

# *An Assessment of Campus Sustainability at the University of Kentucky*

**Natural Resource Conservation & Management  
Senior Capstone Class Project  
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## **Executive Summary**

There is a growing impetus across college and university campuses towards the incorporation of sustainable practices into how these institutions do business. The impacts college and universities have on their local community and beyond, through their resource use and daily activities, cannot be denied or ignored. Because of this influence, college and university leaders worldwide are taking responsibility for these actions and actively seeking viable solutions.

The University Leaders for A Sustainable Future (ULSF) formed in response to this challenge and they believe a sustainable campus is one where "the critical activities of a higher education institution are (at a minimum) ecologically sound, socially just and economically viable, and that they will continue to be so for future generations." The ULSF endorses the Talloires Declaration, a ten-point action plan for embracing sustainability and environmental literacy in college and university operations, teaching, and research, and has been signed by over 275 university presidents and chancellors in over 40 countries, including 6 of the University of Kentucky's (UK) benchmark institutions.

At UK, the Natural Resource Conservation and Management (NRCM) senior capstone course is a one-semester class where the focus is on a single natural resource issue in which the class develops recommendations for ways to address that issue. The class applies skills and information acquired in previous courses to formulate practical solutions. The topic for the 2003 NRCM Capstone was campus environmental sustainability at the University of Kentucky.

The NRCM class chose to use an ecological indicators approach to assess campus sustainability at UK. An ecological indicator is a measurable characteristic that provides quantitative or qualitative information about a component of campus sustainability. Indicators are useful because looking at data over time can show trends in resource use and human behavior.

Five resource sectors were the focal point of this project: energy and water use, procurement and disposal, transportation, land use, and education. Within these areas, 11 indicators were identified and researched.

### **Energy and Water**

Energy and water are fundamental to modern society and the way in which a large institution addresses these resources can have cascading effects on the economic and social health of that institution and the broader community. Both energy and water are facets of sustainability because of the environmental costs associated with their extraction and use, along with the social consequences when these resources are scarce.

***Indicator #1: Electric kWh Consumption and Cost on UK's Main Campus***

- The total electric kWh consumption at UK has steadily increased over the past ten years, with an average 3.5% increase per year.
- UK's main campus electricity cost has also increased annually over the last 10 years, with an average annual increase of 3.2%.
- Main campus per person kWh electric consumption has increased by 2.3% per year over the last 10 years with the per person cost increasing 1.95% annually.

***Indicator #2: Kirwan-Blanding Dorm Complex Electric kWh Consumption and Cost***

- The electricity consumption for the Kirwan-Blanding Dormitory Complex has remained fairly constant since 1989, with the exception of a significant increase in the 1999-2000 fiscal year. The data suggest that in the last 12 years there has not been a systematic increase in electric consumption related to increased use of electric devices in dormitory rooms.

***Indicator #3: Total and Per Person Cubic Feet of Water Consumption on UK's Main Campus***

- The total cubic feet of water consumption for the main campus has decreased an average of 1.4% annually over the past ten years while the cost of the main campus water has increased on average 2.8% annually. Per person cubic feet of water consumption has been decreasing similarly to main campus, with an average annual per person decrease of 2.6% while the per person cost has been increasing 1.6% annually.

The University of Kentucky currently has an energy consumption goal of 50 Mega watt of electricity peak per day. As the campus continues to grow with increased building construction, this goal is becoming harder to maintain. In order to continue to meet this challenge, the University must continue its commitment to energy management, and although water consumption has been declining, the decrease does not negate the rising costs of water use. As old buildings are renovated and new buildings are constructed, the University should consider installing the most energy and water conservative technology available to demonstrate they are committed to sustainability for the welfare of the environment and people of the Commonwealth.

## **Procurement and Disposal**

A major component of university business is the acquisition of materials, including paper, food, office supplies, and new equipment, among others, and the disposal of items the university no longer finds useful. Materials for products purchased by the University must be assembled either through the extraction of virgin resources or the reuse of recycled materials, and transported, sometimes from very far away, to the University. The disposal of materials involves utilizing landfills and dealing with the associated problems that can occur, such as the emission of dangerous gases. When materials are recycled, they are diverted from landfills and are used to make more products without the need for virgin materials. Recycling is not only beneficial because it conserves virgin materials, but the processes that extract virgin materials can create more hazardous pollution than recycling.

Both procurement and disposal are facets of sustainability because they have a direct impact on humans and the environment.

***Indicator #4: Paper Consumption***

- In 2002, 215,000 reams of 8 ½” by 11” white copy paper were purchased from the UK Stores Department at a cost of \$610,000. On average, each UK student, faculty, and staff member uses 2,385 pieces of paper per year purchased from UK Stores alone!

Given the large amount of paper consumed by the University community per year, we suggest the University consider ways to mitigate this impact. Kentucky state statute requires that all paper purchased by state institutions contain a minimum of 30% post-consumer recycled content. UK could boost recycling markets and lessen their impact on forests by demanding that all paper purchased by this institution contain higher percentages of post-consumer recycled content. In addition, the University should consider making printers capable of producing double-sided copies available to all students, faculty, and staff, thereby cutting paper consumption in half.

***Indicator #5: Waste Materials Management***

- Since the incorporation of the UK recycling program into the Physical Plant Division in 1997, the amount of waste recycled and composted at UK has risen from 13% of total waste in the 1997-1998 fiscal year to 17% of total waste in the 2001-2002 fiscal year. The total amount of waste generated at the University has steadily decreased each year since the 1998-1999 fiscal year.

The University is making progress in the area of waste disposal and recycling; however, several other universities, including several of UK’s benchmarks, recycle larger percentages of total waste than that of UK and require higher percentages of post-consumer recycled content in their copy paper. UK should strive to surpass other universities in an effort to become a leader, setting an example for other universities as well as for the Commonwealth.

## **Transportation**

Since its invention, the automobile has been a symbol of status in our country and the attainment of a driver’s license has been considered a right of passage. However, there are consequences to this privilege that are having disastrous effects on ecosystems, the atmosphere, and human health. Carbon dioxide emissions from transportation continue to increase each year, surpassing yearly emissions from industry in 1998. According to the U.S. Department of Transportation, transportation accounts for annual emissions of 1888.5 million metric tons of carbon dioxide, a greenhouse gas. Chosen modes of transportation are a facet of sustainability because they impact the CO<sub>2</sub> concentration in the atmosphere, the aesthetics of our landscape, the fitness of our ecosystems, the quality of the air we breathe, and much more.

***Indicator #6: Transportation Decisions of UK Undergraduates***

- A survey was administered to UK and Lexington Community College (LCC) students to ascertain their transportation choices. The survey revealed 52% of students drive to campus, 35% walk, 4% ride bicycles, and 4% use the C.A.T.S. university bus system. Thirty-three percent of the students surveyed live on campus and account for a majority of the 35% of students that walk to campus.

***Indicator #7: Traffic Flow Analysis***

- Traffic count data for the UK campus area were obtained from the Kentucky Transportation Cabinet Division of Planning. Analysis of the data showed that the number of vehicles coming to campus has steadily increased over the past 30 years.

***Indicator #8: Parking Space per Student Ratio***

- UK has .72 parking spaces per student. Compared to its benchmarks and several other comparable universities, UK has a very high ratio of parking spaces/student. The high availability coupled with the relatively low cost of parking on campus serves essentially as an incentive to students to drive to campus.

UK is an urban campus and with over 40,000 people coming to campus each day, how UK addresses transportation not only impacts its students, faculty, and staff, but the broader Lexington community as well. Currently, UK has very few incentives to encourage students, faculty, and staff to leave their cars at home and pursue alternate forms of transportation, thus forcing UK to create more parking spaces and build more parking structures. Stanford University actually saves money by paying their students *not* to buy a parking pass! In conjunction with the city, UK does offer free ridership to the UK community on the Lextran city bus system; however, very few people take advantage of this program even though most are aware of its existence. UK should consider incentives for use of this program, in addition to incentives for walkers, bicyclists, and car poolers to help minimize funds allocated to parking area construction and mitigate the impacts on Lexington's traffic, as well as negative impacts on the environment.

## **Land**

In 1865, Kentucky's Agricultural and Mechanical College (renamed University of Kentucky in 1916) began as 3 buildings on 50 acres, and main campus now consists of 278 buildings on 841.6 acres. The University owns and operates 15 farms, forests, and research stations in 14 counties across the state. How UK manages these lands has cascading effects on the broader community. Proper land stewardship is a facet of sustainability because it ensures that natural systems are maintained or enhanced for future generations, and affects our quality of life by preserving the health and integrity of the people and their environment. In order to act as effective stewards of the land, we must care for the system as a whole while understanding all of the interactions within it. Through proper land stewardship, UK can reciprocate our dependence on the earth by helping to improve and maintain its natural beauty and function.

***Indicator #9: Land Stewardship***

- The UK Arboretum utilizes 44 acres of land to demonstrate land stewardship practices, thus helping to develop a stewardship network through educating the local population on the benefits of native plant species for structure and function, and the importance of removing non-native invasive species such as bush honeysuckle and wintercreeper.

Based on current research initiatives concerning land stewardship at other universities, the University of Kentucky needs to continue to fund sustainable projects and incorporate courses concerning land stewardship into the University Studies requirements. As more of the student population becomes familiar with these concepts, this knowledge will be dispersed into the Commonwealth, thus helping to ensure land stewardship throughout the state.

***Indicator #10: Open Space***

- Open space on UK's main campus consists of 73.8 acres or 8.7% of the total land, and the area allocated to parking spaces and parking structures is 115.7 acres or 13.7% of the total land, an increase of over 400% in the last 30 years.

In order to maintain a healthy campus environment and provide for the social and recreational needs of the students, a University must contain a combination of both buildings and open space to encourage the interaction of students to promote healthy minds, bodies, and spirits. Additionally, open space aids in purifying infiltrated water and decreases urban runoff.

How UK manages its land sets an example for other universities as well as for the citizens of the Commonwealth. By implementing ecologically sound land stewardship ideals into everyday operations of the University's land holdings while incorporating open space onto main campus, UK could improve the quality of life of its students, faculty, and staff, and the broader community.

## **Education**

The University of Kentucky is an institution of higher learning and therefore has a responsibility to educate its students in a broad range of disciplines. An emphasis on ecological literacy of all members of the University community is the first step toward building a sustainable future for the campus. As a land grant university, UK has the responsibility to lead the state in a global shift to more sustainable living, providing a model for sustainable practices on a larger scale. Education is a facet of sustainability because it is the key to raising awareness of the importance of embracing sustainability in our everyday activities.

***Indicator #11: Student Ecological Literacy***

- Ecological literacy means having an understanding and working knowledge of the basic principle organization of ecological communities and being able to embody them in the daily life of human communities. A survey was administered to UK

seniors to access the ecological literacy of UK graduates. Forty-two percent of UK seniors polled could name one federal or state law that protects the environment, 40% could name two greenhouse gases, and only 12% of UK seniors surveyed knew the world's population to the nearest billion. Twenty-two percent of seniors polled have taken a course that focused on environmental sustainability or other environmental issues.

According to the 2002-2003 UK Undergraduate Bulletin, one of the goals of UK's University Studies Program (USP) is to "help students to develop their own sense of values, to pursue their own goals, and to contribute to the political, moral, social, and cultural enrichment of society." As long as UK students continue to graduate without basic ecological literacy, the goals of the USP cannot be achieved. UK, like many of its benchmarks, should add courses to the USP requirement that focuses on ecological literacy and sustainability because ecologically literate graduates of UK can become leaders of sustainability in their communities. By practicing sustainability, UK can set an example for its students, other universities, communities, and the nation.

## **Conclusion**

Higher education is beginning to recognize that humanity is affecting the environment in ways that are historically unprecedented and potentially harmful for both human health and natural ecosystems. According to the University Leaders for A Sustainable Future, "Colleges and universities prepare a majority of the professionals who develop, manage and teach in society's public, private and non-governmental institutions; they are uniquely positioned to influence the direction we choose to take as a society. As major contributors to the values, health and well being of society, higher education has a fundamental responsibility to teach, train and do research for sustainability."

Campus sustainability initiatives are in place across the country at many of the Nation's university and college campuses. The involvement of students, staff, and faculty is imperative to the success of sustainability programs because they create a large part of the demand for resources on campus. The initiative has begun at UK, and there is a lot of potential to learn from the experiences of other institutions.

For UK to become more sustainable, a task force should be created and recognized, consisting of students, faculty, staff, administrators, and professionals from the community, working toward a common goal. The goal of this interdisciplinary committee should be to serve the University of Kentucky community in establishing and enforcing resource conservation initiatives and measuring the success of ecological indicators over time, while researching innovative ways to implement the multiple aspects of campus sustainability. Such task forces at other colleges and universities have been very successful in this area.

Currently, there is a group of students, faculty and staff who met for the first time in November 2002 to discuss campus sustainability initiatives at UK. The next step is for UK administrators to officially recognize the existing group, expand the breadth of membership to grant authority to implement conservation efforts agreed upon by the Task Force and University Administration.

By signing the Talloire's Declaration, UK would demonstrate its commitment to sustainability to its students, faculty, and staff as well as to other universities, and the Commonwealth.

The overall intent of our project is not to persuade the UK community to immediately make all the changes necessary in policy and practice to achieve complete sustainability on campus. Rather, by infusing the idea into the minds of the students, staff, faculty, and administrators, we hope to plant a seed of sustainability at UK that will grow as the community makes changes in their decisions about resource consumption and management. We are confident that we, as a community, can live our lives in a more sustainable fashion. UK's mission is to be a sustaining resource for the intellectual, social, cultural, and economic development of the Commonwealth of Kentucky; we can meet this goal by becoming a leader among colleges and universities in campus sustainability.

*Apathy can be overcome by enthusiasm, and enthusiasm can only be aroused by two things: first, an ideal, which takes the imagination by storm, and second, a definite intelligible plan for carrying that ideal into practice.*

*Arnold Toynbee (English historian & historical philosopher)*

## Introduction

Colleges and universities around the nation and throughout the world are recognizing the impact they have as community leaders. Whether the influence is local or global, leaders can affect social and economic change. Because of this impact and influence, institutions of higher learning are beginning to acknowledge the cost to the greater community of the demands placed on markets and resources. Many are looking to use their leadership role to change this model. They have done this by forming the Association of University Leaders for a Sustainable Future (ULSF). A ten-point action plan was created to commit institutions to sustainability and environmental literacy in teaching and practice. The plan is the Talloires Declaration and the signatories are embracing the ideal of campus sustainability.

The ULSF describes sustainability by stating:

*"Sustainability" implies that the critical activities of a higher education institution are (at a minimum) ecologically sound, socially just and economically viable, and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally sound and socially just society. The institution would function as a sustainable community, embodying responsible consumption of food and energy, treating its diverse members with respect, and supporting these values in the surrounding community.<sup>1</sup>*

There is a strong correlation between the University of Kentucky's (UK) Strategic Plan and the ULSF definition of sustainability. In UK's *Vision, Mission, Value Statement* (April 1, 2003) there are several phrases that could easily be applied to a "sustainable campus." Examples include:

*The vision to function as a catalyst for intellectual, social, cultural, and economic development*

*The mission to use its leadership role in the Commonwealth to promote human and economic development that will improve lives within Kentucky's borders and beyond*

*The values of: integrity, mutual respect and human dignity, civic responsibility, personal and institutional responsibility and accountability*

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<sup>1</sup> Association of University Leaders for a Sustainable Future <http://www.ulsf.org/about.html>

With the leadership and influence UK enjoys with its students and the Commonwealth even small steps towards sustainability on campus could have a dramatic and long lasting effect on the changing landscape of the future.

## **Using ecological indicators in assessments of campus sustainability**

An ecological indicator is a measurable characteristic that provides quantitative or qualitative information about a component of campus sustainability. By researching information about individual indicators, we can find specific numbers allowing us to compare data over time.

### **Why is an indicator approach useful?**

Indicators are useful because looking at data over time can show trends in resource use and human behavior. We can look at the data and determine whether the University has improved its behavior with regard to a particular resource. This information allows us to give the University a pat on the back for the efforts they make toward a more sustainable campus, or make recommendations for the resource areas that still need work.

## **Framework for indicators approach to assessment of campus sustainability**

The basic framework for using an indicators approach to evaluate the sustainability of UK came from a similar project developed at Pennsylvania State University. The *Penn State Indicators Report: Steps Toward a Sustainable University* examines 33 different indicators presenting data on each one to determine whether Penn State is moving toward sustainability.<sup>2</sup> Their results showed that Penn State's performance with regard to sustainability indicators was average. However, there was evidence that the University was becoming more aware of sustainability issues by implementing new measures to become a more sustainable campus.

Penn State's commitment to increasing ecological responsibility has been embraced by the Faculty Senate and University President. The steps that Penn State has taken toward sustainability present an excellent model for such efforts at UK. In addition to our report, we strongly urge you to visit the Penn State Green Destiny Council web page.<sup>3</sup>

## **Sustainability Initiatives on other Campuses**

There are numerous sustainability programs on other campuses, some of which have been in place for a decade or more, and have made large impacts on the ways those campuses use energy, water resources, design new buildings, plan and manage campus

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<sup>2</sup> Penn State Indicators Report: Steps Toward a Sustainable University <http://www.bio.psu.edu/Greendestiny/publications.shtml>

<sup>3</sup> Penn State Green Destiny Council <http://www.bio.psu.edu/greendestiny/index.shtml>

transportation, and educate. While the adhoc UK Sustainability Task Force will be separately reporting about sustainability initiatives found on other campuses and relating those to UK, we highlight a few such programs that are particularly noteworthy.

- ◆ In 1998 State University of New York at Buffalo won the Association of Energy Engineers "Energy Project of the Year" Award for a \$17 million comprehensive demand side management project for 1994-1997, which reduced UB North Campus energy consumption by \$3 million annually and produced many other campus benefits.
- ◆ The Green Cup at Yale is a contest between residential complexes that measures the recycling performance of each complex and encourages students to conserve electricity, heat, and water. The top complex receives the Green Cup, a trophy blown from glass recycled on campus.
- ◆ Centre College conducted the "Garbology Project" which consisted of emptying a residential complex dumpster in a prominent area of campus onto a tarp and sorting out the materials that were recyclable and the materials that actually were garbage. After sorting almost 300 pounds of waste the students found that 63% of the material that would have been sent to a landfill was actually recyclable. The purpose of this project was to educate other students about the materials that can be recycled and how much of them are usually thrown in the garbage.

The Talloires Declaration is an international agreement that makes universities examples for how to manage environmental issues on an institutional level. The coalition of universities that have signed this declaration have committed to aspiring to achieve environmental sustainability. Many colleges around the nation are moving towards signing this declaration, including several of our benchmark institutions. By signing the declaration the University of Kentucky could become a leader in this national sustainability movement, acknowledging the progress already being made by the University in areas such as energy conservation and recycling, and committing to making progress in other areas.

## **NRC Capstone Course Description**

The Natural Resources Conservation and Management (NRCM) Senior Capstone Course was designed to give seniors the opportunity to apply the skills and information acquired in previous courses to a current natural resource problem. The class focuses on a single current natural resource issue and researches the issue in depth, using a variety of methods including library research, interviewing, and primary data collection and analysis. In addition to research and problem-solving skills, written and oral communication skills are also emphasized. The course is taught entirely in an "active-learning" context. The topic for the 2003 NRCM Capstone was "campus environmental sustainability."

## **Course Goals**

At the beginning of the course, the students decided on six goals to help give the project focus. The following are the goals we set forth:

1. Class members should gain an understanding of how a large state university functions and what it will take to make campus more sustainable.
2. Develop a set of criteria (ecological indicators) on which future classes or a sustainability task force can build, to assess the University of Kentucky's progress toward sustainability over time.
3. To raise awareness about campus resource use, and alternatives, among a selected, pre-identified group of faculty, staff, administrators and students.
4. To gain media coverage through the Kentucky Kernel to raise campus awareness about ongoing sustainability initiatives, including the NRCM Senior project.
5. Provide at least one feasible incentive for each of five resource sectors to encourage implementation of recommendations.
6. Get one upper level university administrator excited about improving campus sustainability.

## **Project's place in a broader UK campus initiative**

The NRCM Senior Capstone course is not the only campus sustainability initiative at the University of Kentucky. Several other groups at UK are working toward the promotion and implementation of sustainable practices on campus. This project was the first of its kind at UK, using an indicators approach to assess campus sustainability. It is our hope that groups will use this assessment as a baseline model for future campus sustainability assessments.

## **Structure of the report**

This report is organized into five resource areas that were the focus of study for this course: energy and water use, procurement and disposal, transportation, land use, and education. For each sector there is at least one quantitative or qualitative ecological indicator, followed by analysis of the data, comparison to other universities, and suggestions for improvement.

# Energy and Water

**Why Energy and Water?** Energy and water are two of the most fundamental needs we have, and interestingly they are also two of the amenities derived from the Earth that we sometimes take for granted in our daily activities. The way an organization uses these particular resources is a reflection of the way that organization addresses their responsibility to the environment in which they live. By environment, we mean the land, water, air, and communities in close proximity to the organization. It is rare to spend much time throughout the day without using some form of both of these resources.

**Why are Energy and Water Facets of Sustainability?** Energy is an important facet of sustainability because of the environmental costs associated with turning natural materials such as coal into the heat and electricity we use daily. Water is an important facet of sustainability because it is required for life.

**Importance to the Broader Community.** The campus sustainability issue is sweeping the Nation's universities and colleges. It has begun at UK, but there has been little assimilation and interpretation of information related to where UK is regarding natural resource use. Before change can happen, we must know what kind of change we need and to what degree it is needed.

# Indicator #1

## Electric kWh Consumption on UK's Main Campus

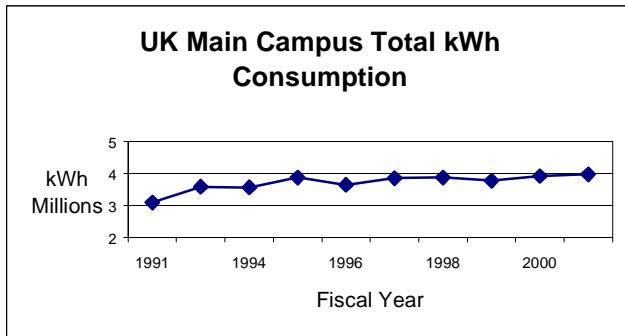
### Why measure Electric kWh Consumption?

We chose per person electricity use because it gives a general idea of how individuals use electricity on campus.

### Data

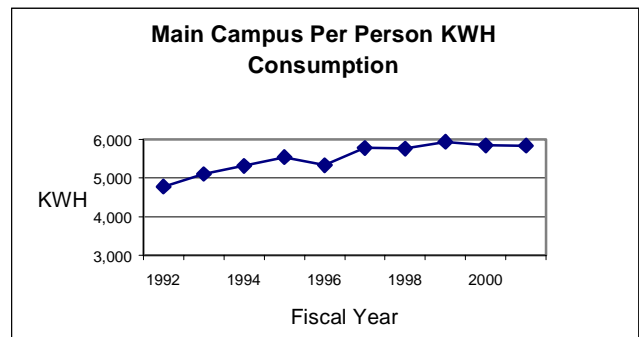
Using main campus utility cost and usage records, provided by UK Physical Plant Division (UKPPD) dating back to Fiscal Year 1992-1993<sup>4</sup>, we calculated the per person kWh electricity consumption by dividing the total kWh electricity consumption by the total on-campus population per year. Per person electric cost was determined by dividing the total cost by the total campus population per year, using the same sources as per person kWh consumption. We determined the total population of the University by adding the total number of students at UK and Lexington Community College (LCC) to the total number of employees at UK and LCC. LCC is included because UKPPD provides them with electricity service. The UK employee and student population records are from the UK Fact Book; the LCC employee and student records are from both the UK Fact Book and the Office of Institutional Effectiveness and Planning at LCC. LCC employee numbers for FY 1992 through 1995 were estimated using the average annual percent employment increase from FY 1996 through 2001.

### Interpretation of Data



We found that the total electric kWh consumption at UK has steadily increased over the past ten years, with an average 3.5% increase per year. UK's main campus electricity cost has also increased annually, with an average increase of 3.2%.

Main campus per person kWh electricity consumption has been increasing overall, but at a slower average rate of 2.3%. Per person cost has increased an average of 1.95% annually.



<sup>4</sup> Jack Applegate & Bill Reesor, pers. comm. See Appendix B for contact information.

# Indicator #2

## Kirwan-Blanding Dorm Complex Total and Per Student Electric kWh Consumption

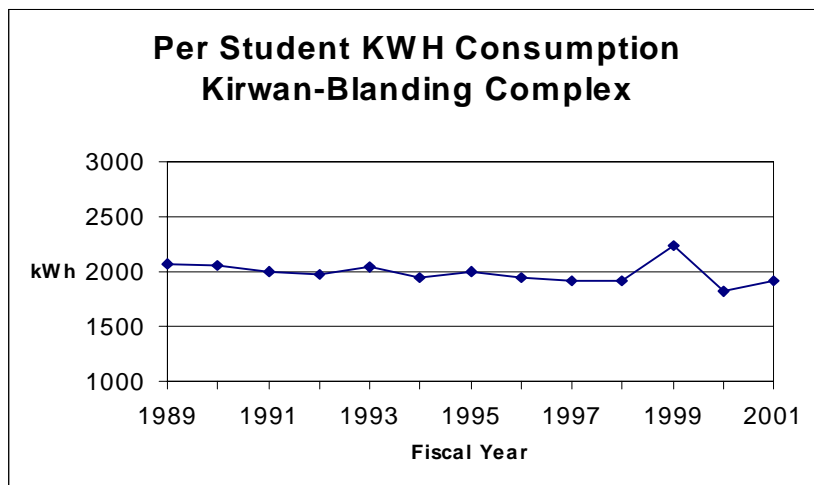
### Why measure Electric kWh Consumption in the Kirwan-Blanding Complex?

We chose to examine the per capita electricity use over time in the Kirwan-Blanding Dormitory Complex because the population has remained fairly constant over time. We believed that this steady population would allow us to assess whether changes in student behavior over the last decade have resulted in changes in electric use.

### Data

We found per student kWh consumption by dividing the Kirwan-Blanding dormitory complex loop kWh consumption by the number of students the complex can house at maximum occupancy, which is 2,576. The Kirwan-Blanding Complex is composed of two 23 story towers and eight three-story halls.

### Interpretation of Data



The electricity consumption for the Kirwan-Blanding Dormitory Complex has remained fairly constant since 1989, with the exception of a significant increase in the fiscal year of 1999-2000. For the 1998-1999 fiscal year, per student kWh consumption was 1919. In 1999-2000 this figure rose to 2232 and then fell to 1818 for the 2000-2001 fiscal year. We could not find any information to explain why electric consumption increased during 1999-2000 and then returned to the pre-peak levels. However, the data do suggest that in the last 12 years there has not been a systematic increase in electric consumption related to increased use of electric devices in dormitory rooms.

# Indicator #3

## Total & Per Person Cubic Feet of Water Consumption and Cost on UK's Main Campus

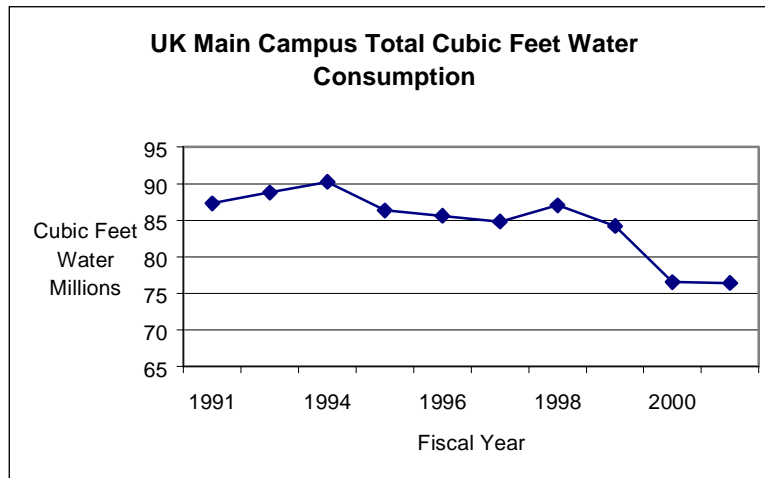
### Why measure water consumption and cost?

We examined cubic feet of water per person for reasons similar to those for electricity use. The amount of water used per person shows a general picture of how water is used on campus.

### Data

Data records for this indicator were readily available and the indicator could be successfully quantified within the time frame of the project.<sup>5</sup> The same methods and resources were used in determining per person cu. ft. of water consumption and cost.

### Interpretation of Data



The total cubic feet of water consumption for the main campus has decreased an average of 1.4% annually over the past ten years while the cost of the main campus water has increased on average 2.8% annually. Per person cubic feet of water consumption has been decreasing similarly to main campus, with an average per person decrease of 2.6%. The per person cost has been increasing 1.6% annually.

<sup>5</sup> All data on water use at UK was obtained from the UK Physical Plant Division (Jack Applegate & Bill Reesor, pers. comm. See Appendix B for contact information.)

## UK's Energy Management Strategies

The University recognized long ago that some level of energy management on their part would result in decreased consumption and increased savings. UK manages energy consumption and cost throughout campus through the Delta Room, the energy management nerve center consisting of sophisticated computer systems staffed by intensively trained controllers twenty-four hours a day, seven days a week.<sup>6</sup> As part of the Physical Plant Division, the operators in the Delta Room have three main goals: life safety, human/creature comfort, and energy management. Delta Room staff answer elevator emergency phone calls, monitor and adjust temperature controls, and monitor and adjust air circulation fans. The comfort range temperature UK tries to maintain is 68 and 76 degrees Fahrenheit, varying seasonally. Fifty to sixty buildings on UK's main campus are equipped with facility management controls.

Energy management strategies at UK include Optimum Start and Stop Scheduling (OSS), Night Cycling, Duty Cycling, Economizer Cycles, Direct Digital Control, and Alarm Alerts, among others. Optimal Start/Stop Scheduling is the scheduling of outdoor air circulation fans to open and close at the earliest or latest time, depending on if it is opening or closing, while maintaining comfort range temperature inside the building. By utilizing a computer program the technicians working in the Delta room are capable of determining the optimum start or stop time for the building's airflow fans. The computer program maintains a database of outside and inside air temperature relationships; with this information it is then able to calibrate the amount of time necessary to attain or maintain comfort range temperatures without fans being in operation. For example, if it is 67 degrees outside and 72 in a classroom the computer program will give the technician the amount of time the fans can be shut off prior to class ending without the classroom temperature exiting comfort range. Night Cycling is run in conjunction with OSS. The Night Cycle maintains the interior building temperature between 64 and 78 degrees Fahrenheit while unoccupied, allowing for a quick recovery of comfort range temperatures when the building is occupied again. Duty Cycling runs within the OSS, and is a work cycle for the temperature controls within a building. If the OSS is scheduled to operate in a building from 7am-5pm then the duty cycle will from 8am-4pm. The Duty Cycle allows for the fans to be off a designated amount of time within any given time period as long as comfort range temperatures are maintained. For example, duty cycles at the W.T. Young Library are often run on a 60-15, which means every 60 minutes, the fans will shut off for 15 minutes, while maintaining a comfort range temperature and adequate indoor air quality. Economizer Cycles is a seasonally based operation dealing with the air circulation fans. When the temperature outdoors increases to the point to where it is no longer cost effective to cool the air, the outdoor dampers are closed and the return air, which has already been cooled once, is cooled again, while maintaining indoor fresh air requirements. Direct Digital Control is programmed into the actual temperature-controlling device and if communication is dropped with the Delta Room, it can run by itself. If the temperature is out of comfort range or a fan fails to operate functionally an alarm will go off in the Delta Room to notify the operator of the problem so they can diagnose and repair it.

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<sup>6</sup> Galen Tolliver, UK Delta Room Supervisor, pers. comm. (3/8/03)

Intense energy management is not currently occurring in all of the buildings on UK's campus. As new buildings are built and older buildings remodeled, more and more of campus is coming online with the Delta Room.

The University of Kentucky currently has an energy consumption goal of 50 Mega watt of electricity peak per day. As the campus continues to grow with increased building construction this goal is becoming harder to maintain. In order to continue to meet this challenge the University must continue its commitment to energy management. As new buildings are constructed these innovative techniques may be the key to University of Kentucky's energy management.

### **What are other universities doing?**

Other universities across the country have created their own energy conservation methods and have achieved great success, making impressive commitments toward reducing energy and water used on their campuses.

The University of Michigan is one of UK's benchmark institutions. Since 1973, when the Arab oil embargo resulted in substantial increases in the cost of energy sources, the University of Michigan made a commitment to a policy of conserving electricity and fossil fuels.<sup>7</sup> According to the Energy Management Guide to Energy Conservation published by the University of Michigan, since the inception of their energy conservation policy in 1973, the University has saved an estimated \$78 million in energy costs. Their campus has grown by 68%, but their energy consumption has only increased by 34%. The University of Michigan has conserved energy through a variety of methods. Like UK, the University of Michigan has installed direct digital control technology to maintain closer control of heating and cooling functions, which in turn achieves greater efficiency. The University of Michigan currently has 77 buildings on campus equipped with direct digital control technology. All of their efforts have not been so technologically advanced. For instance, in 1986 the University of Michigan created the Steam Waste Attack Team, also referred to as SWAT. The mission of the SWAT team was to locate and replace defective components of the steam-piping network. The SWAT team has completed maintenance programs on an estimated 75% of the campus, resulting in an approximate cost savings of \$6.5 million. The University of Michigan has a website containing information on how people can reduce the resources they use on campus because they realize the vital role students, faculty, and staff play in conservation efforts.

Brown University began a water conservation program in 1991.<sup>8</sup> The first step they took was to retrofit all dormitory showerheads with low flow utilities; this resulted in a savings of 5.6 million gallons of water per year. In 1993, Brown University retrofitted all athletic facilities with water conserving showerheads. They are currently in the process of installing low flush toilets into all dormitories as well as improving cooling systems for

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<sup>7</sup> <http://www.energymanagement.umich.edu/utilities/energy-management/>

<sup>8</sup> [http://www.brown.edu/Departments/Brown\\_Is\\_Green/](http://www.brown.edu/Departments/Brown_Is_Green/)

laboratory equipment. A campus water audit found that once all the measures were complete the University could save approximately 120 million gallons of water a year resulting in a savings of \$300,000 per year.

## **Recommendations**

- Promote awareness about the use of resources on campus. For example, post electricity bills in relevant buildings.
- Designate a building conservation contact. This person can turn off unused lights and computers, and report to the building manager where electricity could be conserved.
- Develop and implement an energy management mission statement that guides all new policies and programs regarding energy use.
- Design new buildings in a way that minimizes their energy needs.
- Connect existing buildings to the Delta Room.
- Install low flush toilets. Low flush toilets use 1.6 gallons of water compared to the 3.5 gallons used by conventional models.
- Install low-flow showerheads. A standard showerhead uses 4.5 gallons of water per minute; with low-flow showerheads a family of four can save 20,000 gallons of water per year.
- Continue the use of native plant species in landscaping. Using indigenous plants can save more than 50% of the water needed to care for exotic plants.

# Procurement and Disposal

**Why Procurement and Disposal?** The University of Kentucky has an obligation to purchase environmentally friendly products because they will eventually have to be disposed of. How these products are purchased and disposed of is key to campus sustainability.

**Why are Procurement and Disposal Facets of Sustainability?** When members of the University community can reduce dependence on excess materials, reuse products to the fullest of their extent, and recycle waste materials, we minimize the impact to the environment and become more sustainable.

**Importance to the Broader Community.** The University of Kentucky has the ability to instill sustainable practices into the everyday lives of its students. By acting as a model of sustainability the University can change the habits of the students who will become the members of the broader global community.

# Indicator #4

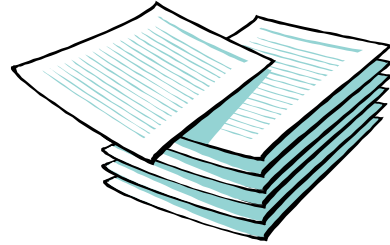
## Paper Consumption

### Why calculate university paper consumption?

Although computer databases are becoming more and more common, paper is still the most reliable way to keep track of permanent records and information.

The world needs paper to function and the University of Kentucky is a part of that world. One of the most important reasons that paper consumption should be a

concern to the University is economics. Paper costs money, and the more paper is used, the more the University pays both to acquire paper, and to recycle or dispose of used paper. The environment is another reason that paper consumption is important. Although paper is a renewable resource if managed properly, consumers today are beginning to realize that natural resources, including landfill space, are not unlimited, and that to make them last longer they must reduce the amount that they use. As a huge consumer of natural resources and an institution of higher education, the University has a responsibility to set the example for the community by reducing its consumption of paper and other resources.



### Data

The method chosen to measure paper consumption for this project was to determine the amount of paper purchased through the University Stores Department over a specific period of time. Although there are many paper products that are used daily, we chose to narrow this indicator to include only 8 ½” by 11” white copy paper because information was the most available, and it is the most commonly used. The University of Kentucky uses an incredible amount of paper each year. Paper purchased through the Stores Department is bought for \$2.84 per ream, and there are 500 sheets in one ream.<sup>9</sup> Over the past two years, UK has purchased approximately 429,928 reams of paper.<sup>10</sup>

### Interpretation of Data

The number above is assumed to be directly related to the amount of paper consumed by the University. To put this data in perspective, if the number of reams purchased over the past two years were divided by the number of students, faculty, and staff on campus<sup>11</sup>, on average each person used 4.77 reams of paper per year. This comes out to be 2,385 sheets of paper per person per year, not including other types of paper used, or paper purchased off campus. In 2002, the University used approximately 215,000 reams of paper at a cost of about \$610,000!

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<sup>9</sup> Rebecca Purcell, UK Purchasing Department, pers comm.

<sup>10</sup> Mark Renfro, UK Stores, pers. comm.

<sup>11</sup> 45,098 persons in Fall 2002, University of Kentucky Fact Booklet 2002-2003

In the past two years, the University as a whole has used about 214,964,000 sheets of copy paper. It is estimated that a 128 cubic foot piece of wood can produce about 90,000 sheets of paper. This means that if all paper purchased over the past two years contained no recycled content the University would have needed an average of 152,863 cubic feet of wood to meet its copy paper demands. If the typical annual wood productivity per acre for native temperate forests is 44 cubic feet<sup>12</sup>, then approximately 3,474 acres of forest would be required to produce this much paper.

Fortunately, copy paper purchased through UK Stores is not virgin paper. State statute requires that all paper purchased have at least 30% recycled/post-consumer content.<sup>13</sup> This reduces the amount of forest required to supply UK's paper needs to 2,432 acres, but this is still a substantial amount of land.

The data collected is only a fraction of UK's total paper consumption. There are many other paper products used for which information was unavailable, and not all paper is purchased through UK Stores. In some instances the University has contracts with office supply vendors where staff members can get paper, and paper purchased by students in support of course work is not included.

### **What are other universities doing?**

While UK has made progress by purchasing paper with 30% recycled content, we are still behind many other campuses. The State University of New York at Buffalo requires that paper purchased have a recycled content of 60%. The University of Michigan Purchasing and M-Stores Departments support a concept known as "Green Purchasing." These departments have made paper up to 100% recycled available for distribution on campus, but UK has only the minimum of 30% unless a higher amount is specifically requested.

If campuses increase the amount of recycled content in paper purchases, they will be supporting markets for recycled paper. Currently, it can often be more expensive to recycle than to landfill waste. If more recycled products, or paper with higher percentages of recycled content are purchased, then more recycled paper is needed, causing the cost to recycle to decrease.

Pennsylvania State University provided a study that showed that if people on campus reduced the margin size of word-processed documents from the default settings to ¾ inch on all sides, they could save over \$120,000. They are encouraging campus members to make this change.<sup>14</sup>

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<sup>12</sup> Wackernagel, 1994

<sup>13</sup> Rebecca Purcell, UK Purchasing Department, pers. comm.

<sup>14</sup> Penn State University Green Destiny Council <http://www.bio.psu.edu/greendestiny/publications.shtml>

## **Goals**

The short-term goals for the University should be to reduce the amount of paper that it consumes, and increase the amount of recycled content required in paper purchased by the University community. We feel that these goals could easily be achieved by following the recommendations below.

## **Recommendations**

Reduce paper use: The University could facilitate reduced paper use by providing copiers and printers throughout the University that are capable of producing double-sided documents. We believe that this will cause a “trickle-down” effect in paper use. Departments could set paper purchasing limits for faculty and staff giving them an incentive to use paper in a more efficient manner. Professors in turn could then require students to use both sides of paper when turning in assignments. Like Penn State University, UK could also save a lot of money and paper by encouraging the reduction of margin size from the default settings. These steps would cause a tremendous reduction in the amount of paper used and could save the University thousands of dollars annually.

Increase recycled content in paper: Although the state mandates 30% recycled content in paper, the University could raise this standard. The University could also require that all paper be purchased through the UK Stores department. This would ensure that all paper meets the requirements and it would also help track amounts of paper purchased. As an alternative, UK could require contract vendors to supply only products meeting the requirements to UK staff and faculty. Increased costs associated with the purchase of paper with high recycled content could be offset by savings realized through a reduction in overall paper consumption.

# Indicator #5

## Waste Materials Management

### Why recycle?

We should recycle because it diverts materials that would otherwise be landfilled to places where the materials can be reused. Most material that is thrown in the garbage can and not in the recycling bin is taken to a landfill. The problem with landfills is that the United States is beginning to run out of places to put them, they emit dangerous gases that are harmful to the atmosphere, and once a landfill is in place, the materials in that landfill stay there for very long periods of time.<sup>15</sup> When materials are recycled they are diverted from landfills and the materials that the products are made from are then used to make more products without the need for virgin materials. Using recycled materials instead of virgin materials is very important because it conserves the virgin materials, the processes that extract virgin materials can create more hazardous pollution than recycling, and it lessens the need for landfill space. Six ounces of gasoline can be saved by recycling one aluminum can instead of manufacturing a new one from virgin materials, seventeen thirty-foot trees can be saved from cutting simply by recycling one ton of paper, and a color television can run for four hours from the energy saved by recycling one glass bottle.<sup>16</sup>

### Data

Waste materials management is measured by determining how much of the total waste discarded is recycled or composted. The amount UK recycles can be traced from year to year to see if the University is increasing, decreasing, or keeping the amount of materials recycled or composted the same. The percent of waste recycled can easily be compared to other universities to see if UK is doing a comparable job or if it needs to do more.

Several recycling efforts have been in effect at the University of Kentucky since the 1970s, but weren't combined into a single program until 1995, when Occupational Safety and Health incorporated recycling efforts into their program. The program was moved to the Physical Plant Division (PPD) in July of 1997, where it is currently supervised by Tom Gregory.<sup>17</sup>

### Interpretation of Data

Since the inception of the recycling program into PPD in 1997, the amount of waste recycled and composted at UK has risen from 13% of total waste in 1997-1998 fiscal year to 17% of total waste in the 2001-2002 fiscal year. This is a 4% increase in the rate of recycling each year over the past five years.<sup>18</sup>

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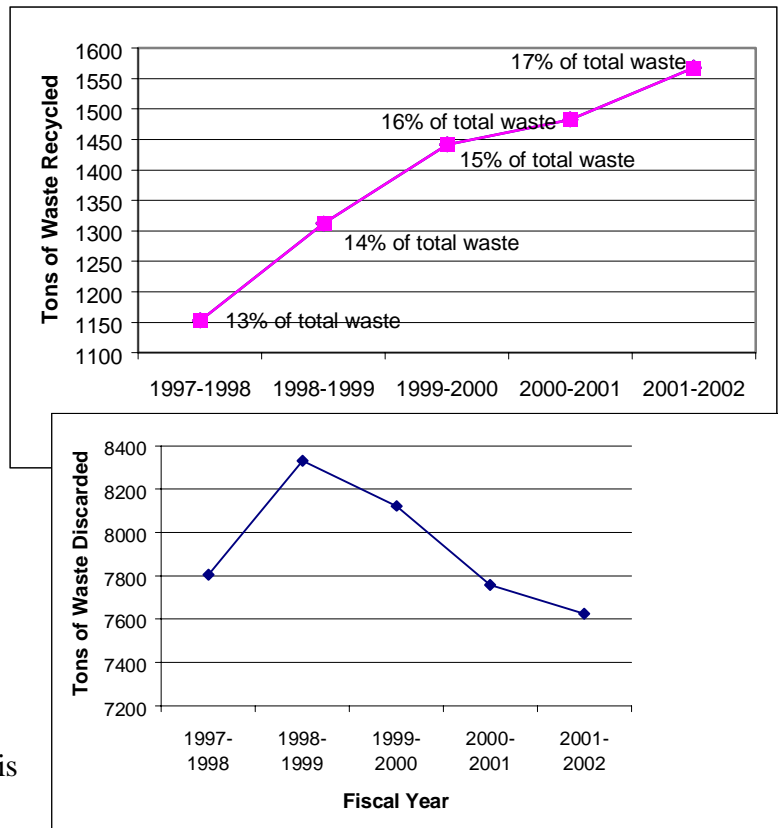
<sup>15</sup> How Stuff Works <http://people.howstuffworks.com/landfill7.htm>

<sup>16</sup> The Campus and Environmental Responsibility. Editors: David J. Eagan and David W. Orr

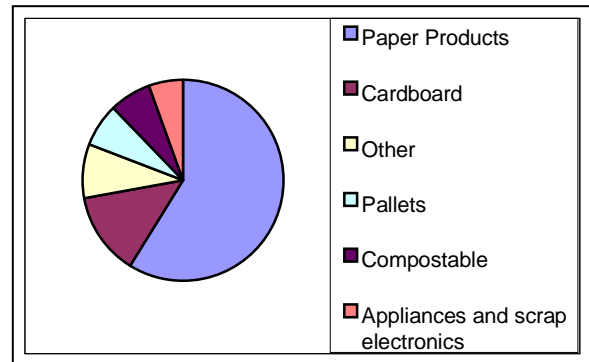
<sup>17</sup> University of Kentucky Recycling Office [www.ppd.uky.edu/recycle/article1.htm](http://www.ppd.uky.edu/recycle/article1.htm)

<sup>18</sup> University of Kentucky Recycling office <http://www.ppd.uky.edu/recycle.htm>

Since 1997, the amount of waste discarded has decreased. In the 1997-1998 fiscal year there were approximately 7,800 tons of waste discarded; however over the past five years the total tonnage of waste discarded has decreased to just over 7,600 tons of waste, a decrease of almost 200 tons of waste.<sup>19</sup> There is a spike in the amount of waste discarded in the 1998-1999 fiscal year. This spike is likely due to a budget excess where there was more money available for purchases, therefore more waste may have been created. There was also a sharp decline in the amount of waste discarded from the 1999-2000 fiscal year to the 2000-2001 fiscal year. This was also probably due to a budget shortage so not as many materials were purchased and not as many materials had to be discarded.<sup>20</sup>



The UK’s Recycling Program recycles much more than just copy paper and aluminum cans. Paper is the largest component of the total materials recycled. Included in the “Paper” category are mixed office paper, confidential and shredded paper, excess Kentucky Kernel newspapers, and paper collected from student operations. The “other” category on the chart to the right represents a small percentage of total materials recycled and consists of plastics, greases, oils, antifreezes, fluorescent bulbs, wet and dry batteries, glass, wood products, and scrap metals including aluminum cans. The “Compostable” category consists of leaves, wood chips, sawdust, and grass clippings that are left on the ground. Since grass clippings are not landfilled they are considered compost.

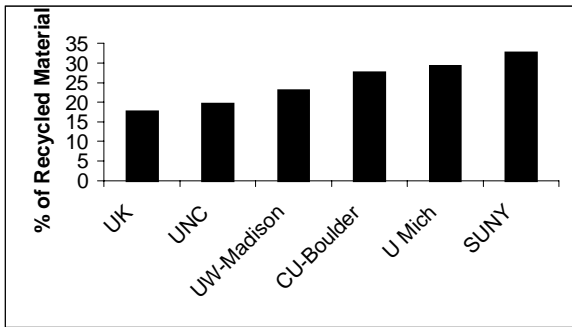


**What are other universities doing?**

We compared UK to five other universities in terms of percentage of waste that is recycled and the content of post-consumer material required in copy paper.

<sup>19</sup> University of Kentucky Recycling office <http://www.ppd.uky.edu/recycle.htm>  
<sup>20</sup> Tom Gregory, UK Recycling Coordinator, pers comm

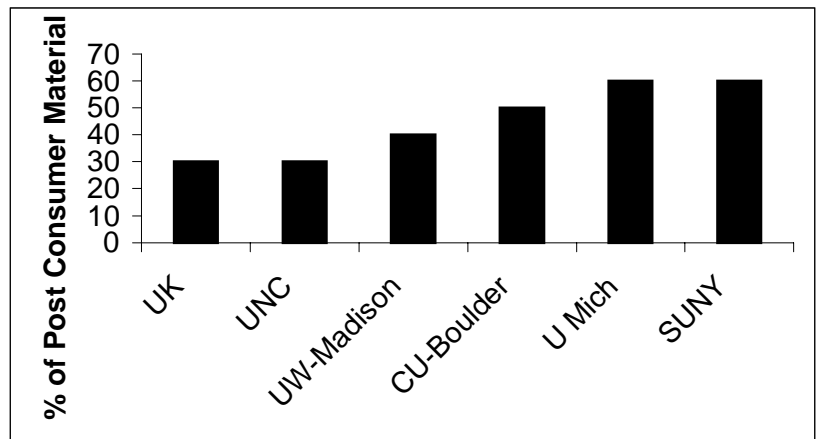
**% of Recycled Material in Waste Stream<sup>21</sup>**



The graph on the left compares UK's recycling efforts to that of other universities. The University of North Carolina, University of Wisconsin, University of Colorado-Boulder, University of Michigan, and the State University of New York at Buffalo all recycle a larger percentage of their total waste than UK. At this point UK is

behind the other institutions listed. However, if UK continues with its current waste reduction programs or increases them it will be possible to be comparable to the other universities in the next few years.

**Post Consumer Content of Copy Paper<sup>22</sup>**



The amount of post consumer material in the copy paper purchased for select schools is shown in the graph to the right. The Kentucky State Government mandates that all public institutions have a minimum of 30% post consumer recycled material in paper purchased. UK is almost equivalent to a few other universities but it is not enough to simply be equal. UK should strive to surpass other universities in an effort to become a leader, setting an example for other universities as well as for the Commonwealth.

## Goals

There are several goals that UK should strive to achieve to improve its waste materials management. These goals are to reduce the cost of recycling, improve the recycling program, educate students, faculty, and staff about recycling and composting, and promote the ResLife end of the year move-out program.

## Recommendations

- Reduce the cost of recycling: It costs UK \$84 to landfill one ton of waste. This amount includes a \$26.50 landfill fee and the cost to transport material from UK to the landfill.

<sup>21</sup> See Appendix C for source of data

<sup>22</sup> See Appendix C for source of data

It costs UK \$221.58 to recycle one ton of material including transportation fees and labor compensation<sup>23</sup>, almost three times the cost of landfilling. The cost of recycling to UK could be greatly reduced by selling the office paper collected, including shredded office paper, to the city recycling program for a profit instead of UK paying a company to dispose of the paper for them.<sup>24</sup>

- Improve the recycling program: UK is somewhat limited in the kinds of products that it can recycle. UK cannot recycle glass because of a liability issue. Yard waste that is created from grass clippings, leaf removal, and removal of other woody debris is composted but there is no composting of food from the campus cuisine areas. A solution to these problems would be to build a composting/recycling facility on campus. Instead of the University spending money to landfill glass and food products, it could save money in the long run by building a facility that could recycle and compost these materials.
- Educate about recycling and composting: An increased rate of recycling is dependent on the willingness of students, faculty, and staff to change their habits and take the extra step to make sure their waste products get recycled. Due to a lack of knowledge about the programs on campus, many students, faculty, and staff do not recycle. A solution to this would be for the University to broadly advertise recycling options on campus and to implement environmental programs and classes that teach the importance of not only recycling but being more aware of sustainability issues in all aspects of our lives.
- Promote ResLife end of the year move-out: This is a program that should be promoted much more than it is. At the end of the Fall 2001 semester, ResLife collected over 500 pounds of clothing and 85 pounds of books for donation from student donations. In the Spring 2002 move-out, ResLife collected 1,667.5 pounds of clothes, 634.5 pounds of food, 189 pound of appliances, 144 pounds of school supplies, 95 books, 1,686 plastic bags, 283 batteries, and 46 ink jet cartridges that were eventually reused or recycled, and therefore diverted from landfills and used by people in need<sup>25</sup>. For the 2003 move-out, UK Reslife has teamed up with Habitat for Humanity as the recipient of student donations.

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<sup>23</sup> Tom Gregory, UK Recycling Coordinator, pers comm

<sup>24</sup> John Vitale Lexington-Fayette Urban Country Government Recycling Center, pers comm

<sup>25</sup> UK Reslife Recycling 2001-2002 Annual Report

# Transportation

**Why Transportation?** In the United States the process of getting from point A to point B has not changed much in the past 50 years. The automobile continues to be the primary mode of transportation. America has often used the automobile as a symbol of status. In the 1950s and 1960s the two-car garage was considered a sign of affluence. Getting your driver's license is a right of passage and just about everyone who is old enough to drive a car does so. Driving a car in the United States seems to have changed from being a privilege to an assumed right. According to the Department of Transportation this privilege now accounts for approximately 1888.5 million metric tons of carbon dioxide alone<sup>26</sup>. In 1998 carbon emissions from transportation surpassed the carbon emissions from industry<sup>27</sup>.

**Why is Transportation a Facet of Sustainability?** Transportation on UK's campus affects our lives in many ways. It affects the quality of life, our personal decisions, safety, aesthetics and walkability on campus. Exploring the effects of the transportation industry reveals many impacts that affect sustainability.

**Importance to the Broader Community.** Everyone directly or indirectly contributes to environmental harm associated with transportation. Oil used for the transportation sector accounts for 2/3 of the oil used in the US<sup>28</sup>. Gasoline production alone accounts for 40% of oil used in the United States. Transportation choices affect the quality of life of the broader community.

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<sup>26</sup>United States Department of Transportation, Bureau of Transportation Statistics  
[http://www.bts.gov/transu/indicators/Environment/html/US\\_Carbon\\_Dioxide\\_Emissions.html](http://www.bts.gov/transu/indicators/Environment/html/US_Carbon_Dioxide_Emissions.html)

<sup>27</sup>United States Department of Transportation, Bureau of Transportation Statistics  
[http://www.bts.gov/transu/indicators/Environment/html/US\\_Carbon\\_Dioxide\\_Emissions.html](http://www.bts.gov/transu/indicators/Environment/html/US_Carbon_Dioxide_Emissions.html)

<sup>28</sup>United States Department of Energy <http://www.eia.doe.gov/emeu/aer/eh/frame.html>

# Indicator #6

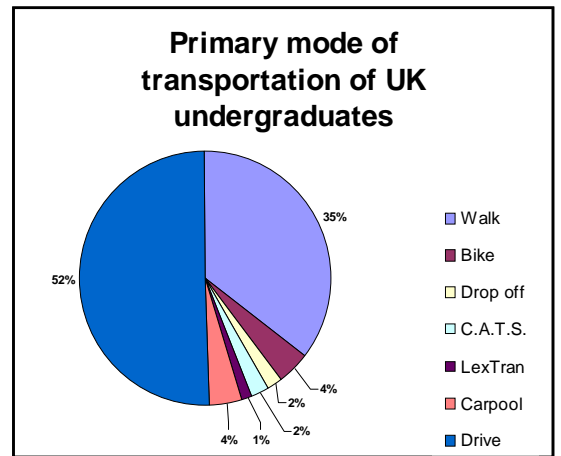
## Transportation Decisions of Undergraduates at UK

### Why are the transportation habits of students important to UK campus?

We designed a survey to capture the transportation decisions of UK and LCC students. The survey was administered to a random sample of UK and LCC full-time undergraduates. The goal of the survey was to find primary and alternative modes of transportation that students use to get to and from campus.

### Data and Interpretation

A survey of this nature facilitates an understanding of student’s knowledge of and usage of alternative modes of transportation. The survey of 139 UK undergraduate students revealed that 52% of students drive to campus, 35% walk, 4% bike to campus, and 2% use the C.A.T.S. university bus system as their primary mode of transportation. Seventeen percent of students said they take C.A.T.S. bus occasionally. Thirty three percent of students surveyed live on campus and account for most of the 35% who reported “walking” as their primary mode of transportation.



# Indicator #7

## Traffic Flow Analysis

### Why Traffic Flow Analysis?

Campus traffic not only impacts the campus community but the Lexington community as well. Locations of new parking structures and additional bike lanes will affect traffic flow in and around campus. Before these endeavors are undertaken, traffic flow patterns should be studied.

### Data and Interpretation

The graph on the right shows that traffic flow peaks at UK campus (orange line) then decreases as you move away from campus (pink line), indicating more cars are coming to campus.



# Indicator #8

## Parking Space per Student Ratio

### Why Parking Space per Student Ratio?

A high parking space to student ratio is an indicator of the importance UK places on personal automobiles. If this ratio stays constant overtime or increases, promoting alternative transportation will not be as successful. More cars on campus decreases the quality of life for students and can make alternative modes of transportation, such as walking and biking, less safe. Currently UK has a high ratio of .72, which is roughly ¾ a space per student this parking availability encourages automobile traffic on campus.

### Data/Interpretations

Parking Space Per Student Ratio<sup>29</sup>

Campus	Location	Ratio Parking Spaces/Student
North Carolina State University	Raleigh, NC	0.50
Ohio State University	Columbus, OH	0.37
Pennsylvania State University	University Park, PA	0.39
University of Arizona	Tucson, AZ	0.31
University of California, Los Angeles	Los Angeles, CA	0.60
University of Georgia	Athens, GA	0.62
University of Illinois at Urbana-Champaign	Urbana-Champaign, IL	0.43
<b>University of Kentucky</b>	<b>Lexington, KY</b>	<b>0.72</b>
University of MD, College Park	College Park, MD	0.56
University of Michigan	Ann Arbor, MI	0.59
University of North Carolina	Chapel Hill, NC	0.67
University of Texas at Austin	Austin, TX	0.27
University of Virginia	Charlottesville, VA	0.76
University of Washington	Seattle, WA	0.32
University of Wisconsin at Madison	Madison, WI	0.29

Compared to its benchmarks and several other comparable universities, UK has a very high ratio of parking spaces/student. The high availability coupled with the relatively low cost of parking on campus serves essentially as an incentive to students to drive to campus.

### Goal

The University of Kentucky should reduce student dependency on private automobiles as a primary mode of transportation to get to campus.

### Recommendations

Most students (98%) were aware of the Lextran ride-free program; clearly, the advertising campaign has been effective, but without resulting in high levels of ridership. Future advertisements of the ride free program should include the information on the stops and

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<sup>29</sup>2002 UK Master Plan

routes around UK's campus and into outlying neighborhoods. Incentives for LexTran riders would probably aid in increased riders of the city bus system.

A survey of all students, faculty, and staff would be beneficial in understanding the transportation habits of the campus community. This would facilitate long-term decisions regarding development and improvement of alternative transportation on campus.

In developing their Masterplan, it is essential for UK to work with the LFUCG Division of Planning and Transportation.

- UK needs to work with LexTran to encourage participation of the ride free program beyond advertising.
- Encourage the UK population to live and work in close proximity to campus.
- Increase incentives to encourage carpooling (monetary incentives).
- Promote alternative transportation modes, (increase walkability and add bicycle lanes as Masterplan 2002 indicates).

# Land Use

**Why Land Use?** Poor planning and urban sprawl continues to occur in Fayette County and across the U.S. leading to the destruction of landscapes and wildlife habitat, and increasing pollution of natural areas. It becomes increasingly important to be smart planners and wise stewards of the land. As populations increase, so do the boundaries of towns, cities, and villages. Farmland continues to be sold for development, as landowners look for quick profits. Improper land management continues to result in over development and loss of plant life and biodiversity.

**Why is Land Use a Facet of Sustainability?** The University of Kentucky campus began as 3 buildings on 50 acres; campus now consists of 841.6 acres and 278 buildings. Greenspace provides a more enjoyable landscape and with proper land management, can save money and lead to reductions in environmental degradation. By practicing proper land stewardship the University of Kentucky can maximize the potential of its land.

**Importance of land to the broader community.** The University of Kentucky owns and operates 15 farms, forests, and research stations in 14 counties across the state. By making smart choices in managing its land, the University of Kentucky can set an example for others to follow. It is important for landmark universities to make choices that are both economically and ecologically sound. Other universities look to UK as a model will see the importance that UK places on proper land stewardship. By setting an example, UK could lead the community and nation to improved land management. If the University of Kentucky can practice proper land stewardship strategies on its land holdings then it will show others that it is possible to support a land ethic.

# Indicator #9

## Land Stewardship

### Why Examine Land Stewardship?

Land stewardship is important because it ensures that natural systems are maintained or enhanced for future generations. In order to act as effective stewards of the land, we must care for the system as a whole while understanding all of the interactions within it. In addition to resource conservation, it encourages the biological diversity of the landscape while developing the cultural and ethical values of the population.<sup>30</sup> Through proper land stewardship one can reciprocate our dependence on the earth by helping to improve and maintain its natural beauty and function.

### Land Stewardship at the University of Kentucky

Undeveloped land on campus is sometimes considered to be unproductive; however it remains a very important element in the fabric of campus.<sup>31</sup> The UK Arboretum utilizes 44 acres of land to demonstrate land stewardship practices, thus helping to develop a stewardship network through educating the local population. These four principles of stewardship, as outlined by Jim Lempke, Curator of Natural Areas, illustrate the procedures for land management:

- Use native species in their home range to highlight their benefits, such as aesthetics, functionality, and hardiness in our climate.
- Encourage involvement of local gardeners and stewards through volunteer efforts and receiving input from the local community.
- Focus on the proper utilization of species composition and structural integrity to stress the complexities and interactions between species.
- Incorporate natural processes such as ice storms, wind throw, and herbivory to help maintain the natural processes that have shaped our current landscape.

Jim Lempke has been instrumental in the implementation of these fundamentals into the operation and development of the UK Arboretum. Lempke's work at the Arboretum on the removal of invasive species, specifically bush honeysuckle (*Lonicera maackii*) and wintercreeper (*Euonymus fortunei*), and his experimentation to better understand the ecological processes behind them have implications for campus and beyond. The threat that Kentucky faces from exotic species requires more research in order to develop effective management strategies for affected areas. As concern over biological pollution increases, other land managers throughout the region may look to these land management procedures.<sup>32</sup>

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<sup>30</sup> Land Stewardship Resource Center <http://www.landstewardship.org>

<sup>31</sup> University of Kentucky Physical Development Plan, August 20, 1991

<sup>32</sup> Jim Lempke, Curator of Natural Areas, University of Kentucky, pers comm

Robinson Forest is an example of a University of Kentucky landholding that offers numerous educational, research, and recreational benefits. It contains two reference watersheds that can be used to measure the integrity of other streams, and is one of the largest remaining blocks of mixed mesophytic deciduous forest in the eastern United States. Strip mining has greatly reduced the forested areas of Robinson Forest. The future status of Robinson Forest as a research and educational area is potentially at risk due to the presence of coal reserves and their monetary value to the University.

### **What are other universities doing?**

The University of Wisconsin's Arboretum has developed invasive species management solutions similar to our own. Farmland that has become fallow is often impacted by the rapid spread of aggressive exotic species that may displace natives. The University of Wisconsin is tackling this problem by increasing ecological knowledge of the problem, formulating economically viable solutions, and developing public support for these initiatives.<sup>33</sup> These guidelines are very similar to the procedures followed by Jim Lempke in his work at the University of Kentucky's Arboretum.

At the University of Tennessee, the Institute for Biological Invasions has been created to compile the multitude of research and data concerning the topic. This institute is comprised of professors and professionals whose research is related to exotic species and native plant propagation.<sup>34</sup>

A cooperative program between the University of Michigan and Michigan State University, known as the Michigan Sea Grant, is one of 29 sea grant programs nationwide. The goal of this program is to help individuals, local communities, coastal businesses, and state and local agencies to develop the resources of the Great Lakes region and practice good land stewardship. By integrating all facets of the community into the program, the Michigan Sea Grant is able to offer information and assistance to those who can use it.<sup>35</sup> Continued research through these and other institutions will prove to be very beneficial as the problems caused by exotic species continue to grow.

### **Goals**

- The University of Kentucky should demonstrate proper land stewardship in order to better educate the local and state population by facilitating ecologically sound land management throughout the state of Kentucky.
- Research on the effectiveness of various treatments on invasive species should be conducted. This is very important in the fight against the spread of exotic species.

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<sup>33</sup> Professor Paul Zedler, University of Wisconsin, *Deciding on Restoration and Management Outcomes: What Kind of Landscape Do We Want?* <http://www.ies.wisc.edu/emcl/cases/arboretum.htm>

<sup>34</sup> Institute for Biological Invasions, University of Tennessee <http://invasions.bio.utk.edu>

<sup>35</sup> Michigan Sea Grant <http://www.miseagrant.org/>

- Focus should be placed on the renewable resources associated with the landholdings of the University of Kentucky. Resources such as education and research need to be preserved while placing less emphasis upon non-renewable resources such as coal.

## **Recommendations**

Based on current research initiatives concerning land stewardship at other universities, the University of Kentucky needs to continue to fund sustainable projects and incorporate courses concerning land stewardship into the University Studies requirements. As more of the student population becomes familiar with these concepts, this knowledge will be dispersed into the Commonwealth, thus helping to ensure land stewardship throughout the state.

# **Indicator #10**

## **Open Space**

### **Why calculate open space?**

As land in the central campus region of the University becomes increasingly valuable due to the encroachment of neighborhoods, businesses, and other facilities, the need for the University to retain open space becomes increasingly important. In order to maintain a healthy campus environment and provide for the social and recreational needs of the students, a University must contain a combination of both buildings and open space.

**Open Space accounts for  
73.8 (8.7%) acres of  
Central Campus.**

Impervious surfaces such as roads, buildings, and parking lots are impenetrable to water, thus making these surfaces conduits for urban runoff. During and after a precipitation event, water runs across these surfaces carrying off pollutants such as oil and gasoline to storm drains, where the polluted water is deposited in the local streams and rivers.

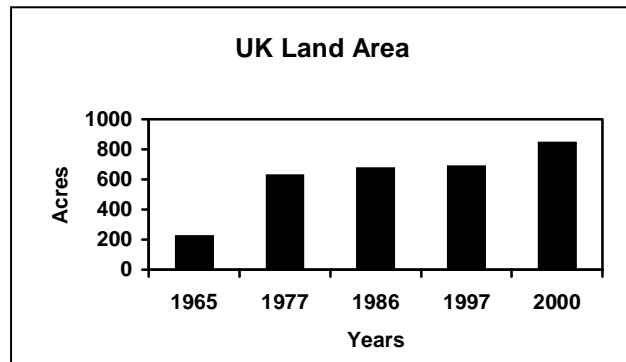
By having soil and vegetation integrated into the campus environment, these areas allow for water to penetrate into the ground. Soil, vegetation, and other constituents of the subsurface act as filters for the precipitation where the water percolates slowly through the ground, is purified to some degree, and eventually ends up in the groundwater system.

### **Data and Interpretation**

The University of Kentucky's Central Campus contains approximately 841.6 acres bounded primarily between Cooper Dr. on the south, Limestone St. on the west, Euclid Ave. on the north and Woodland Ave. on the east. The Central Campus is divided into fifteen land use zones, including 28.9 acres of open space and 44.9 acres at the UK Arboretum. The University defines open space as an area that is intended to be "park-like and utilized for casual, non-organized, outdoor activities." These zones are located in key

campus locations, including but not limited to, areas near University housing. Only about 73.8 acres (8.8%) of UK's Central Campus is open space, which includes what the University defines as open space and also the Arboretum.<sup>36</sup>

In 1965, UK's Central Campus consisted of a mere 223.5 acres<sup>37</sup> and has since grown to 625 acres in 1977<sup>38</sup>, 671 acres in 1986<sup>39</sup>, 684 acres in 1997<sup>40</sup>, and currently 841.6 acres. In association with the increasing trend of UK purchasing and developing land to accommodate the increasing number of students, an increase in parking lots and parking facilities has also occurred. In 1965, parking areas comprised 22.2 acres of campus with a proposed development plan to double-parking acreages because of the increase in students. Today, there are 115.7 acres (13.7% of Central Campus) of parking lots and parking structures across campus, an increase of over 400% in the last 35 years.



UK's 1965 Central Development Plan states an acre of land can hold approximately 100 cars, whereas an acre of parking structures can hold about 400 cars. Large, sprawling parking lots, such as those around Commonwealth Stadium and behind Memorial Coliseum, account for the largest parking acreages around campus. As impervious surfaces, these lots as well as others are large contributors to problems associated with urban runoff and urban flooding.

### Comparison to Other Campuses

In order to foster a healthy college community, universities integrate open space and commons areas with learning facilities to encourage the interaction of students and to promote healthy minds, bodies, and spirits. Many universities incorporate open space and greenways into development plans in order to meet the social and recreational needs of their students. At Stanford University, "2/3 of land is essentially open space and will remain so under the new proposed General Use Plan (GUP)."<sup>41</sup> At Ohio State University, "approximately 362 acres of open space in the West Campus will be preserved as part of the 'Green Reserve' that will knit together a wide array of critical open lands throughout the University as a whole."<sup>42</sup> The University of Florida has a similar plan to integrate the City, University, and the County with "greenway links" that will be designed to promote regional pedestrian and bicycle circulation.<sup>43</sup> At the University of Vermont, "the planning

<sup>36</sup> Capital Request. 2000-2002.

<sup>37</sup> UK Central Campus Development Plan. Sept. 1965. Crane & Gorwic Associates.

<sup>38</sup> UK Fact Book. Sept. 1977.

<sup>39</sup> UK Fact Book. October 1986.

<sup>40</sup> UK Fact Book. January 1997.

<sup>41</sup> Stanford University Open Space <http://gup.stanford.edu/openspace/>

<sup>42</sup> Ohio State University Master Plan <http://www.fpd.ohio-state.edu/mp/regional/wcampus.html>

<sup>43</sup> University of Florida Master Plan <http://www.masterplan.ufl.edu/2000-2010/pdf/08-recreation.pdf>

of any new buildings or additions on the campus must include consideration of its site and its impact on its open space and other open spaces of the University.”<sup>44</sup>

UK has similar goals in its new draft Master Plan; calling for creating sustainable patterns of growth. This includes developing greenways in conjunction with the City, extending natural amenities into North Campus, utilization of natural methods of storm water management, and decreasing reliance on automobiles.

## **Goals**

The University should:

- Limit the amount of space taken up in parking lots by 25%.
- Increase the amount of open space and vegetated areas from 8.7% to 10%.

## **Recommendations**

- Build parking structures instead of lots when addressing parking issues. You can get up to 400 cars/acre in parking structures as opposed to only 100 cars/acre in parking lots.
- Retain existing open spaces in Central Campus.
- Integrate more trees, vegetation, and scenic areas into development plans. Not only do trees help mitigate air pollution, planting trees around buildings also provides shade and can reduce energy costs.
- Limit the number of cars on campus by improving and promoting public transportation.

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<sup>44</sup> University of Vermont Master Plan <http://www.uvm.edu/~plan/masterplan/topics/G3openspace.html>

# Education

**Why Education?** The University of Kentucky is an institution of higher learning and therefore has a responsibility to educate its students in a broad range of disciplines. An emphasis on ecological literacy of all members of the University community is the first step toward building a sustainable future for the campus. As a land grant university, UK has the responsibility to lead the state in a global shift to more sustainable living, providing a model for sustainable practices on a larger scale.

**Why is Education a Facet of Sustainability?** Education is the key to raising awareness of the importance of sustainability. With an understanding of the effects of human interaction on environmental systems individuals can begin to change their resource use decisions and become better stewards of the environment.

**Importance to the Broader Community.** Knowledge is power. Even with a very broad understanding of sustainability and its importance to our planet, the UK campus community can begin to affect change in its own resource use. Ecologically literate graduates of UK can become leaders of sustainability in their own communities. By practicing sustainability, UK can set an example for its students, other universities, communities, and the nation.

# Indicator #11

## Student Ecological Literacy

### Why test ecological literacy?

Ecological literacy means having an understanding and a working knowledge of the basic principle organization of ecological communities and being able to embody them in the daily life of human communities.<sup>45</sup> With a 36 credit hour minimum in the liberal arts component of any degree program, the University of Kentucky is dedicated to educating students in a broad range of disciplines. UK uses the University Studies Program (USP) to “broaden (students) understanding of the world, of themselves, of their role in society, and of the ideals and aspirations which have motivated human thought and action throughout the ages.”<sup>46</sup> One of the most important roles in society for any individual is to be a good steward of the environment. The more ecologically literate graduates of the University of Kentucky are, the better environmental stewards they can become.



### Data

To measure the ecological literacy of University of Kentucky seniors, a telephone survey was conducted. The survey was modeled after a similar survey conducted at Pennsylvania State University, and consists of three basic components. Because the survey results are anonymous, two questions provided demographics for the survey population, nine questions were a test of basic ecological/environmental knowledge, and three questions were included to measure the students’ desire to become more educated in ecological/environmental issues as well as how the student would rate his/her own ecological literacy.

### Demographics

- 50 students were surveyed
- 68% of seniors surveyed were graduating in May 2003

### Test of Basic Ecological/Environmental Knowledge

1. 42% of UK seniors polled could name one federal or state law that protects the environment. Of those who answered correctly the Clean Air Act was the most common, correct response.

<sup>45</sup> Center for Ecoliteracy <http://www.ecoliteracy.org/pages/ecologicalit.html>

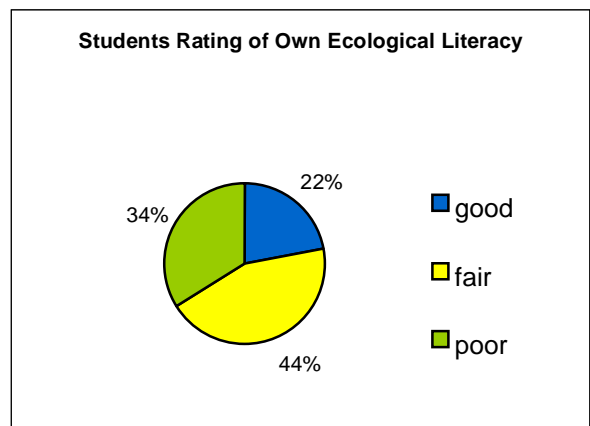
<sup>46</sup> University of Kentucky Undergraduate Bulletin 2002-2003 <http://www.uky.edu/Registrar/bull0203/front/bullusp.html#X>

2. 40% of UK seniors polled could name *two* greenhouse gases. 26% could name one and 34% could not name any. The most common response for all students asked was CO<sub>2</sub>.
3. 18% of students surveyed could identify the topic of Rachel Carson's book *Silent Spring*.
4. When asked to identify two native tree species found on UK's campus, 60% were correct in naming the genus, such as oak or maple, but not the species, such as bur oak or sugar maple.
5. Only 20% of students surveyed named the Bluegrass as the physiographic region in which Lexington, Kentucky is located.
6. 62% of seniors polled could identify a current pressing environmental issue in Kentucky; of these 48% named strip mining.
7. Only 12% of UK seniors surveyed knew the world's population to the nearest billion.
8. 50% of seniors surveyed could name coal as the primary fuel source UK uses to produce most of its electricity and heat.
9. 18% of seniors surveyed could correctly pick all materials approved for recycling on UK's campus from a list provided for them.



### Education and Desire to Learn More

- Only 22% of seniors polled have taken a course that focused on environmental sustainability or other environmental issues.
- 74% of UK seniors surveyed said they would be interested in having an environmental course incorporated into the University Studies Program.
- When asked to rate their own ecological literacy seniors surveyed responded:
  - 34% poor
  - 44% fair
  - 22% good
  - 0% excellent



### **Interpretation of Data**

The survey questions indicate some aspect of ecological literacy. Students who are up to date on current events should be able to easily answer the questions correctly. Students at UK did not perform well on this test of basic ecological literacy.

## Comparison to other Campuses

### University of Illinois at Urbana-Champaign

The General Education Requirements at the University of Illinois at Urbana-Champaign, a UK benchmark, are similar to those required by the University of Kentucky USP.<sup>47</sup> Students are given the choice of several environmental/ecological courses within both the Natural Science and Social/Behavioral Science requirements.

#### *Each Fulfills 3 Hours in Natural Sciences*

- Environmental Biology
- Plants, Environment, and Man
- Introduction to Environmental Factors in Design
- People in the Changing Earth System
- Climate and Global Change

#### *Each Fulfills 3 Hours in Social/Behavioral Sciences*

- Economics of the Environment
- Conservation of Natural Resources
- Contemporary Social and Environmental Problems
- Nature, Society, and Democracy

### University of Georgia

The University of Georgia, another benchmark of UK and signer of the Talloires Declaration, has an ecological literacy requirement for all graduates.<sup>48</sup> The requirement has been in place since 1993. It can be fulfilled by taking one of over 70 approved courses. These courses include everything from Coastal Processes and Conservation to Environmental Ethics, and Resource Economics, covering both theory and practical application.

## Goal

One of the goals of the University Studies Program is to “help students to develop their own sense of values, to pursue their own goals, and to contribute to the political, moral, social, and cultural enrichment of society.”<sup>49</sup> We believe that ecological literacy and environmental stewardship are key pieces of the USP puzzle, and without them the goals of the USP cannot be achieved. In order to achieve campus sustainability, a goal of minimum ecological literacy for all University of Kentucky graduates is absolutely necessary, as well as achievable.

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<sup>47</sup> University of Illinois at Urbana-Champaign General Education Requirements <http://www.provost.uiuc.edu/gened/index.html>

<sup>48</sup> University of Georgia Bulletin <http://bulletin.uga.edu/bulletin/prg/index.html>

<sup>49</sup> University of Kentucky Undergraduate Bulletin 2002-2003 <http://www.uky.edu/Registrar/bull0203/front/bullusp.html#X>

## **Recommendations**

Our preferred recommendation is to incorporate an ecological literacy requirement into the University Studies Program. As an interim solution, we suggest that more environmentally/ecologically-based courses be added to the list of courses already existing in the USP. Lastly we suggest creating a complete list of environmentally/ecologically-based courses to be added to the University Bulletin so that they are readily available to students who are interested.

## Conclusion

The overall intent of our project is not to persuade the UK community to make all the changes necessary in policy and practice to achieve complete sustainability on campus. Rather, by infusing the idea into the minds of the students, staff, faculty, and administrators, we hope to plant a seed of sustainability at UK that will grow as the community makes changes in their decisions about resource consumption and management. UK can become a leader among universities in campus sustainability. We are confident that we, as a community, can live our lives in a more sustainable fashion. Although complete sustainability on UK's campus will not be achieved in the foreseeable future, the initiative should not be considered a failure. By making progress toward sustainability, UK will be one of the success stories among our Nation's institutions of higher education.

North Carolina State University, one of UK's benchmark universities, has set the bar by which to measure sustainability initiatives at UK. The North Carolina State University Environmental Sustainability Task Force, consisting of appointed members as well as participants and physical environment representatives, is only one of the measures NC State has taken in addressing its responsibility to the environment. NC State has publicly declared its commitment to the environment through its educational mission, as well as using and managing its physical environment in a way that leads toward sustainability. A set of guiding principles outlines their commitment. By encouraging and providing support for environmentally focused undergraduate and graduate programs, and by providing new ideas and technologies to "society including business, industry, and agriculture"<sup>50</sup> that will help them put sustainable methods into practice, NC State has outlined how they are using their educational mission to promote sustainability.

At Harvard University, the Harvard Green Campus Initiative is a university-sanctioned committee that has implemented a number of programs with a collective goal of engaging the community to analyze their "current practices of resource consumption and pollution production."<sup>51</sup> A number of their programs involve community interaction, communication, and participation. The way Harvard University can carry out these projects is by having an established department that is formally recognized by the administration and the campus community whose primary mission is to deal with environmental issues on their campus.

The following projects are in progress at Harvard University:

- Best Practice Exchange: a medium for the University community to share environmental projects and how well the projects are working with each other.
- Green Campus Loan Fund (GCLF): a 3-5 million dollar interest-free revolving loan fund established through contributions from the Offices of the President and

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<sup>50</sup> North Carolina State University Campus Environmental Sustainability Web Site [http://www.ncsu.edu/ncsu/environmental\\_sustainability/principles.html](http://www.ncsu.edu/ncsu/environmental_sustainability/principles.html)

<sup>51</sup> Harvard Green Campus Initiative <http://www.Greencampus.harvard.edu>

Provost aimed at financing environmentally and economically beneficial programs within the University. The GCLF was developed after the ending of the Resource Conservation Incentive Program (RCIP), another interest-free revolving loan program at the University. Reducing CO<sub>2</sub> by 8.8 million pounds and water consumption by 47 million gallons annually are examples of the economical and ecological advantages gained through the RCIP.

- Student Internship Program: partially funded through the Green Campus Loan Fund, this program coordinates sponsors, identifies focus areas, and develops work plans for projects that “have a conservation value and a payback period of less than five years.”<sup>52</sup>

Campus sustainability initiatives are in place across the country at many of the Nation’s university and college campuses. The involvement of students, staff, and faculty is imperative to the success of sustainability programs because they create a large part of the demand for resources on campus. The initiative has begun at UK, and there is a lot of potential to learn from the experiences of other institutions.

## **Routes to Success**

There are several steps the University of Kentucky can take immediately to initiate forward progress toward increased campus sustainability. UK has already taken steps towards sustainability on campus and there is great potential. Other campuses have instigated campus sustainability by recognizing an official Task Force and signing the Talloires Declaration.

### **Official Recognition of Sustainability Task Force**

A task force should consist of students, faculty, staff, administrators, and professionals from the community, working toward a common goal. The goal of this interdisciplinary committee should be to serve the University of Kentucky community in establishing and enforcing resource conservation initiatives and measuring the success of ecological indicators overtime, while researching innovative ways to implement the multiple aspects of campus sustainability.

Currently, there is a group of students, faculty and staff who met for the first time in November 2002 to discuss campus sustainability initiatives at UK. The next step is for UK administrators to officially recognize the existing group, expand the breadth of membership to grant authority to implement conservation efforts agreed upon by the Task Force and University Administration.

Pennsylvania State University, North Carolina State University, Harvard University, and Brown University each have a Sustainability Task Force that facilitates their initiatives. The web addresses of these University’s endeavors are below.

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<sup>52</sup> Harvard Green Campus Loan Program <http://www.Greencampus.harvard.edu>

- Pennsylvania State University: <http://www.bio.psu.edu/greendestiny/index.shtml>
- North Carolina State University: [http://www.ncsu.edu/environmental\\_sustainability](http://www.ncsu.edu/environmental_sustainability)
- Harvard University: <http://www.greencampus.harvard.edu/>
- Brown University: [http://www.brown.edu/Departments/Brown\\_Is\\_Green/](http://www.brown.edu/Departments/Brown_Is_Green/)

## **Conservation Officers**

Recently, in the midst of a budget crisis, UK President Lee Todd initiated a voluntary de-lamping practice in University buildings to conserve energy. Even though the President encouraged the conservation of energy not everyone at UK participated. Conservation Officers would put into action the set parameters the Sustainability Task Force and Administrators agree upon. When President Todd calls upon the campus for voluntarily de-lamping, Conservation Officers will have the responsibility to enforce such resource conserving actions.

Conservation Officers should not be a heavy handed disciplinary authority, but rather regulatory figures that seek out wasteful use of resources. Once wasteful uses of resources is recognized by the Task Force, the Conservation Officers shall be responsible for facilitating the wise use of resources by campus community. For example, initially the Conservation Officers may enact a policy of turning off computers that are inactive for a certain length of time. Another consideration is the illumination of buildings during unoccupied hours. It may be advisable for some buildings to turn off lighting at night, while other buildings, because of security, may only turn half the lights out. We recognize that these Officers could be integrated into existing building management positions within the Physical Plant Division to accomplish set parameters.

## **Talloires Declaration**

UK should consider signing the Talloires Declaration. The Talloires Declaration (TD) is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities.<sup>53</sup> Once a university has signed the agreement the university administrators agree to the following ten points of action:

- 1) Increase Awareness of Environmentally Sustainable Development
- 2) Create an Institutional Culture of Sustainability
- 3) Educate for Environmentally Responsible Citizenship
- 4) Foster Environmental Literacy For All
- 5) Practice Institutional Ecology
- 6) Involve All Stakeholders
- 7) Collaborate for Interdisciplinary Approaches
- 8) Enhance Capacity of Primary and Secondary Schools

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<sup>53</sup> Association of University Leaders for a Sustainable Future [http://www.ulsf.org/programs\\_talloires.html](http://www.ulsf.org/programs_talloires.html)

- 9) Broaden Service and Outreach Nationally and Internationally
- 10) Maintain the Movement

Many of UK's benchmark universities have signed the TD. Signing the declaration would be a great way for UK to stay competitive with our benchmarks.

The 2003-2006 Strategic Plan, *The Dream and the Challenge*, states specific goals for the University of Kentucky. Signing and initiating the Talloires Declaration could accomplish several of the following goals outlined in the Strategic plan: Discover, Share and Apply New Technologies (Goal IV) and Elevate the Quality of Life for Kentuckians (Goal V).<sup>54</sup> These goals do not only pertain to signing the TD but also recognizing the Campus Sustainability Initiative as a worthy endeavor for UK, Kentucky, and the world.

**UK benchmarks that  
have signed the  
Talloires Declaration**

University of Arizona  
University of Florida  
University of Georgia  
University of North Carolina  
Chapel Hill  
University of Virginia  
University of Wisconsin at  
Madison

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<sup>54</sup> University of Kentucky 2003-2006 Strategic Plan  
[http://www.uky.edu/Home/2003-06StrategicPlan/4-17-03\\_The\\_Dream\\_and\\_the\\_Challenge\\_Draft.pdf](http://www.uky.edu/Home/2003-06StrategicPlan/4-17-03_The_Dream_and_the_Challenge_Draft.pdf)