

**University of Wisconsin Oshkosh**

**2010 Campus Waste Audit**

**Environmental Studies 390: Topics in Campus Sustainability**

**Dr. Jim Feldman**

**May 13, 2010**

## **Part 1: Trash**

By Annemieke Ratering, Aaron Campbell, Kaci Worth, Jessica Graf, and Seth Heeter

The trash in a dorm room reeks; a stench which surely can no longer be ignored. Even though there are still 3 more days until garbage is picked up once again, something must be done. Take it away so we don't have to smell it, see it and continue to think about it.

But where is "away"? Away could be any number of places, really. It could be to a landfill all the way across town or even to another county. Away is somewhere that we no longer are reminded of its stinky existence, unless you are one who would take the opportunity to live close to Garbage Hill in exchange for a more pocket-friendly rental property or home. As discussed in Gay Hawkins book, *The Ethics of Waste*, the cultural context of what comprises waste or garbage has changed significantly. Most of us here today are able to see what some consider "trash" as a recyclable or compostable resource (Hawkins 2).

Our class has been tasked with preparing an audit of the university's solid waste stream. We want to know how we can minimize the amount of trash we send to the landfill, and also make our trash into a resource. As we learned in the waste sort on Earth Day—and as you'll read more about shortly--only about half of the collected "trash" was in fact trash. The rest was recyclable or compostable. This is particularly important now, as we begin construction on the nation's very first fermentation dry anaerobic biodigester, soon to be located on Dempsey Trail next to the Witzel Avenue Campus Service Center on the other side of the river. Using about 6,000 tons of organic waste- such as the "waste" we separated- this biodigester will generate up to 5 percent of UWO's heating and electricity needs. In other words, our trash could also be our treasure.

## **Current Practices**

The University of Wisconsin Oshkosh is currently under contract with Veolia Environmental Services for waste removal. Most contracts with Veolia are on a three to five year term. Last year the contract was resigned after the contract was renegotiated. Veolia has handled waste removal at UWO for many years so they are able to renegotiate without having the services go out to bid. This saves time and money for both UWO and Veolia personnel. Since Veolia and UWO have had a contract for so long, Veolia knows where we experience higher and lower flows of waste and how to best handle these times. There is a value for this service even though it is not monetary.

Currently Veolia is on the UWO campus six days a week. However, this does not mean that they empty each receptacle daily but each receptacle gets picked up about every other day or every three days depending on the trash flow. After the waste is picked up it is taken to the Winnebago County Landfill. Veolia is charged by the Winnebago County Landfill on a per ton basis. Therefore, if UWO can remove the 37.7 percent of biomass from the waste stream through implementation of the biodigester, the contract could be renegotiated lowering the bill from Veolia. Our trash would also need to be picked up less often as there would be less organic matter causing an odor.

One thing that could be done to make removal of waste more efficient and help the environment is to change the trash receptacles in the Scott's and Gruenhagen dorms. The receptacles can only be picked up by rear loading dump trucks which are very inefficient. The trash receptacles are located in the bottom of the Gruenhagen and Scott dorms which have ceilings too low for the front loading units. If Veolia and UWO could figure out how to make

the switch to front loading units, Veolia could phase out its last of the rear loading trucks. This would make life easier for Veolia employees by reducing time of the pickup by half and we could see a minimal reduction in our contract price.

Construction waste is the product of demolition and the construction or renovation of buildings. Construction waste is defined as “waste materials generated by construction activities, such as scrap, damaged or spoiled materials, temporary and expendable construction materials, and aids that are not included in the finished project, packaging materials, and waste generated by the workforce” (Napier 2008). As stated in the Journal of Construction Engineering and Management “construction waste is more difficult to recycle due to high levels of contamination and a large degree of heterogeneity” (Bissink and Brouwers 1994, 2). These wastes are typically heavy or cannot be compacted effectively enough and thus are costly to dispose of.

As waste tipping fees, fuel prices and labor costs go up, many companies, institutions and even individuals are moving to reduce and divert their construction wastes upstream. Although not always directly responsible for such tasks, UW Oshkosh is making progress through cooperation with the Division of Wisconsin State Facilities, our architects and engineering consultants, and our contractors building these projects.

Materials generally associated with construction waste are concrete, wood, drywall, metal and roofing materials. But there are many more wastes which cannot be as easily recycled in the way those can. Materials like carpeting, painted woods, electronics, glass, ceiling materials and furniture are often land filled.

It is imperative that we not only increase our recycling and reuse rates but also that we implement a reduction in our use of materials when designing and constructing a project as well to limit future demolition wastes and construction wastes as well. In the point system to gain

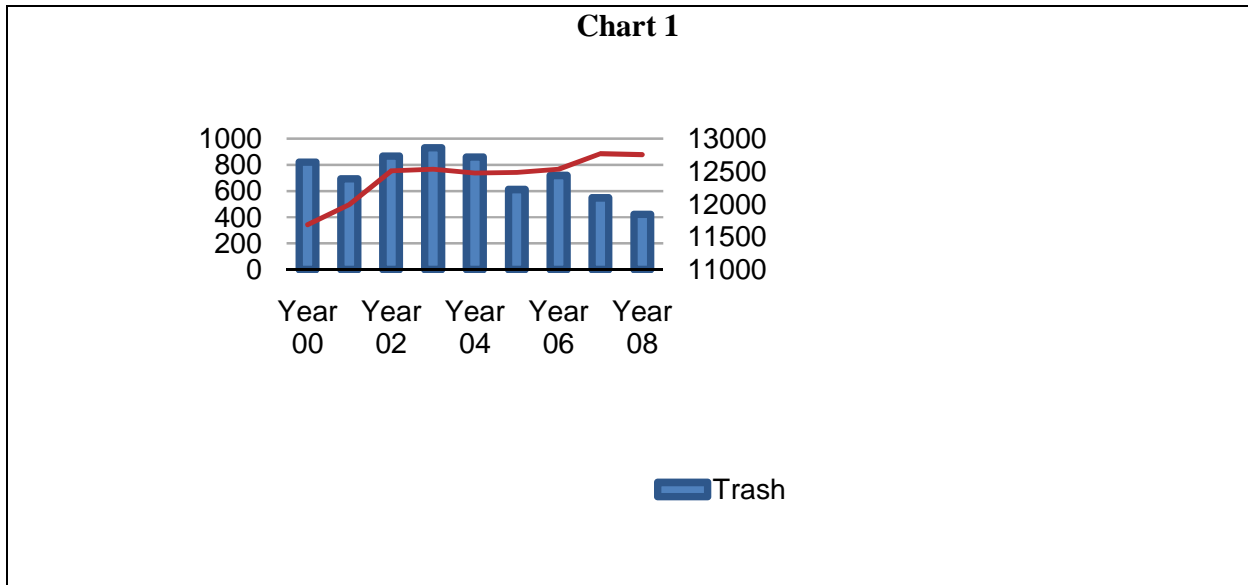
LEED certification any new building following LEED 2.2 Certification can receive one point for the diversion of 50% of construction, demolition and land clearing debris from disposal in landfills (USGBC). An additional one point is earned when 75% is diverted. One point can be earned for 5% materials reuse from a previous building. Obviously such goals are imperative if UW-Oshkosh is to follow through with its commitment to building to LEED Gold Certification.

Current and future building projects on campus are following through with the reduction, reusing, and recycling of building materials. The current remodel of the Elmwood Student Success Center is a prime example of the Universities goal setting. The general contractor, Miron Construction has a waste management plan meets both LEED standards and Wisconsin State recycling laws. Miron also works with clients to use innovative building practices to reduce waste, such as just painting a ceiling structure in lieu of putting in an acoustical ceiling system or by staining or polishing concrete in lieu of putting another flooring material over concrete. Through these methods, they keep in mind that there will be a time when the building has reached the end of its useful life and will have to be deconstructed. Reuse is being seen in the future demolition of the Nelson, Breese and Clemens halls. Reuse of furniture, appliances, electronics, systems and façade materials are planned with six weeks time for their removal being set aside before demolition.

## **Past Trends**

Looking at the history of our trash is important to look for trends of our waste stream and see how past initiatives have affected our trash. When analyzing a graph of campus waste by weight from 2000 to 2008 compared to student enrollment numbers (Chart 1) we can conclude that it is not enrollment total that effects weight per ton of trash that our campus produces. This

forced us to search for other reasons for the trends we see. After talking with Campus Sustainability Director Dr. Mike Lizotte, we got a better understanding of what other items on campus may have had an impact on these waste numbers.



One can see that from 2002 to 2004 campus waste was high. In 2005 we see a big drop in the amount of tons of trash produced. This correlates with the greatly increased availability of recycling bins around campus. Recycling bins for both co-mingled recycling and clean paper have since been found paired with trash bins in many academic buildings, residence halls and high traffic areas like Reeve Union and Blackhawk. Along with the increased availability and ease of recycling awareness and attitudes toward recycling have been changing for the better.

Facilities and vendors have also done their part to reduce waste on campus. More products are bought in bulk such as milk and cleaning chemicals used by janitorial and kitchen staff. Our vendors also use less non-reusable packaging to ship items. One example of this is that soda arrives on plastic pallets. In the dining halls the use of smaller trays has also been

implemented and this action has seen close to a twenty five percent reduction in waste. These numbers are similar to those seen by campuses that have gone trayless. Blackhawk has also purchased and has been using a pulper to process some of its waste. This machine pulls all of the water out of the trash that goes through it. The water goes back into the system and what is left is a the solid matter. Because the water has been pulled out this waste is much lighter than it would have been.

One other action the campus has taken that may be having a strong impact on the reduction of waste going to the landfill is the move out day pods that are available to students at the end of the school year. The program was started in 2009 and will be done again this year (2010). This program makes use of donations, by a UW Oshkosh alumni, of transportable storage units. These storage units are placed at various locations on campus near residence halls so they are readily accessible. Students are then able to bring gently used items like futons, desks, lamps, bikes, food, and clothes. Students this year will have the option to say that the items they donate are welcome to be taken by other students or if they prefer that they must go directly to charity. After all the students have finished moving out the pods are sealed up, put on trucks, and taken to St. Vincent de Paul's as a donation. Everything that goes into those pods will have been diverted from the landfills. A lot of these items are larger pieces of furniture so this is a sizable impact.

It is also important to note that what we see in these pods may actually be a drop in the bucket as to what is truly being diverted from the landfills. The pods are a great visual to raise awareness and get students thinking about the things they are throwing away. It is possible that students are thinking twice about what can and can't be thrown away. They may also decide that an item is still good and decide to keep it for next year. An additional possibility is that by

fostering these thoughts at the end of the year students will continue to think about what they are throwing away throughout the year and change their behaviors, even if slightly, to become more aware of the impact of their actions. By considering the reasons for decrease in the amount of waste our campus is creating it is clear to see it was not one big action but many small actions and changes in attitudes that have added up to make this change possible.

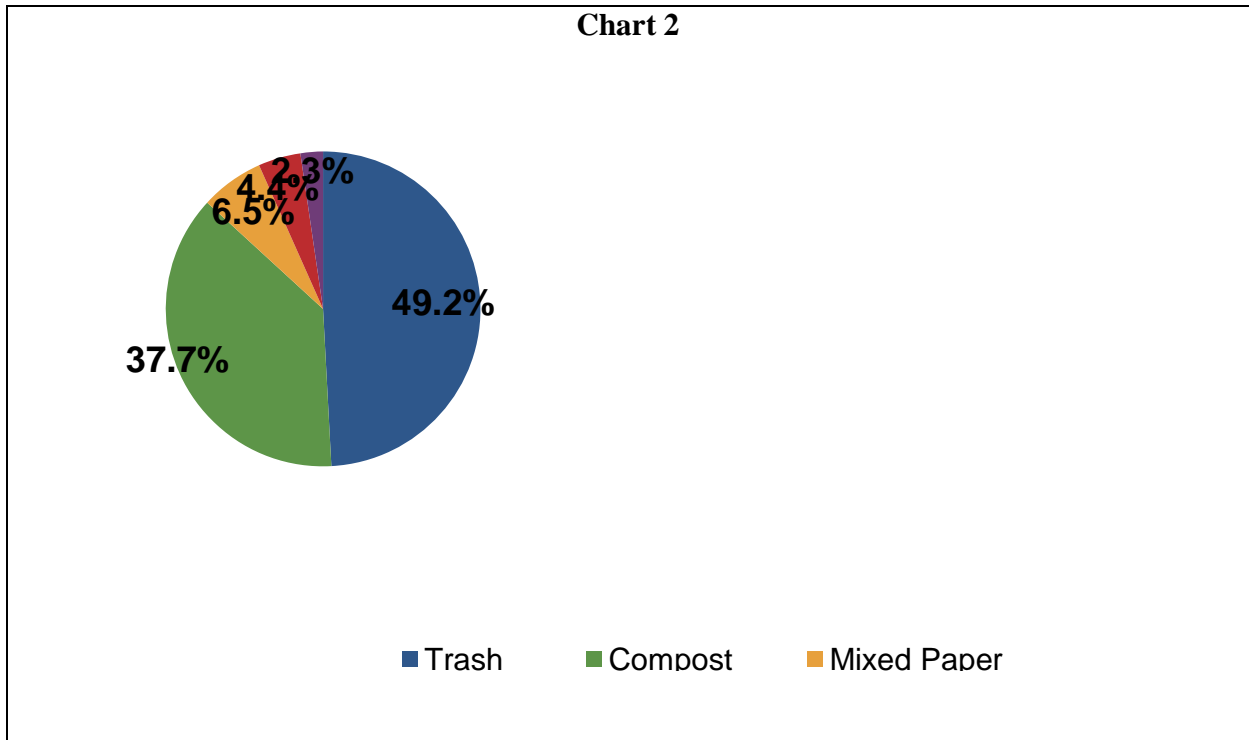
### **Campus Waste Sort, Earth Day 2010**

On Earth Day—April 22, 2010—Veola took 1108 pounds of our campus waste from Nelson, Breese, Stewart, and Clemens Halls and the Halsey Science Center, buildings and dumped it on the University lawn. The goal of the day was simple find out what was in our trash. Our class and a few brave volunteers sorted the pile of trash into commingled recycling (glass, plastic, tin, aluminum), mixed paper, e-waste, compostable materials , and true trash. As the day progressed we found not only a lot of random items in the trash but we also learned that a large portion of our trash isn't really trash at all.

Category	Volume	Weight	Percent by weight
Trash	10 y <sup>3</sup>	545 lbs.	49.2%
Compost	3.5 y <sup>3</sup>	418 lbs.	37.7%
OCC/Mixed Paper	1.75 y <sup>3</sup>	72 lbs.	6.5%
Comingled	1.75 y <sup>3</sup>	49 lbs.	4.4%
E-Waste	—	25.7 lbs.	2.3%
Total	17	1108 lbs	—



Chart 2



1108 pounds of waste represents 13.8% of the University of Wisconsin-Oshkosh's 2 day waste stream by volume. And although our trash was limited to certain buildings and was not entirely random we can make some general conclusions about the composition of our trash. The results of the waste audit showed that only 49.2% of the trash that we actually sorted was in fact trash that should end up in a landfill. We could hopefully in the future continue to reduce this percentage also since a lot of the materials that cannot be recycled could be replaced and therefore reduce our true trash amount. This would mean things such as styrofoam containers, any to-go food containers, and also garbage bags. Despite this a surprisingly large portion of the trash was compostable: 418 pounds or 37.7% of the trash. This shows that not only could a large portion of our waste be diverted from landfills, and that our campus could be saving money, but also that we could be creating and therefore saving money through the creation of renewable

energy. The biodigester which would run on the same materials we sorted as compostable, would generate real energy for our campus. On the smaller side of commingled recycling represented 4.4%, mixed paper made up 6.5%, and e-waste was 2.3% of the trash, however these numbers showcase that the University has room for improvement in their recycling and e-waste recycling practices.

### **Best Practices**

After looking at the results of our waste audit we must take a look at other Universities and the actions they are taking to reduce their waste. In Ashland, Northland college composts food scraps from both their cafeteria and residence halls. This action alone save thousands of pounds of waste from going to the landfill each year. They use the compost in the University garden. In Fall 2008 they started Trayless Tuesday, a pilot program. They found that this initiative decreases their water usage, and food waste since it encouraged staff, students, and faculty to take more appropriate portions. The pilot program was very successful and trays are no longer offered at the University (Northland College Sustainability). The University of Oregon implemented a 5 cent charge for paper. They saw a decrease in their paper usage from 2,009 sheets/day to 940 sheets/day this is an obvious drastic reduction which not only saves the University money but also decreases their waste. The University offers reusable to go containers and utilize biodegradable containers both of which decrease their waste stream (University of Oregon Sustainability). Michigan State University has created a high standard for construction waste. They have established a 6 page construction waste management plan which goal is to recycle, reuse, and salvage construction and demolition waste from their projects. From 2008-

2009, 40,000 tons of waste from construction projects was recycled or reused at a rate of 95% (Michigan State University Sustainability)

From these best practices from around the nation and taking into consideration the current practices at the University of Wisconsin Oshkosh, the following practices are initiatives that the university could implement in order to make our campus and specifically our waste stream more sustainable. UWO has begun the move to trayless with its first trayless Friday. Through these practice trayless days we need to learn how to improve our dining facilities to best accommodate trayless and make the program a success. We need to take into consideration the needs of our students, staff, and faculty and implement a program that will work both to make the university more sustainable but also make our campus behavior more sustainable. We could through the move to trayless reduce our waste use, detergent use, and food waste by 30% as seen on other campus who have made the switch.

The second initiative is to switch our current to go containers to reusable or compostable containers to decrease the amount of packaging that UWO is putting into their waste stream. We have a choice though between reusable or compostable. Compostable would power the future biodigester while reusable would simply reduce the amount of waste we create. There are both cost and behavioral change involved in either option and we need to implement the best practice for UWO.

We also recommend that compostable receptacles should be placed in all our dining facilities and residence halls at the very least to capture a large portion of our waste stream. Until the construction of the biodigester we could use the materials for compost for our own use or find a local use for the compost. If we are to start this initiative now and change faculty, staff,

and student behavior we could create a steady stream of materials to the biodigester to create renewable energy.

Our last recommendation is for a personalized fee for paper instead of integrating this cost into tech fees. This would create an incentive for students to decrease their paper use which they might not even think about. We could set a paper limit for a semester or per week and once over this limit students begin paying for paper use. Another option is that we could implement a similar program to that of the University of Oregon and have a flat rate for printing all year long. There are circumstances that need to be considered however like professors who do not use textbooks for their course and therefore students rely on the use of D2L more.

Having trayless dining facilities, using compostable or reusable to-go containers, composting our food waste, and creating paper fees are real and manageable changes that the University can make. Remembering the history of our waste stream we noticed that in the end little changes can create a major difference. It is for that reason we feel it is extremely important to consider all the small recommendations made not only within the waste audit report but also made by students, faculty, and staff. Little changes have the potential to create real differences.

## **Part 2: Recycling**

By Seth Block, Emily Fisher, Dani Graff, Adam Schmit, and Brad Spanbauer

As many people already know, recycling is simply one way we divert trash out of our landfills, and good thing, because our waste is becoming a problem. For example, according to the EPA, in the United States 280 million tons of trash is generated annually; with each U.S. resident producing about 30 pounds of waste per week. To make matters worse we often have to pay to dispose of our recycling. In 2002 UWO paid 500 dollars to recycle the waste generated from all the academic buildings.

As a university it is our responsibility to set examples, work out solutions, and educate the next generation so that we can achieve a more sustainable future. It is because of this that we at the University of Wisconsin Oshkosh needs to reevaluate and revamp out recycling practices at UWO. Our recycling rate has been steadily increasing through the years. In 2008, we had a recycling rate of 42 percent and in 2010 with the ending results of Recyclemania we had achieved a recycling rate of 48 percent. We need to move to focus our attention to closing the loop. We need to focus on educating our students that it is more responsible to focus on reuse and reduction, and that they need to view recycling as merely a supplement. In order to do this we need to investigate the meager beginnings of our recycling program at the University of Wisconsin Oshkosh.

### **Meager Beginnings: Recycling at UWO from Past to Future**

In response to the 1990 Recycling Law instituted by the Wisconsin Department of Natural Resources, UWO established the Recycling Planning Committee in 1991. The main task

of this committee was to set up a recycling program for the university; this program was very slow to start. The first items to be recycled at UWO were aluminum containers, white office paper, and pizza boxes. All the recycling was done on a voluntary basis, where each department could choose whether they wanted to recycle or not. Getting departments to recycle aluminum containers was not a problem seeing as recycling of aluminum is very profitable. Getting departments to recycle paper was however a different story. This was much more of a challenge seeing as there was not much of a market for paper at the time. It really was not until 1993 that UWO instituted a more comprehensive recycling program.

In 1993 a much more comprehensive program was pushed for by students, and in this many more items were added to the list of recyclables at UWO. Things like, newsprint, glass containers, scrap metal, corrugated cardboard, magazines, waste oil, and many more. This program was driven by student volunteers, as was seen in the residence hall recycling programs. Every floor in each residence hall had four to five recycling bins for various materials, and each building had a designated student volunteer who checked for full bins daily. When bins were full the volunteers would move them to the basement. Twice a week, student volunteers from Residence Life would pick up the recycling and drive it to designated recycling locations. This student involvement was very important then and still remains so today.

Students today are still pushing for more sustainable practices at UWO, as can be seen with the resurgence of the community gardens, and the success of this campus sustainability class. Now that we have some history on our recycling program at UWO (because we cannot move into the future without knowing our past) we can now move to evaluating the current recycling practices at UWO.

## **Current Practices**

According to the University of Wisconsin Oshkosh's Campus Sustainability Plan, the campus has been recycling since the early 1980s. When the plan was drafted in 2008, it reported that the campus only recycled 10% of its total waste stream. The campus has certainly made great strides in only a few years.

Currently at UWO, recycling, like trash, is picked up through a contracted waste management group, Veolia Environmental Services. On campus, waste is collected in three parts: trash, co-mingled recyclables, and paper. These bins, however, are not always placed together. Since trashcans commonly stand alone, especially outside on campus, it is safe to assume that many recyclable items are thrown away because people aren't given the option to recycle. When the recyclables are picked up they are taken to a distribution center. The co-mingled recyclables, like aluminum, glass and plastics, are then trucked to a company in Illinois that is contracted through Veolia, and they are recycled there. The paper, however, stays much closer to home and is delivered to Neenah to be recycled. This route of reuse is very smart as it cuts down on trucking costs and takes advantage of the valley's long history of paper product companies.

Cardboard, however, is factored out of the UWO waste stream, at least for the most part, as the campus possesses a baler so it can be baled and sold. The bales are picked up about every two weeks and the bales are weighed and then purchased by weight by Recycled Fibers Midwest of Milwaukee, WI. According to a purchase statement from January 2010, the university made \$292.50. According to Dawn Dettlaff from Campus Facilities, this is a smart option for the university as it provides income and the purchasing company is willing to retrieve any purchased

material, thus the university doesn't have to spend anything and can make a profit as long as the market for cardboard stays viable.

Also, the campus does not participate in a single-stream recycling system. While the city has implemented a system like this and has seen a major increase in the amount of material people are recycling, the campus's waste system is based on a contract—and so does not yet participate in the single-stream process. According to Veolia General Manager Dave Tellock, when the campus drafted their contract with Veolia, the single-stream facility didn't exist. Now that the recycling center in Outagamie County has been operational for almost a year, Tellock stated that Veolia is aggressively seeking to integrate the university into this system.

UWO also participates in a nation-wide campus recycling competition, Recyclemania, and has competed since 2008. That year, UWO recycled 22.68 pounds of material per person, taking first place in the state, according to Campus Facilities Manager Steve Arndt. According to Recyclemania.com, the competition's website, UWO placed 160 out of 293 competing schools in the nation in 2009, recycling 9.74 pounds of material per person. It is easy to note this great difference in weight from the previous year. It is believed that the pounds of material that were recycled per person was so great in 2008 due to the university's library recycling so many books, nevertheless they were recycled as opposed to being thrown away. In 2010, the university placed 170 out of 346 participating schools nationwide. The university recycled 10.48 pounds of material which resulted in a 48% recycling rate overall, the highest in the state for that year's competition. It seems that the university's involvement in this competition has certainly led to an increase in recycling rates and has expedited the seriousness and awareness of sustainability on campus.



On April 22<sup>nd</sup>, 2010, UWO also held its first campus waste audit. Students from the Campus Sustainability class sorted over one-half of a ton of “garbage”. After about five hours of sorting the waste—which accounted for only one-seventh of the campus’s two-day waste stream—the students had separated the “garbage” into dumpsters of compostable material, co-mingled recyclables, mixed paper and true trash. The results of the weighed material were astonishing. 51% of the material accounted for some material other than actual trash. Especially noteworthy was 49 pounds of co-mingled items and 72 pounds of mixed paper and cardboard. As for the cardboard, this was money that was lost to the landfill.

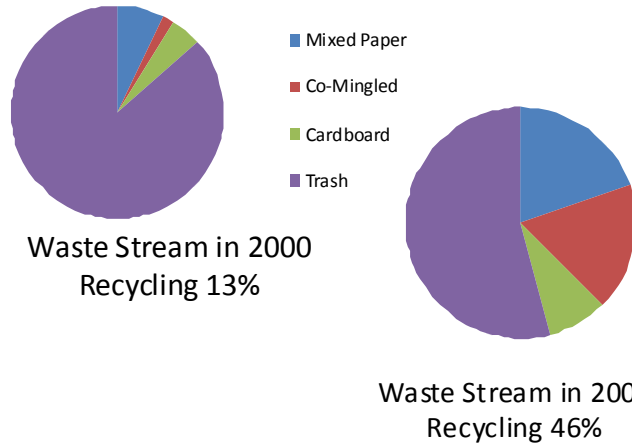
### **Past Trends**

By visualizing our trends of recycling throughout previous years, we can evaluate and verify the success or failures of our overall waste program. By looking at the charts in Figure 1, we can determine our recycling percentage of our total waste stream has significantly increased. In the year 2000, our recycling was 13% of our total waste. Since then, our recycling has increased 3 ½ times by 2009 and consists of 46% of our total waste stream.

It is extremely noteworthy to recognize the success from this data. Successes like these have led to public recognition for UW Oshkosh, as well. In recent years, Oshkosh’s role in sustainability has raised the bar within the UW system’s sphere to become one of Wisconsin’s institutional leaders in sustainability.

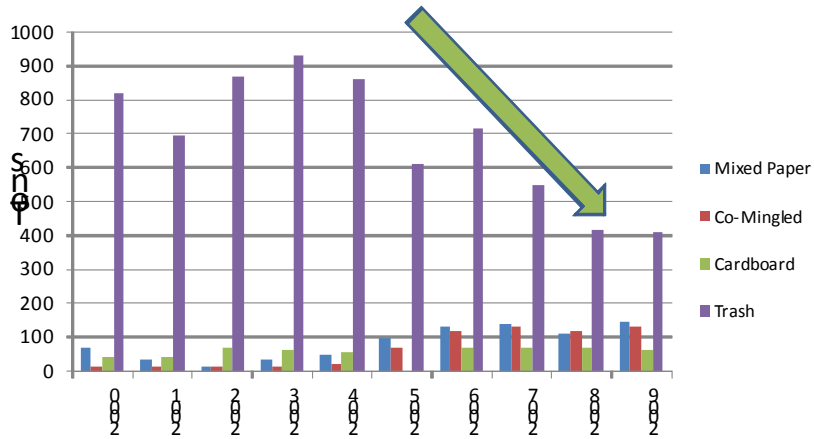
**Figure 1**

### Recycling as Percentage of Total Waste Stream



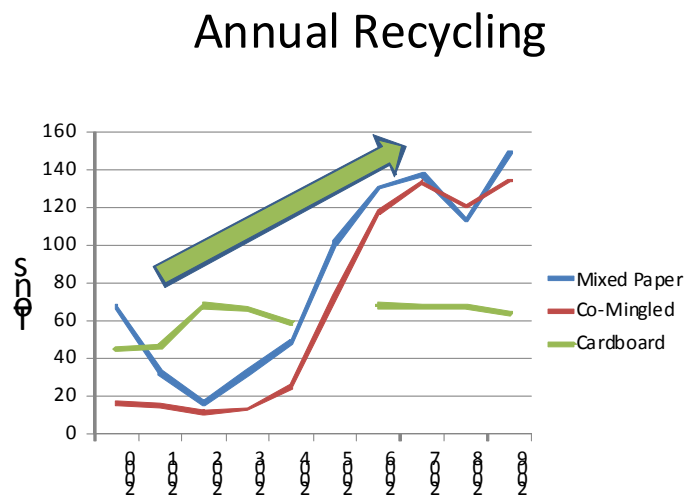
**Figure 2.** (All statistics previous of 2009 were provided by Dawn Dettlaff, UW-Oshkosh facilities/operations dept.)

### Waste Stream Breakdown



By focusing attention to Figure 2., we can compare UW-Oshkosh’s progress between recyclables and trash. By breaking down our waste stream and comparing recyclables versus trash, it is evident that we see a progressive decline in our trash throughout the past decade. Furthermore, while our trash is continuing to decrease, we are experiencing a slow, yet steady increase in all of our recyclables.

**Figure 3.** (All statistics previous of 2009 were provided by Dawn Dettlaff, UW-Oshkosh facilities/operations dept.)



By individually breaking up each category, we can further evaluate our success within our recyclables. Referring to Figure 3., although our cardboard has relatively been stable since 2002, both co-mingled and mixed paper has significantly increased. The causes of these increases are not fully understood. However, we do believe that over the past couple years our small persistent changes, such as providing more available recycling containers, buying supplies in bulk, and introducing recycling pods, have ultimately made a considerable difference.

Furthermore, with the emerging student awareness on campus and our determined vision of sustainability as an institutional mission, we as a university are guiding and investing our campus towards a more sustainable community. After evaluating some of UW-Oshkosh's trends of recycling, we will look at how other schools are recycling and promoting sustainability through their best practices.

### **Berea College**

Looking at the practices of other schools can be beneficial to UWO in planning new projects that will make our campus more sustainable. These are some examples from schools that stood out to us.

Berea College, a small private school in Kentucky, has what they call a "green team." They focus on education and involvement in residence halls. They work with students and community advisors to plan events and to help students get involved with sustainability related organizations. Berea College also has recycling bins for electronics and compost around campus. The recycling program at Berea is mostly run on student jobs. Students are responsible for the majority of recycling collections. They also continue expand their recycling efforts in order to collect as much as possible while making a strong effort to reduce waste through education and curriculum. They have been able to compost 90% of food waste from food service and they recycled 27% of waste in 2009.

Another school that provides inspiration to promote recycling in residence halls comes from Stevens Point. In their dorms, they fine individual students for each piece of recycling that is found in their room trash. They also have garbage and recycling chutes for easy disposal. These two initiatives have been very effective for them in increasing recycling in dorms. Also,

they have eliminated the sale of bottled water on campus to reduce the total amount of recyclables. In addition to waste reduction, their residence halls operate using 53% green energy and the entire university runs on 23% green energy and solar panels are used to increase the use of renewable energy.

Middlebury College, which is also a small, private school has developed a system that they call a “reuse trailer.” This helps them to reduce what goes to the landfill by providing a convenient place for students to drop off things they don’t want. These items can then be resold to other students. Like Berea, Middlebury has a composting system and a recycling center on campus. This allows them to process all of their own recycling and keep those cost and profit on site. Their MRF and composter have prevented 60 percent of their waste from reaching a landfill, which resulted in savings of \$94,001 in 2009.

## **Recommendations**

Throughout the semester as a class we have explored the realm of sustainability as it relates to the University. Over the term we’ve been able to participate in a number of activities including: brainstorming and implementation of Recyclemania awareness campaigns, fieldtrips to both the Winnebago County Landfill and the Outagamie Single Stream Recycling Facility, and also combing through 17 cubic yards of the university’s waste. Those activities have opened our eyes and exposed us to things most people rarely think about and almost never see. However, one of the most beneficial exercises may have been the best practices research. The research exposed best practices of college campuses waste streams from across the country. The most important aspect of the research is that those college campuses have already proven the waste practices can be effective in operation.

Most of the following recommendations were discovered through the best practices research. The recommendations are split into two categories, as we understand that its important Oshkosh identifies what can work on its campus. The two categories are Action and Further Research. Figure 4 depicts a visual display of each recommendation based on estimated cost, time to implementation, and impact.

### **Action**

Recommendations that can be implemented with little additional research.

### **Peer to Peer Education**

Throughout our research we found that educating students, faculty, and staff is important to drive change. A way to successfully educate is through Eco-Reps. Eco-Reps are designated students whose sole purpose is to educate others on various topics including: recycling guidelines, composting, or consumption. These students would receive some sort of reimbursement for their efforts. Berea College has shown progress upon implementation of this program and with some time we believe this program could be successful at UWO.

### **Reuse Program**

The Reuse program inspiration is derived from Middlebury College. This basic idea is that we have essentially a “Goodwill” store here on campus. People can drop off items that can be reused and the University can then sell them to others. This does two very important things: 1. it promotes recycling through reuse and keeps items out of the landfill and 2. it can provide income that can be used to fund the program itself as well as other sustainability initiatives across campus (ex. Eco-Reps).

### **Outdoor Recycling Options**

Currently across the entire 164-acre University campus there are only three outdoor recycling bins. If we want to encourage recycling we need to make it convenient and easy, with the current limited available outdoor options people will simply look for the nearest trash to dispose of their waste, including recyclables. This is especially apparent in the waste audit where almost two cubic yards of comingled recyclables was found in the trash. Providing additional options where feasible may have an impact on our recycling rate for a very low cost.

### **Odyssey Reusable Bottles and Mugs**

UWO accepts around 1800 freshman each year; upon their arrival they are provided with an abundance of materials to familiarize them with the campus life. We suggest that these students are provided with reusable bottles and/or mugs along with some type of information regarding the importance and affect of using the product. Since they have no pre-conceived notions regarding college life they will accept it as the norm. This will help reduce consumption across campus and also serve as an educational tool at a limited cost.

### **Further Research**

Recommendations that may need further feasibility research before implementing.

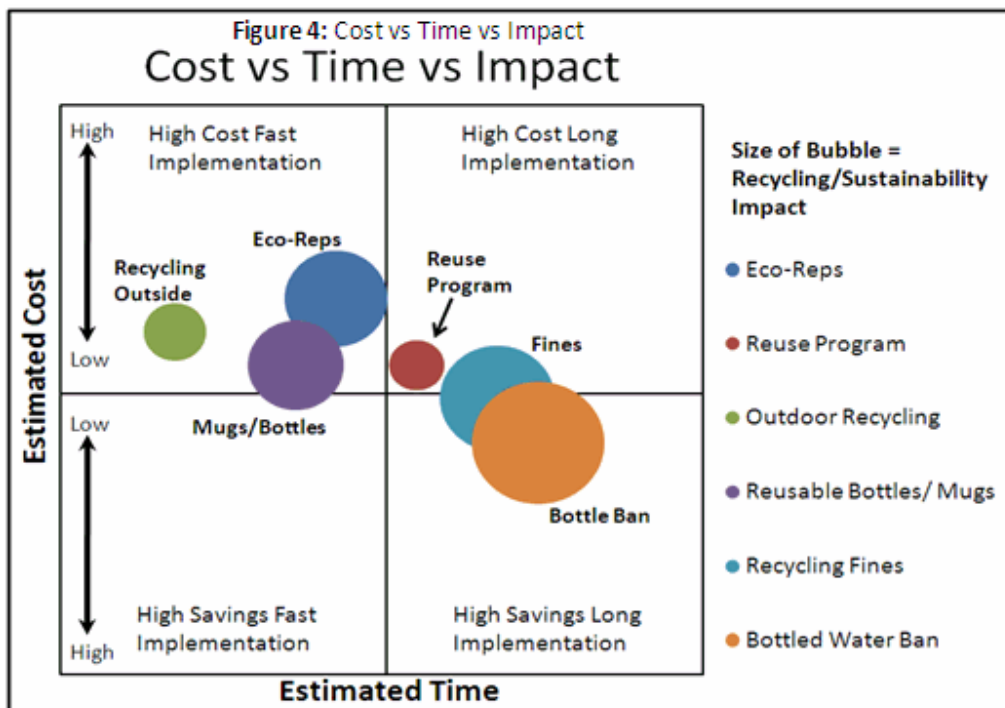
### **Recycling Citations**

Currently UW Stevens Point has implemented a system where students are fined if caught throwing away recycling. The program has seen success since implementation. At UWO there are no costs associated with improper disposal of recyclables and therefore no motivation for

students to recycle. Additional feasibility research needs to be performed before implementation at UWO however; this could increase the recycling rate.

### Bottled Water Ban

UW Stevens Point has also implemented a bottle water ban on campus. The change removes all sales of bottle water across campus. This may reduce the recycling rate, but more importantly it will reduce overall consumption. Due to contract constraints and multiple required approvals, implementation of this recommendation would take additional time and effort. It is recommended that the University perform a feasibility study before moving forward with this effort. It is important to note, however, that a sister UW school has had a successful implementation of the ban.





## **Part 3: E-Waste**

By Brianne Fischer, John Boehme, Brandon Hiller, Korin Franklin, and Ross Zimmerman

### **Introduction**

The focus of our group's research of the University of Wisconsin Oshkosh's waste stream was e-waste. Throughout April and March of 2010, our group conducted interviews with campus departments, such as purchasing and facilities management, as well as the student body, faculty and staff to gain a better perspective as to our academic institute's e-waste practices. The term e-waste is used to describe any type of obsolete, surplus or broken electronic equipment. Cell phones, computers, television sets, iPods, cable cords, batteries, etc are all categorized as e-waste and therefore require a different disposal process than say recycling or trash. The objective of this document is to provide a better understanding as to the current e-waste practices on the University of Wisconsin Oshkosh campus, the global implications of our e-waste and to provide recommendations for future e-waste practices on the University of Wisconsin Oshkosh's campus which will further the sustainability objective that the University is known for throughout the nation.

### **Current Electronic Stream at UW Oshkosh**

Computers, faxes, printers and component parts (electronics) are purchased through the Academic Computing Department of the University of Wisconsin-Oshkosh. In addition to purchasing managers and clerical associates, the department is staffed with technicians that are charged with repair and maintenance of all electronics purchased for the school by the school. Electronics are requisitioned by authorized officials at the university. There are no sales to

students at this level. Where feasible, electronics are purchased in bulk to reduce packaging waste. Purchases are made on a State Vendor Contract. This method typically allows for better pricing but can also limit options.

In view of the State Contracts criteria for best value and price the primary companies in the contract presently are Hewlett-Packard Company, Apple Computer and Cisco Company.

Buying decisions are based on the following order of importance:

- 1) product life
- 2) product support
- 3) product price and
- 4) Environmental safety standards.

Apple has a recycle program where they offer take backs of obsolete products they provide the university. Hewlett Packard may offer a recycle program but the university does not support it at this time (Knaapen, 2010).

Orders arrive at the Campus Facilities Building. They are sorted and distributed to the appropriate department on campus. At time of disposal the management and distribution of electronic waste (e waste) is done through the Campus Facilities Group. E waste is picked up from the individual departments throughout the campus and delivered to the Campus Facilities Building. Hard drives are scrubbed; cartridges are removed from printers and faxes. Cartridges are packaged and sold to a local recycler at \$1.50 each. Batteries are separated and packaged for pick up by a recycler. Most hardware including computer screens, towers, printers and fax machines are palletized for shipment to Badger State Industries (BSI), a division of the Wisconsin Department of Corrections (DOC) (Strey, 2010). There is no charge (material is given free) for discarded material picked up by BSI.

According to Dan Strey, the efficiency rate for environmentally responsible recapture of electronics delivered to the departments is 80% (Strey, 2010). They are always looking hard for better ways in which to close that gap. According to Laura Knaapen, University of Wisconsin-Oshkosh is engaged with the nonprofit community in terms of making available much of the university's electronics including faxes, printers and computers at no charge (Knaapen, 2010). Knappen wrote that the program has been very successful over the years (Knaapen, 2010).

### **Global Issues**

The way we handle e-waste here on our campus has the potential to affect people on a global scale. There are serious negative environmental and social consequences of improperly disposing of e-waste. When the campus purchases electronics, the products end-of-life management needs to be kept in mind. There are upwards of 300 million computers produced every year. All of these electronics become obsolete or unwanted, often within 2-3 years of purchase (e-Stewards, 2010). This leads to approx. 50-million tons of e-waste being generated each year worldwide. Our campus has made a commitment to sustainability, and the proper recycling or donating of electronics should be part of that commitment.

According to Wisconsin law, e-waste is considered hazardous material if it is not recycled because electronics are made up of extremely toxic substances, such as mercury, lead, cadmium, arsenic, phosphorous, beryllium, and brominated flame retardants (2009 Wisconsin Act 50, 2009). When these toxins are burned they can create additional toxins, such as halogenated dioxins and furans which are two of the most toxic substances known to humankind. When electronics are improperly disposed of they have the potential to pollute our groundwater and air. Some of these toxins do not break down over time and instead accumulate in the food

chain, eventually building up concentrations in the fatty tissue of human beings. According to a US Environmental Protection Agency report from 2002, up to 70 percent of heavy metal contamination in US landfills comes from electronic products that are disposed of incorrectly (Wisconsin DNR, 2010).

Materials used to manufacture electronics include copper, lead, gold, aluminum, plastics, and glass; all of which need to be extracted from the earth. Extraction methods include oil drilling and mining. Both drilling and mining have proven to be detrimental to the environment. In addition, our natural resources are being depleted at alarming rates. By recycling e-waste responsibly, we can reduce the amount of virgin materials needed for the production of electronic products.

From the extraction of resources to the manufacturing of electronics is very energy intensive. By recycling the materials in electronic waste we reduce the amount of energy needed to create electronic products compared to electronics made with virgin materials. For example: recycling one million laptops saves the energy equivalent to the electricity used by 3,657 US homes in a year (EPA, 2010).

In the U.S., an estimated 70-80% of the e-waste that's given to e-waste "recyclers" is actually exported to less developed areas such as India, China, Nigeria, and parts of South America (Granatstein, 2009). Once there, primitive technologies such as open air burning and riverside acid baths are used to extract the materials of economic worth. The rest of the toxic materials are usually dumped in make-shift landfills. For example, in China, the workers are often paid around \$1.50 a day to extract materials of economic worth (Granatstein, 2009). The people in these areas are exposed to the hazardous materials in electronics, including some of the most toxic substances known to man. These toxins can cause cancer, skin disorders, nerve

damage, reproductive harm, damage to the fetus, hormonal interference, and more (Basel Action Network, 2010). Brominated flame retardants are one of the toxins that cause hormonal interference and reproductive harm and they have been found in the breast milk and blood of the workers using these crude methods. Aside from direct health risks these people face, the residents living in these areas end up with contaminated drinking water and food sources. And remember, some of the toxins bioaccumulate in the food chain and eventually in the human body.

With the growing problem of e-waste, a new industry has been developing. With the combination of increased demand for a responsible way to dispose of e-waste and the rising value of materials found in electronics, electronic recycling has become a viable industry. Because of this, responsible recyclers are more common than ever making it easier for institutions like UW Oshkosh to establish a responsible e-waste management program.

If electronics are not obsolete, the best thing to do is to donate them to individuals, groups and/or organizations that may not be able to afford them otherwise. Not only are you helping these people, but reusing should always come before recycling. And there may be tax incentives available for these types of donations.

## **Philips**

As was mentioned before, the e-waste from campus that is not in use gets sent to Badger State Industries. Badger State does what they can with the waste to make a profit, but some of it is sent over to Philips in Brazil. Since Oshkosh wants to be considered a sustainable university, it made sense to study the Philips Company to see what kind of processes they implement to help them become more sustainable.

Being that one of the main concerns of e-waste is health risks due to chemicals in products, looking at the chemicals that Philips uses in their everyday products would be very beneficial. According to the Philips website, they have made a commitment to eliminating Brominated Flame Retardants (BFRs) and PVC vinyl plastic by the end of the year 2010. They have also committed to eliminating six different types of phthalates and antimony also by 2010. Philips already has products, such as TV housings and oral care products, which are BFR and PVC free. Philips has not done a great job as of today in dealing with harmful chemicals, but in the future, their products will be safer and will not contain certain harmful chemicals that put people's lives in danger.

Another thing that Philips is doing well is designing their products for the end-of-life phase. This phase occurs when the product is no longer in use. It is important because it is inevitable that electronics are going to become obsolete at one time or another, so it is necessary to plan for this. Philips is a supporter of Individual Producer Responsibility, which means they take responsibility for the products that they sell, after they are no longer in use. IPRworks.com explains Individual Producer Responsibility as, "encouraging competition between companies on how to manage the end-of-life phase of their products. This in turn drives innovation, such as in business models, take-back logistics and design changes, to reduce the environmental impact of products at the end of their life" (IPRworks.com). Designing for the end-of-life phase is something that is becoming more and more common in the world of electronics, and Philips is doing their part to ensure they follow the trend.

Even though Philips is designing their products for what happens at the end of their lives, they are not doing a good job of recycling their own products. Although they have a few pioneer pickup stations in India, Brazil, and Argentina, these are the only three countries in which people

can bring Philips products that are not in use for them to be recycled. They are planning on expanding these sites in the future, but it they have not done so as of now.

As far as UW-Oshkosh is concerned, it makes sense to purchase some products where it might be necessary. Since some of our e-waste eventually ends up at Philips, it makes some sense to send them back their own products. Since Philips is reducing chemicals and is already designing their products for easier handling when they are obsolete, purchasing products from them would cut back on the release of harmful chemicals, even if the e-waste is handled incorrectly. Philips is doing an overall good job as far as their company goes with being sustainable. They are making the right decisions and are definitely improving on their e-waste procedures. The fact that they are phasing out harmful chemicals by 2010 is very important. Hopefully Philips will expand their voluntary pickup sites in the future to more than three countries. As of now, Philips is doing a solid job with sustainability, but has some areas to improve on in the future.

## **Surveys of Campus**

After researching the final destination where the University of Wisconsin Oshkosh's e-waste resides, our next area of questioning was the student body, faculty and staff of the campus to question whether or not people affiliated with the University were knowledgeable about a few questions dealing with e-waste.

The first question proposed to students, staff and faculty was "Do you know what e-waste is?" Of the 50, or so, people surveyed, 54% did not have basic understanding of what type of products were classified as e-waste, while 46% could provide an accurate definition of e-waste (Chart 1). Being a leader in sustainability, the University of Wisconsin Oshkosh needs to use

these results as a starting point as a place to expand educational programs. These programs would then provide basic knowledge to the students, staff and faculty as to what products make up the e-waste category of waste and therefore increasing awareness on campus of environmental and global issues.

The following question dealt with the disposal of e-waste and questioned the interviewee, “Why is it important to prevent hazardous electronic waste from going into the landfill” (Graph 2). The most common response, with 41% of participants, was that e-waste leeches harmful toxins into the ground, which effects not only the environment, but also the water table and soil quality (Graph 2). The fact that e-waste does not decompose was a response given by 32% off the participants (Graph 2). Another 15% of the people interviewed believed it is important to prevent e-waste from being dropped in landfills because of the harm the e-waste will do for the future generations. Lastly, 12% of students, staff and faculty were unable to provide a reason as to why the dumping of e-waste into a landfill should not be legal (Graph 2). Again, education is a common aspect that the University can expand on to provide students, staff and faculty the knowledge needed to provide better reasoning as to the destructive effects of e-waste not only on the environment but also, humanity.

Partnering with landfills, the next question on the questionnaire was if the interviewee was aware of the activation of the second phase of the Wisconsin Recycling Law going into effect September 1<sup>st</sup>, 2010. The second phase of the law requires households to dispose of e-waste properly and bans the disposal of e-waste into the state’s landfills. This second phase is important to the University of Wisconsin Oshkosh’s sustainability standpoint because students, staff and faculty that are off campus still are affiliated with the University and therefore should be considered a member of the sustainability movement here on campus. This provides an area



of knowledge that can be expanded on due to the 90% of students, staff and faculty that are unaware of the second phase of the law going into effect later this year (Graph 3). The first phase of the Wisconsin Recycling Legislation, required institutions, which include the University of Wisconsin Oshkosh, to properly dispose of e-waste using a recycling program. Although the University is already required by law to recycle e-waste, the educational efforts need to be made to ensure a thorough understanding of why this law is important and why the regulation needs to be rigorously followed.

Along with the new law, the e-waste team questioned interviewees on their knowledge of how to dispose of the e-waste individuals produce. Of those interviewed, 63% did not hold knowledge as to the proper recycling route for personal e-waste (Graph 4). The 37% that did know how to properly dispose of e-waste were more knowledgeable of the area of cell phone disposal since many cell phone distributors collect old cell phones when the consumer purchases a new phone (Graph 4). Again, the 37% of interviewees are a viable source for education needs, perhaps by student eco-reps whom could speak to students upon entering the first year orientation, or even continuously walk throughout campus and the residence halls providing knowledge to students about e-waste and the proper way to dispose of e-waste.

Concluding the survey was the question that holds the most information in the e-waste group's mind. The concluding question was "If campus had a drop off spot for e-waste would you use it?" The overwhelming response was yes, with 90% of students, staff and faculty agreeing that campus needs to instate an e-waste recycling program (Graph 5). The other 10% responded with "maybe," which leaves not a single person responding no to using a communal drop off point on campus for e-waste (Graph 5).

## **Recommendations**

With Governor Jim Doyle signing Wisconsin's Electronics Recycling Legislation on October 23, 2009 this provides the university with a great opportunity to educate both faculty and students on the upcoming changes that become effective as of September 1<sup>st</sup> of this year (2009 Wisconsin Act 50, 2009). With the banning of electronics from landfill disposal in September, we need to educate students on the proper purchasing and disposal of electronics. The following recommendations should be beneficial in the universities quest to becoming a leader in terms of sustainability.

We currently have several great media outlets that can be very beneficial in reaching out to students. The university could use methods such as WRST radio, Titan TV, or the campus website to reach out to people and educate them. Our campus sustainability website is just one method we could use to show an outlining of the proper process that occurs when one wants to recycle or make the purchase of any electronic devices.

There are currently IT courses offered on campus that focus on the purchasing of computers. Making slight changes in a course such as this would be a great opportunity to show options that are not only available for the purchasing and disposal of computers, but also the most responsible ones. If we first focus on the purchasing of the computer, then the disposal will become less problematic in the future. EPEAT is a program of the Green Electronics Council. EPEAT is a system that helps purchasers compare and evaluate different environmental attributes between different desktop computers, laptop computers, monitors, and workstations. These electronics are then rated on a bronze, silver, and gold scale (EPEAT, 2010). The

university should increase stricter guidelines when purchasing electronics, and look into making purchases of electronics with no lower than a bronze EPEAT rating.

We also need to evaluate different types of electronic waste. Televisions and computers are often the focal point, but there are smaller components such as printers, fax machines, DVD players, and even ink cartridges that pose a problem. One step we could take is creating electronic waste drop off boxes in major locations around campus such as Reeve. Students could then recycle waste such as batteries, ink cartridges, or even cell phones at these locations. The University of Connecticut currently has drop boxes that are provided by an organization called Think Recycle (EcoHusky, 2010). They then ship these boxes back to Think Recycle and receive payment based on the electronics that were provided (ThinkRecycle, 2010). Not only would we be saving electronics from reaching a landfill, but we would also benefit financially.

One alternative to recycling the waste is creating an office exchange program. Rather than throwing out a used VCR, keyboard, mouse, or working printer, students could donate it to an office exchange program where other students could then purchase at a cheaper cost than buying brand new. Programs such as these exist all over the country already, and even in our own state. University of Wisconsin-Madison for example, has SWAP which is essentially an indoor garage sale where you can purchase used office tables, projectors, etc.

Another alternative to the recycling of cell phones is the reuse by donating them to different types of shelters that are in need. There are different types of homeless and domestic abuse shelters across the country. In our own city alone we have the Christine Anne Center. These cell phones do not even have to be activated. They could be used for emergency purposes only in case of possible future domestic abuse issues. One simple recommendation

would be a partnership where the Christine Anne Center, or other shelters could pick up used cellular phones from our campus free of charge.

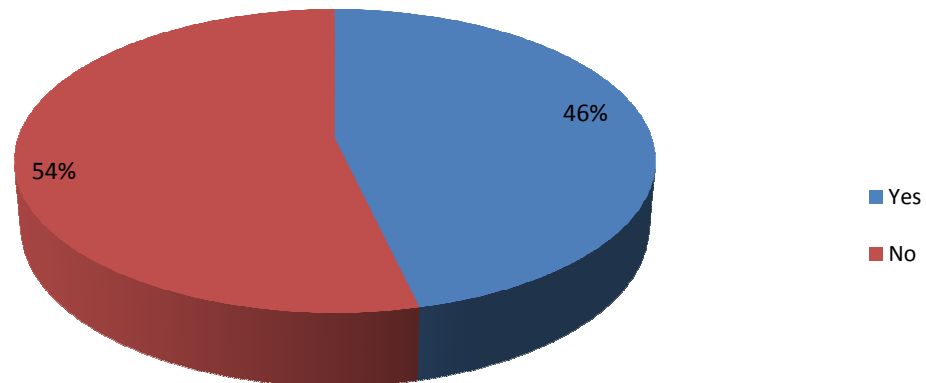
The final recommendation is creating a campus online classified advertisement website. The days of picking up your local newspaper and flipping through the classified section are slowly coming to an end. With websites such as Craigslist and Facebook offering free classified sections, we believe this is something the university could do to exchange products amongst students. A simple website offering different products would essentially run itself. It would be maintenance free, and would put the responsibility in the hands of the individuals giving away, or receiving the electronics.

## **Conclusion**

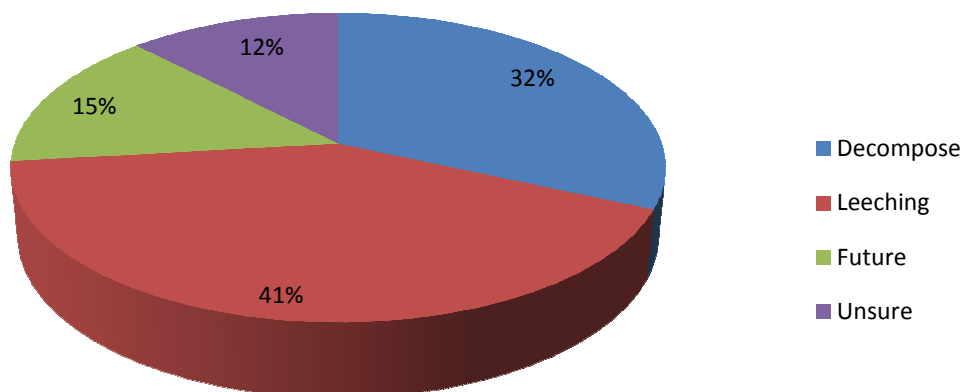
In conclusion, the university is taking many steps in being a leader in sustainability. However, with the information on electronic waste being so limited, there are still many options available that the university can do to set itself apart from other colleges. Coming to a clear understanding of what electronic waste is, and then evaluating both its local and global impact on society will be beneficial in creating different programs that educate others on the implications of improper purchasing and disposal.

## Appendix A-1

Graph 1: Do you know what e-waste is?

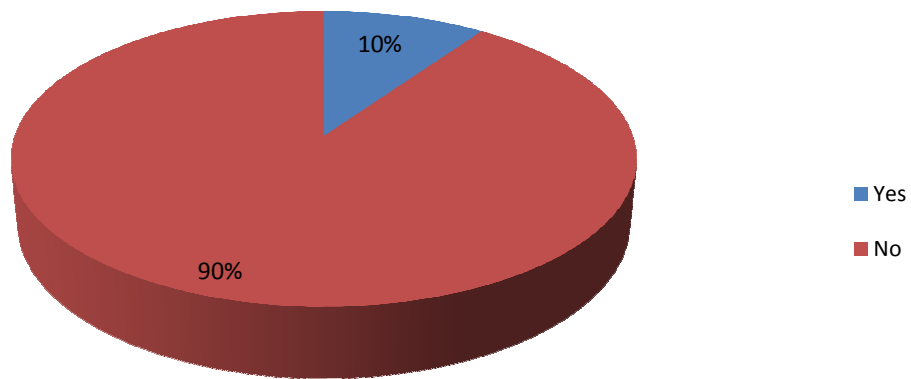


Graph 2: Why is it important to prevent hazardous electronic waste from going into the landfill?

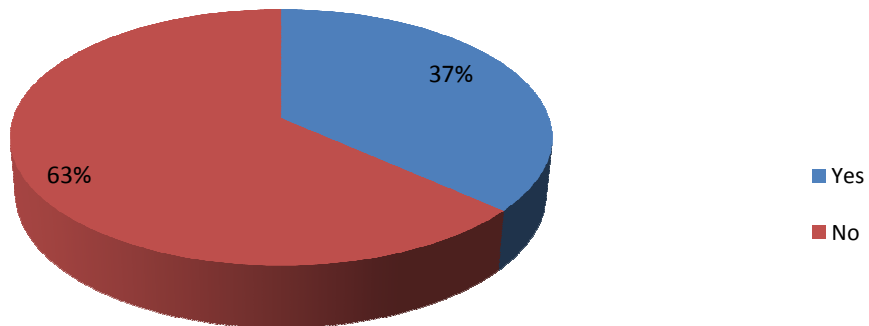


Appendix A-2

Graph 3: Are you aware of the Wisconsin Recycling Legislation that bans e-waste from landfills effective September 1, 2010?

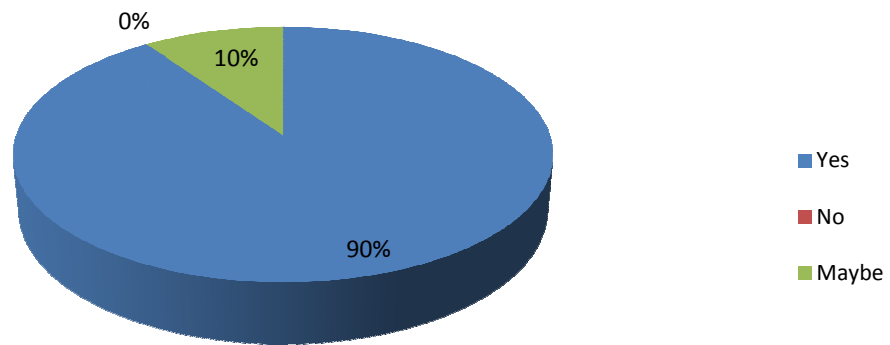


Graph 4: Do you know how or where to properly dispose of electronic waste?



### Appendix A-3

Graph 5: If the campus had a drop off spot for e-waste would you use it?



## Appendix B-1

Questions to Central Stores Receiving Manager- **Dan Strey**

- 1) What is your exact role in your job? **Head of receiving at Campus Services Building**
- 2) What is your title? **\_Central Stores Receiving Manager**
- 3) How many years with UWO? **25 years**
- 4) How did you get this job what background did you have? **Working in central stores for 25 years**
- 5) Who is your director? **Barry Gauthier**
- 6) How many people on your team? **1 full time 8 students**
- 7) Describe their jobs? **Inventory control, deliveries**
- 8) What is your primary job description? **Daily operations**
- 9) How do you describe sustainability? **Making the campus environment safer for everyone. Recapturing as much electronics as we deliver on to campus and redistribute and or dispose of in an environmentally and a sustainable way. Leave this place like we found it for future generations.**
- 10). Describe what the path is for electronics that come through your warehouse **Material hits the doc, we unwrap and sort, we deliver to appropriate location . We get an order for a pickup of obsolete or e waste then we go back out and pick up. We bring to Campus Services Building. We scrub hard drives, pull cartridges from printers and faxes. We palletize hardware for pickup by recycler. Batteries packaged up for safe pickup by UPS. Cartridges packaged and picked up by local recycler @1.50 per cartridge.**



## Appendix B-2

Questions to Purchasing managers of e commodities. This is an attempt to capture the process for requisition, criteria for selecting a product and manufacturer (computer, fax machine, printer) Individual background information request is to get a feel for your responsibility-accountability-commitment-knowledge of the job

- 11) What is your exact role in your job? **\_I review all purchase requests for technology hardware and software. I oversee campus technology for all computer labs, all employee offices and all campus servers. I oversee distribution of surplus equipment off campus.\_**
- 12) What is your title? **\_Director of Academic Computing\_**
- 13) How many years with UWO? **\_22 years, since September 1988, with UWO; 9 years in my current title, since 2001\_**
- 14) How did you get this job what background did you have? **\_B.S. in Mathematics from UW Madison, MBA with concentration in Operations Management from UW Oshkosh, worked 13 years as Business Manager for the College of Business at UWO with responsibilities for all technology within the college, 2 years as project manager for a small software company, 2 years as technician for small computer company.\_**
- 15) Who is your supervisor? **\_Ken Splittgerber, the campus Chief Information Officer\_**
- 16) How many people on your team? **\_I supervise 12 full-time staff; they supervise 10 student interns, 4 help desk student assistants, and about 30-40 student lab consultants\_**
- 17) Describe their jobs?  
**\_Lab Manager – supervises Lab Consultants, makes sure the 5 GCA labs are staffed, clean, coordinates repairs with the technical staff.\_**  
**\_Help Desk Manager – supervises Help Desk student assistants and interns at the Help Desk, schedules help desk, answers calls, assists walk-ins.\_**  
**\_Assistant Help Desk Manager – fills in when HD Manager is gone, answers calls, assists walk-ins, manages campus surplus by wiping data off hard drives and arranging for disposal.\_**  
**\_4 Desktop Support Technicians – install and repair computers and printers, remove viruses, setup lab and office computer images, train and supervise interns, maintain HP and Apple service centers and vendor relationships.\_**  
**\_5 Server Support Technicians – maintain all campus servers and server systems including email, web, file, database, and directory servers; maintain campus antivirus and backup services.\_**
- 18) What is your primary job description? **\_Supervise and develop Academic Computing staff; provide vision and planning for campus technology utilization; maintain campus standards for hardware, software, and customer service; provide technology consulting for campus projects; communicate with the campus especially through the Academic Computing Users Group; advise the Student Technology Fee Committee. I suppose if I had to distill it to one sentence it would be to manage technology resources on campus.\_**
- 19) How do you describe sustainability? These answers can inform our understanding of the way that top managers for e commerce on our campus think about sustainability and how seriously they take their role in the process? **\_Sustainability is using our resources wisely**

and not wastefully. It is thinking ahead to how the decisions we make will affect future generations.\_

- 20) At the purchasing staff level, do you and your team think about sustainability and strategies to improve the supply chain sensitivity to environmentally safe products, wasteful packaging, or how we are going to get rid of it after useful life? **\_Yes, we try to. One example was when purchasing large numbers of computers from HP we can order them in bulk packaging instead of individually packaged. It did cost more, but reduced the packaging we were dumping.\_**
- 1) Exactly what commodity do you purchase-hardware, software, printers, fax machines, laptop. All the above? **\_all the above\_**
  - 2) How many years in your specific job? **\_answered above\_**
  - 3) Where were you previously-what was your background that got you here? **\_answered above\_**
  - 4) What is your yearly purchasing budget for electronics under your management per year? **\_\$200,000 under my direct management\_**
  - 5) What are a few of the criteria that UW management says you must abide when making a buying decision (budget, eco concerns, carbon foot print of manufacturer, buying group, other)? **\_State Contracts and Vendors\_**
  - 6) How does this criteria affect your ability to buy competitively (stay within budget, features you need, other)? **\_Having to stick with the State Contracts can provide better pricing, but it can also limit our options\_**
  - 7) When selecting a vendor for a computer, how would you rate, by using UW purchasing guideline importance, the following criteria? A).Price B). Manufacturer meets all environmental safety standards (components used, where it was made, manufactures overall commitment to sustainability etc.) C). Product Life D). Product support? **\_1 – Product Life, 1 – Product Support, 3 – Price, 4 – Environmental Safety Standards\_**
  - 8) Where does the order come from-who is authorized to give you a purchase order to fulfill (department head, tenured professor, student, faculty)? **\_I get purchase requisitions from all but students. Usually it is from the department secretary on behalf of the department head. These are the purchase requisitions I review to approve the technology, not what is included in the \$200,000 I authorize myself.\_**
  - 9) What is the typical lead time from manufacturer? **\_30 days\_**
  - 10) Does the manufacturer have a program in place-as a company (we may not use it) that recovers end users hardware as a service-a huge user like Oshkosh Truck? **\_Apple does have a Recycling program we've taken advantage of for the past 3 years. HP may have such a program, but I'm not sure and if they do, we haven't made use of it.\_**
  - 11) Who are the important volume oriented manufacturers you use for electronics under your management? **\_Hewlett-Packard, Apple, Cisco\_**

12) Do you buy on a contract, and how long is the contract, for electronics? If you are free to test the market do you go to the vendor that has the best price, environmental footprint at the time of purchase? Is it a combination of the two buying criteria?

*\_The State Contract permits purchases from several manufacturers (Dell, HP, Lenovo, and maybe one other). I'm free to select my manufacturer within that contract. We've selected the one that gives us the best product and service. Because we've developed the relationship, we believe we are getting a good price, though it may not be the cheapest. We've also invested in training our staff to be certified repair specialists for these manufacturers, which saves the campus money and contributes to sustainability since we aren't shipping equipment off campus to be repaired.\_*

- a) If offering to nonprofit entity how does that work and what is your role? *\_Not sure how this fits under question 12. We do offer our surplus computer and printer equipment to nonprofit entities. We send letters or emails to a very large list of nonprofits in the area letting them know what equipment we have and that they can request it on a first-come, first-served basis. This has been a very good project for us and for the non-profits.\_*
- b) Is UW Oshkosh a member of any state buying group that uses sustainability as a criteria for selecting vendors? *\_Not that I'm aware of, but UW System and the State of Wisconsin may be doing that on our behalf.\_*
- c) How do you work with Badger State Industries (do we sell to them or just give to them) and what do they do with the e waste they pick up from UWO (after they break down into components-do they sell it)? *\_I'm not sure about Badger State Industries, but we do send surplus equipment to the State of Wisconsin Corrections Recycling program. My understanding is that they will refurbish what they think they can resell and tear down to recyclable components what they can't refurbish. I don't know what they do with the ewaste or components after that.\_*
- d) Any ideas in your area that you could improve the process, Any areas you see we could improve upon? *\_We don't always remember the bulk packaging option, the State has signed a new contract for ewaste disposal with a new vendor that is certified and disposes electronic waste in a sustainable manner. They are still working on what the process will be to make use of this new contract.\_*

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