recycling/waste reduction requires a change in cultural behavior. In order to implement new systems, creative education and promotional activities must compliment regular operations. It is important to train folks to incorporate new practices into daily activities. The goal includes refocusing societal perceptions and collective actions.

Recycling is just one step away from the garbage can and is merely a stop gap measure. The larger picture of best management practices involves waste reduction and material reuse. This involves pre-cycling, which is consuming less by buying products that are reusable and repairable instead of ones that are disposable and are difficult or overly expensive to repair. Pre-cycling also involves choosing products that are minimally packaged in recyclable packaging. In order for recycling efforts to be successful, there needs to be a demand for the materials. This demand can only be created through consumers choosing recycled content products.

Recycling is more than just another garbage can; it involves closing the loop. Reduce, Reuse, and Recycle: practicing the intention of this phrase maximizes resource use efficiency. The key to the success in closing the loop is through excellence in education and promotion of these ideas to the culture as a whole while stimulating a consciousness that follows this path: *Buy Recycled Products So We Can Recycle the Products We Buy*.

Where to Begin

When considering educational opportunities, remember that there is not a catch-all strategy for getting the word out. Everyone responds to different cues. Some people respond to pictures, others to printed words, music, or even dance. Diversify educational and promotional activities in order to reach the greatest amount of campus community members.

There are many opportunities to include waste reduction education into all campus practices. Incorporating this information into all program materials and operations is just a beginning. There are several promotional strategies that employ printed materials, but promoting waste reduction and recycling can be incorporated into actual activities and events such as Earth Day and America Recycles Day. There are many opportunities to promote the idea of waste reduction and recycling and also promote the school and recycling program in the process.

Promoting recycling and waste reduction can be a very inexpensive project or can involve higher costs. There are many effective options. The key is to be creative and resourceful and implement multiple strategies simultaneously. Being on a college campus is a plus because there are numerous resources available by the very nature of being part of an educational institution. There is a diverse population of experts and students who are looking for real world, hands-on experiences to compliment academics.

Professors are always looking for practical application projects to incorporate into academic classes. This is especially true of journalism and advertising classes. Therefore, college classes are a good place for students to do projects that can be utilized within the academic realm and also benefit a recycling program. Through classes, internships or practicums, students can produce brochures, business plans, waste stream analyses, posters, advertisement campaigns, etc.

Additionally, as the new generation of computer literate youth pursues higher education, there is a huge opportunity to involve students in producing graphics and web site materials at little or no cost. The recycling program gets free PR materials and the students get an opportunity to see their work published, build their portfolios, and gain practical experience.

Program Visibility

Recycling Programs on college campuses serve the university through great PR merely by the presence of recycling systems on campus. When students preview universities to attend, seeing recycling containers gives a message that the school has an environmental awareness which also indicates that the school cares for the campus community as a whole.

Additionally, as institutions of higher education, our job is to create contributing community citizens. As the UO Campus Recycling Motto states, "Recycling IS Higher Education!"

Create a Program Name

Many campuses call their recycling department “Campus Recycling.” Others incorporate the name of the school, for example, "Vermont Recycles.” Due to the inconsistency of where recycling programs end up being administered, it is important to create a name that makes the program accessible. Folks do not automatically know that the recycling department is located within facilities or central administration or student government. Additionally, recycling programs are very unique in that they are an operational function that involves much more administration than typical trade functions or custodial functions. Recycling programs also incorporate education and promotion into daily operations and involve other

aspects such as creating conservation practices within existing university procedures. Through good PR and convenient collections, waste management will become an economic success.

Create a Program Logo

This can be put on all recycling collection stations, program vehicles, signs, printed materials, employee T-shirts, newsletters, posters, and recycling containers. A program logo is the foundation for building a recycling program. It identifies the program and also inspires the practice. This could be as simple as utilizing the generic recycling symbol with the school's name in the center.

Basic ideas to Begin Educating the Campus Community

- Design a materials collection poster using logo, graphics, and sorting guidelines. Do not make this too wordy. Establish clear common sense guidelines.
- Create decals and/or signs, for labeling all collection containers. These work best in conjunction with posted sorting guidelines.
- Set up user-friendly, aesthetically pleasing recycling collection sites. A strong presence is the best education. Most college recycling programs have inexpensive collection containers. Keep containers well signed and clean in order to compensate for any aesthetic issues.
- Create recycling program brochures. These can be included in new student/employee packets to directly educate campus newcomers. Brochures are also a valuable asset when tabling at educational and promotional events.
- Launch a program website. In the information age, a recycling program will be much more successful and visible with an online presence. At the very least, put operational information on a website. A materials list, site location map, resource guide, and event updates are also helpful.
- Utilize social networking sites. Websites such as Facebook, Instagram, and Twitter can be a minimal effort way to spread the word about events and any operational changes. See **Social Networking** below for more information.
- Create a recycling information center.
- Publish newsletters (quarterly or as possible).
- Establish a department listserv to send out messages.
- Promote successes through well-publicized celebrations.
- Conduct a solid waste audit in front of the student union.
- Work with student union food services and nearby campus food vendors to offer cheap refills with refillable cups.
- Have refillable cups made with the recycling program logo to sell at all campus food areas, use for giveaways, and give to all new employees and students. This serves the dual purpose of promoting the program and reducing campus waste generation.
- Put helpful hints, facts and recycling/waste reduction slogans on university literature. Some schools even put messages on paycheck envelopes and course schedules.
- Giveaways (refillable mugs, reusable lunch bags, etc.) create great PR. Many on-campus and nearby businesses will donate items. If the program is incorporated as a 501(c) (3) non-profit organization, make sure to give local donors the program's tax code so they can include their contribution as a tax write-off.
- Put messages on magnets that can be attached to campus service vehicles. Be sure to clearly identify all recycling trucks.
- Make sure to create multilingual posters for international students. This is a great project for academic credit. These can be especially useful in areas where large populations of international students reside on campus such as in internationally themed residence halls.

- Set up displays that can be put in various locations on campus, including display cases and bulletin boards.
- Make table tents with waste reduction facts and upcoming events to put in campus dining areas.
- Door hangers work great for conveying information in housing areas.
- People love factoids! Make signs with all kinds of statistics and place them around campus. Get permission to put these on stakes and set them throughout the campus grounds.
- Advertise in the campus newspaper.
- Offer presentations in campus departments and for classes.
- Offer program tours.
- Conduct program surveys.
- Plan activities for Earth Day, Recycling Awareness Week, and America Recycles Day.

Social Networking Websites and YouTube

As online communication becomes more and more popular, social networking websites such as Facebook, Instagram, and Twitter can be an asset to a campus recycling effort. Utilizing such sites creates a means of reaching out to the campus community to promote events, post educational materials, alert the community to changes in recycling collection procedures or routes, and network with program allies. These sites provide an informal means of outreach that allows students, staff, and faculty members to become familiar with the recycling program and have questions answered even if attending an event may not be possible. Make sure to update social networking sites regularly so that interest will be maintained over time. Include contact information on the site so that the online communication systems can be used to facilitate more direct communication and networking in the future.

YouTube is another online means of promoting waste reduction and recycling efforts and learning about strategies used on other campuses. Make educational videos, post them online, and put links on the program's main website and social networking profiles for maximum viewing opportunities. Post links to other educational videos related to waste reduction, recycling, and sustainability.

There are endless ways to promote waste reduction and recycling on campus. If more ideas are needed, just ask some students what works to get their attention. The great wild ideas that come from brainstorming are always surprising.

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Chapter 24

Education to Action

Effective education results in perception and behavior change within the campus community. Therefore, events should generally combine both education and action. Actions can include petitions, pledges, letter writing campaigns, call-ins, flash mobs, guerilla theater, rallies, and more. Make action and education positive, even when discussing serious issues. Be honest, but empowering, open to multiple viewpoints, and flexible while staying true to the program's mission.

A campus recycling program will be involved in broader sustainability efforts in addition to waste diversion. A truly sustainable program must be integrated into a larger effort in order to create a campus and community that promotes human and environmental health and well-being. Therefore, the program should be able to offer assistance to other groups with similar visions and goals and be a leader on general campus sustainability issues.

For any action, know the audience (those decision makers or members of the public that the action is attempting to influence) as well as the volunteers who will be participating in the action. Actions may differ depending on whether the change will take place just on campus, or whether it will influence law at the local, state, or national level. When working with volunteers/participants acknowledge and respect individuals' comfort levels. Encourage, rather than pressure, members of campus and surrounding community to participate. Be considerate of individuals' differing viewpoints and right *not* to participate, but *do* attempt to create dialogue and find common ground.

Customize petitions based on what level of government official is being addressed and who is supporting or opposing the decision. For example, if the student government is considering supporting a certain policy, fashion the petition so that it reads as being from the student population to the student leaders. If a decision is being made on the city or local level, direct the petition toward a specific decision maker from members of the community, including the campus. Petitions should be short and to the point. If petitions refer to a specific policy or legislation, a copy of the proposed policy/legislation should be readily available to potential signatories so that they are well-informed before making the decision to sign or not.

Communication with representatives from local media outlets such as television, newspaper, and radio is essential to getting the word out to those who may be interested in participating, as well as ensuring that the event is reported on by the local media. List the event in local newspapers. Be sure to send all of the necessary information in before the deadline. Send a press release to reporters at least a week prior to the event. Call to remind them the day before the event as well. A press release should include

background information and a purpose, the date, starting and ending time, and location of the event as well as contact information for whoever is organizing the event.

College campuses are a great place to stimulate change through education and involvement. Campus bottled water bans, global warming initiatives, educating people about using refillable containers/reusable shopping bags, and creating collegiate recycling programs, are all issues that can be brought to the attention of administrators through education to action activities.

Sample Petition

Bottled Water Ban

We, the undersigned students of the University of _____ wish to support a clean and healthy environment by immediately stopping the purchasing of bottled water in all campus stores/dining areas and for all campus events. We ask that the University of _____ Purchasing Department support this change in behavior in order to uphold the University's commitment to the environment.

Pledges can be written similarly to petitions in that they should be short and to the point, but are more focused on individual actions instead of influencing decision makers. Following through on a pledge is an excellent opportunity for those participating to be able to re-evaluate their everyday choices and lower their impact through simple lifestyle changes. Pledges also create dialogue, encourage social networking, and can be fun to undertake as a group or team.

Sample Pledge

Take Back the Tap

I pledge to immediately stop purchasing and consuming bottled water. Instead, I will use a refillable container in order to promote global environmental health and encourage others to do the same. In doing so, I will reduce my carbon footprint and overall environmental impact by refusing to support unsustainable industry that wastes natural resources, privatizes the essential right to clean water, and contributes to global warming. **I Pledge to Take Back the Tap!**

Letter writing campaigns and call-ins are most appropriate when specific legislation or plans have been proposed that will directly affect the recycling program or other campus sustainability efforts. This type of campaign should ask for specific action on the part of the government. Be very clear about what type of impact the proposed action will have on campus and why there should be support of or opposition to the plan.

Make pre-printed post-cards that can be signed, and then sent in a mass mailing to government officials. The statement on the postcard should be short, direct, and clear. Tabling at a larger event is an effective venue for a letter-writing campaign.

Sample postcard:

Bottle Bill (Container Deposit Law)

Dear (name of legislator here),

Please vote in favor of the proposed Bottle Bill. This new legislation will divert significant amounts of waste from landfills and prevent litter, which will lead to cleaner, safer, and more attractive streets, public parks, and beaches. Recycling will increase, municipal waste management costs will decrease, and a steadier funding source for recycling, waste prevention, and other environmental programs will be created. Please do your part to protect the environmental health and safety of your constituents and vote "Yes!" for the Bottle Bill.

Sincerely,

(Your name here)

Call-ins entail calling government officials and can serve as a non-paper alternative to letter writing campaigns. They are basically identical to writing campaigns in that they directly support or oppose specific legislation that will affect campus sustainability. Give participants a script to either base their statements on or read directly. It is very likely that callers will end up leaving a message on an answering machine, or, in rare cases, speaking with an assistant. Even though participants will not be speaking directly to decision makers, tying up the phone lines for a few hours is an effective way of ensuring that government officials are aware of their constituents' viewpoints.

Sample call-in:

Bottle bill (Container Deposit Law)

Hello my name is (your name here) and I am calling to let (name of legislator here) know that I am strongly in support of the Bottle Bill and hope that he/she will do his/her part in maintaining a healthy environment by voting in favor of this legislation. It will divert reusable and recyclable containers from landfills, reduce litter, create funding sources for recycling, waste prevention, and other environmental programs, and reduce municipal waste management costs. Thank you for your time and please vote "Yes!" for the Bottle Bill.

Sample Press Release:

Global Warming Awareness Rally

To Whom It May Concern,

Global warming is one of the greatest threats facing our world today. According to the Intergovernmental Panel on Climate Change (IPCC) Report published in 2007, climate change will have a negative net overall impact on water resources across the globe. [22] Here in Oregon, snowpack in the Cascades has already decreased drastically in recent years. Not only is snowpack crucial to a great ski season which attracts tourists and boosts the economy through job creation and sales, but it also provides water storage that is later accessed in the dry summer months as the snow melts and runs down the streams. Snowpack is expected to decline further, reducing summertime stream flows by 20-50% in the next 50 years. [23] Water resources are not the only systems that are already being stressed by climate change. More frequent wildfires, weakened forests and other ecosystems, and mass species extinction are all predicted as a result of climate change. Immediate action needs to be taken to slow the negative effects of global warming on the environment and economy. In order to achieve this goal, cooperation among individuals, corporations, non-profits, and government officials is essential.

In order to raise awareness about these crucial issues and more, (name of primary sponsoring organization here) in cooperation with (list secondary organizations here) will be holding a rally at (insert location here) on (insert day of the week/date here). The event will begin at (insert start time here) and end at (insert end time here). Speakers will include (list speakers here) and entertainment will be provided by (list local bands or other performers here). A petition will be circulated requesting that our legislators take immediate action to regulate greenhouse gas emissions and will be delivered to our representatives following the rally. Similar rallies will be held in (x#) other cities worldwide in order to show solidarity and widespread support for government action in curbing and regulating runaway greenhouse gas emissions.

I hope to see you at this event and am happy to answer any questions that you may have prior to or at the event. Please feel free to contact me at (list phone number and email here.) Thank you for your time.

Sincerely,

(Your name here)

(Title, if applicable)

Other Education and Action ideas

Flash mobs, guerilla theater, and rallies create boundless opportunities for creativity. Such actions are an opportunity to publicly make a viewpoint seen and heard and can impact both fellow community members as well as government officials. As these types of actions (especially flash mobs and rallies) involve large numbers of people, work with local law enforcement officials prior to the gathering to ensure that the group's actions will be in compliance with local ordinances and that there is a plan in place to maintain a non-violent atmosphere during the event.

Flash Mobs

Flash mobs are groups of people who congregate for a short period of time in a crowded public space with a specific intent. Often, these events are apolitical and more geared towards fun and pure performance art, but they can also be manipulated to make a more specific statement. Instead of freezing in place at the same time, clapping, or acting as a particular character, participants can organize to spell out words with their bodies, freeze holding signs with educational factoids, or sing a song together while dispersed among the rest of the crowd. In the past, flash mobs have not been publicized ahead of time and give off a spontaneous feeling. However, the flash mob model of using social networking and getting a group of people together for a brief period of time can also be used to make a clear statement.

Guerilla Theater

Guerilla theater can be spontaneous and improvisational or well-planned with media invited ahead of time. Like flash mobs, guerilla theater takes place in public places in order to reach a wide audience of people. This type of performance can take a wide variety of forms from one person dressing up as a recycling mascot and chatting with passerby about the program to a small acting troupe performing a skit about campus sustainability.

Rallies

Rallies are much more highly organized than performance art actions, but have the same effect of drawing the attention of both fellow community members and government officials. Depending on the venue of rally, it may be necessary to reserve space or attain approval for the event from local law enforcement officials.

Speakers should be contacted and confirmed well in advance as does access to sound equipment, so that speakers may be heard by a large group of people. Publicize the event as much as possible; the success of a rally is largely dependent on the number of people who show up in support of whatever cause the rally is promoting.

As with petitions, letter writing, and call-ins, rallies should include a specific demand for change either on behalf of the government or citizens. They can also take place purely to raise awareness about an issue, but incorporating a more concrete goal is effective because it gives the rally a more specific purpose and will therefore be more likely to incite change. Rallies are also an effective community building tool because they promote solidarity. Other actions such as petitions, letter writing, and guerilla theater can all be easily incorporated into a rally as a larger event.

Tabling and Tracking Participation

At all events, make sure to have sign-in lists available. This helps the recycling program track how many people are attending educational events and helps to create more connections and alliances between the recycling program, students, faculty, staff, and community members. Leave an optional space for email on the sign-in sheet as well as a box for attendees to check if they are interested in volunteering at upcoming events or receiving more information about the campus recycling program.

Tabling is an effective way of making a sign-up sheet visible and accessible. Place informational brochures and other visuals at and around the table. If possible, make tabling interactive. For example, write up factoid/quiz questions and give participants prizes such as free water bottles, mugs, or reusable shopping bags (whether they get the answer right or not). Another interactive idea is to place a small block of compacted aluminum cans on the table and ask people to guess the weight and number of cans in order to be entered into a raffle. A prize will be awarded to the closest guesser.

The above ideas for actions represent only a few of the infinite possibilities for creating change on a college campus in order to lead to a more sustainable future. Be creative and have fun while educating the campus population and surrounding community. Build and maintain alliances to encourage both environmental and social sustainability within the campus sustainability effort.

Get Caught Green Handed

Dress up in costumes and reward people who are exhibiting eco-friendly behaviors such as using reusable shopping bags, bringing their own mugs to a café, or riding their bikes. Reward them with small prizes like stainless steel water bottles, bike lights, or raffle tickets to win prizes donated by local businesses. Take the opportunity to educate those who are not using refillable containers. Carry reusable mugs to trade with people who are using disposables. Always be friendly: the goal is to educate, not to embarrass.

Social Networking Sites and YouTube

Online resources facilitate widespread event publicity and information sharing. For more details see Chapter 23: Education and Promotion- Getting the Word Out.

Movies

Choose environmentally related films to show on campus. Table before and after the viewing to create more opportunity for discussion. Combine the movie showing with some sort of action such as a letter writing campaign, petition, or pledge as described above. Be creative and make your own film to show on campus or shorter movies to post on YouTube or submit to film contests such as the EPA's “Our Planet, Our Stuff, Our Choice” video competition. This contest invites participants to create inspirational films about how individuals can make a difference through their everyday actions.

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Chapter 25

Housing

Much of the waste generated each day occurs in the home environment and, for a segment of a university's population, the home environment falls within university housing areas. University housing facilities are more than residential facilities. They include food services, administrative offices, and purchasing. It is this composition that makes university housing a microcosm of the larger campus community, thereby providing an essential area for waste reduction and recycling that can serve as a model to the rest of campus. There is tremendous waste recovery and reduction and education potential within these buildings. Including housing department administrators in planning processes is integral to successful waste reduction efforts on campus.

Residence Halls, apartments, multi-family complexes, cafeterias, campus catering, and other food related areas are just some of the unique categories that fall under the umbrella of university housing. These areas can be grouped into on- and off-campus residential areas. Conducting operations on-campus where buildings are often clustered together is much different than accessing off-campus complexes. Off-campus housing areas maybe be spread out over a larger area and may require more time to service than residential areas concentrated on-campus.

Assessing and addressing the educational and operational needs of the various groups living and working in university housing areas create a path to long-term recycling success. For example, administrative, maintenance, custodial, and kitchen staff oftentimes carry over from year to year and can easily incorporate recycling into daily operations. Subsequently, these staff groups benefit most from periodic education which focuses on recycling materials specific to their work. In contrast, students who are new to the responsibility of handling their own garbage and recycling need more detailed education about what and how to recycle when they arrive on campus at the beginning of the new academic year.

Audit the Waste Stream

The volumes and types of materials generated within the numerous areas across campus can differ greatly. By addressing the waste streams stemming from each area, recycling and overall waste reduction can be very successful in university housing locations. An easy way to do this is through observation. Walk around housing areas, look in dumpsters, and observe which items are easily recyclable, have markets, and are generated in large quantities. As mentioned, university housing is a microcosm of a small city. Typically, these areas generate the same materials that are already being collected on campus. An in-depth waste audit can be done to gather further information. See Chapter 7: Solid Waste Audits for detailed steps on how to perform a waste audit.

- Food service areas typically generate large, bulk containers, larger volumes of lower grade paper products and food scraps.

- On-campus dormitory areas generate more single use materials such as beverage containers and many types of paper- both low and high grade.
- Multi-family complexes generate multiple grades of paper as well as kitchen containers and packaging.

Housing Food Service Areas

Housing food service areas typically include several large cafeterias, fast food venues, and often catering operations for events. For more information about institutional kitchen recycling, see Chapter 26: Recycling in the Kitchen.

Food services on college campuses are changing. Housing departments are following suit and diversifying the dining options available to students, particularly those living on-campus. Many campuses are moving away from offering only dine-in, buffet-style meals served on reusable dishware. Incorporating convenience into food services has become a main focus. Cafes and convenience stores, where students can purchase pre-packaged, single-serving products and a la carte items, have become commonplace.

The shift from reusable dishware and kitchen prepared meals to single-serving, disposable food products undoubtedly has a huge impact on all aspects of waste generation in housing areas. Increased trash generation is typical due to disposable dining ware and non-recyclable food packaging, but greater recycling potential emerges as well due to changing on-campus food services trends.

It is important to pay attention to food service areas and to monitor any changes in the waste stream. Garbage is increasingly expensive to manage and university housing departments pass these costs along to students. Waste reduction efforts in housing food service areas is an important area to focus on because it can significantly lower waste management costs while contributing to a healthier environment.

Reduce Waste in Housing Food Service Areas

- Eliminate disposable cups in all housing food service cafeterias. Give each new resident a reusable mug to be used to take drinks out of the cafeteria and offer discounted beverages at “for pay” housing food service areas. The refillable mugs can save thousands of dollars in disposable cup costs alone and can also be designed with a waste reduction message and campus logo.
- Educate students in the cafeteria setting to reduce napkin and food waste. A variety of messages can be placed on table tents that students read when they eat at the cafeterias. Put messages on napkin dispensers and in food areas that remind students to take what they will eat; they can always go back for more. Little reminders help people reduce waste.
- Food waste and napkin waste audits are very effective in creating awareness to reduce the amount of food and napkins people take and throw away. A theme and variation on this is to have the recycling staff dress up in t-shirts or waste buster’s outfits (abatement suits or lab coats with the program symbol work great!). Go to a meal and set-up barrels in the dish area for food waste, napkins, and trash. As people bring dishes to the dish return area, have folks (student volunteers who live on campus are ideal) instruct diners to place the items in the appropriate bins. At the end of the meal, weigh and track the material generated. This is

especially helpful in demonstrating waste reduction through educational activities and gathering information for a future campaign for composting.

- Eliminate (or do not offer) trays at buffet-style, all-you-care-to-eat food venues. While trays can provide a convenience which allows patrons to take multiple meal courses at one time, there is a greater tendency to take more food than can be finished in one meal, resulting in food waste. In the absence of trays, patrons are more likely to finish items for which they make a second trip to the serving areas. Additionally, eliminating trays reduces the amount of overall water and energy used simply because there are fewer items to be washed.
- Offer minimally packaged items in bulk that are recyclable within the campus collection program. This is especially important in the mini-mart type of stores that are becoming more common place in residence areas and in general food service purchasing. Buying in bulk reduces waste and saves money, and people are happier getting ketchup out of a bulk squirt jar than trying to open and empty numerous single serving ketchup packets!
- Utilize reusable plates, cups, and table ware at fast food type locations for customers who stay and eat. Minimize disposable options. The trend towards fast food options is becoming a mainstay for college student unions and more recently in residence hall areas as well.
- Create a ban on polystyrene (styrofoam) as it is a petroleum product that is the symbol of a disposable society. Styrofoam is lightweight and has a low-scrap value resulting in it generally not being accepted for recycling. Begin reducing the presence of styrofoam on campus by banning the use of styrofoam in food service applications, such as cups and to-go containers.
- Utilize reusable products and materials when possible and especially offer them in cases when students actually stay in or near the food service establishments for dining. Many schools issue students refillable mugs when they move in. Also consider issuing a full non-breakable food ware set to all students when they move in. Plates can be made with the school logo. This can be given as a souvenir, like refillable mugs. Another option is to issue items that are considered part of the room and must be returned at the end of the year. If not, the student will be charged. When these items are lost or forgotten at fast food areas, institute a charge for the disposables. Be sure to consider waste generated in the equation. It is likely that students will indeed have the necessary incentive to remember to bring reusable containers and table settings to dining areas.
- Implement waste reduction practices at all food locations, including elimination of unnecessary disposable items and single-serving items. This is especially important in food store types of settings. Work with the University Housing Department to reduce the volume of waste coming out of these locations. Provide opportunities for recycling at these sites.
- Another option for fast food types of operations is to offer compostable paper food ware. Ideally, compostable collection sites will be present in the areas where paper food ware is used.
- Design reduced food ware options. For example: create a minimal pizza envelope for a pizza slice as opposed to using a standard paper plate. This will have a notable impact in reducing waste.
- Create options for renting or selling reusable containers (like tupperware) as an additional mechanism for waste reduction.

...AND VOILA! A win-win situation for all...waste reduction that literally costs the University Housing Department next to nothing to establish, while monetary savings from waste will be notable.

How to Build a Recycling Program in Campus Residence Halls

In order to build a recycling program in campus residence halls, it is important to:

- Create a proposal for waste recovery and reduction in these areas
- Work with Housing administrators to develop this plan
- Consider that, at most colleges, residential areas are an auxiliary department, which indicates that they will be charged for a recycling service. With this in mind, determine how the garbage is handled and what options are available for recycling collection. Some schools handle their own garbage; other schools pay outside contractors. Research the potential costs to the University Housing Department for this service. Identify if the hauler includes recycling in the service and work to create collection in these areas through an existing contractor. For schools that manage their own waste, work with a campus waste manager to determine how to implement a recycling program in residential areas in an efficient and economically viable manner.
- Keep in mind that students are the "clients" of housing departments. Work with residents, housing affiliated student groups, and resident directors/assistants to support and provide input on recycling and waste reduction.
- Compete in the annual RecycleMania Competition. Many schools focus on residence halls for educational activities and waste stream tracking. Since it is easy to reach students living on campus, residence halls provide an effective venue for getting the word out about recycling and RecycleMania adds a fun and competitive edge to waste reduction efforts. The RecycleMania also provides an opportunity to test and improve tracking mechanisms since winners are determined based on the quantity and type of recyclable materials that are recovered during the ten-week competition.

Enlisting the Residents and Student Staff

Getting the student population on board with the recycling effort is an important aspect of ensuring the recycling program's success in housing areas.

- Conduct a student survey annually to gather information on ways to improve, expand, and maintain an effort in these areas. Surveys not only provide valuable information, but they also serve as an opportunity to educate and assess the attitudes of the student population.
- Meet with resident assistants (RAs) and resident directors (RDs) throughout the year, but most importantly at the beginning of the year. Become a regular part of their orientation and education process. Introduce the recycling routine in housing areas as part of Student Life Department programs on campus. This will help incorporate waste reduction and recycling practices into daily life in on-campus residential areas.
- Present information and include interactive waste reduction education at residence hall meetings
- Build relationships with all housing staff, especially the custodial and kitchen staff. Make sure that staff knows who to contact when service needs arise. These alliances will be beneficial to supporting the effort and gaining staff involvement and leverage for making changes and adding new programs.
- Utilize student residents as volunteers to promote waste reduction and recycling on their "home front."
- Make contacts with residence hall governance associations or any other student leadership groups that have input into housing programming and activities. Sometimes, these student associations have funding available to assist with purchasing contest prizes, mugs, in-room dorm recycling bins, and other promotional items.
- Work with existing resident groups that would be receptive to promoting recycling initiatives and events, such as an environmental club or a themed hall focused on civic engagement. If such a group does not exist, work with housing administrators and student leaders to develop a

group that can represent and communicate with the rest of residents in the same ways that other housing groups operate.
- Offer recycling program facility tours to students living on-campus.
- Request to be included in new student orientations in housing areas and take opportunities to do promotional tabling or other educational activities at gatherings during new student week and other programming events.

Recycling Operations in Housing Areas

There are several important factors to consider when establishing recycling collection in housing areas.

Central, Convenient Locations

Locate potential interior and exterior sites that would be convenient for residents to use. The optimal scenario is to site recycling next to or near trash collection containers. This step minimizes the amount of trash contamination in recycling containers. Additionally, identify areas that are visited frequently by residents and are highly visible. Be creative with collection. Set up collection that is appropriate to what is generated. For example, collect junk mail at mail rooms and set up boxes for unwanted reusable clothing in laundry rooms.

Material Generation

Determine what types of materials residents will be generating based on where students get materials. In residence halls, primarily bottles and cans, newspapers, and both high and low-grade paper are generated. Due to space limitations and a trend towards regular contamination, a collection for white, newspaper, mixed paper, and cardboard (paperboard or corrugated cardboard) is recommended. Having an additional colored paper category invites contamination and becomes a low grade mix anyway. It is less hassle to create a mix category that sorters will know to check for contamination while processing paper that can be upgraded by the recycling program.

Both on and off campus apartments/houses will generate a greater diversity of materials than residence halls because residents are able to prepare meals within their own housing units. Balance material types with space restrictions and capacity needs. In order to provide a broad collection approach, it may be necessary to combine materials to collect them.

Site accessibility

Recycling site accessibility is important to both users and those who will service the sites. Locate recycling collection in areas that are accessible to the users any time of the day. Recycling sites can be overloaded at times and the staff members who are responsible for the upkeep of these sites need to have access to these areas promptly.

As mentioned before, recycling collection should always be located in trash areas. Create waste/recycling stations that are complete. Locating certain materials in separate locations (such as cardboard collection) will reduce the possibility that these materials will be collected for recycling.

Convenience, consistency, good signage, and clean, well-maintained areas will maximize recycling and reduce contamination.

While recycling sites located on residence hall floors may provide the utmost convenience for residents, those sites may be inconvenient for service and may not be approved by the local fire marshal, nor located in proximity to garbage. Review the areas where garbage is currently centralized and work to incorporate recycling systems into existing sites. Set up efficient systems to minimize Campus Recycling Program and University Housing Department labor needs.

Incorporate collection systems into areas that generate specific types of waste. For example: site a mail collection station at all area desks where students receive mail. Remember to ask yourself: if there is garbage collection, then are there any recoverable materials generated in the area that would require a recycling site?

Some schools have trash rooms; others have trash collection areas outside. Typically, students are required to dump the materials they generate at central locations. The more centralized the collections are, the less the labor costs will be for handling these materials.

In family housing complexes and student housing apartments and houses, establish community waste/recycling areas. Typically, these are trash enclosures and are often uncovered. There are many unique types of covered containers and units that are available and suitable for these types of areas.

Site maintenance

Create a system where an employee (ideally a University Housing Department employee) monitors recycling areas. Designate a recycling program employee to go through these sites daily to clean-out contaminants, collect high grade materials, and keep the area clean. Always make sure that signs are properly displayed and aesthetically pleasing. Keep bins clean by creating a maintenance switch out schedule for containers.

Select areas that allow for easy clean-up. Keeping recycling areas clean and organized serves a greater purpose beyond ease of use. Well-kept sites continue the element of convenience for users and help make the recycling experience a positive one. Identify convenient sites where recycling containers can be taken to be cleaned and where custodial equipment can be used for quick area clean-up.

Servicing Recycling Sites

When planning a recycling collection system, work with the Housing Department to determine how much collection can feasibly be incorporated into existing operations. Ideally, the more custodians and housing personnel assisting in this effort, the less expensive the recycling service will be. Determine whether staff members are available to move recyclables and trash from both on and off-campus locations. Explore various options for incorporating existing labor into this process as any little bit can help. Present findings to the Housing Department.

With sites monitored, clearly labeled, and easily accessible, recycling crews can quickly swap out barrels instead of emptying barrels into bags or other barrels. Bring materials back to warehouse/processing center to be sifted through as they are processed into marketing containers.

Of note: Campus residential areas are notorious for creating contamination. Monitoring, good signage, introduction of the practice through new student orientations, and continuous promotion will result in more efficient and effective recycling service.

Container options
When selecting recycling containers consider the following:

- Fire code
- Protection from inclement weather
- Space restrictions and capacity needs
- Site organization
- Serviceability
- Aesthetics
- Ease of recycling

Outdoor areas are often utilized for residence hall recycling collection. If areas are covered, 55 gallon drums are excellent for minimizing cost and maintaining compatibility with the system of swapping out containers for servicing. These also have generous capacity which reduces the need for increased servicing.

In other outside uncovered areas, there are plastic barrel lids available at a minimum cost, but these are not ideal. There are many companies that make metal recycling units that enclose plastic 55 gallon containers and are aesthetically pleasing, fire safe, and easy to service and maintain. Inexpensive galvanized garbage cans with lids are available at home supply stores.

Signage
Creating appropriate signage is an important factor in ensuring participation in a recycling effort. Whenever possible, replicate sorting categories and campus signage. A special consideration for residential areas is making signs that are more universally accessible as international students typically live in all varieties of university housing facilities. Creating photographic signs and multilingual promotional information and posters is very helpful in reaching the potentially unique population living in these areas.

In family housing areas, children are often the ones charged with recycling and garbage disposal. Make signs easily understandable and use visuals to help identify each type of collection.

At outside areas, corrugated plastic signs made by a sign company are useful, sturdy, and can be a good medium for both operational and educational information.

Recycling tools
Providing tools to make recycling a convenience for residents is also important to a successful recycling

effort. A simple tool (that also acts as a promotional item) is a room or apartment recycling bin. This concept is modeled on curbside recycling bin programs that are successful across the country. Involve residents in choosing recycling bins that would work best for their units.

Develop a system to integrate in room/house/apartment recycling bins into the room inventory. They are considered part of the room or apartment and if they are missing or damaged at the end of the year, the student is charged. Of course, if there is a mechanism to give these to students outright, this is also an option.

Ideally, these bins will be a one-time investment and will be maintained through replacement cost systems from inventory control.

The recycling program can also sell recycling bins to help generate revenue to purchase such containers for all housing areas.

Move-Ins, Move-Outs and Large Material Generation Opportunities

Students in housing areas generate a copious amount of materials during Fall Move-Ins, Spring Move-Outs and, to a lesser, but still larger than normal extent, before breaks and after term finals. It is important to pay attention to these times, especially move-outs.

Move-Ins

Cardboard is generated in large quantities during move-in periods. Plan for extra collection areas and servicing, and unexpected piles of cardboard appearing spontaneously. Additional materials such as newspaper, packing peanuts, plastic bags and block styrofoam are also generated during student move-ins. Create a collection plan for the materials that can be recycled. Temporary containers for trash collection set up alongside the cardboard recycling containers helps reduce contamination of the cardboard. Keep in mind during move-ins that these are new students who are not yet focused on how things work in a university setting. Extra promotions and regular monitoring of collection sites during move-ins are recommended.

Move-Outs

Move-Outs are an exceptionally busy phase when many students are moving off campus within the same short time frame and are under a time constraint to be moved out by the end of finals week. Imagine having a final on Friday morning and having to be moved out by 5:00 p.m. the same day. Residents are busy and focused on studying for finals and often leave packing until the last minute. With little time to pack and clean their rooms, students can be tempted to throw away anything that they do not want to move with them. This is a crazy time for both students and staff. Plan AHEAD!

- Plan for extra daily pick-ups during move-out week. As the move-out deadline approaches, increase the number of pick-ups to three times per day. Coordinate recycling program staff and make sure to participate in move-out planning meetings organized by the University Housing Department.
- Though cardboard boxes are a commodity during this period, there is still an increased amount of cardboard generated. Make sure that sites are serviced frequently.

- Set-up extra barrels at all sites.
- Organize a collection site (or series of sites) for reusables, preferably within existing waste/recycling collection areas. Other effective areas for collecting reusables are high-traffic, visible areas such as residence hall lobbies or laundry rooms.
- Housing departments often set up extra dumpsters in areas that may not be near recycling collection sites. Stay in the loop and make every effort to set-up reusable and recycling collection sites next to extra dumpsters.
- Do extensive promotion and start up reusables collection during the two weeks prior to move-out week. This gives students more time to identify and donate reusable items, which in turn reduces the likelihood that these items will end up in the garbage dumpster.
- Distribute move-out information on door hangers and put them on every door in the residence halls and family housing units.
- Designate a crew to keep working until everything is cleaned out and each site has been swept and emptied at least one time through. Many students wait until the last minute so waste disposal areas will fill quickly during the final move-out day.
- Some schools have been very creative in setting up a place for students to hold a large community yard sale. In family housing areas, this has been effective as people live there year round and population turnover does not occur at the same time as it does on-campus. In residence hall areas, conducting a yard sale in connection with move-outs is more difficult because students often do not want to part with items they want until the end of the school year.
- Another idea is to work with a non-profit to gather these materials and re-sell them to new students at the beginning of fall term as a fundraiser and waste reduction project.
- Dump and Run is a project that helps colleges with move-outs.
- When students are in a hurry to pack and clean out, it is common for them to combine recyclables and trash into one bag, bound for the garbage. Issue students two or three large color coded and labeled plastic bags for move-outs to assist with this problem: one for garbage, one for paper, and one for bottles/cans.
- Remember to debrief the process to find strategies for the following year and exchange ideas with other schools.

Move-Outs Beyond the Residence Halls

End of the year move-outs extend beyond the on-campus living areas as students also reside within the local community. Work with community groups such as churches, fraternities and sororities, and the United Way and other non-profits to expand reusable item recovery efforts both at on-campus locations and primarily student residential areas near campus. These efforts can yield opportunities to keep valuable items out of the landfill while creating opportunities to assist agencies and low-income families.

Reuse Exchange Areas

Set-up a materials exchange area to be accessed throughout the year. If such an exchange can only be initiated during move-outs, it is a great start, but the more material recovered throughout the year, the better.

Set up collection bins, promote and monitor sites, and work towards improvements over time by incorporating feedback from residents in the area. Containers should be located in high traffic areas or (ideally) within waste/recycling collection areas.

Laundry rooms are a popular dry space to set-up a reusable material/item collection or exchange. This is especially successful in family housing areas as children grow in and out of clothing and toys faster than these items wear out.

Funding and Contracting Services

Recycling, like many other campus activities, is a collaborative effort. The Housing Department is considered an auxiliary service by many colleges and thus contracts recycling services through the Campus Recycling Program. As mentioned above, it is important for the Campus Recycling Program to work with the University Housing Department to design a plan that will reduce waste, streamline operations and keep costs affordable.

Colleges that incorporate recycling into waste management can add recycling more easily into the waste management system contract and fees. Many schools have recycling departments that are separate from waste management, which makes it more difficult to coordinate waste management efforts. Under this scenario, working together with campus waste management departments is critical to creating recycling services that reduce costs and services from waste management. If recycling exists as a separate entity, it can be difficult to convince administrators that recycling is not an extra cost, but rather a program to reduce garbage costs and services.

When establishing contracted services with the University Housing Department, work with administrators to develop a position or designate an employee to oversee recycling operations, waste reduction, and educational activities in campus residential areas. Make sure to meet with the designated administrator regularly and stay apprised of what is going on in the Housing Department. Stay informed about new trash enclosures being built to ensure that they include sufficient space for recycling collection and continue to attend meetings to discuss move-outs. Establish additional contacts and advocates within the Housing Department (such as custodial staff members), as well as within off-campus organizations, student living groups, and any other allies on campus and in the surrounding community.

Be sure to plan ahead for future opportunities that may arise to streamline operations. Track all the materials that are collected as this is valuable information for re-negotiating contracts or justifying recycling services. Stay in tune with the population changes in housing areas. If new facilities are being added or there is a record amount of students, the recycling charge will increase. Try not to lock in a set price, but if this is the only option, add a little extra into the budget to account for unforeseen expenses. Consider that these contracted services include labor and administrative costs including tracking and educational activities.

Education

Education is an important factor in creating an effective, well-utilized collection system in campus housing areas. One of the primary functions of a housing system is to provide residential populations with educational, social, and cultural programs. Recycling and waste reduction fit nicely into this goal. Such programs are put together by housing staff, residence hall leaders, and volunteers. These groups of students can help to incorporate recycling education and promotion into the daily life of residents. Here are some ideas:

- Enlist the help and experience of resident assistants in developing and promoting educational events. Utilize their leadership in addressing problem areas with their residents.
- Make contact with staff from many levels of the Housing Department from decision-making administrators to enthusiastic resident assistants. These employees can help recycling program employees to gain an understanding of University Housing's administrative structures and how information flows among the different areas of operation and service.
- Hold regular trainings and staff in-service presentations, including during orientation and once per term refreshers. This is especially important with the kitchen/cafeteria and other food establishment staff.
- Attend residence hall meetings to provide recycling demonstrations, answer questions, and offer games and awards for motivating more students to participate in recycling efforts.
- At the beginning of each school year, give each student an in-room recycling bin, refillable mug, reusable food ware, a recycling program brochure, and a guide to waste reduction in residence hall areas.
- Make a variety of informational and factual table tents for cafeteria tables; change these periodically.
- Do regular promotional tabling with general information. These are best located by cafeterias.
- Make and display posters around housing areas and in cafeterias; focus on simple concepts such as waste reduction and recycling opportunities.
- Get media coverage for promotional events in housing areas.
- Submit information to housing area publications.
- Post charts of recycling recovery in residence halls. Thank residents and staff members for their efforts and let them know that their contributions to recycling make a difference
- Sponsor regular promotional events such as waste audits and recycling contests.

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Chapter 26

Zero Waste in the Kitchen

On most campuses, dining service operations are responsible for generating and managing enormous amounts of waste including packaging, cardboard, food, compostable food ware and napkins. With the

fast food trend growing on college campuses, disposable food ware has increased the food service waste stream. As campuses are able to implement composting programs, campus inputs are getting greened through purchasing and distribution of compostable food ware. Campus catering services are also incorporating compostable items into campus food service operations.

Depending on the size of the student population, a college campus may have multiple dining facilities that offer various forms of dining including: campus catering, all-you-care-to-eat sit down, purchase-by-item sit down, take out, and snack and fast food types of eateries. On some campuses, at certain times of the year, dining service operations are open around the clock. From procurement and production to the serving line and checkout counter, decisions are made that impact the waste stream. Many food service options are available for reducing kitchen waste while diverting items through recycling and composting.

Many schools contract out the campus food services. Some contractors are becoming more competitive by incorporating sustainability and waste management (e.g. waste reduction, recycling, composting, bulk foods etc.) into their operations. Consider researching how a contractor performs at other colleges and how that school is utilizing creative contracting to encourage green practices.

Research

Research the food services waste stream on campus to determine what types of materials are generated, what can be recovered, and how to reduce overall waste generation.

Inventory the dining operations in order to answer several questions:

- Are facilities operated in-house or contracted to a non-campus entity?
- Is there more than one contractor?
- How many facilities are there?
- Where are these facilities located?
- What are the operating hours in each of the dining service locations?
- Who is responsible for purchasing?
- What are the primary components of the waste stream?
- What is currently being done with the waste?
- What kind of space is available for recycling collection stations?
- How is food served?
- What types of disposable items are generated?
- What contracting opportunities exist to reduce waste generated through the fast food operations? (If the fast food operation is a chain, does the chain have related policies?)

Performing a visual waste audit in meal preparation areas, followed by a more in depth audit of the dumpsters located by food service areas, is a useful strategy to know where to begin. In addition, assess the item storage and purchasing processes. This information is valuable and will provide the opportunity for a thorough overview of the solid waste stream and strategies for reducing it.

Reduce

Start with reduction, beginning with purchasing changes in order to minimize waste, cost, and need for additional space to accommodate single serving packaging.

- Purchase in bulk.
- Dispense bulk milk into a reusable cup
- Dispense soda by the fountain instead of from a can or bottle
- Buy fresh fruits and vegetables packaged in reusable crates or canned produce in #10 recyclable steel cans.
- Buy spices, oils, margarine, and sauces in quart or gallon quantities.
- Purchase flour in large quantities and have it pumped directly from a truck to a storage facility.
- Work with the purchasing department to include contract language to reduce unnecessary and unrecyclable/non-compostable packaging.
- Encourage kitchen managers to monitor the quantity of food that is cooked, but not served. This saves money and valuable food resources.
- Reduce disposable food ware whenever possible and charge for any disposables that are used.
- Encourage the use of refillable cups; sell these in dining facilities, the bookstore, and at various events throughout the year. Proceeds can benefit the purchase and distribution of mugs to future students.
- Rent disposable food ware to students to use throughout the year or use a deposit system. Students will be issued a plate, spoon, fork, or reusable Tupperware-like lunch container with tableware included to use throughout the year at dining facilities.
- If disposables are used, purchase food ware that is inherently compostable such as paper food boats and plates and wooden chopsticks. Fees for disposable tableware will help fund the purchase of more durables.
- Use low-maintenance durables such as plastic baskets with compostable paper liners. Wash the plastic baskets for reuse and compost the food soiled paper.

Whether to use durable service ware or disposables is a long debated issue. Initial purchase of durables, how to ensure that items are returned to the proper locations, and creating and funding washing facilities are just some of the concerns of food service managers. Space and labor are necessary to collect and wash durables. Consider electricity, water, and sewer expenses, as well as potential theft of service ware. In a sit down facility, durables are more likely to be used, while take-out facilities are typically designed to use disposables. Franchise packaging considerations are made in a boardroom and are written into contracts. If disposables are unavoidable, try to reduce the impact as much as possible through education programs.

The following are measures that can be taken to reduce food waste by minimizing the amount of food that is purchased, then not eaten:

- Educate students to raise awareness about food waste and empower them to make decisions to reduce personal food waste: take small portions, and then go back for more.
- Conduct food waste audits and publicize the results (on posters or table tents) so that students will be aware of how much pre and post-consumer food and napkin waste is generated during an average meal.
- Design meal charges based on portions as opposed to all-you-can-eat buffet style. This will reduce the portions of food that people take and therefore the amount that will be thrown away at the end of the meal.

- Get rid of trays in cafeteria areas. This will encourage smaller portions to be taken. Diners can always go back for more, but will be less likely to take more than they can eat if they do not have a tray that can hold multiple dishes.
- Reduce plate sizes to encourage smaller portions to be taken.

Pre and post-consumer food waste also needs to be dealt with in order to minimize impact on landfills. Here are some ideas on how to prevent valuable meals and food scraps from being wasted:

- Save food that has been cooked, but not served, to donate to local food banks. Request records of recovered food quantities to assist kitchen managers in reducing food preparation waste, while supplementing campus waste tracking.
- Work with a local garden project that can accept pre and post-consumer food scraps for composting systems.
- Utilize local pig farms to dispose of pre and post-consumer food waste. Ensure that food is transported to farms in a timely manner so that pigs will be less likely to suffer from food borne illnesses.

Napkins are expensive items that overwhelm food service waste streams. Take the following steps to reduce the impact from paper napkins on the campus waste stream:

- Since napkins are not easily eliminated in food service areas, educate students to take fewer napkins at each meal. Table tents and signs on napkin holders are very effective because the educational material is right in front of students as they sit down to eat.
- Purchase chlorine-free napkins in order to promote more sustainable production practices and reduce chlorine's negative environmental impacts.
- Purchase napkins made from post-consumer recycled content paper. This is not only better for the environment, but will help to create a closed loop system: paper collected on campus will then be recycled into paper napkins that can be purchased by and used on the campus before being composted into soil for use on the campus grounds.

Recycle

All campus food service areas generate recyclables that are easy to identify and separate. The most commonly generated materials in a kitchen area are:

- Cardboard
- Glass
- Metals
- Plastics
- Low-grade paper

Compost

As campus food services implement use of compostable products, ensuring compost collection in all campus kitchens is critical to a zero waste campus. It's always important to establish what materials are generated in what areas. With that, implementing a compost recovery system in a campus kitchen involves: identifying the discards and areas where food is prepped, setting up a system to capture pre materials within the kitchen area, providing central composting bins outside the kitchen area for service collection and ensuring that all campus catered events have a zero waste event service that includes capture of all compostables and compost. The most commonly generated compostable materials in a campus kitchen are:

- pre consumer food waste from prep
- cooked but not served food (to be donated to a local food bank)

- compostable products from public cafeteria such as: all paper food ware and specialized compostable items such as coffee cups (ideally including lids and straws), plates, napkins

**Of note: in considering implementation of a composting recovery effort for all campus food related activities, requires working with the Food Service Directors to ensure all of the "disposables" utilized are compatible with the compost processor. It's important to work with the local processor to determine what items are acceptable locally. If the discards from campus food services are not approved for the local compost system, then it creates public confusion and high contamination. Greening the inputs is key to a successful composting and zero waste recovery system.

Work with Campus Kitchen Staff Members

- Set up conveniently located recycling areas with well-labeled bins.
- Post easily readable guideline posters for all kitchen staff to reference.
- Educate kitchen staff through trainings and question and answer sessions (these are most helpful if held semi-annually).
- Work with kitchen staff to meet their challenges in integrating recycling into other job responsibilities.
- Check in regularly with the kitchen staff to answer questions and trouble shoot any issues so that the job will be made easier for everyone.
- Show appreciation for the kitchen staff through promotional items such as T-shirts, mugs, and canvas bags with the recycling program logo and a waste reduction message. These also create an incentive for kitchen staff to pitch in with the recycling effort.

RECYCLING...so simple, it WORKS!

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Chapter 27

Printing Departments

Colleges generate copious amounts of paper in the form of memos, handouts, course packets, office and school paper, and more. Paper choices and distribution, copy machines, printers, and other technology that uses paper resources are all factors in paper generation on campus. Campus printing departments are a key area where use of environmentally friendly products and practices can make a huge impact in waste reduction, recycling, and sustainability.

Forming alliances within the Campus Printing Department is critical in closing the loop within a campus recycling effort. After all, college recycling programs collect more paper than any other item. By purchasing recycled content paper, the campus is supporting the demand for collected recycled materials, a vital piece in ensuring the long-term viability of a college recycling effort.

Here are some ideas to reduce campus impact through printing practices:

- Create a recycled paper policy (see example below) that requires the campus to utilize post-consumer recycled content paper, elemental chlorine free, and tree free papers. Some campus policies go so far as to put a surcharge on neon and heavily dyed papers (which contain heavy metals and are toxic to produce and recycle). These policies also specify ½ sheet and double-sided copies as the default for all orders unless otherwise specified.
- Establish a short list of contacts within various offices around campus so that departments get small amounts of fliers, announcements, etc. to be shared around the office instead of one per employee. Encourage departments to set up a centrally located bulletin board for these postings.
- Create a campus "stop the junk mail" postcard that can be ordered through the printing department. These postcards should have text on them requesting removal from mailing lists, a place to tape the mailing label, and room on the flip side for the address of whatever company is being asked to stop the mailing. College campuses receive hordes of unsolicited off-campus mail. This material is expensive for the college to process and deliver. Junk/bulk mail creates significant amounts of trash and paper recycling, which also have associated costs. The "stop the junk mail" card has been successful on many campuses and thus has saved money in labor, handling, and disposal.
- Encourage the University Printing Department to offer elemental chlorine-free, recycled, and tree free papers. Establish contracts that encourage printing campus stationary and business cards on environmentally friendly paper. Assist the printing department in promoting the use of these papers to create campus-wide demand.
- Research paper buying cooperatives that can save money for schools looking to purchase environmentally friendly papers. Work with neighboring schools and governments to partner on paper purchasing.
- There are great non-toxic soy based and vegetable inks available for use in the printing process. Many colleges have been considering this option. Inks and dyes used for paper are some of the most toxic substances in our environment. These inks reduce the risk to workers and the environment while offsetting a past hazardous practice and creating compliance with the Clean Air Act. Additionally, all campuses have to consider hazardous material disposal costs. Purchasing environmentally friendly inks and dyes eases waste management budget pressures.
- Encourage creation of online ordering for on-campus printing orders. Colleges process thousands of orders for printing and copying. On-line ordering saves paper (usually in triplicate) as well as other hassles.
- Remember to work with Printing and Copying Departments to ensure a maximum recycling effort. There is valuable pre and post-consumer paper that can be recovered from these areas.

There are many other opportunities for reduction of both toxic chemical use and waste generation within printing departments. Image processing, plate processing, cleaning, and use of fountain solutions can be very toxic processes. The good news is that there is an increasing amount of non-toxic

alternatives and new systems on the market to help alleviate environmental impacts through environmentally preferable purchasing.

Build alliances with campus Printing Departments as they are the foot in the door on waste prevention, recycling, environmentally friendly purchasing, toxic materials reduction, and campus sustainability.

Sample Recycled Paper Policy

It is the policy of the University of_____ to purchase and use recycled paper products in its operations in accordance with Executive Order No._____, dated _____. This policy requires the purchase and use of paper products made from recycled materials when such products are of a quality to satisfy applicable specifications, are available in the desired preferential rules of the State of Model Public Contract Manual.

Any University of _____ request for bids or quotes for purchase of paper products, including authorized printing from outside vendors, shall include a solicitation of bids or quotes for recycled paper and papers that have not been bleached with chlorine or other hazardous materials. No specification shall require the use of paper products made exclusively from virgin materials, nor specifically exclude the use of recycled paper or tree-free products, as provided in _____State statutes.

University Printing Services shall have the authority to specify the minimum recycled content standard in bid solicitations to accomplish the purpose of this policy. The default for all office equipment that uses paper, such as copiers, printers and fax machines, shall be set to reflect these specifications, and be in compliance with the State of _____ _____policy guidelines. Every effort will be made to eliminate excessive or unnecessary paper use. Strategies for doing so include, but are not limited to:

- Electronic mail or other paperless communication
- Double-side copying
- Half-sheets of paper for all brief, printed, on-campus communications
- Short distribution and targeted mailing lists to reduce volume

In accordance with the guidelines stated above in this policy, the official stationery program as shown in Graphic Style of the University of _____shall be determined by the Office of University Publications and University Printing Services, with approval by the Environmental Issues Committee. The use of heavily dyed paper or paper which requires special handling for recycling will be subject to additional charges.

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Chapter 28

Zero Waste Events Recycling

College campuses go beyond the classrooms and facilities. Most college campuses have athletic events, conferences, festivals, workshops, and meetings on a regular basis. All of these types of gatherings have the potential to generate large amounts of waste, including food and beverage waste, paper, and beyond.

These gatherings present a wonderful opportunity for campus recycling programs to visibly reduce waste, institute compostable material collections, educate the campus community and demonstrate cost savings. There are many other subtle benefits from these practices such as overall cleaner grounds, reduced clean-up costs, and involvement of volunteers.

There are many strategies and considerations in creating an events waste reduction effort. Each event has different variables, generates different types of trash, and has various focuses. There is no blanket set of procedures for maximizing waste reduction and recovery. It is important to take a look at each type of event and make a determination from there.

General Guidelines for Events Waste Reduction and Recovery Prior to Event:

I. Get a list of Annual and Special Events

- Athletics
- Conferences
- Meetings
- Trainings
- Festivals and other large gatherings

Get monthly lists of all on-campus events from the campus scheduling office. Ask for the recycling program to be put on a mailing list to receive calendars or find out another way to stay current on events, such as through on-line calendars.

II. Waste Assessment for Events

Create a spreadsheet that can act as a waste assessment tool and tracking mechanism. This tool can be used to organize, plan ahead, track materials recovered, and provide a historical perspective or review for future implementation.

Sections to include in your assessment:

- Determine if existing recycling collection would suffice
- Materials generated at each event

- Location of where and when materials will be generated
- Equipment needed
- Event contacts
- Scheduled set-up and pick-up
- Notes section
- Photos collected of event waste recovery
- Tracking mechanism for collected materials which can be compiled with overall
- materials collected at all campus events

Ideally, the best scenario is to set up waste recovery as a regular part of events, especially athletics. Coordinate efforts with outside haulers. Work with the Athletics Department personnel to handle collection if possible. Whenever possible, minimize the amount of extra planning needed to provide a service.

III. Preliminary Contacts

Be aware of scheduled campus events. At least one month prior to each event, make contact with the event coordinators and meet with them to discuss waste management needs.

Ideally, after doing one event, the coordinators will integrate waste management into the future event planning. Encourage event organizers to contact the recycling program prior to future events. Contact all secondary haulers as needed.

IV. Create Events Operations Manual and Set-up Kit

Incorporate an event assessment sheet into a manual. For larger events, create a separate notebook to collect all of the information related to the event including: successful past strategies, material tracking, volunteer list, contract information, etc.

V. Promotion and Education

Prior to events (especially larger events with food vendors) create a vendor guide to waste reduction. Incorporate this into any preliminary contracts so as to create a clear requirement for vendors to follow.

During events, have well signed waste recovery stations. Place these signs above the crowd so that stations can be easily identified during the event. A good idea is to have wooden stanchions at each site with a simple identification sign: “Events Waste Recovery Station.”

Make sure to have recycling and compostables stations at all garbage cans, and likewise have garbage cans at all recycling stations.

For places where there are permanent garbage cans, but no recycling collection, cover the trash cans during the events and put a sign on the covering that says something like “Please help us reduce waste, utilize Event Waste Recovery Stations for your disposal needs”.

As is possible, make announcements during the event to encourage people to help out by recycling and composting. Announcers at athletic events and festivals are usually happy to help.

Encourage waste reduction at all events. Ask event promoters to sell reusable mugs or encourage folks to bring their own to the event. Some events will even be promoted as not providing disposables, but having refillable mugs available for purchase if an attendee does not bring his/her own. This will help both with advertising the event and reducing waste.

During Event

I. Setup

- Assess materials to be collected
- Make sure signs and containers are easy to read and consistently labeled. Use stanchions for easy identification.
- Make sure recycling/compost options are available at every garbage site and vice versa.
- At larger events, provide designated recycling/composting stations for vendor use.
- For vendor sites, include collection for: cardboard, glass, metals, plastic, low grade paper, and compostable materials. It is helpful to provide each vendor with a well-labeled composting bucket. Workers and volunteers can help by monitoring compost collection at each booth if possible.

II. Collection and Maintenance

- Assign workers/volunteers monitoring and collection duties. Monitoring sites is very important step in reducing contamination and educating the public.
- Keep sites and signs well maintained.
- Keep good notes so as to trouble-shoot operations and help improve collection strategies at future events.

III. Tear Down and Clean-up

- Know when to tear down sites. Remember that materials will continue to be generated during the event's clean-up process.
- Make sure that materials are processed and containers are cleaned. Re-label containers if necessary and record data in events and assessment documents.
- Make sure collected materials (including garbage) are weighed. Create graphs/charts and data spreadsheets to track collection and savings.
- Debrief with outside haulers and confirm pick-up schedules.
- Bring compost to community gardens if there is no contract with a compost company.

From Recycling to Compostables to Reusables: The Road to Zero Waste Events

It is important to start with a pilot project, establish the idea of waste recovery at events, and continue to incorporate further waste reduction activities as when opportunities arise. There are different variables to consider with each type of event; determine a course of action based upon support from the event organizers.

Athletics

When reducing waste at athletic events, consider that distinct materials will be generated depending on

locations (e.g. stadium, beer garden, sky boxes, and parking lot). Incorporating cardboard recycling into all athletic events is standard. Evaluate the types of materials generated at athletic events, propose waste reduction strategies (bulk condiments for example), and encourage the Athletics Department to purchase compostable cups (especially in beer garden areas). Though outside drinks are prohibited, encourage the Athletics Department to allow the Campus Recycling Program to establish collection sites around the stadium for newspapers, event programs, bottles/cans, and compost.

Participate in the clean-up process, and then evaluate additional recovery possibilities. During the clean-up process evaluation, take an overview of the items collected, estimate percentages of the waste stream made up by each category of recyclable, and propose a trial run where the clean-up crews are divided into teams. Have each team collect one type of item: newspaper/events brochures/recyclable pressboard coffee carriers, bottles/cans, compostable cups, and garbage. When these are in bags, determine the percentage of waste stream composed by each item.

Demonstrate the benefits of this process to the Athletics Department and work with personnel to encourage expanded waste recovery programs during games. Some schools (e.g. Penn State and University of Nebraska at Lincoln) have been successful in implementing biodegradables at athletic events. By taking a step beyond recycling, they have been able to move towards zero waste through a dedicated effort of compostables recovery. Remember that every effort is an important one. Start with collection within the stadiums and grow from there.

Ideally, the best scenario is to set up waste recovery as a regular part of the events, especially athletics. Coordinate the efforts and have outside haulers handle as much of the collection as possible with assistance from Athletics Department personnel to centralize materials. Minimize the amount of extra planning and work done by the Campus Recycling Program.

Reducing

Work with events planners to reduce waste prior to events. The best way to approach this is through the vendors. Create a waste reduction plan for vendors that will be incorporated into the event contract. Ideally, this will encourage vendors to generate items that are compatible with the event waste collection system.

Recycling

Incorporate existing campus recycling collection procedures into events recycling. Generally, all events generate paper, bottles, and cans. This seems simple, but is a good place to start. For larger events, incorporate all of the “kitchen recyclables” into a vendor waste recovery station. Locate this in the food vendor area of the event. Materials that are frequently generated include: cardboard, low grade paper, plastics, metals, and glass.

Events Composting

If the school already has a composting program, then a mechanism already exists to include compostable materials in the collection system. Composting has been evolving and special events are a

good opportunity to incorporate additional materials. With the development of new biodegradable food ware products, many campuses are looking at utilizing these items for events (and incorporating them into food service areas as well).

If there is not a food waste composting program on campus, check with local forest products companies to see if they would work with the Campus Recycling Program to recover compostables at events. Many forest products companies consistently need more soil amendment materials and thus are looking for ways to increase their yields through food waste and other compostables.

Before buying expensive compostable food ware, consider the inherent biodegradability of conventional disposable food ware such as paper plates, napkins, chopsticks, and waxed paper cups. Specially designed compostable food ware is not always necessary. It is expensive and requires a change in thinking and purchasing practices for the event and vendors. This could be a hard sell, so start with items that are already biodegradable and focus on waste reduction (eliminate lids and straws for example). To ease collection, purchase cornstarch bags or use plastic bags that can be easily emptied onto a compost pile as these will not degrade and will be a contaminant in the composting process. (See Chapter 15: Bioplastics,)

When shifting to a compostables collection, maximize the potential for success in this program by utilizing monitors at each collection site. This will help reduce contamination, ensure proper disposal and educate the public.

Be sure to track the collection of all recyclables/compostables. By incorporating compostables, there will be a noticeable reduction of materials being disposed of as trash.

If possible, set up a list of acceptable items for vendors. Remember that not all paper plates are just paper; some have plastic, non-compostable liners. Work with local food ware distributors and industrial composters to identify what food ware is compatible with the campus waste recovery system and try and offer a vendor discount through the distributor.

The Ultimate: Reusables

The largest percentage of an event's waste stream comes from plates and cups. Encourage people to bring their own refillable mugs for drinks; this will have a huge impact on waste reduction at an event. If it is not possible to eliminate disposable cups as part of an event, work with event organizers to provide a discount for those using refillable containers. Do not forget to promote this as people like the idea of saving money by using refillables. Provide reusable cups if possible and waste will be reduced. Offer refillable mugs for sale at events. This will generate money for the recycling effort as well as the event and will provide an opportunity to educate the public.

The next challenge is plates. Disposable plates make up the largest single item in the waste stream at events that provide food. The largest challenge in switching to reusables is in washing the tableware. For events that are held in areas where there is access to a dishwasher, evaluate whether there is an

opportunity to borrow, rent, or purchase reusable plates (preferably plastic or melmack). This is a labor intensive process, so before making a decision, assess labor needs, facilities, and availability of plates to institute this practice.

As with other events, reduce garbage collection areas and consolidate into waste recovery stations. Create public waste recovery stations to collect recyclables, compostables, and dirty plates. For plate collection, be sure to have rolling toters for portability and ease in swapping containers. Designate a crew specifically for collecting toters of plates, washing dishes, and restocking plates for food vendors. This can be difficult to do at free events. Ideally, charging a deposit will ensure that the program does not loose plates and that replacement costs will be covered in the event that plates are lost. Be sure to periodically survey trash cans to find any stray reusable plates and forks that inadvertently get tossed in the trash instead of the reuse bin.

Charging Vendors an Environmental Deposit and Fee

Consider charging vendors a two-part deposit: one part is refundable; the other is a charge for the waste services. When vendors leave events, they often are tired and want to get home as fast as possible. Often this manifests as a “dump and run” mentality. The refundable part of the deposit will be returned to the vendor at the end of the event upon check-out of the vendor's booth. This will create an incentive for vendors to clean up in order to receive refunds. The non-refundable part of the deposit will be an environmental fee used to fund waste recovery efforts. By using reusable tableware, food vendors can save money by reducing the costs spent on disposables. This fee will help offset the large labor costs of successfully managing reduced-waste events.

Using Volunteer Help

Volunteers are plentiful on college campuses and in the surrounding communities. Also, many towns have volunteer organizations that are happy to participate in an events waste recovery program. They get to participate in a community event that creates visibility for their organization, gives them free entry to the event (football games are particularly popular), and gives them a sense of satisfaction from doing something that is making a difference.

For larger events, create a training program for the volunteers. Be organized and thorough. Follow through with a survey for volunteers at the end of the event in order to receive their valuable feedback. If possible, especially at larger events, give volunteers t-shirts, mugs, a token item, or free food to thank them for their effort and help in making the event a success.

When doing general promotional events on campus, it is always good to get a list of folks who want to volunteer. There are a lot of students who are interested in being involved. Likewise, this experience is valuable in teaching students how to apply waste reduction strategies in other areas outside of campus and garner support for a recycling program.

Well Worth the Effort

Managing waste at events is a big job. Events are highly visible opportunities for colleges to educate the

public and make a positive difference in the community. Gather data at events to demonstrate that waste diversion efforts DO work and make a big difference!

Events are a great place to test out more intense waste recovery efforts that can be applied back to the general college waste stream. Learn from events waste reduction and transfer these lessons to the everyday waste management operations. Use this information to evaluate and improve recovery in food service areas that have become increasingly geared toward fast food and disposables. Additionally, events waste reduction efforts are opening the door to the next horizon of waste diversion: composting. With the possibility of compostables, there are new steps ahead that can be taken by waste management operations at all colleges. See Chapter 13: Composting for more details.

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Chapter 29

REUSE EXCHANGES AND WASTE REDUCTION

Waste reduction is the key to a successful college recycling effort because it involves preventing materials from even entering the waste stream. There are many ways that this can be accomplished and in some areas, actual monetary savings can be demonstrated. It is important to look at ways to reduce campus waste as a mechanism to save money, extend the lifespan of resources, and lower the costs and impacts of overall waste management.

On-line Bulletin Boards

One way of getting the word out about what is available in surplus is to create an online bulletin board to be used by faculty and staff members. Departments can post items that they no longer need and other departments can browse these items to see if they will be able to reutilize any of the unwanted items. Surplus property is generally administered through the Business Affairs Office. Creating mechanisms for reuse within the campus system helps to reduce waste and save money. Such programs can also be expanded to the state level if the college or university is part of a larger collective of schools (e.g. all public universities within a state). Property managers on each participating campus can network with one another using listservs and other paperless communication to set up exchanges of both information and surplus property.

Reuse Exchanges

Creating reuse exchanges can be extremely successful ventures. Some colleges have reusable office supply exchanges and surplus furniture exchanges. Other colleges, with available space, have turned trash into gold while keeping valuable items out of the landfill. These schools have created reuse stores,

held auctions, or even sold items on eBay. Reuse exchanges are sometimes operated through a college recycling program, but often involve property management as well. These reuse stores can generate a healthy income for the college, while the exchanges can save colleges money.

Reusable Office Supply Exchanges (R.O.S.E.)
A Reusable Office Supply Exchange (R.O.S.E.) can be set up on a small scale in department offices. This can be a small area such as a closet or set of shelves where unwanted items can be left and needed items can be taken.

This can also be done as a campus wide exchange through finding a suitable closet or room that can accommodate a large amount of material. These exchanges work well unattended and are available to faculty, staff, administration, graduate students, and student groups. In state funded institutions, the materials are considered state property and therefore are not available to the general student population.

Find a place to have a reusable office supply exchange on campus. Let folks know about it. Gather materials from departments or have departments drop off materials in the designated space. Organize the room and shelved materials for easy access. When a sufficient amount of materials has been collected, have an open house. This can be done in conjunction with Earth Day, America Recycles Day, Recycling Awareness week, or another planned event. This is also a great opportunity for media attention.

An R.O.S.E can be efficiently operated with minimal labor. Some schools set up programs such that it is each department's responsibility to bring unwanted materials to the exchange area. Designate a place where a key to the supply room will be located and can be checked out, or staff the room once or twice a week. With a key check out, the room can be accessed anytime during the week. Let the campus moving crew know about this; when they are doing move-outs, the department can gather up office supplies to put in the room and it will be paid for as part of the move. This works well and people still drop items off even if Campus Recycling does not offer a pick-up service.

Operate the R.O.S.E. using student help. It is best to have an area for new items coming into the room. Hire a student worker to shelve the items. Keep a notebook with an inventory check-out sheet where people can record which items they take. The student worker can look in the college office supplies catalog and record the prices for purchasing new items, which in effect is the savings from reuse. Keep this documented in order to demonstrate savings to the college. Just from file folders, staplers, notebooks, and other common office supplies, savings can amount to over $10,000 annually.

All colleges have property management policies. If the R.O.S.E. needs "reducing," check with the Property Management Department to find out where extra materials need to be taken. Some schools can donate items and others have to go through state surplus. Overstock items may be able to be donated to students on campus. Some colleges also take an extra step and post available materials from the exchange online. However, it will take significant time and effort to keep this list current and a program can still function without online updates.

Office supplies are expensive and there are plenty to go around. Setting up an R.O.S.E. is a good strategy for waste reduction on a college campus, which will save departments money and reduce the quantity of usable materials entering the waste stream.

Reusable Furniture Exchanges
Office furnishings are big ticket items that are continually being purged from college settings. Offices are remodeled, moved, or even eliminated. All of these places have valuable office furnishings that can be reutilized by others on campus.

On a smaller scale, some colleges create an area (typically a warehouse setting) where usable, good-quality furniture is collected. Broken or non-usable items can be recycled or may have to be landfilled. Remember that these items can be costly to dispose of. Schools without the capacity for creating an exchange find themselves shipping items to a state property management facility, which is typically located far enough away that there are costs involved. Gleaning usable items on campus is a smart practice that will reduce waste management costs.

As with the R.O.S.E, a furniture exchange area can be operated at a minimal cost. Staff the area three times a week with at least one time during a lunch hour, another time in the morning, and the third time in the afternoon. This will provide a good variety of times to meet everyone's needs. The staff person can make sure that usable items are available, items are organized and recorded, and furniture is delivered. Additionally, the staff person can track replacement costs by researching local costs of middle-of-the-road quality items so as to provide a reasonable cost avoidance figure. Also, it is possible to estimate the weight of each item and demonstrate weight and dump savings along with other tracking systems.

Tags can be available to put on the claimed items which indicate: item, department, contact, and method of pick-up. It is best to work this out such that only the official Facilities Services moving crew can pick up and deliver the items to the departments as there are liability concerns with individuals handling items.

A furniture exchange program can provide a college with significant savings and especially benefits departments with less funding. Items in a reusable furniture exchange can include: chairs, desks, bookcases, dividers, bulletin boards, and conference tables. There are a lot of great finds for furnishing offices from a college furniture reuse exchange.

Some schools are lucky to have large amounts of space, preferably warehouse space, available to property management. Setting up a public reuse store or auction is a full-time job but can also provide a healthy source of income for the college, while reducing the impact on the waste stream. Some schools are also selling items on E-bay, which has proven to be lucrative as well.

Whether the school is a state or private institution will also influence how surplus property is managed. Funds may be required to go back to departments or go into a larger state pool in the case of state colleges and universities. Make sure to be in compliance with all state and local laws when setting up a surplus exchange and/or resale program.

Other Campus Waste Reduction Opportunities
There are endless ways in which colleges can reduce waste and, in turn, save resources, money, and landfill space. Here is a list of just some of the possibilities:
*Use vendor contracts to encourage waste reduction on items and services provided to the college. (See Chapter 11: Buy Recycled and Environmentally Preferable Products for more information about vendor contracts.)

*Establish reusable materials exchanges.
*Establish and maintain department contacts to network information and also for on-line exchanges.
*Hold an annual yard sale for on-campus residents. Donate the leftovers or save them to sell back to students in the fall. (See “Dump and Run” link in the **Resources** section below.)
*Give all new students and staff refillable mugs, recycling collection containers, and a recycling program brochure when they arrive for orientation.
*Encourage all campus food service areas to provide a discounted refill price for beverages and eliminate disposable cups in residence hall cafeterias. If a student wants to take a beverage out of the cafeteria, they need to bring their mug. By eliminating disposable cups in a residence hall cafeteria at a school with 17,000 students, over $30,000 can be saved by eliminating disposable cups.

Reduce Paper Use
*Inspire double sided copying. If possible, keep one-sided paper for draft copies in one tray of copy machines.
*Make an instructional sticker for all copy machines explaining how to make double-sided copies.
*Encourage paperless communication: use campus newsletter, e-mail lists, minimal hard copy departmental memos, and route slips on memos that are not time specific.
*All printed memos should be 1/2 sheet and double-sided as default.
*Purchase and use at least 50% recycled content paper. This will stimulate the recycling markets, thereby closing the loop and providing a market for the paper recycled on campus.
*Put recycling containers in all offices, and copy and mail rooms.
*Make recycling a part of the everyday life in these areas: place well signed, convenient and aesthetically pleasing recycling containers everywhere possible.
*Print "stop the junk mail" cards that folks can send to companies when they receive unwanted, unsolicited mail from off campus, as this is a huge waste generator.
*If possible, get cloth towels on a roll or air dryers for all bathrooms. If it is not possible to create an alternative to paper towels, put stickers on the paper towel dispensers to encourage people to think about reducing paper towel use (Use Wisely, Paper=Trees). Of note: paper towels can be composted.
*Work to establish on-line electronic forms for everything possible from customer service requests to print shop orders.
*Set up a reuse area for envelopes, pens, paper clips and other office supplies.
*Charge students for printing from campus computers. Printing costs a lot of money in paper, electricity, computer, and recycling costs. Charging for printing will encourage people to print what they need as opposed to pages of unnecessary materials.
*Do a contest for reuse and waste reduction ideas and give an award of a gift certificate for recycled content products at the bookstore or other prizes. It is easy to get donations from local businesses for prizes.

Food Service Areas
*Establish “pay-per-serving” instead of “all you can eat” charge systems to minimize food waste.
*Buy in bulk and set up large serving containers rather than purchasing individually packaged items.
*Utilize reusable dinnerware, travel mugs, and tupperware meal containers. Create a deposit system for these items in food service areas or sell reusables.
*Donate unsold meals to a local food bank.
*Reintegrate unsold food into next days’ meal (if possible).
*Use compostable (all paper) dinnerware where reusable dinnerware is not possible.
*Purchase in bulk for meal preparation.
*Use recycled content napkins.

Facilities/Custodial

* Set-up blow dryers or cloth towels instead of paper towels.
*Use refillable soap dispensers instead of disposable bladder pouches.
*Utilize low density plastic bags that reduce both cost and resource use.
*Purchase cleaning liquids in concentrate.
*Set-up toilet paper rolls such that there is never any toilet paper left, this can be done with new systems that put two large rolls in the dispenser so that there is always toilet paper available and the small amount left on a roll does not have to be disposed of. Partially used toilet paper roles can be recycled or given away.

Campus and Grounds

*Use grasscycling to add nutrients to lawns without the use of petrochemical fertilizers.
*Use xeriscaping techniques to minimize water usage.
*Install grey water systems so that water is recycled as many times as possible.
*Compost all grounds waste on-site and use the end product as an alternative to bagged soil amendments. Rent a chipper twice per year if needed.
* Purchase bulk manure instead of bagged fertilizers.
*Implement an Integrated Pest Management (IPM) program to deal with pests with minimal adverse effects on other nearby species.
*Mill wood from trees that need to be culled on campus and utilize lumber for campus construction projects.

Trades

*Save scrap materials for use on smaller projects.
*Recycle all industrial waste.

Motor pools

*Recap tires.
*Integrate hybrid and electric vehicles into fleet.
*Use bicycles for short trips.
*Recycle motor oil, batteries, and anti-freeze.

General

*Purchase carpet tiles that can be replaced in worn sections without replacing entire carpet.
*Buy carpets with a manufacturer take-back clause in the purchase contract.
*Theater productions can reuse set frames, canvas, and props for next production.
*Collect reusable items at all residence hall move-outs.
*Buy items that can be fixed, such as hand trucks that have replaceable parts.
*Encourage people to purchase what they will use. Far too often, valuable campus space is taken up with things that are outdated and unneeded.
*Give all new students and employees refillable coffee mugs, water bottles, and shopping bags. Institute a charge for disposables if durable containers are not utilized. In addition to rewarding conservation, charge for wasting. At the very least, work with the on-campus food services to provide a discount for using a refillable container. Establish refill spouts on all campus water fountains to promote refilling water bottles and reducing the amount of bottled water sold and consumed on campus.

There are endless opportunities for waste reduction and reuse on college campuses. Waste reduction practices can save money, staff time, and valuable natural resources. An added bonus is that such practices will enhance campus recycling efforts and allow for demonstration of waste stream reduction.

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Chapter 30

Campus Sustainability

"Sustainability" is an abstract term and has been highly debated in recent years, but generally refers to practices that can continue indefinitely as resource quality and quantity are maintained over time. In other words, renewable resources are used only to the extent that they are able to regenerate themselves. While sustainable practices have existed for centuries on the local level, they have become a global political priority only in the past few decades.

In the United States, sustainability as part of a national environmental policy has existed since 1970 when the National Environmental Policy Act (NEPA) was signed into law and the Environmental Protection Agency (EPA) was created, in order to respond to growing public concern about ecological well-being. [24] NEPA requires that Environmental Impact Statements be completed for all federal actions that have potential environmental impacts and also established the Council on Environmental Quality (CEQ) within Congress that became the catalyst for future environmental legislation. The NEPA model has also been implemented at the state level and has inspired countries throughout the world to develop and adopt similar laws with the goal of reducing negative environmental impacts. [25]

In 1972, the United Nations (UN) held the Conference on the Human Environment in Stockholm, Sweden which led to the establishment of the United Nations Environment Programme (UNEP) as "the environmental conscience of the UN system." UNEP has helped to facilitate the implementation of sustainable practices on a global scale through intergovernmental collaboration. This relatively new concept has been a priority since the first UN Earth Summit was held in Rio de Janeiro, Brazil in 1992. At this monumental event, over 100 heads of state met to discuss means of environmental protection and socioeconomic development. This resulted in Agenda 21, a framework for achieving sustainable development in the 21st century. [26] The Commission on Sustainable Development (CSD) was created to monitor and report on the policies agreed upon as part of Agenda 21.

These advances in sustainability policy have been essential in increasing discussion about ecological concerns, but do not provide a clear vision of what a sustainable world is. Sustainable practices must be tailored to fit to a region's resources and are therefore effective on a local level. As a result, many college campuses have been spearheading programs that fit into their communities' conceptions of sustainability. These initiatives are continually changing the way that campuses and surrounding communities interact with local and global resources to meet basic needs such as food, water, and shelter. The concept of sustainability is now being redefined, manifested, and implemented in modern practices with colleges leading the way.

College Sustainability Overview

College campuses are becoming gardens of sustainable practices where ideas take root and bloom into successful programs. Solid waste and recycling issues have been the foot in the door for campuses to evolve additional sustainable campus practices such as resource conservation, composting, green building, environmentally preferable purchasing, and sustainability focused courses and degree programs.

Many college recycling programs have developed over time in order to define and implement sustainable campus practices. College recycling coordinators are being brought into the discussion on how to extend and improve campus environmental responsibility. As a result, many college solid waste and recycling coordinators are taking on additional responsibilities and becoming campus sustainability coordinators.

As the world beyond college campuses further defines its viewpoints on sustainability, institutes of higher education are finding unique opportunities to be involved in global discussions and model sustainable practices. Governments, industry, business, academia, and local communities are embracing key elements of sustainable practices and are instituting policies, practices, and theories about how sustainability works.

The Natural Step

The Natural Step has been one of the most outspoken leaders in the discussion and implementation of global sustainability initiatives. The Natural Step is an international organization that uses, “a proven, scientifically robust model that helps organizations make pragmatic decisions to move toward sustainability.” [27]

The Natural Step has defined a technical framework for organizations to follow with the basic premise of identifying the human impact on the environment while identifying practices to reduce this impact and establish systems that result in continuous renewable cycles. Many colleges, businesses, industries, and government agencies are embracing The Natural Step and working to implement more sustainable systems in all areas of home, school, commercial, and governmental environments.

College Sustainability Practices

College campus sustainability is taking on numerous forms. In order to reduce environmental impacts,

colleges are addressing sustainability at all levels of operation from academic pursuits to construction and building maintenance. The practices and programs outlined below help to conserve resources, educate the campus community, and create plans for future action.

Sustainability Assessments

In order to begin defining sustainability on a given campus and what can be done to increase sustainable practices, current practices and systems must first be evaluated. The following are assessment tools that can help to identify steps that can be taken to improve sustainable procedures and practices.

- EPA Calculators are available for a wide range of topics from compost cost benefit analyses to carbon footprints. These are a great starting point as they provide both environmental and budgetary analyses.
- Carbon Footprint Calculators and Ecological Footprint Calculators help to demonstrate an individual's environmental impact and offer suggestions for reducing impact. These suggestions can be incorporated into long-term campus planning and create ways to help individuals reduce impact both on campus and off.
- Benchmark energy assessments are more detailed than the analyses that would be found on the internet because the assessment takes place on-site. Keep track of electricity and water usage on campus using records from the local utility company. Identify areas where systems can/should be updated in order to be more efficient. If the campus is planning on creating a comprehensive energy reduction plan, designate someone with the appropriate qualifications on the staff or hire an energy consultant to identify problem areas around campus and offer suggestions as to how they may be improved.
- The Sustainability Tracking, Assessment & Rating System (STARS) is a standardized self-assessment instrument developed to assist colleges and universities in tracking progress toward meeting sustainability goals. The tool was developed through collaborative efforts led by the Association for the Advancement of Sustainability in Higher Education (AASHE). Participants who use this system are often recognized for their green accomplishments. Other tracking systems have been developed in the past, but have not been as widely used and accepted as STARS.
- A Green Office Audit is a tool developed to identify “low-hanging fruit” in an office setting. It covers a variety of topics from paper waste, to electrical and water usage, to cleaning products, and even pest management and landscaping techniques. It analyzes what is already being done to reduce impact in the office and offers suggestions for the next steps. Ideally, someone on staff would be able to help departments create a waste reduction plan based on the results of the Green Office Audit. Green Office Audits are most effective when customized to the school's needs and capabilities. See Appendix 2 for a sample Green Office Audit from the University of Oregon.

Administrative Structures

As sustainability becomes a priority on campuses across the nation and the world, it is important that administrative structures are put in place so that discussion becomes action.

- Some colleges are creating Offices of Sustainability that oversee all sustainability related actions on campus such as developing comprehensive waste reduction strategies, energy efficiency and greenhouse gas reduction plans, working with recycling programs, hosting educational events, networking with environmentally related groups on campus and in the community, networking with other schools, and providing PR for the University to highlight the steps it is taking to be a better environmental steward. A sustainability director or environmental coordinator is generally appointed to administer this type of program.

- Committees (such as the Environmental Issues Committee or Sustainability Committee) bring campus community members together, generate discussion about sustainability, and put pressure on central administration to encourage positive changes in campus behaviors and practices.
- Departmental contact lists help administrators in the Office of Sustainability and the Campus Recycling Program to network with designated faculty and staff members in each department when implementing new waste reduction plans. A contact list allows information to be sent to a designated person in each department who can then disseminate information to his/her colleagues.

Long Term Planning

In order to turn discussions about sustainability into real, action-based solutions, long-term, comprehensive planning is required.

- The American College and University Presidents' Climate Commitment has 685 signatories to date. These higher education leaders have agreed to institutionalize plans to achieve climate neutrality within their institutions as soon as possible. This commitment includes setting a target date for achieving climate neutrality, completing an inventory of all greenhouse gas emissions generated on campus within one year of signing the agreement, and continuing to complete annual inventories. Within two years of signing, an institutional action plan (or Climate Action Plan) must be developed to achieve interim goals leading to climate neutrality, incorporate sustainability education into the curriculum, expand climate neutrality research efforts, and create tracking mechanisms that can be used to evaluate the progress on the goals and actions outlined in the plan.
- Developing campus environmental and sustainability policies is one way of creating accountability within an institution. Policies create clear expectations for environmentally preferable purchasing, and maintenance procedures for buildings and grounds.
- Developing and implementing sustainable development guidelines can help to identify opportunities for lower impact building procedures for new construction and remodels as well as sustainable land use planning on campus properties. Such guidelines can also address green space preservation on campuses, plantings of native and/or non-invasive species in campus landscaping, and environmental cost/benefit analyses for new projects.
- Creating long-range campus sustainability plans incorporates policies and guidelines into a more comprehensive document. Comprehensive plans can go beyond the Presidents' Climate Commitment by addressing issues such as resource consumption, land use planning, waste management, hazardous materials handling, and other factors that have climate impacts as well as other ecological implications.

Education

Education provides the necessary tools to lead to positive actions that conserve natural resources. At institutes of higher education, there are endless opportunities both in the classroom setting and in hands-on, practical settings for environmental education.

- Curriculum additions and adaptations to include environmental issues is essential in ensuring that upcoming generations of college graduates are well informed about the world they live in and interact with on a daily basis. Think outside of the box: environmental issues can be incorporated into every department on campus. Each division of academia provides new, innovative opportunities for “greening.”
- Degree and Certificate Programs are the next natural step after incorporating environmental issues into the college curriculum. Environmental Studies, Ecology, Environmental Planning, and

Environmental Engineering major programs are becoming increasingly popular and attracting students to colleges and universities. Certificate programs can also be valuable because they incorporate ecological awareness into fields that tend to have significant impacts. For example, architecture programs could develop a sustainable design certification with coursework focused on passive solar design, lower impact building materials, locally sourced materials, Leadership in Energy and Environmental Design (LEED) Certification, greywater systems, rainwater catchment systems, living roofs and more. Similarly, a business program could offer a green business certificate that could be achieved by completing courses on topics such as environmental and ecological economics, steady-state economics, sustainable development, low-impact product design, local currencies, and waste-reduction practices for businesses.

- Carbon Footprint Calculators and Ecological Footprint Calculators are valuable interactive educational tools because they allow students to connect their personal decisions to the impacts they have on the planet. Calculators analyze everything from food choices, to electricity usage, to preferred modes of transportation. Many versions of these calculators are available online and also offer suggestions that can be implemented into classroom lessons as well.
- Princeton University's Carbon Mitigation Assessment (CMI) Stabilization Wedges concept is an educational tool that helps to visualize a multi-faceted approach to carbon stabilization. The main purpose is to demonstrate that the technology already exists to mitigate carbon emissions. The framework identifies four "carbon-cutting" categories (Efficiency, Decarbonization of Power, Decarbonization of Fuel, and Forests and Agricultural Soils) with specific strategies in each. A combination of eight strategies can be used to build a carbon mitigation portfolio that together will mitigate carbon emissions.
- Eco-reps are students who act as liaisons between administrators and other students to promote environmental awareness and education on campus. This peer to peer structure has been successful on campuses across the U.S. in teaching students about topics such as energy and resource use, local and sustainable food production, recycling, and more. Eco-reps may work within on-campus residential facilities, student unions, serve on environmental committees, coordinate with administrators who focus on health, safety, sustainability, and waste management, and act as general resources to encourage ecologically conscious living.

Preservation, Conservation, and Mitigation

Preservation designates and protects certain areas of land, water, or other natural resources for the future. Conservation compliments preservation in that it involves consuming less and using resources (including climate systems) strategically. Mitigation seeks to lessen or offset environmental damages that are already present. Planting trees to sequester CO_2 or restoring wetlands or riparian zones that were damaged during construction processes are examples of mitigation programs.

- Work with the Campus Planning Department to develop buffer zones in between the campus and surrounding residential areas and designate green spaces where new construction will be prohibited. Limit new construction in order to preserve open spaces on campus. Promote these open spaces for recreational activities and educational purposes such as wildlife viewing, plant identification, surveying and land analysis classes, and physical education.
- Energy use reduction should be a top priority within all campus operations. While extremely energy efficient technology exists, it may not fit within a school's budget. Therefore, using less energy (turning off all lights and computer monitors when leaving a room, making sure appliances are unplugged when not in use, turning thermostats down in the winter and up in the summer, etc.) is a way to conserve both money and energy. As systems wear out and are due to be upgraded, choose energy efficient options, but focus on reduction in the meantime.

- Waste reduction significantly reduces costs to an institution because disposing of waste always has associated costs. Recycling is one way of helping to reduce waste, but reducing waste through reducing consumption is always preferred. See Chapter 1: Why Reduce, Reuse, Recycle? and Chapter 29: Reuse Exchanges and Waste Reduction for more details.
- Carbon offset programs and other forms of mitigation banking are often included in long-term climate neutrality and campus environmental plans, but they also have the potential to pose significant blockages to campus sustainability. Unless all offsets are made locally through tree planting or a similar initiative, there is no way of determining whether or not emissions are in fact being offset. Hiring a company requires a college to trust that the mitigation company is truly following through on their responsibility to offset emissions. In addition, offsets do not encourage conservation. Such programs promote the idea that current levels of emissions are allowed as long as a consumer can pay enough. This skips the essential step of reduction when analyzing campus environmental impact.

Waste Reduction and Recycling

Waste reduction and recycling are complimentary sustainability practices because both help to protect natural resources by ensuring that minimal virgin materials are extracted. The fewer materials that are used to begin with, the fewer materials will need to be reprocessed using energy intensive recycling processes. Recycling programs assist in educating the campus community as well as collecting recyclables and often have the role of implementing additional sustainability programs.

- ”Reduce, Reuse, Recycle” is an oft used adage that truly works when put into practice. See Chapter 1: Why Reduce, Reuse, Recycle? for more details about this simplified version of waste hierarchy and Chapter 4: How to Start a Recycling Program for step by step program implementation ideas.
- Composting provides a means of turning waste to a valuable resource. It is a natural way of recycling material and improving efficiency in a waste management system. See Chapter 14: Composting for details about starting a composting program on campus.

Food

Campuses generate large amounts of food waste in dining halls, other on-campus eateries, and at special events. As with other products, certain food choices are more environmentally preferable than others. Consider the following options for improving campus food sustainability.

- Buying local, organic, and unprocessed food serves multiple purposes by reducing environmental impacts, reducing waste disposal costs, providing healthy food to the campus population, and stimulating the local economy. Packaged foods (especially in single serving containers) are a major contributor to the campus waste stream. By reducing or eliminating this stress on the waste stream through bulk buying, waste disposal costs and environmental impacts will be significantly reduced. See Chapter 26: Recycling in the Kitchen for further details. Local foods can be purchased for campus kitchens by setting up contracts with local farms or produce distributors or even growing a percentage of the produce required by the campus kitchens on site. Campus farms can be integrated into the sustainability curriculum through hand-on classes and internships at the farm. Local food can also be made available on campus by holding regular farmer's markets on campus. Schedule these so as to not conflict with other regularly scheduled farmer's markets.
- Composting both pre and post-consumer food waste is a sustainability initiative that more and more schools are getting on board with. Organic materials make up a large portion of the campus waste stream, so by composting these materials, waste can be turned into a resource. This waste to resource model is essential to improving campus sustainability. For more

information about how to start and maintain a campus composting program, see Chapter 14: Composting.

- Reusable dishes and tableware decrease waste because disposables such as plastic forks, coffee cups, and compostable food ware such as paper plates and PLA cups are eliminated from the waste stream. Consider creating a campus program to provide all new students and employees with a reusable mug, water bottle, plate/bowl, and tableware to be used at campus events. A similar initiative could involve charging a fully refundable deposit for these items at the beginning of the year and charging fees for disposable tableware at food service areas.

Water

Water is a human need and is therefore a human right. It is a finite resource and must be used wisely in order to maintain both quality and quantity. Many high and low tech options are available for improving water quality and efficient water usage.

- Water conservation and consumption reduction campaigns are the best place to start regardless of the technological options that are currently viable based on budget restrictions and availability of appropriate systems. Put signs above sinks reminding users to minimize water consumption and turn the faucets off when not in use. When constructing or remodeling buildings, install low flow toilets and shower heads, and water and energy efficient washing machines and dish washers.
- Greywater is water that has already been used in domestic practices such as hand washing, showering, dish washing, laundry, etc. It is therefore not of drinking quality, nor is it highly contaminated like black water (toilet water). Greywater systems allow this water to be recycled multiple times for landscaping or to flush a toilet instead of immediately being treated as waste. As greywater comprises 50-80% of "waste" water in an average residential setting, implementing such systems can significantly decrease fresh water use and also provide additional benefits such as decreasing the strain on septic tanks and water treatment plants, recharging groundwater, natural cleaning of water as it is reintroduced into the water cycle, reclaiming nutrients that would otherwise be wasted, and enhancing plant growth. [28]
- Water catchment systems utilize the rainwater that falls on a property by harvesting it for on-site usage. These systems save money by reducing reliance on a utility company for water services. While not all rainwater may be of drinking water quality, it is certainly valuable for bathing, hand washing, as wash water for clothing and dishes, flushing toilets, and landscape irrigation. Water catchment systems also help to decrease storm water runoff (and therefore stress in storm water treatment facilities) by slowing and storing water.
- Install refill spouts around campus to encourage refillable container use. Ban bottled water on campus as it creates environmental degradation through every step of its life cycle from extraction, to packaging, to disposal. Involve students, faculty, and staff to start a successful campaign. For sample pledges and petitions for banning bottled water on campus and switching to refillable containers, see Chapter 24: Education to Action.

Energy

As new energy efficient technology is developed, college campuses are emerging as perfect testing grounds because residential, industrial, and institutional settings are incorporated into one area. Therefore, there is an opportunity to identify the most appropriate context for new technology and strategies. Keep in mind that reducing energy consumption goes along with energy efficiency, so campaigns aimed at appropriate technology and conservation need to go hand in hand.

- Energy conservation is the true key to creating a sustainable campus. Reducing energy consumption should always be of higher priority than technological fixes that require no change

in personal behavior. Put stickers with energy conservation messages and logos on switch plates as reminders to turn lights off when leaving a room. Place similar signs near computer monitors. See Chapter 2: Energy and Resource Conservation for more energy saving ideas.

- Renewable energy is becoming more affordable over time as more consumers begin demanding it. Campuses are among these consumers. Launch a campaign on campus to request that a certain percentage of the power on campus is purchased from renewable sources.
- Combine locally sourced energy campaigns with renewable energy campaigns. Buying local energy has the dual benefit of increased efficiency and support for the local economy.

Buildings

Just as the decisions that we make as part of our everyday lifestyles impact the environment, the places where we live and work have an ecological impact as well. Buildings help determine human relationships to the surrounding environment by either integrating into existing natural systems or separating humans and nature. The entire life cycle of a building must be assessed in order to identify ways that it can be made more sustainable. As a structure is being built, the site itself must be analyzed to identify potential environmental impacts to the soil, air, water, and wildlife. Construction materials need to be evaluated in order to choose low-impact, durable, and repairable items. Appropriate technology needs to be implemented based on regional climate, microclimates, ease of use and maintenance, and universal accessibility. At the end of a building's life cycle, options must be available for material reuse, recycling, or return to natural systems through biodegradation. There are countless options for including sustainable campus building programs in long-term environmental plans.

- Green buildings and natural buildings are both steps toward creating more sustainable dwellings and work spaces. “Green buildings” tend to be more focused on technology than “natural buildings,” which tend to be lower-tech, often using biodegradable materials. Both green and natural buildings focus on increasing sustainability by building with lower impact materials and increasing energy efficiency through both passive and active design and technologies. Building codes may inhibit (or prohibit) certain building styles, materials, and techniques, but experimental building permits may be available depending on city ordinances.
- Leadership in Energy and Environmental Design (LEED) is a program administered by the U.S. Green Building Council (USGBC) to certify buildings that improve energy and water efficiency and indoor environmental quality, reduce CO_2 emissions, and demonstrate resource stewardship and impact sensitivity. [29] Not only do LEED certified buildings significantly reduce environmental impacts and promote healthy living and working environments, but LEED certification also provides positive publicity for colleges and universities because it is an internationally recognized certification system. LEED for Neighborhood Development takes the building certification a step further by evaluating how a project fits into the community context and provides local services. This is especially important for large institutions such as colleges and universities because there is often a rift between campus life and the surrounding neighborhoods. For new construction and major renovation, work with LEED Accredited Professionals or contractors who have demonstrated a strong background in green building skills and knowledge of the LEED certification process.
- Construction and Demolition (C&D) waste recovery is another aspect of building sustainability that is sometimes overlooked as it may be more convenient for materials to be hauled away as trash rather than separating and salvaging usable items. However, C&D recovery presents a major opportunity for both cost and environmental savings on college campuses. For instructions detailing C&D waste recovery and common materials that are generated through such processes, see Chapter 13: Construction and Demolition Recycling.

Sustainability Demonstration Houses

Sustainability demonstration houses are becoming more and more popular on college campuses across the country. A house is a perfect learning environment for sustainable practices because not only can sustainable building practices be demonstrated, but everyday lifestyle choices that students and community members can incorporate into their own lives can be demonstrated as well.

- Education is essential at sustainability demonstration houses. A house with a flourishing garden is a welcoming environment for workshops about a wide range of sustainability related topics such as permaculture design, native plant landscaping, rainwater harvesting, greywater systems, seed saving, tree planting, food preservation and cooking with local foods, woodworking, harvesting and processing natural fibers, and herbal medicine. Campuses tend to establish and maintain their sustainability houses to mesh with local culture and student life while adhering to administrative restrictions.
- Humboldt State's Campus Center for Appropriate Technology (CCAT) is one of the oldest and most successful sustainability demonstration houses in the country and has been cited as a precedent for many other houses that have been established in recent years. It was founded in 1978 when a group of students spent a summer renovating a house on campus that would otherwise have been torn down. CCAT was moved to a new site in 2004 to accommodate a new campus building and has continued to provide a valuable resource to students and community members. It is student funded and staffed and houses three co-directors to administer CCAT programs including regular tours of the house and grounds, classes, workshops, and student initiated projects that test new technologies at the house. The house is a continually evolving project and living laboratory which over the years has implemented a photovoltaic system, solar thermal system, greywater marsh, wind turbine, pedal power electrical generation, and grounds that incorporate permaculture design, organic gardening, and natural buildings. [30]
- Center for the Advancement of Sustainable Living (CASL) at the University of Oregon was founded by a graduate student as a terminal project in 2003. The project used CCAT as a precedent and one day hopes to have a similar program. Like CCAT, CASL has three co-directors, and coordinators who volunteer as event organizers, fundraising and grant coordinators, publicity coordinators, and garden coordinators. In 2007, CASL was designated a house in the east campus neighborhood to remodel and turn into a permanent home for the program. The remodel is still in progress, but plans include an array of technologies such as a solar hot water heater, green roof, and rainwater catchment and greywater systems. As the remodel and new construction processes are in the works, students have plenty of hands-on opportunities to learn about sustainable building practices. Even though few events are held on the property, CASL continues to sponsor sustainability related events including the annual Redefine the Dream Speaker and Workshop Series which brings local experts to campus to discuss sustainability and teach sustainable living skills. [31]
- Treehouse at Dickinson College started as the Center for Sustainable Living's student residence in 1990. It now houses fourteen student residents who are committed to living a low-impact communal lifestyle and is administered as Special Interest Housing within the Office of Student Life. While the focus of Treehouse is reducing consumption through personal choices, its technological features earned Treehouse a gold rating from the LEED program in 2008. The house's green features include energy and water efficient appliances and heating and cooling systems, salvaged and recycled content building materials, low or non-toxic building and finishing materials such as low VOC paints, adhesives, and carpeting, and a high performance envelope (building shell) to provide insulation. The house also has an energy monitoring station that keeps track of consumption in “real time.” The residents reach out to the community to

teach more about sustainable lifestyle choices by hosting potlucks, concerts, tours of the house, workshops, and guest speakers. [32]

Student Activism

Students have the ability to influence campus environmental policy by lobbying student government representatives and university administrators as well as initiating education campaigns, forming groups and clubs, conducting research, and completing projects for classes that will have tangible impacts on campus and in the community.

- Student Government resolutions are one way of ensuring that central administration hears student voices, while influencing environmental policies that will have effect on student fee funded groups. For example, banning the purchase of styrofoam containers and bottled water with student fees acts as a precedent that the rest of the university can follow.
- Environmentally focused clubs and other organizations on campus help to build community and also have the opportunity to educate fellow students and community members about resource conservation and waste reduction. These groups can include outdoor recreation clubs, sustainability demonstration house organizations, and groups dedicated to green practices in their respective course of study such as an environmental law club, sustainable business club, or green building club. Community service organizations, fraternities, sororities, and social justice organizations can also have a stake in environmental issues on campus and in the community.
- Sustainability coalitions allow numerous environmentally focused groups on campus to collaborate when planning larger events such as Earth Day. Develop listservs within coalitions to send out information about upcoming meetings, events that coalition members are promoting, and environmental current event updates. Create a website so that events can be easily publicized and groups belonging to the coalition will avoid planning overlapping events.
- Conferences can be geared toward students, community members, and in some cases students from other campuses in the region. Conferences provide excellent networking and educational opportunities and give students practice in planning and coordinating all of the details involved in hosting large events.
- Earth Hour and other international and national events create awareness about both local and global social and environmental issues. Combine student-led events with nationwide and worldwide calls to action.

Competitions

Friendly on-campus and intercollegiate competitions provide opportunities for education, outreach, and waste reduction.

RecycleMania

RecycleMania is an intercollegiate competition and benchmarking tool that takes place over a ten week period. The competition started in February 2001 as a contest between Miami University and Ohio University to determine which school could collect the largest quantity of recyclable material. Less than ten years later, over 600 schools have joined the fun. Participation categories include “Grand Champion” (recycling as a percentage of the school's waste stream as a whole), “Stephen K. Gaski Per Capita Classic” (quantity of recyclables collected per person on campus), “Waste Minimization” (lowest amount of municipal solid waste, including both recycling and trash), “Gorilla Prize” (highest gross tonnage of material), and “Targeted Materials,” (largest amount of corrugated cardboard, paper, bottles and cans,

or food service organics). Participating schools provide educational events throughout the ten weeks in order to promote recycling and waste reduction on campus. [33]

Harvard Green Cup

The Green Cup is a competition between on campus houses to determine which house is the most environmentally conscious. Houses are evaluated based on seven criteria:

- Improvement in Waste Reduction and Recycling
  - *Improvement in Energy Conservation
  - *Eco-Projects (developed by individuals or teams within each house)
  - *House Council Efforts to Reduce Waste at Events
- Participation in the Campus Sustainability Pledge and Resource Efficiency Program (REP) Surveys
  - *Performance in Food Waste Audits
  - *Reduction in Dishware Loss and Plastic Ware Use

The competition's purpose is to increase environmental awareness, foster innovative ideas that reduce Harvard's environmental impacts, and reward participants with prizes for their commitment to the environment.

Ohio University's Energy Challenge

In the fall of 2001, Ohio University did an energy competition called the Energy Bowl in the residence halls. There are 41 residence halls at Ohio University. The competition lasted 10 weeks. 15% of the savings went back to the halls in the form of a check for the nine top-ranking halls.

All halls competed with each other in three campus areas. At the end of four weeks, the top halls (three from each area) competed for the rest of the competition. Each area was ranked 1st, 2nd and 3rd for a total of nine winners. There was a quarter final competition, which narrowed the nine winners down to three first place winners. Then to a semi-final, then final, which determined the overall 1st, 2nd and 3rd place winners. The Ohio University Energy Bowl winner then competed with another close by college for the grand prize. The three hall winners got PR during homecoming and representatives from each winning hall had their photos taken with the University President and put in the campus newspaper. Each residence hall in the top nine halls got cash awards which went to hall councils for fun stuff.

1st place hall winners $1,346

2nd place hall winners $561

3rd place winners $337

Additionally, there was Energy Week during the middle of this competition. A variety of speakers, giveaways, information tables, an energy fair with companies displaying energy conservation products, career information on energy-related fields, and contests to answer trivia questions about energy conservation (with prizes like a piece of pizza) were some of the activities that took place during the week. Local kids were asked to participate. In the middle of this week, the town Mayor issued a

proclamation making it Energy Conservation Week. There was even an alternative energy car show including an electric race car.

At the end of all of this, a banquet was held for the winners. Housing provided the banquet at no cost. The banquet included recognition of halls and waste busters who participated. The average amount each hall reduced was 20%. Each hall is on a separate meter so it was easy to monitor energy usage.

The total energy cost reduction was $75,000 over a 10-week period. The total cost of implementing the program was about $18,000. Those costs went towards paying student workers to carry out the program: two student executive directors got $500 each, five student assistants got $200 each, and another fourteen student waste busters received $75 each.

This was done as a project with a student group called Waste busters, plus a consulting agency to complete such tasks including meter readings, administrative work, sign and t-shirts making, ads, a float in the homecoming parade, table tents, and other promotion (including a "beat writer" to keep the stories flowing in the student paper.) One student also created a video about this (which was included in the cost of the program) which aired on public and campus television. The group worked with the Residence Hall Assistants to promote the program. This was endorsed by the Student Senate which passed a resolution to support the project.

The idea of this was to make it an annual competition with follow up education and promotion during the year. A little invested and a lot saved! Kudos to Ohio University for this innovative resource saving competition.

Purchasing

The entire life cycle of a product (from the resource extraction processes used to obtain the materials to create it, to its disposal when it can no longer be reused) is necessary to consider when deciding whether or not to purchase a particular item. When it comes to purchasing, always remember the 3 Rs. Can the need for the product be reduced? If it cannot be reduced, what options exist for reuse and repair? When the product is no longer able to be reused, can it be recycled?

- Purchasing policies create mechanisms so that specifications for products can be clearly stated. These specifications can include minimum required recycled content, reduced packaging, buy-back programs for excess packaging, and restrictions on hazardous material content.
- Purchasing energy from renewable sources is also a way of implementing environmentally preferable purchasing practices. "Green power" still tends to be more expensive than fossil fuel based energy sources, but may still be a financially viable option when paired with energy conservation programs. The money saved by using less energy can then be used to purchase energy from cleaner sources.

Transportation

The way in which students, faculty, staff, and visitors go to and from campus has major implications on the surrounding land, air, and water. Consider the following options for making transportation more sustainable.

- Limit the number of parking passes issued each term and the availability of parking on campus. Making alternative transportation more convenient than trying to find a parking space is one way of encouraging biking, walking, using public transportation, and carpooling.
- Buy bus passes for all students, faculty, and staff. Bus passes will be cheaper if there is a campus wide contract instead of just an incentive program that gives campus community members the option of buying a discounted bus pass individually.
- Guaranteed ride home programs allow faculty and staff that walked, biked, used public transportation, or carpooled to work to get a free ride home in the event of an emergency or unscheduled overtime. Check locally to find out if such a program already exists and determine the logistics necessary to set up a contract so that campus employees will be able to receive the service. Once the program is in place, publicize it so that employees will be encouraged to use alternative transportation.
- Bike parking should be readily available in multiple convenient locations. Work with the Campus Planning Department to identify areas that would benefit from additional bike racks and how bike parking areas can be designed to fit into the overall campus aesthetic.
- Bike loan programs provide bike access to students who do not own bikes. Programs like this are perfect for serving exchange students and students who have moved from out of state and may not want to purchase a bike. This type of program can be operated in a variety of different ways depending on the needs of the campus population. Some campuses loan student's bikes for an extended period of time (such as a semester) while others offer loans by the hour or the day. In areas with low levels of bike theft, some schools have purchased bikes, marked them as campus bikes, and left them unlocked around campus. Students and employees can use the bikes to get from one campus destination to another as long as the bikes are left unlocked for anyone to use.
- Provide incentives for walking, biking, using public transportation, and carpooling such as raffles for prizes donated by local businesses, coupons to local bike shops, free bike maintenance workshops, and discounted (or free) bus passes.
- Post rideshare boards in each department so that coworkers can easily coordinate carpooling to and from campus.

Funding Opportunities

One of the greatest challenges of sustainability is securing funding for new programs and projects. As the global community becomes more environmentally educated and aware, there is more interest from donors wishing to support campus environmental practices. With the plethora of students demanding environmentally focused academics, there will be a new generation of alumni making financial contributions to campus sustainability. With this in mind, there are vast opportunities for fundraising. Colleges are beginning to expand funding opportunities to support existing and new sustainability programs.

*Student Green Fees provide financial backing for campus initiated sustainability projects by requiring that a percentage of student fees be designated for such a purpose. At larger campuses, even a green fee of a few dollars per student per term will generate enough revenue to initiate valuable projects each year. For example, at the University of Oregon, a $0.60 per student per term fee generates approximately $36,000 annually for the Student Sustainability Fund. This funding is then designated for student initiated projects, which over the past few years have included installing solar hot water heaters on campus buildings, purchasing energy efficient appliances for student groups, and installing a

rainwater-to-potable water treatment system at a campus facility. [34] Students, faculty, and staff members serve together on the board which decides how to allocate the funds.

*Federal, state, and local grants, loan programs, and rebates may be available to assist campuses striving to implement sustainable technologies into new and remodeled buildings. Work with the development office to identify potential funding sources. These may be available through the government, utility companies, or private foundations with missions related to sustainability or environmental protection. Development offices can also assist with fundraising campaigns for specific programs.

The practices and initiatives described in this chapter save resources, create continuous systems, and utilize renewable resources. Sustainable college practices provide an opportunity for students to be involved in real world issues. This has been manifesting impressive results as students leave campuses and continue to work on sustainability in order to help alleviate some of the world's problems. Truly, this is the purpose of higher education.

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Appendix 1

Cardinal Rules of Recycling Programs

Always site trash and recycling collection together- this way the choice to recycle will be present and will serve as a reminder to conserve, even if an item is not recyclable.

Collect only materials with existing markets- otherwise, the end result is waste.

Get the word out- create an easily recognizable program logo.

Always start with pilot projects- work out the glitches with a small program, then expand from there.

Make sure sites are highly visible and well-maintained- this makes recycling sites easy to use and service.

Prioritize worker safety- use side loading containers instead of top-loading bins and wear gloves, eye, and ear protection when needed.

Clean out reusable containers- reduce use of disposable liners and bags.

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Appendix 2

UO Green Office Audit

As ecological concerns become more prevalent across the globe, it is crucial that each of us do our part to minimize impact. Even small steps will make a difference if everyone participates. The UO Green Office Audit is a tool to help the University of Oregon to create healthier workspaces for employees and students and promote cost savings through energy and resource conservation and waste reduction.

Scoring: Circle the appropriate response and add points at the end of the assessment.

For Yes / No questions, **Yes=4 points** and **No=0 points**

For 0-4 questions, **0=Never, 1=Rarely, 2=Sometimes, 3=Almost Always, 4=Always**

- **For questions that are formatted differently, scoring for each answer is specified.**
- **Some questions are formulated more broadly and are not included as part of the score.**

General Recycling

1. Are recycling bins available in the office? **Yes / No**

2. How often are the bins utilized? **0…1…2…3…4**

3. Are bins strategically placed and promoted in order to facilitate and increase use? **Yes / No**

Paper

1. Is the UO Recycled Paper Policy followed? **0…1…2…3…4**

2. Is post-consumer recycled content paper purchased for office use? **0…1…2…3…4**

3. Is process chlorine-free paper purchased for office use? **0…1…2…3…4**

4. Is neon paper use limited? **0…1…2…3…4**

5. Are printers set to double-sided as a default? **0…1…2…3…4**

6. Are interdepartmental memos printed on half sheets? **0…1…2…3…4**

7. Are single sided sheets saved and reused? **0…1…2…3…4**

8. If paper cannot be reused, is it recycled? **0…1…2…3…4**

9. Are small scraps of paper, sticky notes, old calendars, etc. recycled? **0…1…2…3…4**

10. Is electronic (paper-free) communication utilized whenever possible? **0…1…2…3…4**

11. Are backs of envelopes from junk mail, backs of outdated flyers, and other one sided papers saved for use as scratch paper? **0…1…2…3…4**

12. Is there a designated, easily accessible spot for one-sided/scratch paper? **0…1…2…3…4**

Office Supplies / Furniture

1. Are unwanted office supplies (folders, staplers, notebooks etc.) donated to R.O.S.E.? **0…1…2…3…4**

2. Is R.O.S.E. checked for reusable supplies before new supplies are purchased? **0…1…2…3…4**

3. Are environmentally preferable products purchased whenever possible? **0…1…2…3…4**

4. Is the UO Surplus Furniture Exchange checked before new furniture is purchased? **0…1…2…3…4**

Food Waste

1. Are composting containers accessible in or nearby the office? **Yes / No**

Containers

1. Are non-reusable containers recycled or composted? **0…1…2…3…4**

2. Do employees use refillable water bottles/coffee mugs? **0…1…2…3…4**

3. Is there a place to rinse/wash reusable containers? **Yes / No**

4. Is there a water fountain or clean tap nearby where containers can be refilled? **Yes / No**

Electricity

1. Are lights turned off when the office is unoccupied? **0…1…2…3…4**

2. Are Compact Florescent Lights (CFLs), Light Emitting Diodes (LEDs) or other energy efficient lighting choices used? **0…1…2…3…4**

3. Do employees turn off computer monitors when leaving the office (even if it is only for a few minutes)? **0…1…2…3…4**

4. Are computers/monitors, printers, copiers, and other electronics turned off at night and over weekends and holidays? **0…1…2…3…4**

5. Are electric devices and appliances unplugged when not in use? **0…1…2…3…4**

E-Waste

1 Are electronic items repaired instead of thrown out? **0…1…2…3…4**

2. Are resources at NextStep Recycling utilized for proper E-waste disposal? **0…1…2…3…4**

Ink Cartridges

1. Are refillable cartridges purchased? **0…1…2…3…4**

2. Are cartridges returned to the supplier when empty? **0…1…2…3…4**

3. Is there a central collection point in or nearby the office for empty ink cartridges? **0…1…2…3…4**

4. Is the draft setting used on printers to minimize ink usage? **0…1…2…3…4**

Meetings/Special Events

1. Is reusable tableware used for meetings and special events? **0…1…2…3…4**

2. Is food for events purchased from local sources? **0…1…2…3…4**

3. Is organic food purchased for events? **0…1…2…3…4**

4. Are napkins made with high recycled content purchased for events? **0…1…2…3…4**

5. If durable tableware is not an option, is compostable tableware used instead? **0…1…2…3…4**

Cleaning Products

1. Are all cleaning products non-toxic to human health and the environment? **Yes / No**

2. Can any hazardous products be substituted for less harmful/more healthful products? **Yes / No**

3. Are cleaning products bought in bulk? **0…1…2…3…4**

4. Are reusable cleaning materials (cloth rags, mops, etc.) purchased? **0…1…2…3…4**

5. Are concentrated cleaning products being mixed at the proper dilution rates? **0…1…2…3…4**

Indoor Air Quality

1. Are there plants in the office? **Yes / No**

2. Is the office (including bathrooms) fragrance free? **Yes / No**

3. Can any fragrances/deodorizers be substituted with less hazardous products? **Yes / No**

4. Are low VOC or VOC free cleaning products purchased for the office? **Yes / No**

5. Are heating/cooling systems designed to be easily turned on and off? **Yes / No**

6. Are HVAC systems fully operational? **Yes / No**

7. Can the windows be opened? **Yes / No**

8. Is there a fully functional air filtration system in the office? **Yes / No**

9. Are new carpets, furniture, paints, adhesives, etc. low VOC or VOC free? **Yes / No**

10. Is the office free of harmful mold and/or bacteria sources? **Yes / No**

11. Is the office asbestos free? **Yes / No**

Hazardous Waste/Toxic Substances (especially for science labs/medical facilities)

1. Is the workplace free of flammable or otherwise unstable chemicals? **Yes / No**

2. Are all potentially hazardous substances safely contained? **Yes / No**

3. Could hazardous substances be replaced with less hazardous substances? **Yes / No**

4. How are hazardous wastes currently being disposed of? **(Briefly explain.)**

5. What alternatives (if any) exist for safer disposal of these products? **(Briefly explain.)**

Transportation

1. How do most employees currently travel to and from work?

Personal Vehicle (0 points) Carpool (1 point) Bus (2 points) Bike (4 points) Walk (4 points)

2. Do the majority of employees live along or near a bus route? **Yes / No**

3. Do the majority of employees live within walking distance of the office? **Yes / No**

4. Do the majority of employees live within biking distance of the office? **Yes / No**

5. How often do employees travel out of town for meetings, conferences, etc.?

Multiple times a week (-4) Weekly (-3) Monthly (-2) 6-11x/year (-1) 0-5x/year (0)

6. Do employees have the option of telecommuting? **Yes / No**

7. Does the office have the capability for videoconferencing? **Yes / No**

Water

1. Are all faucets in bathroom and kitchen areas leak free? **Yes / No**

2. Are toilets water efficient/low-flow? **Yes / No**

3. Do toilets have a manual flushing mechanism (instead of automatic sensors)? **Yes / No**

4. Are sprinklers turned off during hottest points of the day? **0…1…2…3…4**

5. Are sprinklers effectively placed in order to maximize water use efficiency? **0…1…2…3…4**

6. Are native species/those well adapted to the local environment planted in order to minimize watering, mowing and other forms of maintenance? **0…1…2…3…4**

Landscaping/Areas surrounding buildings

1. Are all species that are being planted non-invasive? **Yes / No**

2. What types of fertilizers/soil amendments are used? **(Briefly explain.)**

3. Are fertilizers/soil amendments free of harmful synthetic chemicals? **Yes / No**

4. Do landscaping practices minimize/eliminate the use of synthetic biocides? **0…1…2…3…4**

5. Does landscaping create microclimates to help heat/cool the building and surrounding areas? **Yes / No**

Pest Management

1. Are Integrated Pest Management (IPM) techniques used whenever possible? **0…1…2…3…4**

2. Are alternatives to synthetic biocides used whenever possible? **0…1…2…3…4**

Results:

200 points or more: The office has already taken significant steps toward creating a more sustainable workplace. Keep in mind that, even with a perfect score, there is still room for creativity and innovation.

100-199 points: Progress is being made, but current systems must be reevaluated and improved upon.

99 points or less: A few "green" practices may be in place, but there is plenty of room to implement more sustainable practices.

Regardless of the score on this audit, all offices are able to continually improve everyday procedures in order to minimize waste and maximize efficiency and cost effectiveness. The following are suggestions that correspond to each of the sections in the UO Green Office Audit. Each suggestion for "greening" can be incorporated fairly easily into a typical office setting. Be a leader for other offices and departments to follow.

General Recycling

Recycling bins should be readily available in offices across the UO Campus. If an office does not have a recycling bin, request one from Campus Recycling by calling (541) 346-1545 or emailing recycle@uoregon.edu.

If recycling bins are not being utilized, or are used infrequently, consider the following options:

- Always place recycling bins with garbage cans so the option to recycle is present.
- Place signs around the office reminding employees to recycle- every scrap counts!
- Make announcements encouraging recycling at staff meetings.

Paper

- Review the UO Paper Policy with employees during a staff meeting.
- If paper materials are bought by the Purchasing Department instead of directly by the office, request that process chlorine-free, post-consumer recycled content paper be purchased for the office. If it is more expensive, make sure to include it in any budget increases for the following year and cite the UO Recycled Paper Policy to support the decision to buy more environmentally responsible products.
- If at all possible, eliminate neon paper use. The dyes used in these papers are extremely toxic and require special handling in the recycling process.
- Set printers to double-sided as the default. This will greatly reduce paper waste, especially for long reports.

- Print departmental memos on half sheets. Post signs on printers and around the office to remind employees to use less paper.
- Put a tray or box for one-sided sheets next to the printer/copier so that paper can be reused for printing. Put another box next to it for reusable scraps, envelopes, outdated flyers, junk mail, and other one-sided paper that can serve as scratch paper.
- Use electronic (paper-free) communication whenever possible and put a note in email signatures requesting that the message only be printed if absolutely necessary.

Office Supplies / Furniture

- Before purchasing new office supplies, check out the Reusable Office Supply Exchange (R.O.S.E) to see if the needed products are there. Donate materials that are still of good quality, but no longer being used. R.O.S.E. is located in the Prince Lucien Campbell (PLC) building and the key can be signed out from the English Department on the first floor of PLC during regular office hours: 8:00-11:45 a.m. and 1:00-4:15 p.m. Monday-Friday.
- If a new product is necessary for the office, choose the most sustainable option. Research alternatives and collaborate with the Purchasing Department.
- Before buying new furniture, check out the UO Surplus Furniture Exchange managed by Facilities Services. Offices are constantly being remodeled and moved in and out of on campus, so used, high quality furniture if often available. The furniture is free, but a moving charge will be applied. Call the Facilities Services Customer Service Center at (541) 346-2319 for more information.

Food Waste

- Collect food scraps from lunch and bring them to one of the composting locations in the EMU or other food service areas around campus.
- Start a vermicomposting (worm compost) system in the office. These are easy to maintain, odorless, and provide great nutrients to use on office plants.
- Contact Campus Recycling at (541) 346-2354 to manage food waste at low-cost for campus events.

Containers

- Put signs in the kitchen area reminding employees to recycle empty drink bottles.
- Set up a dishwashing station to encourage employees to bring reusable containers which can be rinsed out at work.
- Remind employees to bring refillable containers to work in order to cut down on trash in the office.

Electricity

- Put signs on light switches as energy conservation reminders.
- Remind employees at staff meetings to turn off lights and computer monitors when leaving the room, even if it is just for a few moments.
- Replace incandescent light bulbs with CFLs, LEDs, or other energy efficient choices.
- If select lights can be turned on and off individually (instead of as a whole bank), use only those lights which are needed; use task lighting whenever possible.
- At night, turn off all lights except those required to remain illuminated for security reasons.
- Turn off all computers, monitors, printers, copiers, and other electronic equipment before leaving for the evening, weekend, or holiday break.

- Unplug anything electric when not in use to decrease “phantom loading.” Even appliances on standby mode use energy when plugged in.

E-Waste

- Look into repair options for electric devices and appliances instead of throwing them out.
- Contact NextStep Recycling at (541) 686-2366 to donate old electronics for reuse or recycling. Charges may apply for certain items that require special handling such as ink jet printers, microwaves, and items weighing more than 50 lbs.

Ink Cartridges

- Purchase refillable ink cartridges.
- Set up a collection area for empty ink cartridges so that they can be returned to the supplier to be refilled.
- Set printers to the draft setting unless printing flyers, final reports, etc. This printer setting will help to save ink by printing lighter, but still very legibly.

Meetings/Special Events

- Request local and/or organic food and reusable tableware from UO Catering at (541) 346-4303.
- If possible, keep a few reusable plates and bowls in the office to serve snacks from during meetings.
- Request pitchers of water and reusable glasses instead of bottled water during meetings.
- Purchase napkins with high recycled content.
- If it is not feasible to use durable tableware during an event, use items that are inherently biodegradable (such as paper plates, food boats, and chopsticks).
- Contact the Campus Recycling Compost and Events Coordinator at (541) 346-2354 to set up composting stations for special events.

Cleaning Products

- Replace products that contain harmful chemicals such as VOCs, phosphates, oxalic acid, hydrochloric acid, petroleum distillates, formaldehyde, and parabens with natural cleaning products. Vinegar acts as a disinfectant and does not leave residual odor. Make sure to choose products that do not have strong odors or contain common allergens.
- Buy cleaning products in bulk and/or concentrate in order to minimize packaging waste.
- Buy reusable cleaning materials instead of disposables (e.g. cloth rags instead of paper towels).
- Post clear guidelines for diluting concentrated cleaning solutions.

Indoor Air Quality

- Put potted plants around the office. Even small plants release oxygen and contribute to better air quality. Choose low maintenance plants that are rarely allergy inducing.
- Replace synthetic deodorizers with natural products.
- Use only cleaning products that are low VOC or VOC free.
- Make sure that HVAC systems are regularly maintained. Well maintained systems are more energy efficient and will also provide the best indoor air quality. Report any problems to Facilities Services Customer Service at (541) 346-2319. Also be sure to contact Facilities Services with any other questions or concerns about Indoor Air Quality.
- Open windows on occasion for increased ventilation.
- Work with the purchasing department when the office is being repainted or new carpets are being put in to ensure that all products are low VOC or VOC free.

- Immediately report any mold so that it can be abated before the problem spreads.
- Environmental Health and Safety should already be aware of any asbestos in campus buildings and can be contacted at (541) 346-3192 with any questions or concerns.

Hazardous Waste/Toxic Substances (especially for science labs/medical facilities)

- Make sure to comply with all OSHA standards and University policies for proper handling and disposal of hazardous wastes and toxic substances in the work place. Contact Environmental Health and Safety with questions and concerns at (541) 346-3192.
- Replace hazardous materials with lower impact alternatives whenever possible.

Transportation

- If possible, offer incentives to employees who choose to carpool, ride the bus, bike, or walk to work.
- Work with employees to set up a ride share system to and from work.
- Encourage telecommuting when possible in order to decrease travel.
- Use videoconferencing whenever possible, especially as an alternative to out of state and overseas travel.
- Work with the department to set limits on per employee per year out of town travel. Be especially sure to limit airplane travel.

Water

- Report leaky faucets to Facilities Services at (541) 346-2319.
- When bathrooms are remodeled, request low flow toilets without automatic sensors.
- Turn off sprinklers during the hottest points of the day. This will reduce water waste because watering in the early morning or in the evening is more efficient than watering at hotter points in the day when water evaporates more quickly.
- Place sprinklers strategically in order to maximize efficiency (i.e. make sure all of the water is going onto the plants and not draining onto a sidewalk or street).
- Plant native plants or those that require little water in order to minimize water usage.
- Request that drip irrigation systems be installed in order to maximize water efficiently.

Landscaping/Areas surrounding buildings

- Work with Facilities Services' Exterior Maintenance Team to request that native and or/drought resistant species be planted around the office, that no synthetic fertilizers are used, and no or limited biocides are used in landscaping. Request that Integrated Pest Management (IPM) techniques be used whenever possible.
- Request that trees be planted near the office in order to increase heating and cooling efficiency through microclimate creation.

Pest Management

- Work with Facilities Services to deal with any pest problems inside or outside of the building. Request that non-toxic substances are used to eradicate pests whenever possible. Ask about Integrated Pest Management (IPM) techniques.

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