

SUSTAINABILITY AD HOC COMMITTEE REPORT

JULY 2007

AD HOC COMMITTEE MEMBERS

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INTRODUCTION

This past spring semester, an ad hoc committee (members listed above) met to review current sustainability activities at UNCW and to make recommendations for continued efforts. The committee had broad campus representation. The committee inventoried current activities underway at UNCW, reviewed best practices at several institutions, and formulated recommendations for future actions.

Sustainability is multi-faceted and touches many areas of campus. Generally, current activities are numerous, but lack coordination. There is a considerable volume of material in the media, and many websites are devoted to the topic. Many institutions have recognized the importance and the value of being good environmental stewards. For comparison, several institutions are included in this report. Committee members brought forward numerous recommendations from their perspective areas. However, several recommendations resonated throughout the committee and are presented as priorities.

CURRENT ACTIVITIES

History at UNCW

UNCW has initiated a number of activities, particularly since the 1980s, which fall within the parameters of what could be labeled *sustainability*. These initiatives include:

- **Energy Conservation** in the late 1980s through the early 1990s, when stickers were applied to light switches throughout the campus, encouraging faculty, staff and students to turn out the lights when leaving an office, meeting room or classroom; locking thermostats at 70 degrees during the winter months and 75 degrees during the summer; UNCW produced a Strategic Energy Plan in August 2003; UNCW also has a Conservation Awareness Team.
- **Gasoline Conservation** in the early 2000s, when the state mandated that all state vehicles use only state-operated gasoline pumping stations; during the mid 2000s, the state later severely limited travel both in- and out-of-state in response to Gulf pipeline gasoline shortages.
- **Water Conservation** measures were implemented on campuses as a result of a mandate issued by Governor Easley in 2004.
- **Recycling** trash as well as using recycled paper, etc. as far back as the 1980s; there are now 2.5 FTEs who maintain the operations related to recycled materials on UNCW's campus (details and results of the program can be found in two reports issued – one in 2004-2005 and one in 2005-2006 – and by contacting Robert Warren at UNCW).

Facilities Sustainable Initiatives

Over the last several years, the university has been proactive in reducing energy use both actively and passively. Actively, we have focused on saving energy through use of high efficiency equipment and new technologies. Passively, we have bid projects that encourage the use of recycled and environmentally friendly components. In renovation projects, we specify that the contractor recycle as much debris as is possible.

The following are examples of our efforts to reduce energy and non-renewable resource consumption:

High efficiency HVAC and related equipment recently installed:

- Friday Hall Renovation: chillers, boilers and air handlers (the simple pay back for the upgraded equipment is approximately 3-5 years – with a life expectancy of 30 years that translates into six to ten times the simple pay back on the high efficiency premium or equivalent/approaching the actual cost of the equipment);
- CMS: replacement of old boilers that were 100% over required capacity for redundancy with new multi-stage set-up of condensing boilers. These units allow for redundancy while providing the most efficient technology currently available for this application;
- CMS-Ops: new installation of a Turbocor compressor/chiller; this new technology using magnetic bearings is extremely efficient with low maintenance cost. It is also more environmentally friendly as compared to traditional equipment because it is oil-less;
- Leutze Hall: ice storage unit for chilled water production – this system is highly efficient in design and reduces the peak-load power demand;
- Hanover Hall: heat/cooling recovery from one-pass HVAC system via an energy wheel;
- Dobo Hall: heat/cooling recovery from one-pass HVAC system via glycol coils;
- Building Management System: Tritium Niagara platform has been chosen and is being implemented as funding becomes available. The system is currently providing feedback and some control components to the newer HVAC systems being installed around campus (i.e. new buildings, regional plants, etc.). The ability to monitor and/or control allows the university to make proper decisions relating to the efficient operation of equipment;
- A replacement chiller has been installed at Kenan House for improved efficiency;
- A replacement chiller has been purchased and is currently being installed at the Warwick Center to improve operating efficiency;
- A variable speed drive is being installed on the Morton Hall cooling tower to reduce energy usage;
- HVAC controls improvements were made in Honors and International Dorms;
- HVAC controls improvements were made in the University Suites;
- HVAC controls improvements were made in Wagoner Hall;
- Replaced inefficient chiller at Cameron Hall;
- Replaced inefficient condenser at Bear Hall;
- Natural gas meters were upgraded in pursuit of improved energy management;
- Lowering boiler and hot water temperature set points;
- Boiler efficiency checks are exercised quarterly;
- Night temperature setbacks where possible;
- Boiler shut-downs in summer months when not required for humidity control; and
- Training for maintenance staff to maintain peak efficiency of equipment.

UNCW has committed to regional energy plants that will serve multiple buildings as compared to individual chilled and hot water plants for each building. The cost savings comes in several ways as follows:

- Reducing the total pieces of equipment to purchase/maintain;
- Reducing the excess capacity inherent with multiple pieces of equipment; i.e. better load management;
- Reduced short cycling of equipment therefore extending the life of the equipment; and
- Reduced peak electrical demand due to the efficiencies with fewer large pieces of equipment versus multiple medium-sized pieces of equipment.

Lighting:

- Use of electronic ballast and T-8 lamps in lighting;
- Use of compact fluorescent lamps in place of incandescent lamps;
- Use of occupancy sensors for lighting control;
- Reduced light levels in areas like corridors, storage rooms, bathrooms and
- Continual replacement of failed bulb type exit signs with energy reducing LED type.

Power:

- Use of variable speed drives on motors;
- Use premium efficient motors to reduce losses; and
- Use of high efficiency step down transformers to reduce core losses and reduce heat dissipation to electrical rooms.

Controls:

- Use of Building Automation Systems to control building environment and turn mechanical systems on or off or to a reduced level during off peak hours.

Mechanical Items:

- Use of more efficient hot water boilers and multi-stage chillers; using modular units in parallel so that at low use time, a smaller unit supplies the needs rather than a large unit at half load.

Housekeeping: Sustainability is a criteria in our selection of supplies:

- Toilet tissue: Tissue is purchased and dispensed in jumbo-sized rolls to minimize waste. Tissue has 95% recycled content;
- Paper towels are supplied in large rolls and dispensed in such a way to minimize wastage. Paper towels have 95% recycled content;
- Bathroom and laboratory hand soap is supplied in large, foam-style dispensers to minimize soap and water usage;
- Plastic trash bags are half the weight of traditional can liners, reducing the amount of material going to landfill;
- Switched from ammoniated to non-ammoniated glass cleaner;
- Use green products where possible. For example, we currently use a green multi-cleaner and disinfectant and have eliminated routine use of non-desirable products such as Clorox;
- We reuse dust mop heads via a cleaning service to minimize replacement;
- Wet mop heads are cleaned several times before replacement.

Landscape Services:

- We take a number of steps to minimize water usage for irrigation, including:
 - Night-time irrigation;
 - Use of rain delays;
 - Xeriscape design; and
 - Proper design of irrigation systems.
- Use an integrated pest management program to minimize usage of chemicals. Chemicals used are specific to plants and the diseases/pests being treated. We do not broadcast spray in order to minimize usage of chemicals and to foster the use of natural predators to maintain the health of plants and to maintain a healthy ecosystem;
- Landscape plants that are known to be disease-resistant are selected for use in this environment;
- Plans for new construction of any kind (buildings, sidewalks, temporary structures) are carefully reviewed to minimize impact on existing landscape; and
- Mowers are used with recycling decks.

Garage:

- A recycling program is in place for used oil and batteries;
- Vehicles are serviced regularly to maximize fuel efficiency, maintain emissions equipment, etc.

Recycling Program:

- We have an active recycling program, consistent with N.C. Executive Order 156;
- Our recycling section has 2.5 FTE. We collect and recycle glass bottles, plastic bottles, aluminum, tin and steel cans. We also handle office paper, newspapers, and magazines. We collect materials in bulk, bags, or boxes using rolling carts;
- Collection includes, but is not limited to, more than 200 multi-use containers, more than 350 paper totes and numerous cardboard collection sites;
- We have 5 dumpster locations throughout campus for cardboard collection. Cardboard pick-up at these locations is done by an outside contractor twice weekly; and
- In the past year, we have increased the amount of material recycled from 233 tons to 599 tons, an increase of 260%. In the same time period, we have decreased the amount of solid waste removed from campus for landfill from 12,462 tons to 7,723 tons, a reduction of 62%.

The university is currently considering instituting the following concepts:

- The use of bio-fuels, which are typically a recycled product, as an alternative to our diesel and fuel oil powered equipment;
- Improved “day lighting” of interior space – this not only saves energy for lighting but is usually preferred by the occupants as well;
- Solar options ranging from hot water to photovoltaic cells;
- Geothermal heating/cooling;
- Energy recovery of exhausted conditioned air via various systems (e.g. energy wheel, glycol coils – system specific);
- Landscape irrigation change-over from potable water to storm water recover and shallow well ground water;
- To help facilitate some of these items, the state has given its approval for the various state entities to pursue *performance contracting*. This process allows the energy savings attained from specific projects to be used to pay for the projects over time. In effect, the energy saving project is funded by its future savings. UNCW is currently pursuing this funding mechanism in an effort to reduce energy consumption across campus;
- A variable speed drive is being considered for installation at Cornerstone Dorm to reduce energy consumption;
- Rate review is planned for next month with Piedmont Natural Gas to determine if our current rate structure can be improved;
- Actively looking at methods to reduce petroleum usage;
- Daylight harvesting – use of daylight to provide adequate lighting of offices and rooms;
- Use of dimming ballast/sensors to maintain constant light level in offices, reducing the needed amount of artificial light when natural light is sufficient or to supplement the natural light, as needed, and this being done automatically;
- CO2 monitors in large gathering rooms, reduce airflows when no one is in the rooms; and
- Electric instantaneous hot water heaters – elimination of hot water storage tank/heater and re-circulation loop and motor.

Environmental Health & Safety Sustainability Initiatives

- Instituted orphan chemical program that allows researchers to “adopt” chemicals that are awaiting disposal, thus reducing the volume of hazardous wastes;
- Encourage distillation/recovery of solvents where possible;
- Utilize sustainable waste disposal options as priority methods; fuel-blending and recycling instead of land disposal and incineration, for example;
- Use of fiber drums for radioactive wastes to allow for volume reduction;
- Where allowed by law or regulation, treat biohazardous waste on site;
- Sponsor/host New Hanover County Household Hazardous Waste Day
- Consolidate or bulk hazardous wastes; and
- Encourage choice of alternative chemical selections for non-hazardous alternatives.

ITSD Sustainability Initiatives

Current projects / programs / practices:

A Business Process Management project is in progress to implement an enterprise document management environment where documents can be stored, routed, retrieved and archived electronically. Paper waste will be reduced so that employees will not need to print and copy the voluminous documents that are involved in many campus processes, such as graduate and undergraduate admissions.

- ITSD provides several options for faculty, staff and students to electronically share documents and distribute information without having to print the material, such as personal and departmental Web pages and centralized file sharing services.
- ITSD has developed and implemented a process whereby all EPA and some SPA job applicants must submit their application, résumé/vita and other supporting documentation electronically. Members of the search committees then review the documentation on-line during the selection process.
- Paper consumption in computer labs has been reduced due to a centrally managed printing program. As an example, in five ITSD general access labs, the number of pages printed in fall 2005 was 860,372 pages compared to 247,009 in fall 2006.
- ITSD has updated UNCW Web pages to print more efficiently. Printed Web pages automatically strip out unnecessary information and print across the full width of the paper.

- ITSD provides video and telephone conferencing services to the campus, thereby reducing the amount of travel normally required to attend out-of-town meetings.

Projects / programs / practices that ITSD intends to pursue further:

- Research and distribute information on recycle programs that are available for computers, printers, monitors, etc.; and
- Continue to develop and promote opportunities to reduce paper waste via technology such as presenting meeting materials electronically vs. distributing copies for each attendee.

Auxiliary Services Sustainability Initiatives

Food Services: Buying locally, buying organic, biodegradable containers, and composting are some of the best practices gaining momentum in higher education.

The university contracts with ARAMARK for campus dining and catering. Examples of current efforts to help our environment include:

- Campus dining recycles cardboard boxes from food and supply deliveries;
- Campus dining has converted its To-Go program trays from Styrofoam to Bio-Pak. Ninety-six percent (96%) of Bio-Pak is made from a renewable natural resource. Bio-Pak can be composted and recycled. An approximate 21,560 to-go containers were used in fall 2006, or approximately 1,348 containers per week;
- Recycle bins are available in most buildings for plastic, glass, paper and aluminum. This is maintained by UNCW recycling department;
- Beginning this fall, Campus Dining is offering 100% fair trade and organic coffees at the Fair Trade Market in Cameron Hall;
- Campus dining is distributing Market Place bags filled with goodies to all students in the vicinity of the new residential convenience store. By students bringing their bags to the Market Place, less plastic is circulated in the environment; and
- Campus dining buys locally (locally generally means within 150 miles) when feasible, and local suppliers are approved by corporate for food safety and consistency.

Printing: Printing and Copying Services is an ideal match for sustainable practices. The iPrint program, a partnership with Information Technology Systems Division, is a program that was implemented to minimize wasteful printing and improve services in computer labs.

Computer labs were a source of much paper waste prior to 2006. Paper usage in Randall Library Reference Area alone in Fall 2005 was 639,285 prints. Total printing in high volume labs that could be calculated from paper purchases was 1,499,657 sheets.

With the introduction of iPrint, the same areas printed 597,255 sheets, or a reduction of 63.31%. The cost savings, including labor to stock printers, exceeded \$70,000.

Printing also purchased a digital printing press in recent years. The digital press makes it more economical for the customer to purchase a lower volume of printed pieces when printing in full-color, as compared to using the printing press.

Printing is researching the means to update software and provide solution replacement for expensive desktop printing. New digital machines allow departments to copy and print to the same machine via the network, thereby reducing dependence on desktop printers which use toner inefficiently and waste paper when the print quality is poor.

Purchasing: Environmentally-friendly procurement has been a stated goal of purchasing since 1994. Annual reports are submitted to the State Agency Recycling Coordinator. For 2005-2006, key statistics are as follows:

Paper Category	Recycled content purchases	Non-recycled content purchases	Total paper purchases
Office papers and envelopes	\$ 89,286	\$ 197,410	\$ 286,696
Towel, tissue and related products	\$ 59,000	\$ 59	\$ 59,059
Miscellaneous other paper products	\$ 20,389	\$ 1,212	\$ 21, 601
Totals	\$168,675	\$ 198,681	\$ 367,356

Additionally, in 2005-2006, purchases of re-manufactured laser printer toner cartridges totaled \$6,451 and purchases of plastic can liners made from recycled content totaled \$25,067.

Transportation: Transportation Demand Management is a tool for reducing the dependency on the single occupant vehicle as means of transportation. Some of the earliest efforts included the establishment of the *One Mile Radius*. Commuter students living within a one-mile radius of campus should walk, shuttle or bicycle during the day. Shuttle service is free with a UNCW One Card.

Other measures by the university to reduce traffic include the establishment of parking zones and *park and ride*. By restricting students to a particular zone, the policy discourages the return to vehicles throughout the day, thus minimizing the number of vehicle trips by students and the traffic on nearby congested roadways. Parking zones and park and ride have increased on-campus interaction during the day. Today, nearly 1,500 students park in a *park and ride* lot away from the main campus and shuttle to campus.

Together, the *one-mile radius rule*, parking zones and *park and ride* have resulted in increased shuttle rider-ship. In fall 2006, the campus averaged 47,735 rides per month. This means that approximately 5,683 fewer cars came onto campus during each week in fall 2006.

As a member of the Transportation Demand Management Employer Group since its inception in 1999, UNCW has participated in programs designed to develop more transportation choices and increase awareness of those that already exist. In 2005, UNCW had the largest number of participants in Bike to Work Week. UNCW placed third in the Commuter Challenge in 2007.

To support alternative transportation, UNCW must have alternative transportation infrastructure. With two routes now on the campus loop shuttle, parking and transportation has added more benches and shelters at shuttle stops. A new bike path, separate from the sidewalk, is currently under construction in the residential areas of Seahawk Village and Seahawk Landing. A partnership with the City of Wilmington to build the cross-city trails is resulting in a multi-use path being developed along Randall from College Road to Racine.

Academic Courses

In reviewing academic courses that have content related to sustainability issues, it was determined that a large number of courses touch on the subject. See Appendix II for a list of these courses.

BEST PRACTICES REVIEW

Summary of Sustainability at Other Higher Education Institutions

According to the Chronicle of Higher Education (October 20, 2006), *since 1990, more than 300 college leaders have signed onto the Talloires Declaration, which commits them to the pursuit of a sustainable future. Nevertheless, relatively few institutions have made major commitments to actually alter their campuses, and even fewer have incorporated sustainability into their teaching and research. One institution, the University of Florida, is among a growing number of institutions that are beginning to transform their campuses, their operations, their policies, and their teaching to reflect a commitment to sustainability, a wide-ranging concept with three components: environmental awareness, social responsibility, and sound economic stewardship. Some environmentally-oriented colleges – such as Berea College, College of the Atlantic, and Warren Willson College – made sustainability a central part of their mission years ago. Other institutions – including Arizona State University, Furman University, the Johns Hopkins University, Muhlenberg College, and many others – discovered sustainability more recently, and are increasing their efforts quickly. For the time being, most institutions are reaching for low-hanging fruit. Some of these low-hanging fruit initiatives are listed below. The Association for the Advancement of Sustainability in Higher Education (now more than 175 members strong) states that its goal is to encourage colleges to do more and to learn how to measure success with respect to sustainability.*

In February of this year, a press release was issued from Boston, Massachusetts, stating that *79 college and university presidents promised to achieve climate neutrality on their campuses. Called the American College and University Presidents Climate Commitment, the agreement defines climate neutrality as the point at which campus carbon dioxide emissions are offset by the use of renewable energy and the oxygen released from trees and other plants on campuses. The climate commitment pledge asks universities to develop an institutional plan within two years outlining how they can neutralize their effects on the climate. Meanwhile, these universities have been asked to initiate at least two of the following five actions to help reduce their greenhouse gas emissions:*

1. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent;
2. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist;
3. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by the institution;
4. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at the institution;
5. Within one year of signing this document, begin purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources; and
6. Establish a policy or a commitment that supports climate and sustainability shareholder proposals at companies where the institution's endowment is invested.

A random survey of numerous higher education institutions – private and public, small, medium and large – reveal a wide variety of sustainability initiatives, organizational structures and task forces/committees. Following are some observations:

- Only a handful of institutions have identified an individual and/or department specifically charged with addressing sustainability issues. Examples include: Newcastle University's Institute for Research on Environment and Sustainability; Center for Sustainability and the Global Environment (SAGE) at the University of Wisconsin; Institute for Environment, Sustainability and Regeneration at Staffordshire University in the United Kingdom; University of Oregon Institute for a Sustainable Environment; Institute for Resources, the Environment and Sustainability (IRES) at the University of British Columbia.
- As a first step, many institutions create a sustainability web site that provides links to already existing sustainability-related courses, programs and initiatives. Examples include: Durham University <http://www.dur.ac.uk/environment/>; Cornell University http://environment.cornell.edu/action.php?resource_id=9; University of Florida <http://www.cce.ufl.edu/>; University of California, Berkeley <http://sustainability.berkeley.edu/links.html>; Harvard University <http://www.greencampus.harvard.edu/d/SustainabilityPrinciples.pdf>; Ball State University <http://www.bsu.edu/ceres/sustainability/>.
- Some institutions have one or more committees/task forces charged with assessing, identifying and implementing sustainability initiatives on campus. Many of these are listed on the Web sites noted above.
- Some states have programs that provide recognition or rewards for corporations, non-profits and government agencies or institutions (including universities) that initiate effective sustainability programs. Examples include: Monmouth University received *New Jersey's Clean Energy Program* or the U.S. Green Building Council's LEED Silver standard.
- Some institutions are working with campus cafeteria food-service providers, such as Aramark, which pledge to use locally-grown or locally-produced food. Examples include Furman University and the Johns Hopkins University.
- Students are mobilizing to promote sustainability on their respective campuses. Most often, they plug into regional or national networks of sustainability activists. In fact, students groups at more than 330 colleges across the country have joined the Campus Climate Challenge, an initiative created by the youth coalition Energy Action. These students pledge to pursue clean-energy policies at their respective institutions. Examples can be found at the blog "It's Getting Hot in Here."
- According to the Chronicle of Higher Education (October 20, 2006), *When colleges do adopt more-sustainable practices, they often turn them into selling points. The Chronicle claims, Several admissions directors report that prospective students often ask about campus sustainability and are impressed to hear a tour guide mention, for instance, that the college's bus fleet runs on cooking oil recycled from its dining halls.*

At some institutions, students have taken the sustainability issue into yet another direction – namely, concerns about the companies with which their respective institutions might be investing their endowment funds – namely, corporations that do not have clean-energy policies. In fact, the Sustainable Endowments Institute scrutinizes such investment practices (tobacco, South Africa, etc.) of colleges and universities. Examples include: Middlebury College and Williams College. (See Appendix I for review of selected institutions.)

RECOMMENDATIONS

Many recommendations have been suggested by members of the committee. Numerous ones were mentioned by more than one member. These have been consolidated into a list of highest priorities. These should receive immediate attention by an ongoing sustainability task force (See recommendation #1). Additional recommendations are listed that require further review and could also be selected for implementation.

1. A new Task Force should be created that is comprised of students/staff/faculty that will continue to review prospective sustainability measures on an on-going basis and ensure implementation of recommendations. This permanent committee would research new ideas for sustainability, and ensure that present courses of action remain in place.
2. It is essential that UNCW observes what other campuses within the state and across the nation are doing with regards to recycling, disposal, spending, programs, etc. It is highly recommended that we contact the *University of North Carolina Greensboro* and ask them what suggestions they have for UNCW, including the ways UNCW might improve its recycling program.
Jennifer Braswell is the Environmental Educator for UNCG Recycling.
3. Publicize goals and results to increase awareness of UNCW's commitment to purchase recycled products.
4. In 2007-2008, expand promotion of alternative transportation to faculty and staff. Begin a carpooling program with emergency ride home and incentives for employees to carpool.
5. Continue the advocacy for and the development of bike paths to supply the necessary infrastructure to support alternative transportation on campus. Support all sidewalk and multi-use paths that enhance the campus as a pedestrian campus.
6. Continue to promote the shuttle with better maps, signage and more convenient and comfortable shuttle stops.
7. Implement bus tracking system via the web by fall 2007.
8. Expand iPrint program to all general use labs to reduce wasteful printing and print more economically.
9. Expand, refine and promote current campus recycling programs including printer toner/cartridges, batteries, plastic bags, and Styrofoam.
10. Establish a position that is responsible and accountable for sustainability programs.
11. Develop a Sustainability Web site that provides information about UNCW's various sustainability efforts.

Additional Committee Recommendations

- Do another program with the Residence Halls "Energy Week."
- Work with RHA, ACE, SGA on various sustainability initiatives.
- Procure the movie *Inconvenient Truth*, show it to students living in residence halls; conduct a competition among the residence halls, or have some display booths to educate students about climate change/energy use/recycling, etc.
- Implement a program of recycling among the different residence halls.
- Draft a resolution in which the university will construct new environmentally friendly buildings.
- Make changes to older buildings (Bear, Morton, DeLoach, S&B) when they are renovated in 2011 in order to make them more environmentally friendly.
- Goodwill/Salvation Army drop-off canisters should be strategically placed around campus where students/faculty/staff can place materials that are deemed reusable for the general public (e.g. old electronics, clothing, canned food, etc).

- Within the new Recycling Department, there should be a position created that is specifically responsible for policing the trash and recycling dumpsters to reduce the amount of recycling material incorrectly placed in the trash bins and to ensure that the recycling bins are not tampered with.
- A system of checks and balances should be created within the new Recycling Department to keep track of material amounts, locations and other potential inconsistencies caused by human error/ignorance with respect to the new recycling program.
- The new Recycling Department should work closely and align itself with the “Green Club” (Sustainability Club) at UNCW, because students have the best perspective of what specific issues need to be addressed on a campus wide level.
- UNCW should inquire as to what kind of contract readjustments should be made in the future to increase the university’s recycling program.
- Pursue marketing of Bio-Pak so students understand the importance of recycling containers.
- Start tracking the amount of food purchased locally.
- Begin a discussion with Green Club about composting; the benefit, requirements, etc.
- Determine the feasibility of purchasing network copiers/printers to allow departments to reduce wasteful printing and print more economically.
- Make it more user-friendly to order high volume copying online in order to facilitate more economical printing and pass any savings on to the customer (software has already been purchased).
- Conduct a cost/benefit analysis to offer a reduction in cost to the customer if documents are printed double-sided (in computer labs and at convenience copiers).
- Work with Purchasing and explore consortia or other means to reduce the cost of purchasing recycled content paper (currently more than 25% greater in cost than non-recycled content paper, even with state contracts). Use Rutgers Purchasing Department for leads on how to do this.
- Work with printing to reduce purchase of non-recycled content paper, by reducing price of recycled content paper.
- Begin a composting program.
- Place sustainability tips on @uncw on a regular basis.
- Explore uses for solar energy.
- Recycle and donate discarded items during “Move-out”. Implement a volunteer effort for “Move-out” similar to the one for “Move-in”.

SUMMARY

As outlined above, UNCW currently is engaged in numerous activities that promote sustainability. However, there are many additional practices that could be incorporated into a comprehensive sustainability program. Better oversight and coordination will be required. Publicity and education are critical to establishing public awareness.

A permanent committee needs to be established that will review best practices and facilitate implementation when appropriate. Additional resources may be required; including a full-time position charged with the responsibility to ensure that UNCW is doing all that it can to be good stewards of the environment. UNCW has many sustainability initiatives underway, and the potential exists for many more.

APPENDIX I

REVIEW OF SELECTED INSTITUTIONS

James Madison University

- Center for Energy and Environmental Sustainability
 - Goals of the program
 - To promote a green curriculum at JMU and work toward the goals of the United Nations Decade of Education for Sustainable Development (2005-2014).
 - To conduct research and outreach on implementing more sustainable practices in homes, schools, offices, industry, and communities in the Shenandoah Valley.
 - To green the JMU campus at multiple levels—buildings, grounds, and use of resources.
 - To foster a culture of natural resource awareness and stewardship at JMU.
 - To engage students in education, research, and outreach on sustainability.
 - To conduct integrated research that recognizes the interdependence of the environment, the economy, and society in achieving sustainable communities and ecosystems.
- Defines Environmental Sustainability as:
 - The emergent fields of sustainability studies and sustainability science operate on a basic understanding of this concept. In general, it is recognized that sustainable development promotes human well-being and quality of life while:
 - Protecting environmental quality
 - Conserving resources
 - Meeting human needs at an acceptable financial cost.
- **The Eco-Campus Project:** This is a class project whose aim is to implement changes to the upcoming dorms on James Madison University's campus. For more information, contact [Jon Miles](#)
- **Green Team Coalition:** The team consists of JMU campus organizations EARTH, Progress, Environmental Business Assoc. Energy Engineers, and Orange Band. JMU Green Team is committed to decreasing JMU's ecological footprint and increasing sustainability through renewable energy use, efficiency, conservation, and education. For more information, contact Maria Papadakis.

College of Charleston

<http://www.cofc.edu/sustainability/home.htm>

- Greenbuilding
 - Techniques Implemented

Green Building Renovations

	Cost	Benefits
Installed R-19 fiberglass insulation in 2 nd floor ceiling	\$\$\$	Reduced heating and cooling costs
Painted interior walls with paint free of Volatile Organic Compounds (VOC)	\$\$	Improved indoor air quality
Installed energy efficient T-8 fluorescent bulbs into hall and office fixtures.	\$	Reduced energy costs
Replaced all incandescent bulbs with efficient and long lived compact iodiversity.	\$\$	Reduced energy costs
Installed 22 Winsulator acrylic storm window inserts.	\$\$\$	Reduced heating and cooling costs/Reduced exterior street noise
Installed motion sensors for hall lighting.	\$	Reduced energy costs
Installed programmable thermostats.	\$	Reduced heating and cooling costs
Installed Energy Star© ceiling fans.	\$	Reduced energy costs
Installed waterless urinals.	\$\$	Reduced water consumption
Placed bins for recycling on each floor.	\$	Reduced waste
Recarpeted the 2 nd and 3 rd floors with 30% post consumer recycled carpet.	\$\$\$	
Installed a tubular skylight.	\$\$\$	Reduced energy consumption/Increased natural sunlight
Insulated water heater.	\$	Reduced energy consumption
<ul style="list-style-type: none"> ○ Implemented a committee to research greenbuilding and suggest ideas for the college <ul style="list-style-type: none"> ▪ Committee consisted of members of the Faculty Senate and Student Groups 		

- Native Species
 - In the spring of 2004, work was completed to convert the area behind the Political Science Green Building into a model of an urban native species garden. With funding provided by the **Sustainable Universities Initiative**, the **National Fish and Wildlife Federation**, the **Urbanization and Southeastern Estuarine Systems (USES)** project, the **Master of Environmental Studies Program** and the **Political Science Club** at the College of Charleston, this effort has been under way to further the mission of the Political Science Green Building to encourage sustainable building by providing this model to promote the benefits of sustainable gardening.
 - The benefits of native species gardening range from lowering the amount of water, pesticides, and fertilizers needed for healthy plants to maintaining the natural biodiversity of a habitat. Plant species native to a particular area are generally better adapted to soil and climate conditions, making them easier and cheaper to grow and maintain.

Murray State University

http://www.murraystate.edu/facilities_management/cutting_edge/index.htm

- Campus Green Campaign
 - The Campus Green initiative has been receiving national attention as a means of maintaining environmental sustainability. Murray State University is not new to environmental consciousness. It was nominated for the Governor's Environmental Award for its environmental education accomplishments in 1998. The following year it was nominated by the Department for Natural Resources and Energy for its accomplishments in energy reduction. All of the Facilities Management divisions contribute to the university's reduction in energy consumption.
 - Murray State uses a 20 percent mixed grade (biofuel).
 - Murray State has been upgrading external light fixtures to mercury-halide or high pressure sodium to reduce energy consumption since 1986. Upgrading of interior lighting has included the change of all internal incandescent light fixtures to fluorescent fixtures. Most of the 40 watt bulbs have been replaced with 32 watt bulbs for the sake of financial savings and energy efficiency. Occupancy sensing switches were installed across campus to turn off lighting automatically when the rooms are not in use.
 - One area of energy reduction involves reducing the loss of either warm or cool air from thermal conduction. Academic and administrative buildings had single-pane windows replaced with double-pane windows. Tinted glass has also been utilized to reduce solar loading. When window air-conditioning units could not be eliminated they were replaced with more energy efficient units. Ceiling fans have been installed throughout campus to provide better circulation of conditioned air for building occupants. Air that is circulated can be cooled or heated with less energy, thereby increasing the efficiency of electrical energy and reducing consumption.
 - The Honeywell Delta 5100 Series and Honeywell Web energy management systems control 48 campus buildings. The systems are designed to address the expansion of the university. It will also service New Clark College and Science Complex when they are completed. All academic building fan systems are cycled off after business hours each day and cycled on two hours before the start of the business day. All systems cycled are off during holiday and unoccupied periods.
 - The building services division has steadily transitioned to environmentally safe and more efficient cleaning supplies such as chemical dispensing systems. Aerosol usage has declined significantly. The division purchases vacuum filters made from recycled paper. It cleans and reuses mop heads instead of throwing them away and purchasing new ones.

University of Northern Iowa

<http://fp.uni.edu/energy/>

- Energy! Week
 - A week long program in which the residence halls compete to see who uses the least amount of energy.
 - Drawings for students who calculate their energy usage in their rooms.
 - Helps students create a reduction plan.
 - Campaign to help join the Energy! Saving Team.
- Campus Climate Challenge
 - The Challenge
 - The Campus Climate Challenge is a project of more than 30 leading youth organizations throughout the U.S. and Canada. The Challenge leverages the power of young people to organize on college campuses and high schools across Canada and the U.S. to win 100% Clean Energy policies at their schools. The Challenge is growing a generation-wide

- movement to stop global warming, by reducing the pollution from our high schools and colleges down to zero, and leading our society to a clean energy future.
- Getting Involved
 - Challenge groups are local youth lead groups working to bring clean energy to their campus and local community. Groups vary from student governments, to clubs, to groups of friends. Find a group on your campus and plug-in with their campaign.

Appalachian State University

http://www1.appstate.edu/dept/anthro/sd_html/honduras.html

- Sustainability Task Force
 - Building upon the campus-wide sustainability assessment, completed by Billy Schumann in May 1999, the Task Force was able to address specific needs identified in that initial report. The recycling efforts of our campus residence halls was identified as an area in need of improvement, and was our Task Force's first priority for the school year. A meeting between the Housing Operations manager and Task Force members Jeff Boyer, Dennis Scanlin, Jim Rice, Amanda Morse, and Logan Brown yielded almost immediate and very successful results. The residence halls now have an aluminum recycling receptacle on each floor and their recycling rates have already doubled. The plan is to increase all levels of student recycling with a stepped up educational campaign as students go through freshman orientation.
 - One of the earliest programs implemented by Appalachian State during the 99-00 school year was our Physical Plant's cooperative effort between students and campus food service providers to begin composting cafeteria food wastes.

APPENDIX II

“SUSTAINABILITY CLASSES”

ANT 309—Enviro. Anthropology
BIO 366—Ecology
BIO 458—Fisheries Bio.
BIO 466—Conservation Bio.
BIO 478—Global Environ. Problems

CHM 211—Organic Chem. I
CHM 212—Organic Chem. II
CHM 312—Adv. Organic Chem.
CHM 377—Enviro. Chem.
CHM 475—Chem. Oceanography
EVS 120—Enviro. Geology
EVS 195—Intro. To Enviro. Studies
EVS 205—Global Enviro. Issues
EVS 325—Enviro. Economics
EVS 330—Nat. Res. Economics
EVS 360—Nat. Res. Management
EVS 361—Hist. Nat. Res. Man.
GGY 130—Physical Geography
GGY 140—Human Geography
GGY 180-181—World Regional Geography
GGY 210—Economic Geography
GGY 230—Weather and Climate
GGY 245—Tourism Geography
GGY 270—Land Use Planning
GGY 317—Urban Geography
GGY 328—Introduction to GIS
GGY 333—Applied Climatology
GGY 335—Geomorphology
GGY 336—Rivers and Floods
GGY 340—Resources, Population and Environment
GGY 345—Geography of Food
GGY 422—Remote Sensing in Environmental Analysis
GGY 424—Advanced GIS

EVS 362—Enviro. Law
EVS 363—Enviro. Ed. And Interpretation
EVS 370—Enviro. Psych.
EVS 420—Global Climate Change
EVS 462—Adv. Enviro. Law
EVS 470—Wildland Man.
EVS 471—Nat. Res. Area Man.
EVS 485—Special Topics
EVS 495—Sem. In Enviro. Studies

GLY 120—Environmental Geology
GLY 125—Natural Disasters
GLY 150—Oceanography
GLY 220—Environmental Field Methods
GLY 226—Principles of Hydrology
GLY 420—Global Climate Change
GLY 426—Hydrogeology
GLY 458—Coastal Management
GGY 426—Environmental GIS
GGY 433—Weather Analysis and Forecasting
GGY 435—Environmental Geography
GGY 437—Soils in the Earth Sciences
GGY 473—Regional and Environmental Land Use Planning
GGY 478—Historic Preservation Planning
HST 332—Amer. Enviro. Hist.
HST 456.533—Sem. Amer. Enviro. Hist.

PAR 360—Phil. Of Evolution

REC 362—Special Issues in Rec. Services
REC 366—Coastal Rec. Res. Management
SOC 215—Contemporary Social Issues