

The Status of Office Equipment and Supplies at KU:
An In-Depth Review

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ABSTRACT: Background. The current purchases, use, and disposal of office supplies across the United States poses a serious problem for the environment. Specifically, paper supplies, furniture, and electronics each cause significant environmental degradation in their creation and, often improper, disposal. We sought to better understand the use of these office supplies at the University of Kansas (KU) through interviews of key individuals and the employment of a case study of the Business and Geography departments.

Results. The purchasing of all three categories of office supplies is done departmentally, and the Purchasing Department at the University does not keep a centralized inventory for tracking purposes. This made any analysis of the status quo on the campus difficult to do. The Environmental Stewardship Program (ESP) is a major player in reducing waste and implementing programs to increase recycling participation on campus. In regards to paper use and disposal, KU has recycling bins located throughout the campus that the ESP collects weekly and has diverted about 3,700 tons of paper from the landfill. The ESP has also implemented a desk-side-recycling program that has increased recycling participation by 3%. The ESP also operates a surplus item pickup, storage, and redistribution program to help divert furniture items from the landfill. From June 30, 2007, through March 23, 2009, a total of 3,424 surplus items were collected by the program. There are little to no purchasing requirements regarding electronics. Because of the decentralized nature of purchasing, there is no way to acquire campus wide electronics numbers. The electronic waste recycling at KU is at an important crossroads. Funding is lacking for a recycling program and no policy requiring recycling exists.

Conclusions. We recommend that the University begin a centralized tracking system for purchases of furniture, implement an educational program for department buyers, and expand the ESP surplus program. It is important for KU to install a permanent electronics recycling program, implement a recycling policy, and require EPEAT certification for new computer purchases. Thus far, the ESP has done an excellent job as far as waste reduction and increasing recycling participation, but putting desk-side recycling in every building is recommended. We also recommend a university-wide mandate to purchase recycled paper, as well as centralizing printers and copiers to reduce needless printing. Further research and documentation, along with implementation of these recommendations, should lead to greater sustainability at the

University.

KEYWORDS: University of Kansas, Sustainability, Office Supplies, Paper, Furniture, Electronics, Recycling, E-waste

1. INTRODUCTION / GOALS

Offices are the lifeblood of the American economy. They make sure businesses and universities across the nation work and run smoothly, yet at the same time they could be the source of our biggest waste. The average office worker in the U.S. uses 10,000 sheets of copy paper each year. That's four million tons of copy paper used annually, and this waste usually goes straight to the landfill (EPA 2008). In view of the environmental impacts of office supply and equipment consumption, we sought to further understand the current nature of office supply use at the University of Kansas and to provide recommendations for a more sustainable system.

We determined that focusing on three main topics - paper supplies, furniture, and electronics - would be the most appropriate way to format our assessment. These categories were chosen in part because the Sustainability Tracking, Assessment, and Rating System (STARS) employed by the Association for the Advancement of Sustainability in Higher Education uses these criteria when assessing institutions. This is done not only because of the high volume of use and consumption of these items, but also due to the often environmentally dubious manners in which they are disposed. The environmental impact of each of these types of office supplies and equipment on a national and global scale is large.

We begin this study by developing a detailed understanding of the impacts of each of these types of supplies. Next we recorded the methods we have used in all aspects of our study, specifically in a departmental study we conducted in the School of Business. We then focused on use of these office supplies on the KU campus. We studied purchasing policies and contracts and disposal and recycling policies. Results from our general and cases studied follow. Finally, we offer specific recommendations to be implemented at several levels of University administration to increase sustainability, based on our findings.

TABLE 1. *List of Informants*

Celeste Hoins, Administrative Manager, Environmental Stewardship Program, University of Kansas
Kathy Jansen, Buyer, Purchasing Department, University of Kansas
Beverly Morey, Geography Department, University of Kansas
Jeff Severin, Director, Center for Sustainability, University of Kansas
Mark Strand, Administrative Assistant, School of Business, University of Kansas

2. LARGE-SCALE IMPACTS

A total of “8.8 million tons, or 3.6 percent, of [the national] trash stream in 2005” came from furniture, according to the EPA (EPA, 2009). To narrow the scope of this data, “every year, U.S. companies purchase 16.5 million chairs, 4.5 million tables and 11 million file cabinets and 3 million desks” (Sethi, 2008). Not only should we be

concerned with what happens to this furniture when it is discarded, but also with how it is produced. According to grist.com writer Joel Makower, some methods of production use volatile organic compounds (VOCs), which are “a major contributor to indoor air pollution and outdoor smog” (Makower, 2006). Makower also notes that the nature of resource use in furniture production (e.g. sustainable timber harvest, etc.) should be taken into account.

The materials used to produce paper should also be harvested sustainably, but often are not. Not only that, but the chlorine bleaching process that is used in paper production releases dioxins and degrades ambient air quality. Also, “every ton of recycled office paper saves 380 gallons of oil” (University of Kansas Environmental Stewardship Program, 2009). Office workers in the US generate approximately two pounds of paper and paperboard products every day (EPA, 2008). Paper makes up 40% of the U.S. waste stream (University of Kansas Environmental Stewardship Program, 2009), which, according to the EPA, is six times greater than the global average – making us the largest consumer of paper in the world (EPA, 2008).

Finally, electronics are a significant source of environmental degradation. In the U.S., between 14 and 20 million computers become obsolete every year. About 75% of these obsolete electronics are not discarded in a timely manner, which often leads to poor disposal practices. Computers include metals such as aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, gallium, gold, iron, lead, manganese, mercury, palladium, platinum, selenium, silver, and zinc. Of these, eight (antimony, arsenic, cadmium, chromium, cobalt, lead, mercury, selenium) are listed as hazardous by the Resource Conservation Recovery Act (RCRA) (USGS, 2001).

Computer recycling should be of the utmost importance to a university the size of KU. With the wealth of computers being used and disposed of at the University, it is important to be sure that the electronics are being disposed of in the most environmentally sensitive manner. One of the biggest problems with electronics recycling is the exportation of hazardous waste to poor countries. These countries are ill equipped to handle the waste, with recycling operations consisting of open burning of electronics after scrapping the material for precious metals such as gold, which appears in small quantities in central processing units and copper, which is contained in cables.

Unprotected workers are faced with a number of environmental and health hazards including exposure to lead and phosphorus. Guiyu, China, has received a large amount of attention among researchers and the popular press for its e-waste recycling practices. Research finds that blood lead levels in Guiyu children average 15.3 µg/dL compared to an average of 9.94 µg/dL in non-e-waste recycling cities. At those levels, there is a serious threat to childrens’ health (Huo, 2007). The problem has also been documented in Africa cities such as Lagos, Nigeria, as well as in cities in India and Vietnam (Schmidt, 2006, 233-235; Leung, 2008).

3. METHODOLOGY

In order to effectively understand office supply use on campus, we conducted interviews with key university staff. Interviewees included Jeff Severin of the Center for Sustainability, Celeste Hoins of the Environmental Stewardship Program, Kathy Jansen of the Purchasing Department, Mark Strand of the School of Business, Travis Arellano of Administrative Support Services, and Beverly Morey of the Geography Department. The

purpose of these interviews was to obtain campus-wide data regarding recycling, office supply purchases, as well as to gain insight into practices on campus that are relevant to our topic.

The group came to the unexpected realization that the decentralized nature of our topic, the sweeping bureaucracy of the University, and the size of the problem make data synthesis and interpretation virtually impossible. Data are scattered throughout various University offices with no central system for synthesis and interpretation. It is the intention of our group to utilize the available data in order to provide a very general picture of campus-wide usage of electronics, furniture, and office paper. In order to do this, a comparison of campus-wide purchasing totals to the total amount of material recycled or otherwise reused will be conducted.

3.1 CASE STUDY

The group conducted interviews and observations in order to gain a more in-depth perspective on these data. Due to the relative durability of furniture and electronics compared to paper, there can be no practical short-term study that produces an accurate picture of furniture or computer use. In place of such measurements, interviews were utilized to discern any existing departmental policies or standards practices regarding purchasing and disposal of computers and furniture. Although this failed to give quantitative measurements for the lifespan of products, barring the possibility of existing department policies that mandated upgrades after a certain amount of time, it did provide us with some indication of where these products go at the end of their useful lifespan, since there is no unified University policy regarding computer and furniture disposal.

A case study that provided quantifiable results was possible for paper. To judge the effectiveness of the Environmental Stewardship Program's desk side recycling program and assess the possible effects of its potential expansion, we chose to observe a department currently participating in the program: the School of Business. Interviews were conducted with a key player in the department. This was Mark Strand, Assistant to the Associate Dean of the School of Business, who allowed us to interview him as well as observe the department. In order to provide substance to our data, the Geography Department was later chosen to provide something to measure our results against, as they are not in a building that participates in the deskside recycling program.

Following the interviews, we began the monitoring portion of the case study. This portion relied on a relatively simple equation, being that the total amount of paper recycled divided by the total amount of paper used equals the rate of recycling. In order to find the data required to compute this equation, the budgets of the department were examined, specifically the annual or quarterly, amount spent on paper. These data were converted from dollars to weight, dividing the total amount spent in a given time period by the cost of one case of paper, the typical quantity ordered, and then multiplying the resulting value by the weight of one case. This yielded the total amount of paper used based on weight.

This total amount of paper used based on weight was compared to the total weight of recycled paper, calculated by weighing the total amount of paper from communal and deskside recycling bins on a daily basis for one week. We then divided the total weight of paper in the desk side bins and communal bins by the total amount of paper used based on the budget which yielded the percentage of material recycled in total. Additionally, we distinguished between usage rates for communal and deskside bins. These numbers were

then compared to overall University numbers to determine if the deskside recycling program puts the department above, at, or below average recycling rates compared to the rest of campus.

4. RESULTS

4.1 Purchasing

In an interview with Kathy Jansen from KU's Purchasing Department, it was discovered that there is no longer a centralized system for purchasing furniture, office equipment, supplies or paper at KU (Jansen, personal communication, 24 March 2009). There is no comprehensive data list of items purchased and used on the KU campus because each department has complete autonomy in office supply purchasing making these numbers are difficult to quantify. Each department at KU receives a budget to buy this equipment, as well as a list of various vendors to choose from. The listed vendors are contracted with KU and vary from national corporate vendors such as Office Max, to local vendors who recycle and have a sustainable agenda such as Contract Furnishings based out of Kansas City. Although specific numbers of items (furniture, paper, etc.) bought at KU are not available, monetary figures for purchases from a few vendors from 2008 were. In the last six months of 2008, \$154,000 was spent on paper and \$1,800 were spent on furniture with Corporate Express. The total spent with Corporate Express was \$429,000 for the entire 2008 year, but this total does not delineate between furniture, paper, or other items purchased through the vendor (Jansen, personal communication 24 March 2009).

4.1.1 Paper

The University of Kansas changed its paper purchasing contract for 2009. Office Max is now the sole provider of paper and office supplies for the University. Campus-wide, \$75,000 was spent in the first quarter of 2009 from Office Max. This document, however, does not include an itemized account of paper purchased.

At this time, there are no standards regarding the type of paper, recycled content, or amount. While it would be optimal to have a standard of recycled paper content for all paper purchased at KU, there are problems regarding costs compared to benefits, and this mandate would have to come from the Provost. There would be considerable increases in cost with a mandate of recycled paper content in paper purchased because non-recycled paper costs about \$28.00 a case for 5,000 sheets while recycled paper costs about \$30.80 a case for 5,000 sheets.

4.1.2 Furniture

The University of Kansas currently contracts with several vendors for the purchase of furniture. Nearly all of the contracts are optional, and as of now each department is in charge of purchasing furniture out of its individual annual budget. Unfortunately, the Purchasing Department at the University does not have a record of the number of individual items purchased annually. The only information available on a campus-wide basis is the amount spent with specific companies. Kathy Jansen, Buyer for the KU Purchasing Department, determined that \$185,000 total was spent with Thompson Crawley and \$483,000 total was spent with Herman Miller in 2008 (Jansen, personal communication, 24 March 2009). These numbers were pulled from the invoices

sent by the companies. No specific numbers on the types of furniture purchased were available.

Due to the wide variety of contract options available to each department and the inability of the Purchasing Department to track individual purchases, it is unclear what the total tonnage of new furniture making its way onto campus amounts to for any given year. The two totals above are examples from companies that reported an invoice to the Purchasing Department, but no total number for amount spent by the University on furniture is readily available for analysis.

It is known that, in an effort to make more sustainable furniture purchases, the University has developed a pilot contract program with Contract Furnishings out of Kansas City. This company specializes in selling gently used furniture. Each purchase of a used furniture item from the company means one more large item has been kept out of a landfill. This program was put into place at the start of 2009, and no report has yet been received on the number of orders placed with the company by the University. Until this report is available, which will hopefully be before the end of the fiscal year on 30 June 2009, the level of success of this pilot program remains unknown.

Many of the companies the University currently contracts with for furniture offer environmentally-friendly versions of several of the products in their line. This is a trend in many furniture businesses, and not a result of any effort on behalf of the University to demand more environmentally-conscious options. Upon reviewing several of the contracted companies' websites, it is apparent that this is, indeed, a growing trend among furniture manufacturers. Many of the companies, including Herman Miller Furniture, provide information on what practices and products the company is offering in order to be more sustainable. Specifically considering the amount of money spent last year on Herman Miller Furniture alone, there is the potential for a large environmental impact if departments switch to these more sustainable options within the contracts already available. According to Kathy Jansen at KU Purchasing Services, choosing to purchase a piece of furniture that was produced using more environmentally-sound products is often not limited by price (Jansen, personal communication, 24 March 2009). Since furniture items are already expensive investments, the difference in price between a conventional piece and a 'green' piece is not typically prohibitive for a department's budget.

Also, many of the buyers for the University have become more concerned and aware of the importance of making environmentally-conscious furniture orders. For example, Loraine Malone in the Housing Department, has stipulated that no furniture crafted out of wood from old-growth forests will be purchased for the dormitory facilities (Malone, personal communication, 15 March 2009). Continued education of department buyers would likely result in the development of more environmentally-conscious policies for the purchase of furniture within each department.

4.1.3 Electronics

Because of the decentralized nature of purchasing, there is no way to determine the amount of computers purchased on campus. The University has few regulations when it comes to electronics purchasing. Formerly, departments were required to replace new computers every three years, in order to keep them current. This practice has been abandoned because of the university-wide budgetary constraints. It is now up to

departments to decide whether to implement this voluntary rule.

There is no campus-wide purchasing contract in place for electronics, though Dell is the preferred provider. This is likely because different departments have different computer needs. Departments like the School of Fine Arts require software such as Final Cut that is only available on Apple computers. Other schools require software such as AutoCAD that is only available on Windows computers.

Choosing a computer that has fewer toxic substances and is more energy efficient is also significant. In 2006, the Green Electronics Council (GEC) developed the International Electrical and Electronics Engineers (IEEE) standard 1680, known as the Electronic Product Environmental Assessment Tool (EPEAT), that implements environmentally conscious design in electronics. The standard is nationally recognized and all major computer companies, including Dell, Hewlett Packard, Lenovo, Sony, Apple, and Toshiba, have registered products. As of February 2008, at least 95% of federally purchased computers must be EPEAT registered (EPEAT.net). Based on the number of the 51 criteria that are satisfied, products are registered in one of three tiers: bronze, silver, or gold. Criteria are divided into sections that include the reduction/elimination of environmentally sensitive materials, product longevity / life cycle extension, energy conservation, end of life management, and packaging. Within the required criteria is the provision for a take-back service, reduction of lead, mercury, cadmium, and other prominent hazardous materials, ENERGY STAR compliance, availability of a three-year warranty, marking of plastic components, and using 65% reusable materials (EPEAT, 2009).

4.2 Disposal

4.2.1 Paper

The Environmental Stewardship Program (ESP) is responsible for developing and implementing integrated waste reduction efforts and environmental awareness and improvement programs (<http://www.recycle.ku.edu/aboutus.shtml>). They have implemented several recycling locations throughout campus and campus buildings that are collected many times throughout the week. Since this program was started in 2001, the ESP has diverted 3,739,241 tons of paper from the landfill. This number includes a variety of paper, such as office paper, magazines, newspaper, phonebooks and cardboard, with office paper being the highest recyclable to be diverted. For further information and a breakdown of these numbers see Appendix 1.

In an effort to reduce waste and increase awareness of recycling, the ESP has implemented a deskside office paper recycling program. In the Strong, Snow, Summerfield, Haworth, Dole Human Development Center, and Moore buildings, each office/work space received a recycling container in order to dispose of its recyclable, non-confidential office paper. This project was funded through a grant given by the Kansas Department of Health and Environment and collection participation was agreed upon by KU Housekeeping. Housekeeping collects the recyclable office pak and stores it until the ESP picks it up weekly. From there the ESP has weighed the paper in order to gauge a percent increase or decrease. So far in the study, the ESP has diverted more than 14 tons of office paper waste through this service. Also, during their review of the data collected during their initial six month pilot, they estimated a 3% increase in the amount

of paper recycled in those buildings (Hoins, personal communication, 4 March 2009). With this estimated increase of recycled paper, the deskside recycling program has seemed to greatly increase participation in recycling and diversion of waste to the landfill. Although there are positive effects of the program, upon further inspection and interviewing of offices that participate in the Deskside Recycling Program, some buildings and offices may have better luck with the program than others. Although the ESP states that housekeeping helps in collection, some departments say that they are responsible for collecting the recycled paper themselves and putting them in the building's communal recycling centers. The departments who did not have housekeeping participation did not seem significantly inconvenienced and still participated, but communication between housekeeping and the ESP could be improved.

As for confidential office paper, KU has a program to recycle shredded paper documents as well. KU has a new paper-shredding contract with a company called Cintas who are based in Kansas City. Within the contract, Cintas must collect the shredded paper documents and recycle them. There are about 100 recycling collection bins across campus, which are collected based on department need. Since this is a new program, recycled paper data as well as paper use reduction has not been calculated, and this information may be difficult to obtain in the future because of a lack of a centralized tracking system and diversion due to contracted work.

4.2.2 Furniture

Currently, the Environmental Stewardship Program (ESP) on campus provides removal service for reusable furniture and office equipment free of charge to the department. In order to use the service, departments send a list of the pieces to be retrieved to the ESP, along with contact information in order to coordinate a pickup. Accepted items include reusable furniture and office supplies, furniture from the Student Dormitory Move-out times, and other items on a case-by-case basis. The documentation required for disposal is available to the departments through the Property Accounting Services website ("Surplus Property Recycling", 2009).

The surplus items collected by the ESP are redistributed either back to another KU department or to a charitable organization. Redistribution back onto the campus is given first priority. The items are assigned a nominal price by the ESP with an additional minimal delivery charge. The ESP assigns a price to the surplus items based on the following criteria:

1. Original cost of the surplus item.
2. Current price of a replacement item.
3. Condition of item (i.e. wear and tear and style).
4. Quantity of items in storage.

Departments can locate used surplus items for purchase at the ESP's online inventory listing ("Surplus Property Recycling", 2009). The inventory includes a product description, digital picture, dimensions, and conditions of the property available. It is also possible to physically view the furniture at the surplus property storage facility on West Campus between 8-10 AM on Tuesdays and Wednesdays, or the department can set-up a viewing appointment with the ESP staff. Once a selection has been made, it is

the responsibility of the department to provide the university and the ESP with the proper documentation and to arrange a delivery. The department can also set up a pick-up appointment to avoid the delivery charge.

If a surplus furniture item cannot be redistributed onto the campus within two weeks of its pickup, it becomes available for donation to an approved charitable organization. The approved nonprofits list is maintained by and available through the KU Property Accounting Services Department. Surplus items are available to these organizations on a first-come, first-serve basis. The items must be picked-up by the organization and no returns are allowed. These items are considered a donation, and the organization must provide written recognition of the transfer at the time of retrieval.

Any items not redistributed through the University or donated to a charitable organization are put up for public auction. Items set up for auction may be bid on through Purple Wave Inc. The Manhattan, KS based company is the University's preferred auction affiliate. They provide both live and internet bidding services for surplus items stored by the ESP. All items purchased through public auction are non-refundable and must be picked up from the surplus storage center on West Campus. The public auctions are announced on the ESP's website as they occur and an archive of past auctions is also made available at the same site.

Large furniture items that are not in decent enough condition to redistribute or donate will still be picked up by the ESP for scrap materials. The furniture is scrapped for recyclable aluminum and steel before being disposed of through the regular waste stream. If possible, some salvage work will be done on partially damaged property. For example, otherwise functional chairs will be reupholstered in order to make them fit for redistribution or donation.

The surplus furniture removal program has seemingly been successfully implemented on the main campus. If there were more storage space available, it would likely be able to have an even greater impact since furniture items could be stored longer and have a greater chance of resale back onto the campus. A report from Celeste Hoins, Director of ESP, details that from June 30, 2007 through March 23, 2009, a total of 3,424 surplus items have been collected by the program. This amounts to a total landfill savings of 211,601 pounds and a total volume of 1799.07 cubic yards diverted from the landfill.

4.2.3 Electronics

Any institution dealing with the disposal of electronics faces a number of logistical, financial, security, environmental, and political issues. The University of Kansas, with its multitude of computers scattered across various departments, labs, and offices, is certainly no exception. There are virtually no State or Federal regulations addressing electronic waste, making it difficult to determine proper procedures. Financing an electronics recycling program can be difficult, especially when faced with State-wide budget cuts. Additionally, it is impossible to ensure a recycling company is handling the waste in an environmentally and socially responsible manner because there are no federally recognized certifications.

4.2.3.1 Problems with Electronics Recycling. Both Federal and State electronic waste regulations are lacking, meaning there is no legislative guideline to follow regarding e-waste. In the US, the majority of e-waste, with the exception of Cathode Ray

Tube (CRT) monitors, is not treated as hazardous waste and is therefore not subject to the same environmental guidelines as hazardous waste (Daly, 2006). This is true even though the waste is known to contain large quantities of environmentally sensitive materials such as lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE).

Though facilities in the US are generally more capable of handling e-waste in TSDFs, there are still problems with storage facilities. A study by the University of Florida assessed the leachability of lead from CRT monitors and televisions. The findings show that color CRTs leached lead at an average of 18.5 mg/L. This exceeds the regulatory limit of 5.0mg/L (Townsend et al. V, 1999). Toxic leachate may end up downstream in the drinking supply. This concern has led some states to ban CRTs from landfills (Harris, 2008) and the US from eventually banning the lead laden CRTs from landfills. Once in landfills, rare and precious metals cannot be recovered. This means manufacturers must mine new materials, an environmentally deleterious process. Strip mining leads to an increase in damage due to flooding and impacts ecological systems, due to the removal of vegetation that absorbs storm water and serves as habitat for a number of species.

There are a number of options for electronic waste recyclers in the United States, including in Lawrence and the surrounding region. Because there is no Federally or nationally recognized certification, there is no way to make certain that a recycler is not exporting electronic waste to poorer countries or sending waste to landfills. The best the University can do is assure the chosen recyclers pledge not to export to foreign countries or send to landfills.

4.2.3.2 E-waste Recycling at KU. Formerly, the University of Kansas had a contract with Kansas Computer Recycling Center (KCRC) in Topeka. The Environmental Stewardship Program (ESP) was in charge of receiving and accounting for recycled computers. When KCRC closed in July 2008, the University began looking at other options, while stockpiling computers on campus. ESP itemized all recycled and scrapped electronic materials for fiscal year 2004 through 2008 (see appendix 2).

The computer recycling program on campus is at an important crossroads. The Computing Center is now in charge of handling electronic waste instead of ESP. The University is seeking a new electronics recycling company and restructuring the e-waste recycling system. KU Purchasing Department Buyer Kathy Jansen says there are problems with funding (Jansen, personal communication, 24 March 2009). In order to maintain a computer recycling program, a new paid position would need to be developed. However, the University is unsure from where the funding for such a position or program will come from. Also, the University is not seeing a financial return from e-waste recycling and must pay for pickup.

Despite financial burdens, there is a pilot program for electronic waste recycling in the works. This program is with Asset Life Cycle LLC, an electronics recycler operating in Topeka. Asset Life Cycle manages all waste on site using the latest shredding technology. They also pledge not to export to foreign countries and not to landfill. They are also a KDHE accredited business.

The pilot will go on for six months to a one year before a permanent program is set up. In order to expedite the program selection process, the normal bidding process was not used. The program is hoped to be in place by the end of the fiscal year which

occurs in June. Other forms of disposal have been examined at KU. This includes donating old hardware. However, Kathy Jansen says the local market for used computers is largely saturated (Jansen, personal communication, 24 March 2009).

Another problem facing computer recycling is information privacy. University hard drives often contain sensitive material which must be removed before disposal, recycling, or donation. With this in mind, the University purchased a degausser, a device which removes all stored magnetism on a hard drive, effectively clearing it of information. A degausser wipes hard drives to Department of Defense standards.

4.3 Case Study

After speaking with those in charge of purchasing in the School of Business we found that there was little organization regarding departmental spending. We realized that finding numbers regarding paper purchases would entail going through every departmental invoice and compiling all those related to paper, a task too difficult and time-consuming to pursue. Additionally, we quickly learned that weighing bins every day provides more insight for trends in recycling, but is too short of a time period to provide an understanding of the big picture of paper use.

In order to overcome these problems and oversights in the initial case study design, we altered a few aspects of our study. The primary change was in the manner in which purchasing data were collected for the School of Business. After interviewing Mark Strand and touring the administrative offices in the School of Business, the only possible consolidated source for purchasing data lay in the mail room, which handles all paper ordering for Summerfield Hall.

Another aspect of the original case study methodology that will be altered is the frequency of our data collection. After weighing bins in both the Geology and Geography departments (consequently, the only two bins located in Lindley hall) in order to gain an idea of what comparative numbers would resemble, the total amount of paper amassed over the week for the entire building came to 15.6 Kg. With this lack of waste directed towards recycling, one can only assume that daily numbers would be trivial and could be projected from weekly averages regardless. This does however create an opportunity to study more bins in more places, as weighing will only take place at the end of the day prior to pickup scheduled by the ESP.

5. RECOMMENDATIONS

Although there is no longer a centralized system for purchasing at KU, there once was. Seven years ago, there was a department at KU that ordered and stored nearly all the office supplies a department would need on a regular basis and departments would order from this centralized office. Such a system allowed for more accountability for items purchased from each department since it all went through one office. Unfortunately, the department was closed because of the rising popularity of next day delivery, which proved more efficient than the centralized system and eliminated the need for storage facilities. However, without such an office, the inability to track the numbers of office supplies ordered has created a serious roadblock for any in-depth study of the environmental impact of the use of paper, furniture, and electronic items within campus offices at the University.

The Center for Sustainability has compiled a list of sustainable practices for

departments to use for self-education on its website (<http://www2.ku.edu/~sustain/>). Included are tips for energy conservation, waste reduction, purchasing, communication, events and meetings, travel, and green leadership. These tips should be publicized through the purchasing department and facilities operations to encourage the education of all departmental employees. Specifically, training in sustainable practices should be highly encouraged or even required for staff members responsible for purchasing from each department.

5.1 Paper

Although it is difficult to determine how much paper is being purchased and discarded instead of recycled, the ESP is doing a good job in reducing paper waste on campus and implementing programs, such as deskside recycling. It is recommended that deskside recycling be implemented in all buildings, rather than just a select few. Although this may be more costly because there would be an increase in labor, it would be beneficial for KU in the long-term. There would be a significant increase in recycling and diversion of waste from the landfill, as we saw with a 3% increase of recycling with only seven buildings participating in the program.

Educating staff and faculty on paper consumption is also important. Some staff members believe that computers cannot be trusted with precious information. As a result, paper copies of emails are often printed. This practice is unnecessary and wasteful. Additionally, there should be more awareness of the current recycling programs available at KU, such as the deskside recycling, and the shredded paper recycling program. Currently, there is no mandate at the university that recycled paper content is necessary in the purchasing of paper. If the Provost could be convinced of the benefits of purchasing recycled paper, he could change the current system and make sure all paper that is bought is made with recycled paper content.

Other changes that could be made are in the works, such as with the new copier contract. With the new contract that will be implemented through the University, departments will pay to lease copiers (toner, service, etc.) with a "per-click" charge, paying just for copies used. With this implementation the University will have to get IT on board to create a print management program that will check for how many printers and copiers are used at each department and whether or not they are central or personal. It is recommended that there is a centralization of copiers and printers so that people will be less tempted to print unnecessary items. This would save departments money on buying paper.

5.2 Furniture

It has become apparent through our research and interviews that one of the biggest problems with the university's current use of furniture items is the lack of a centralized inventory. It has been impossible to accurately assess the lifespan of furniture items because there is no data kept by the Purchasing Department. The only numbers available are the total dollar amounts listed on the annual invoices with each contracted company. It is imperative for the proper assessment of the acquisition and disposal of furniture on the campus that an itemized inventory be kept. If each department tracked their purchases through the year and sent an annual report to the Purchasing Department, a more in-depth study could be done on this topic. The development of this inventory

tracking system is by far the most important recommendation on this subject.

Since each department is responsible for purchasing the furniture it needs, it is extremely important that an educational campaign be put in place. Each person who is responsible for ordering furniture items - or any office supplies - should have at least a basic understanding of the environmental impacts each decision can make. In regards to furniture, this means department buyers should be informed of the availability of used furniture either purchased from the ESP's surplus storage facility or from Contract Furnishings. If an acceptable used piece is not available, buyers should know to look for items made with recycled and/or sustainably harvested materials.

A third recommendation would be for the University to mandate certain furniture choices that take into account environmental concerns. This could include limiting contracts to companies that offer more environmentally friendly options, requiring a thorough examination of used furniture options before looking for a new piece, and opening up a contract with used furniture stores in Lawrence (i.e. The Habitat ReStore). In conjunction with an education campaign, this could lead to a significant lessening of the campus carbon footprint resulting from furniture acquisition.

Finally, we recommend an expansion of the ESP's surplus furniture item program's storage space. If the program had more operating space, more pieces could be kept for a longer period of time, increasing the likelihood of any item making its way back onto campus. As it stands now, pieces are only held for two weeks before it is available for off-campus donation. If pieces cannot be held onto for a more significant period of time, the window of opportunity for a department to find a piece it desires at any given time is very small.

5.3 Computers

It is of the utmost importance that the university implements a permanent electronic waste recycling program, though finding money for an e-waste recycling program is going to prove difficult. It is encouraging to see the university taking the initiative by introducing pilot programs for e-waste recycling. It is especially encouraging that the recycler is KDHE accredited and pledges not to export waste or send it to landfills.

Few provisions exist for computer purchasing. This means that it is impossible to determine the energy efficiency of electronic products. A university regulation requiring the purchase of EPEAT certified computers is highly recommended. This would be rather easy to implement. Dell, a major provider for the university, has a number of EPEAT certified computers available. All Apple computers are EPEAT certified. Other manufacturers are beginning to implement the standard as well. For the greatest impact, the university could require an EPEAT Gold standard for all new computer purchases.

6. CONCLUSIONS

Throughout this study we have learned much about the significant environmental impact of office supplies not only globally, but also on the University of Kansas campus. We have examined acquisition, lifecycle, and disposal of three key types of items: paper, electronics, and furniture. Perhaps our most salient conclusion centers on the lack of centralized data concerning office supplies on campus. It is critically important that the University begin centralizing data on the purchasing, use, and disposal of *all* materials.

This will surely prove to be a means of cutting unnecessary costs and increasing environmental stewardship. Below follow specific conclusions about each of the key item types.

The Environmental Stewardship Program has done an excellent job with waste reduction by diverting several thousands of tons of paper from the landfill. An expansion of deskside recycling would increase recycling participation, but an increase of the ESP labor force would be required and may prove difficult to procure with budget cuts. Also, if departmental budgets could be larger and recycled paper was mandatory, the purchasing of recycled paper products would be recommended as a part of increasing sustainability at the University of Kansas.

Computer recycling on campus is at an important crossroads. It is encouraging to see the University introduce a recycling program that addresses environmental, political, and security concerns. It is important that the program become permanent, although it will be difficult to fund. Introducing regulations that require that all new computers be EPEAT certified would also be an easy step for the University to address sustainability.

The current process for the acquisition of furniture items for the campus is unregulated and nearly impossible to navigate in efforts to decrease environmental impact. However, the efforts of the ESP through its surplus furniture pick-up and resale program have been as successful in reducing waste as their available resources allow. To improve the environmental footprint of on-campus office furniture use, a centralized inventory system and departmental education program are the two most important first steps to be taken by the university.

As we have seen, office supply consumption at KU is a multifaceted, nefariously complicated beast. Further research and much work must be done in order to better understand this problem. The recommendations we have supplied should be implemented. Future reforms will be more effective when more data is collected through this process.

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9. APPENDICES

Appendix 1. KU Recycling Tonnage Report

KU Recycling Tonnage Report

January 2001-Present

Year	Print Stock	Ledger:	Mixed OP:	OP:	OCC:	ONP:	OMG:	OTD:	PET:	ALUM:	Total Annual Tonnage
2001	95820	43710	0	74770	197065	179515	115460	28145	13560	3445	375.745
2002	110465	0	0	268355	198665	263445	20500	2920	3500	3301	435.576
2003	95945	0	0	296165	210340	223675	1210	4500	4635	3240	419.855
2004	118680	0	0	322710	185100	283635	4480	330	5030	4685	462.325
2005	13920	0	11070	321860	297720	338620	26680	1860	15120	5663.5	516.257
2006	0	0	37960	275670	330150	331190	14880	6640	15440	5117.5	508.524
2007	0	0	66235	319785	369480	286600	20610	4920	18830	7473	546.967
2008	0	0	83790	241905	352620	315520	61550	1640	21195	2204	540.212
Total Pounds:	434830	43710	199055	2121220	2141140	2222200	265370	50955	97310	35129	
Total Tons:	217.415	21.855	99.528	1060.610	1070.570	1111.100	132.685	25.478	48.655	17.565	
Total Cubic Yards:	1144.289	115.026	523.829	5582.158	3058.771	6172.778	698.342	203.820	3243.667	702.580	
Total Tons To Date:				5,585.87							
Total Cubic Yards To Date:				21,445.26							

Note: This report does not include tonnage for glued books, steel, #2 HDPE plastic, glass, pallets, e-waste or furniture

OCC = Corrugated Cardboard

OP = Office Paper (Office Pak) or white and pastel papers

Mixed OP = Mixed Office Paper, books and cereal boxes ONP = Newspaper

OMG = Magazines

PET = Polyethylene terephthalate (Plastic)

OTD = Telephone books and Directories

ALUM = Aluminum

Appendix 2. Total e-waste numbers for FY 2005-2008.

Fiscal Year	CPU R	CPU S	LCD	CRT	Monitor S	Printer R	Printer S	Peripherals R	Keyboard
2005	1,250	84	0	893	44	202	7	438	10
2006	1,206	0	0	1,166	30	215	14	606	0
2007	732	0	8	992	0	257	0	732	5
2008	1,152	0	37	1,043	16	502	7	2,177	34
No Date	26	0	0	57	0	11	0	35	0
Totals To Date	4,366	84	45	4,151	90	1,187	28	3,988	49

Fiscal Year	Laptop	Scanner	Server	Hard Drive	TV	VCR	Copier	Other Escrap R	Other Escrap S
2005	16	3	0	75	0	1	0	197	2
2006	7	4	6	48	0	0	0	662	0
2007	33	4	2	6	19	19	0	576	0
2008	48	41	30	80	10	3	8	668	0
No Date	0	2	0	0	0	0	0	5	1

Totals To Date	104	54	38	209	29	23	8	2,108	3
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R = Recycled

S = Saved

Fiscal Year	CPU	Monitor	Hard Drive	Printer	Peripherals	Laptop	TV	Other
2005	1,334	937	75	209	448	16	0	203
2006	1,206	1,196	48	229	606	7	0	672
2007	732	1,000	6	257	737	33	19	601
2008	1,152	1,096	80	509	2,211	48	10	750
No Date	26	57	0	11	35	0	0	8
Total FY05 - FY08:	4,450	4,286	209	1,215	4,037	104	29	2,234