Campus Sustainability Road Map

A Collection of Student Input for the Direction of the New Committee on Sustainability
Introduction

In April of 2008, the College of William and Mary adopted its first sustainability policy, promising to "set an example for present and future generations in the use of natural resources." The institutionalization of environmental sustainability will continue in the fall of 2008 with the inauguration of a new College-wide Committee on Sustainability, created to examine and implement the policies listed in the sustainability plan. The committee will evaluate all aspects of the College for resource efficiency and environmental impact, and this Campus Sustainability Road Map is intended to help expedite that process.

The Campus Sustainability Road Map is a result of the hard work and dedication of over 120 undergraduate students and 12 Environmental Science & Policy professors, who addressed the topic of sustainability at William and Mary through a Campus Sustainability seminar held in the spring of 2008. More than 60 proposals resulted from the one-credit seminar, covering a wide range of issues, from runoff control and porous paving materials to real-time energy monitoring and student waste management. The individual proposals will be posted online in the future and are available upon request.

The proposals are grouped here in six different categories: education, food, energy, waste management, transportation, and landscape. Each category includes a vision for sustainably-minded growth, as well as a list of long-term goals. While the projects cover varying aspects of the College, a focus on education runs through all of them. The main purpose of a university is the education of its members, and these projects should be kept in mind as not only improvements in sustainability, but also as vehicles for the education of all members of the College community.

Furthermore, as the Committee on Sustainability begins to implement projects such as these, it is important that the Committee promote and publicize the improvements made across campus. To do so, creating a sustainability logo is a recommended first step, to be used on all relevant official letterheads, signs, public postings, web site graphics, and other visual media. Also encouraged is an on-site visual that highlights the less visible projects undertaken. For more information on possible visuals, see Appendix B (possible sustainability logos) and the Education proposal entitled "Install Green Plaques Noting Sustainable Initiatives on Campus."

Current Initiatives

It is important to note that the College has not been inactive on issues of sustainability. In fact, there are numerous initiatives already underway, many of which are the result of positive collaborations between students, staff, faculty, and administrators. As of the summer of 2008, here are many of the current projects that continue to work towards the College's sustainable future:

- Campus energy manager Dan Patterson was hired in 2005, and with his help, the College reduced its energy costs 10% between the years of 2006 and 2007.
- In the last three years, the residence halls Jamestown North and Jamestown South and the new Recreation Center have received LEED certification for their environmentally-friendly construction.
- William and Mary Hall has undergone significant renovations to increase energy efficiency through a public-private partnership.
- Energy meters, programmable thermostats, and occupancy sensors have begun to be installed in several buildings across campus.
• Biodiesel fuels some of the Grounds & Gardening equipment, and a Sharp Scholars program has created a biodiesel plant in the Keck Environmental Field Laboratory.
• Beginning in the fall of 2008, incoming students will watch a short environmental awareness video, highlighting basic conservation tips such as recycling and public transportation. Through this program, developed by the Student Environmental Action Coalition in coordination with Residence Life, the students will also receive free compact fluorescent light bulbs and reusable drinking mugs.
• The Greening Williamsburg Coalition, first formed in the spring of 2008, is a group of students and local citizens working with Williamsburg mayor Jeanne Zeidler on sustainable issues in the community.
• A student-run vegetable and herb garden is located behind the Commons cafeteria, fertilized in part by a Dining Services composting program.
• A few items of regionally-grown food have been introduced in the cafeterias on campus.
• Storm water runoff management practices are being implemented in the landscaping near Landrum Hall and the Commons cafeteria.
• Every residence hall has recycling run by Facilities Management, and Old Campus academic buildings have recycling run by volunteers from the Student Environmental Action Coalition and Alpha Phi Omega.
• The communal bike program, run out of the Sadler Center, as well as continual services from Williamsburg Area Transport gives students alternatives to traveling by car.
• The Environmental Science and Policy program offers many interdisciplinary courses and some courses and internships allowing for hands-on learning.

The Campus Sustainability Road Map is the beginning of a new collaborative relationship between all members of the College community in the movement towards sustainability. More efficient natural resource use and a decreased ecological impact will save the College money on energy and materials, improve the relationship of the College with its natural environment, and provide innovative educational opportunities for students and faculty. This Road Map is designed to facilitate the efforts of the new Committee on Sustainability and the College as a whole into a new era, and we look forward to the sustainable initiatives that will be undertaken in the coming years.

Signed,
L.H. Brumfield '08, Julia Elkin '08, Connor Horne '10, Nicole Scheer-Irvine '09, Clare Stankwitz '11, and Philip Zapfel '09

Special thanks to the Environmental Science and Policy department and all students involved in the Spring 2008 Campus Sustainability seminar.
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1. Education

Vision

Education stands at the core of sustainability. The issue of education on sustainability at William and Mary must be presented on a level accessible to all members of the community, in such a way as to encourage productive dialogue on numerous levels beyond the walls of the classroom. It is through education that challenges are recognized, individuals develop into concerned participants in solutions, and ideas actualize into positive widespread changes.

The challenges posed by environmental issues are multifaceted and complex. In its tradition of ingenuity and an interdisciplinary approach, William and Mary stands ready with the necessary tools for examining and engaging the future engendered by the rising need for ecologically conscious, socially just, sustainable vision and action. The commitment to a sustainable future starts with education.

Current Initiatives:

- Interdisciplinary courses offered in environmental topics
- Multiple websites including www.greeningwm.com and www.wm.edu/so/seac
- Lecture series and accompanying seminar in Campus Sustainability (Spring 2008)
- Introduction of environmental education component for 2009 Freshman Orientation

Proposals:

1.1. Streamlining Sustainability Websites for William and Mary
1.2. Install Green Plaques Noting Sustainable Initiatives on Campus
1.3. Campus Wide Posting Publication The Greener Digest
1.4. Basic Environmental Education Training for RAs
1.5. Course in Sustainability with Extension to Active Research
1.6. Long Term Goals
1.1. Streamlining Sustainability Websites for William and Mary

*Project Description*

Creating a meaningful sustainability website for William and Mary will both educate and generate interest among students and faculty in order to promote sustainability initiatives on campus. Making this site accessible through *my.wm.edu*, *www.wm.edu*, and *greeningwm.com* will allow easy access by all members of the William and Mary community as well as prospective students. This site will go a long way towards promoting awareness and implementation of sustainability practices on the part of individuals at the College. The site will be set up and managed by Information Technology, the Committee on Sustainability, and volunteers from SEAC.

This website will include:

- Updates on sustainability projects at work at the College by students, faculty, and administration
- Live feed data on water and energy usage at the College from energy meters
- Location map of all current recycling dumpsters on campus
- Detailed list of what can and cannot be recycled
- Helpful tips related to energy saving, water conservation, etc.
- Contact information for various campus sustainability projects and campaigns
- Discussion board to field opinions, exchanges, and advice

Student Contributors: Lauren Murray ’08, Kara Starr ’10, Don Martin ’08

1.2. Install Green Plaques Noting Sustainable Initiatives on Campus

*Project Description*

Installing small plaques at the site of current sustainability initiatives on campus will educate the public by raising awareness and ensuring recognition of such initiatives in place at William and Mary. These profile signs will underscore how many projects have already been effectively integrated into the fabric of life at the College.

The plaques, much like those seen in gardens on campus, will be small metal signboards bearing a standardized “William and Mary Sustainability” logo (to be determined by the Committee on Sustainability) and a concise description of the highlighted project. Possible sites for such green plaques include:

- LEED certified campus buildings or elements therein
- Organic garden on campus
- Dining hall composting sites
- Dining hall local food use
- Native planting areas
- Storm water management areas employing Best Management Practices
- Rain barrels (if and when installed on campus)
- Motion sensitive lighting areas
1.3. Campus Wide Posting Publication  
*The Greener Digest*

**Project Description**

By providing information to the community and making students and faculty aware of the College’s movement toward sustainability, more people will advocate sustainable practices both in the larger community and in their personal lifestyles. A monthly one-page newsletter entitled *Greener Digest* would cover sustainable ideas and educate the College on environmentally focused issues. The *Greener Digest* would be posted like *The Throne* (published by Swem Library) in plastic covers in the restrooms throughout campus, particularly in high traffic areas so as to ensure access for all demographics. As shown by the popularity of *The Throne* among students and faculty, this method of posting is more successful than traditional flyering. This effort would be conducted at the discretion of the Committee on Sustainability.

- Monthly one page publication
- Distributed and maintained by student volunteers with ENSP oversight
- Requires single editor with submissions and ideas sent to a specifically focused email account (i.e. greenerdigest@wm.edu)
- Short articles to engage all readers
- See Appendix C for sample *Greener Digest* posting

Student Contributors: Kristina Dumas ’10, Brittany Lane ’11, Tejal Patel ’10

1.4. Basic Environmental Education Training for RAs

**Project Description**

In order to reach the most students, basic information on environmental concerns and responsibilities as relating to life at William and Mary should be dispersed to students through their residence halls. Hall meetings led by RAs provide a forum for information distribution, raising awareness, and ongoing discussions on issues.

As part of RA training prior to the start of the academic school year, the Residence Hall Association will run a session familiarizing RAs with environmental resources on campus. Specifically, RAs will be made aware of energy use, transportation, and conservation issues in their areas.

**Issues to be covered include:**

- What can and cannot be recycled
- Where recycling stations are located
- Use reusable mugs where possible
- Bicycle loan program run out of the University Center
- Williamsburg Area Transport bus schedules and general information
- Personal and residence hall-wide energy-saving measures
  - Compact fluorescent light bulbs
  - Use surge protectors, and unplug appliances not in use
  - Turn off personal computers at night
• Encourage use of shared dorm goods to reduce number of appliances brought to campus
• Print double-sided when possible
• etc.

Currently, there is an Orientation Aide program slated for before the fall 2008 orientation begins, during which SEAC members will teach the OAs these same topics; however, the OAs have little contact with students past the first week. Thus, RA training is more beneficial, as the RA will spend all year with the new students.

By presenting this information to students as early as possible, we may spur interest and direct individual accountability much earlier and help engrain in the student body a more environmentally-friendly attitude.

Student contributors: Mathew McMillan ’11, Lauren Billingsley ’11, Kelly Dulka ’11, Sajithya Perera ’08, Amanda Vtipil ’09

1.5. Course in Sustainability with Extension to Active Research

Project Description

The recent Campus Sustainability seminar has highlighted a growing interest among students in the level of sustainability of campus and local facilities and practices. A hands-on sustainability class will provide students with specific skills needed to improve both campus areas and future living and work spaces. Readings and lectures will be complemented with field experience and relevant explorations of campus facilities. This hands-on format will provide not only real-world skills for improving sustainability, but increase campus and community cooperation and understanding, as the students and faculty will work closely with Facilities Management and community members working in areas such as agriculture and waste.

• Three credit, 300 level course listed in under the ENSP department
• Taught by professor or community member / recent graduate
• Split into three units across the semester:
  o Water
    • Includes wastewater management, runoff, low flow fixtures, fixture maintenance, water conservation
  o Energy
    • Includes campus energy use, conservation methods, retrofit work
  o Landscape
    • Includes erosion, runoff control, native plants, local agriculture, composting
• Guest lectures from College faculty such as Dan Patterson, and community members such as local farmers, energy conservations experts, and county sanitation workers

Student Contributors: Julia Elkin ’08, Jennifer Swalin ’08, Lynn Thompson ’08

1.6. Long Term Goals

• Implement Environmental Science and Environmental Policy majors as primary majors
• Integrate sustainability issues into curricula of all departments
• Build a collaboration between the College and the proposed James City County Eco-Discovery Park
2. Food

Vision

Increasing campus food sustainability directly through dining services and through educational initiatives will reduce carbon emissions from transportation, lower environmental degradation from large-scale agribusiness, and ensure the health and safety of students. In addition, sustainable food procurement policies support local agriculture, strengthening the college’s connections to the community.

By promoting both formal and hands-on learning, the College will cultivate a greater understanding of food sustainability challenges, and empower William and Mary community members to make informed food choices in their every day lives.

Food sustainability course offerings are currently limited to one Environmental Science and Policy course, but should be expanded to address the numerous aspects of sustainable food education as a natural part of a William and Mary education (See project proposal "Course in Sustainability with Extension to Active Research" in Academics section).

Current Initiatives

- Student-run on-campus vegetable garden
- Dining services composting program
- Reusable mugs given by SEAC to all freshman for use in dining halls
- RealFood co-operative: Williamsburg area buying club focused on procuring local, sustainably grown food
- Sustainable Agriculture course with hands-on volunteer component
- Initial efforts to offer locally purchased produce in campus dining halls

Proposals

2.1. Audit of Campus Food Services and Facilities
2.2. Sustainable Food Procurement and Preparation
2.3. Reduction of Food Waste from Dining Facilities
2.4. Food Sustainability Lecture Series
2.5. Campus Garden Internship
2.6. Farm Internship Field Study
2.7. Campus Farm
2.8. Long Term Goals
2.1. Audit of Campus Food Services and Facilities

Project Description
A thorough and objective analysis of the current state of food production, procurement, and distribution on the campus of William & Mary is an indispensable prerequisite to any further actions striving towards food sustainability. The campus food audit would be a collaborative effort between the Committee on Sustainability, Dining Services, and student volunteers.

- Review production methods and origins of food
  - Document points of origin of all items and products
  - Document production and transportation methods associated with all food products
- Evaluate packaging and storage strategies
  - Assessment of quantity and nature of packing materials for food
- Examine methods of waste management
  - Measure quantity of food waste produced at Dining Services facilities
  - Methods of waste disposal
- Compile a complete financial overview of food services
  - Enumerate operational costs of food service
  - Include implicit costs of waste
- Document the carbon footprint associated with college food services

Student contributors: Kate McClure '09, Nicole Scheer-Irvine '09, Abigail Stokley '10

2.2. Sustainable Food Procurement and Preparation

Project Description
In order to adhere to a plan of environmental sustainability, campus dining halls must commit ecologically sustainable procurement and distribution practices. Such a commitment would focus on local procurement with a priority placed on organic standards and seasonal availability. Guidelines and procurement would be managed by Dining Services and the Committee on Sustainability.

- Restructure food procurement guidelines
  - Adopt local food procurement as first priority
    - Initiate buying plans with local farmers, especially those in James City County
  - Seek organic/sustainable production practices
    - Use as a secondary priority, ideally coinciding with local sources
  - Create a seasonal menu
    - Dining halls food options based around seasonal availability of produce
- Provide sustainable food options in retail locations
  - Stock organic and/or local options in Student X-change, Mews, Dodge Room, etc.
  - Advertise local/organic food options and their environmental benefits
- Reduce water and energy use in food preparation
  - Increase use of Energy Star appliances (see: Energy: Current Initiatives)
    - Gradually phased into facilities, replacing existing appliances
  - Promote water use efficiency
    - Low-flow appliances and modifications to nozzles, etc.

Student contributors: Connor Horne '10, Tala Woodward '08, Ansel Ashby '11,
2.3. Reduction of Food Waste from Dining Facilities

Project Description
The reduction and recycling of food waste from campus food facilities is an integral component of the plan to reduce the environmental impact of these facilities.

- Encourage students and customers to produce less food waste
  - Removal of trays in dining halls to limit food waste
  - Reusable takeout containers
    - Full set of containers given to students; cleaned containers distributed at dining facilities upon the return of used containers
- Expand composting efforts
  - Composting program expanded to include all dining services
    - Food slop bins in tray return area
    - Meal preparation waste
  - Compost used in campus garden or by Grounds & Gardening
    - Student volunteer programs to manage compost treatment and distribution
- Use waste oils to produce biofuel
  - See Energy: Addressing Campus Diesel Use with Waste-Based Biodiesel

Student contributors: Connor Horne '10, Tala Woodward '08, Laura Condyles, Kevin Jarcho '09, Liesl Voges '09, Zoe Welch '09, Ginna Ellis '09

2.4. Food Sustainability Lecture Series

Project Description
Experts in the field of food sustainability will give lectures to educate the William and Mary community, sparking interest in the subject and providing a forum for discussion between students, farmers, food providers, and faculty. Similar to the Campus Sustainability lecture series in spring 2008, the series will build both student and community interest in the topic.

- Involve farmers, chefs, food writers, sustainability experts, nutrition experts
- Chef demonstrations using local and/or organic food
- Led by the ENSP program, with involvement of Dining Services in organization and publicity
- Provide tabletop literature on sustainable food, seasonality, and lecture series

Student contributor: L.H. Brumfield '08
2.5. Campus Garden Internship

Project Description
A Campus Garden Internship will provide students the opportunity to focus on garden management. Working to expand the current campus garden and involve larger numbers of the William and Mary community in its care, the internship will provide reliable coordination and accountability for the garden plot. Possible expansion of the internship program would allow for work with Buildings & Grounds on sustainable landscaping and flower gardens.

- Design garden plantings for maximum efficiency and educational benefit
- Work to involve William and Mary and greater Williamsburg community members
- Will fulfill ENSP Capstone Experience requirement

Student Contributors: Zoe Welch ’09, Ginna Ellis ’09

2.6. Farm Internship Field Study

Project Description
A number of William and Mary students already participate in semester or summer internships on both local and international farms, gaining experience in sustainable agriculture. Researching the quality of these programs and listing them for students will ensure that students’ experiences are both educational and engaging.

- List local, regional, national, and international farming internship programs
- Pre-approve credits for listed programs and streamline application process for approved programs
- Create partnerships for credit transfer with programs offering courses beyond agricultural techniques
  - ex. Community Planning at the Center for Ecological Living and Learning in Iceland

Student Contributor: L.H. Brumfield ’08

2.7. Campus Farm

Project Description
Procuring one to five acres in the city of Williamsburg or James City County for a campus farm will provide a space for education, food production, and community interaction. Along with possibly supplying vegetables and herbs to campus dining halls, the farm will serve as a lab site for a Sustainability and Agriculture class similar to the course taught by Charlie Maloney. Internships at the farm will give students a chance to pursue and develop agricultural skills beyond the introductory course, and the farm will provide a site for other courses involving hands-on experiences in biology and agriculture. A farm will also connect the College to Virginia’s agricultural heritage and current agricultural economy, and serve as a source of interaction between William and Mary and the greater Williamsburg community.

- 1-5 acre tract of land
  - discussions with James City County are already underway
• Managed by full-time employee, $30,000-$40,000 salary
• Worked by community and student volunteers
  o Interns and lab students
  o Local youth groups: 4-H club, environmental and Key clubs at local schools
• Harvest sold at market value to campus dining halls or at farmers’ market
  o Decreases dependence on outside food sources
  o Locally grown food decreases carbon footprint
• Similar farms attractive to potential students at other colleges
  o Yale Sustainable Food Project farm, Dartmouth College farm, and Oregon State farm

Student contributors: Grace Heusner ’10, Margaret Person ’10, Maya Cough-Schulze ‘10, Andriana Hench ’10, L.H. Brumfield ‘08, Connor Horne ’10, Tala Woodward ’08, Ansel Ashby ’11

2.8. Long Term Goals

• Multiple interdisciplinary course offerings
  o ex. Food and Literature; Global Policy and International Institutions: Hunger and Environmental Threats; Anthropology in Food, Bodies, and Power.
• Commit to a Food Sustainability Challenge
• Expand campus farm to create a Williamsburg community farming center
• Expand local food procurement to a majority of food consumed on campus
• Host nationally attended sustainable food forum with representatives from local farms, campus staff, administrators, non-profit organizations, etc.
3. Energy

Vision

Energy use is the largest contributor to climate change. This sector provides significant opportunities for improvement to William and Mary’s environmental sustainability and budget management. Programs and projects designed to reduce energy use and encourage alternative sources provide tremendous educational benefits and often financial benefits as well.

The following projects are designed to be relatively simple introductions to a commitment to energy conservation and alternative energy at William and Mary. The implementation of these proposals will reduce William and Mary’s substantial energy usage and carbon footprint, inspire further transformations in the energy and fossil fuels dependence of the College, and educate the College community about the issues surrounding energy consumption.

Current Initiatives

- Energy metering on select campus buildings
- On-campus small-scale biodiesel production
- Campus Energy Manager Dan Patterson hired in May 2005
- Campus-wide energy / greenhouse gas audits conducted
- William and Mary Hall renovations
- Centralization of high temperature hot water loop
- Increase in programmable thermostats
- Launching of occupancy sensors program
- LEED certification standards for new buildings
- Biodiesel fueling of some grounds equipment
- Increased purchasing of Energy Star appliances
- Improved efficiency procurement strategies
- New student sustainability orientation and Compact Florescent Light bulb (CFL) distribution

Proposals

3.1. Updated Energy Audits
3.2. Installation of Campus-Wide Energy Meters
3.3. William and Mary Energy Monitoring Website
3.4. Motion-Sensitive Lighting in Dormitory Public Spaces
3.5. Addressing Campus Fuel Oil Use with Waste-Based Biodiesel
3.6. Long Term Goals
3.1. Updated Energy Audits

**Project Description**

Audits of the College’s energy use and greenhouse gas output have been done in the past, and updated audit information is necessary to identify areas with the greatest potential savings and improvements in efficiency. William and Mary Hall has been audited by Energy Service Corporations (ESCOs) at no cost, resulting in $200,000 in savings and a 40% reduction in energy consumption. By conducting similar audits across campus (along with greenhouse gas audits such as Joshua Wayland ‘08’s “Greenhouse Gas Inventory for the College of William and Mary”), the Committee on Sustainability can streamline the process by which facilities on campus are renovated and improved for energy efficiency.

- Conducted either by Facilities Management and energy manager Dan Patterson or an outside agency (ESCO, etc.)

3.2. Installation of Campus-Wide Energy Meters

**Project Description**

Energy conservation through both building efficiency and modification of personal practices is an integral part of environmental sustainability. However, the effects of such conservation efforts and the extent of such practices are nearly impossible to measure without effective energy metering on individual buildings. By installing energy meters on each campus building, both efficiency and conservation will be far easier to encourage.

- Install separate energy meters on each campus building, particularly residence halls
- Implement effective monitoring of energy usage
  - See William and Mary Energy Monitoring Website proposal
- Enable energy conservation efforts both in maintenance and occupant habits
- Managed by energy manager Dan Patterson and Facilities Management

Student Contributors: Miriam Gleiber ‘08, Roshan Patel ‘08, Stephanie Burton ‘10, Natasha Bridge ‘11

3.3. William and Mary Energy Monitoring Website

**Project Description**

Disseminating information about energy usage to the campus at large is integral to the success of any program aimed at decreasing energy usage. Therefore, a website with information from energy meters is critical to sustainability efforts.

- Develop and maintain a website throughout the year to show the daily energy use/energy savings of each campus building
- Website designed specifically to monitor energy use in real time
- Website maintained by Facilities Management and Information Technology. An alternative would be a website designed specifically to monitor energy use in real time.
- Website would facilitate activities such as dormitory and academic department energy-saving competitions, organized by Residence Life or Student Affairs

Student contributors: Miriam Gleiber ‘08, Roshan Patel ‘08, Stephanie Burton ‘10, Natasha Bridge ‘11
3.4. Motion-Sensitive Lighting in Dormitory Public Spaces

Project Description
Installation of occupancy sensors would eliminate a significant source of unnecessary electrical energy use. This would decrease William and Mary’s greenhouse gas emissions as well as promote energy savings.
- Install occupancy sensors in all public spaces in all dorm buildings, including kitchens, laundry rooms, and bathrooms
- Pilot program already in place for motion sensitive lighting in some buildings across campus, including the bathrooms in Tucker Hall and Blair Hall

Student Contributors: Khaleelah Jones ’09 and Dawson Lindauere ’10

3.5. Addressing Campus Fuel Oil Use with Waste-Based Biofuel

Project Description
William and Mary currently uses approximately 3,000 gallons of fuel oil each year in the operation of generators alone, releasing 37 tons of carbon dioxide. These emissions could be nearly eliminated through the use of biofuel in these generators. Biodiesel production from waste vegetable oil began on campus last year as both an educational and community-service oriented project, and would provide the fuel necessary to run the generators and fleet of campus maintenance vehicles at a cost lower than projected distillate fuel costs through a relatively small expansion of current refining capacity. The project would be a collaborative effort between Facilities Management, Grounds & Gardening, and student volunteer groups such as the Sharpe Scholars Program.
- Use biodiesel produced onsite to power diesel generators on campus
- Current biodiesel station is a project of the Sharpe Scholars program, partnered with the Williamsburg Unitarian Universalist Church and the Greening Williamsburg Coalition
- Modify existing biodiesel station to increase production capacity to 50 gallons per week
- Construct a second refining station, possibly on the Facilities Management site on South Boundary Street
- See Appendix D for first-year cost estimates

Student Contributor: Clare Stankwitz ‘11

3.6. Long Term Goals

- Retrofit every building on campus with electricity and HVAC-efficient materials
- Produce a portion of the College's needed energy via on-site, alternative sources
- Install geothermal heat pumps for building temperature control to defray energy costs
- Photovoltaic (PV) panels installed on all compatible residential buildings
- Use of federal and other incentives, grants, and loans to fund alternative energy installations
- Increased public-private funding agreements for renovations (with companies such as Johnson Controls, etc.)
4. Landscape

Vision

Improving landscape practices requires implementation of remediation methods as well as preventative measures in order to bring the physical operations of the College in line with its mission for environmental sustainability. Through small changes to current landscaping practices, the College will improve the sustainability of Grounds & Gardening activities and the health of the local environment.

Current Initiatives

- Wildflower Refuge native plantings with information plaques
- Employment of BMPs in recreating the landscape behind Landrum Hall
- Riparian buffer area in progress behind The Commons

Proposals

4.1. Porous Paving Parking Lots
4.2. Storm Water Management for the College of William and Mary
4.3. Long Term Goals

4.1. Proposal: Porous Paving Parking Lots

Project Description

Runoff from paved areas on campus has caused extensive erosion and increased the amount of sediments in Lake Matoaka. The use of porous concrete in the eventual reconstruction of campus parking lots will greatly ameliorate current runoff and sedimentation problems.

Porous concrete is regular concrete without filler materials such as sand, resulting in a smooth textured surface with void spaces allowing water to seep through at a rate of 3-5 gallons per minute, eliminating many of the erosion problems that occur due to large impervious surfaces. The initial installation costs more than with regular concrete, but other systems to deal with storm water do not have to be built, thus saving money overall. Overall, porous concrete is a reasonable and easy way to become more sustainable.

The rising popularity of pervious paving can be seen in recent projects within the Williamsburg and Hampton Roads area. In spring 2008, The Prime Outlets off Richmond Road replaced 558 parking spaces with 828 new spaces using porous concrete. In December 2007, the City of Williamsburg revealed intent to change
parking lot regulations to having medians with plants with a width of 10 ft at 10 spot intervals. As early as 1995, Sentara Bayside Hospital in Virginia Beach, VA switched to porous concrete.

- Relieve sediment pressures from runoff into Lake Matoaka
- Filter out pollutants in storm water
- Let water reach the water table rather than flow over it like traditional concrete
- Control flooding
- Reduce risk of hydroplaning
- Does not contain asphalt, which accounts for 90-95% of hydrocarbon pollution
- Reduce heat island effect as light color attracts less sun
- Reduce need for retention ponds and demand on sewer systems
- Reduce storm water impact fees

Student contributor: Kimberly Garrett ‘11

4.2. Storm Water Management for the College of William and Mary

Project Description
Installation of further water retention technologies on campus will reduce runoff, sedimentation, and increase water quality and overall health of the Lake Matoaka watershed.

Storm water flow can be reduced by
- Rain gardens with native plants
  - Create depressed collection area filled with permeable material to facilitate slow evaporation and absorption of rainwater
- Cisterns at new construction sites to retain storm water runoff from buildings
- Rain barrels can be integrated into the landscaping around buildings and the collected water can be used for landscaping, avoiding the use of potable water for this application

Student Contributors: Christy Ottinger ‘10, Dana Taylor ‘10

4.3. Long Term Goals

- Elimination of harmful fertilizers in campus landscaping; further transition to native and perennial planting
- Rain barrels on all high runoff campus buildings
- Replacement of all annual flower gardens with perennial gardens
- Installation of green roofs on buildings such as Phi Beta Kappa Hall, Yates Hall, School of Education building
5. Transportation

Vision

Reducing the dependence on individually-owned cars will decrease the College's carbon dioxide emissions and parking problems, and create a community where students are able to get around easily in an environmentally conscious manner.

Current Projects

- Communal Bike Program: free 24-hour bike rentals available at the University Center (http://sa.wm.edu/projects/bikes.php)
- Williamsburg Area Transport (WAT): (http://www.williamsburgtransport.com/)
- Biodiesel manufacturing partnership with Sharpe Community Scholars, Williamsburg Unitarian Universalists Church (WUU) and Aberdeen Barn Restaurant

Proposals

5.1. Transportation Audit
5.2. Biodiesel: Addressing Transportation at the College
5.3. Zip Cars: Individual Mobility with Community Support
5.4. Long Term Goals

5.1. Transportation Audit

Project Description

Conducting a full audit of the transportation habits of all members of the College will highlight the areas and demographics in which the College will see the most improvement in transportation efficiency.

- Collaborative audit through Parking Services, Williamsburg Area Transport, Campus Police, and Student Life surveys to determine rate of car, bus, and bicycle use to and from campus
- Audit conducted through Student Affairs and the Committee on Sustainability
5.2. Biodiesel: Addressing Transportation at the College

Project Description
Fuel Williamsburg Area Transport with biodiesel, derived from locally donated waste vegetable oil and from various local vendors.

- See project 3.4. Addressing Campus Fuel Oil Use with Waste-Based Biofuel
- Expansion and support of current Sharpe Scholars and Williamsburg Unitarian Universalists Church biodiesel project
  - Purchase two 50 gallon wash tanks (one to replace a 25 gallon tank located in the Keck Lab)
  - Create an additional 50 gallon wash tank facility
  - Combined facilities would produce an output of 100 gallons of biodiesel a week
    - The remaining necessary fuel for WAT buses can be purchased from local biodiesel vendors

Student Contributors: Sam Meckley ’10 and Clare Stankwitz ’11

5.3. Zip Cars: Individual Mobility with Community Support

Project Description
Creating a Zip Car program at the College will decrease individual car use, needed parking space, and overall greenhouse gas emissions. This daily car rental program will increase community mobility and carpooling as well.

- University Partner Program
  - No up-front cost to the university: only parking space needed
  - Rental age is 18 for university students
  - $25 per year joining fee, minimum of $7.50 per hour driving cost

Some colleges currently using the Zip Car program: Middlebury College, George Mason University, Wellesley College, University of California Santa Cruz, Harvard University, Brown University, and Amherst College.

5.4. Long Term Goals

- Fleet vehicles of the college (such as those used for athletics and academic departments) be transitioned into alternative-fuel vehicles, clean diesel, electric and hybrid vehicles
- Recycle all used and damaged tires and batteries
- Expand carpooling and shuttle programs to increase student, faculty, and staff use
- Publicize alternative transport opportunities in the city of Williamsburg
- Commit to no further parking lot construction, eventually leading to conversion of parking sites for other uses
6. Waste

Vision

With thousands of students and faculty, William and Mary creates the waste of a small city. In order for the College to become sustainable, it is necessary to consider the varieties of waste we create and find ways to creatively reduce our consumption and improve our disposal practices.

Current Programs

- Recycling in student housing is handled by Facilities Management
- Recycling in New Campus academic buildings is handled by SEAC and Alpha Phi Omega
- Reusable mug program has been introduced in campus dining facilities
- The Commons dining hall composting program in cooperation with SEAC

Proposals

6.1. Campus Waste Audit
6.2. Reducing Paper: Banner Coversheets and Duplex Printing
6.3. Student Salvage Sale
6.5. Long Term Goals

6.1. Campus Waste Audit

Project Description

It is necessary to conduct an audit of the College’s waste and recycling output before beginning initiatives to improve waste disposal, resource efficiency, and recycling capacity. See “Greening the Green and Gold: 2002 Environmental Assessment of the College of William and Mary” for more details on solid waste and recycling at the College.

- Done under the supervision of the Committee on Sustainability
- Collaborative effort between Waste Management, recycling sites, and numerous areas of the College, such as Residence Life, Dining Services, Facilities Management, Grounds & Gardening and academic and athletic departments
- Audits of solid waste, recycled material, water waste, construction waste, etc.
6.2. Reducing Paper: Banner Coversheets and Duplex Printing

Project Description

Banner Coversheets

Currently, our school operates on a Banner coversheet system and a simplex printing setting. Banner prints out a sheet of paper for every student’s print job showing user name and current IT print balance. Eliminating this practice in the Swem Library printers and various other campus computer labs would be a simple and affordable way to reduce paper waste.

In an informal survey, Albright College, Bowdoin College, Rice University, Tufts University, Vassar College, Valparaiso University, and Williams College all noted that their school has no cover page system and have encountered few problems in claiming printed documents. Students can access their print balance through the current desktop link as well as on the IT website (https://www.wm.edu/it/bill/index.cfm).

Duplex Printing

Placing duplex printing (double-sided printing) as the default printing setting would further reduce paper waste, nearly cutting paper usage in half. For professional documents and academic papers, an instruction card at each computer would assist in switching duplex print setting to simplex print settings, as shown below.

Sample business card-size instruction sheet for switching duplex print settings to simplex print settings, to be attached to computer monitors:

```
Need to Print Single-sided?
Here’s How:
1) Go to the Print Menu
2) Click “Properties”
3) Click on the “Finishing” Tab
4) Check box for “Print on One Side”
5) Click “OK”
6) Click “OK” on the Print Menu
```

From these savings, William and Mary could implement a policy of using only 100% recycled and chlorine-free paper. Middlebury College began such a practice, and found the switch cost only a $100 annual increase, one that was easily offset by a decrease in paper consumption.

Student contributors: Mallory Hogan ’09, Christine Kudrav, and Richard Walsh ’10

6.3. Student Salvage Sale

Project Description

At the end of every year, students moving out of their dorm rooms produce hundreds of tons of waste that will eventually find their way to landfills, bringing a great deal of environmental cost and landfill and disposal fees for the College. Freshmen and upperclassmen return to school in the fall, oftentimes buying furniture, appliances, carpets, electronics and many other items which had been dumped just months before.
A Student Salvage Sale will close this gap between spring waste and fall need, receiving donations of goods at the end of the year and holding a sale of these items at the beginning of the following year. This program would reduce waste, decrease costs for the College, and be a cheap alternative for students.

- Donation centers would be set up in all dormitories, increasing accessibility and ease. The items would be stored during the summer either on campus, or in an off-campus storage facilities such as Eastern State Hospital
  - The profits from the sale in the fall would pay for the storage
  - The Student Salvage Sale would be run in a partnership with the Office of Student Volunteers and Residence Life
    - To ensure sufficient volunteers, student volunteer groups will receive a portion of the earnings of the sale proportionate to hours their members volunteer
  - Volunteers (approximately 12) would arrive a week before orientation to price and set up the sale
    - The sale would take place the week of orientation until the first day of classes

Student contributors: Judith Krauss ’10, Kristin Mahalak ’10, Alex Olaya ’10, Kunal Bhatia ’09, Yasha Mathur ’09, Megan Snell ’11


*Project Description*

There are multiple ways to encourage water conservation and reduce water waste in bathroom facilities of residence halls, academic buildings, and dining halls.

Possible projects include:

- Install waterless or pint-flush urinals
  - Retrofit into existing urinal infrastructure
  - Estimated $350-400 for waterless, $600-700
    - For a detailed comparison study between waterless and pint-flush urinals, see Appendix E
- Upgrade toilets to dual-flush capable toilets
  - Two flushing options based on waste, with the liquid waste setting using a smaller amount of water than solid waste
  - Estimated $300-700 per unit
  - Use 66% less water than 2.9 gallon toilets
- Place low-flow aerator nozzles in bathroom faucets to reduce amount of water with no sacrifice to water pressure performance
  - Estimated $1-2 per unit
  - Uses 0.5 GPM (gallons per minutes)
- Install electric hand dryers, replacing paper towels
  - Reduces trash and operating costs
  - Xlerator dryer recommended, due to its ability to dry hands in approximately ten seconds (comparable time to paper towel drying)
  - Estimated $400-500 per unit

Student contributors: Lewis Blake ’08, Martha Morris ’08, and Patrick Malin ’09
6.5. Long Term Goals

- Expand the recycling program from student housing to all academic buildings, dining areas, sporting and other William and Mary events
  - Expand types of materials able to be recycled
  - Place recycling bins in public areas to increase use
- Reuse or recycle building materials and various supplies in demolitions, construction and renovations
- Use environmentally friendly cleaning products in maintenance / housekeeping
Appendices

Appendix A: Resources

EDUCATION
Greening William and Mary: A Path for Leadership and Responsibility. 2008.
The College of William and Mary. <http://greeningwm.com/>
Grist Environmental News and Commentary. “Fifteen Green Colleges and Universities.”
Steptoe, Sonja. “Getting Schools to Think and Act Green.” Time, (27 August 2007).

FOOD
"Realfood Campus Challenge (under construction)" <http://realfoodchallenge.org/>
"The Greening of Swarthmore" <http://www.swarthmore.edu/x10965.xml>
"Yale Sustainable Food Project" <http://www.yale.edu/sustainablefood.html>

Sustainable Food Procurement and Preparation
"Farm to College Food Security Coalition" <http://www.farmtocollege.org/resources.htm>
"Food Alliance’s Sustainable Food Purchasing Policy" <http://www.foodalliance.org/sustainablefoodpolicy/Sustainable%20Food%20Policy%20Guide.pdf>
"Local Harvest Farmer’s Network" <http://www.localharvest.org/>

Farm Internship Field Study
"Sustainable Farming Internships and Apprenticeships" National Sustainable Agriculture Information Service <http://attrainternships.ncat.org/>
"Foundation for Sustainable Development” <http://www.fsdinternational.org/>

Campus Farm
"Yale Sustainable Food Project" <http://www.yale.edu/sustainablefood.html>
"Small Farm Success Program" <http://www.smallfarmsuccess.info>
"Dilmun Hill Student Organic Farm" Cornell University Department of Horticulture <http://hort.cals.cornell.edu/cals/hort/about/dilmun-hill/index.cfm>

ENERGY

Energy Audit
Wayland, Joshua. “Greenhouse Gas Inventory for the College of William and Mary: A Summary.”

Biodiesel

LANDSCAPE

Porous Concrete
Balogh, Anne. "Pervious Pavements-Helping the Environment with Concrete."
<http://www.lid-stormwater.net/permpaver_costs.htm>
"Pervious Concrete Pavement.” Pervious Concrete.
Green Roofs
Green roofs at other universities:
- Michigan State University: http://www.hrt.msu.edu/greenroof/
- Various: http://www.greenroofplants.com/university.htm

“Green Roofs in Urban Landscapes.” University of Florida http://edis.ifas.ufl.edu/EP240
United States Environmental Protection Agency – Integrating Water and Waste Programs to Restore Watersheds. http://www.epa.gov/superfund/resources/pdfs/cross-program.pdf,

Rain Barrels
“Rain barrels.” http://www.standardmethods.org/
“Rain barrels.” http://www.dnr.state.md.us/ed/rainbarrel.html

TRANSPORTATION
"Zipcar.” http://www.zipcar.com/universities/
Other universities with Zip car programs:
  http://www.yale.edu/sustainability/zipcar.htm
  http://www.middlebury.edu/administration/enviro/initiatives/

WASTE
Audit
“Greening the Green and Gold: 2002 Environmental Assessment of the College of William and Mary.”
http://itrobe.people.wm.edu/greeningWMv08.28.02f.pdf

Salvage Sale

Urinals


Mahler, Robert; et al. “Household Water – Dos and Don’ts.” University of Idaho College of Agriculture website.

Appendix B: Possible Sustainability Logos

past 1 future

tradition 1 innovation

sustainable

William & Mary

sustainability initiative

past • future • tradition • innovation
Funding the Fun!

The College of William and Mary passed the Green Fees referendum on March 20, 2008! This referendum asked the student body whether it would be willing to pay $15 dedicated to funding sustainable projects on campus. An astounding 85% of students voted in favor of the fee, proving that students are willing to take steps to a more environmentally aware campus.

The students who worked to get this referendum passed asked the College to “embrace the new standard for forward-thinking universities” and saw this as an obligation for our campus. They want to use the money to help the College become a leader in environmental sustainability.

The College now has its very own Green Fund!

With this money the College will be able to fund sustainable endeavors that will make us a leader amongst schools of higher education. As students of the College we should be proud that we are taking steps to improve on the dismal D– we received on the “Campus Sustainability Report Card” awarded by the Sustainable Endowments Institute—and passing the Green Fees is a great start!

Be sure to visit www.greeningwm.edu for more updates on Green Fees!

The Flat Hat Wants YOU!

Interested in the environment and looking for a way to get involved? The Flat Hat newspaper wants you! The Flat Hat is currently looking for a student not already involved in any environmental interest groups to become a story researcher focused solely on topics regarding the environment and William and Mary campus sustainability efforts.

The student should not have a predetermined opinion one way or the other about environmental issues to avoid bias in reporting. Rather, the potential researcher should be dedicated to finding noteworthy information to make interesting articles for readers. If you are interested, contact Maxim Lott at mclott@wm.edu or Alex Guillen at acguill@wm.edu for more information.
Appendix D: 3.5. Addressing Campus Fuel Oil Use with Waste-Based Biofuel

Total Estimated Cost for First Year of Operation
(Maximum Capacity, 30 weeks per year)

<table>
<thead>
<tr>
<th>Item</th>
<th>Fixed or Variable</th>
<th>Cost Per Week (if Variable)</th>
<th>Cost if Fixed</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Hydroxide</td>
<td>Variable</td>
<td>$44.43</td>
<td>N/A</td>
<td>$1330.29</td>
</tr>
<tr>
<td>Methanol</td>
<td>Variable</td>
<td>$40.00</td>
<td>N/A</td>
<td>$1200.00</td>
</tr>
<tr>
<td>Upgrade to Existing Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$202.72</td>
<td>$202.72</td>
</tr>
<tr>
<td>Stand for New Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$101.70</td>
<td>$101.70</td>
</tr>
<tr>
<td>Hot Water Heater for New Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$254.00</td>
<td>$254.00</td>
</tr>
<tr>
<td>Clear Water Pump for New Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$28.99</td>
<td>$28.99</td>
</tr>
<tr>
<td>Wash Tank for New Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$202.72</td>
<td>$202.72</td>
</tr>
<tr>
<td>Carboy for New Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$98.00</td>
<td>$98.00</td>
</tr>
<tr>
<td>Plumbing for New Station</td>
<td>Fixed</td>
<td>N/A</td>
<td>$126.99</td>
<td>$126.99</td>
</tr>
<tr>
<td>Photovoltaics</td>
<td>Variable*</td>
<td>$24.08</td>
<td>N/A</td>
<td>$722.40</td>
</tr>
<tr>
<td><strong>Total Cost per Year</strong></td>
<td>N/A</td>
<td><strong>$108.51</strong></td>
<td><strong>$1015.12</strong></td>
<td><strong>$4270.42</strong></td>
</tr>
</tbody>
</table>

*This would entail both fixed and variable costs, but the only quote available without an official evaluation is in terms of kilowatt-hours per week, which is variable format.

payback in years assuming 7800 flushes/yr*

Estimated Water and Sewer Rates for William and Mary

<table>
<thead>
<tr>
<th>Year</th>
<th>Water Rate per 1000 gal.</th>
<th>Sewer Rate per 1000 gal.</th>
<th>Combined Water and Sewer Cost per 1000 gal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$3.30</td>
<td>$2.65</td>
<td>$5.95</td>
</tr>
<tr>
<td>2009 (15%)</td>
<td>$3.80</td>
<td>$2.29</td>
<td>$6.09</td>
</tr>
<tr>
<td>2010 (30%)</td>
<td>$4.29</td>
<td>$2.39</td>
<td>$6.68</td>
</tr>
</tbody>
</table>

Estimated costs for current 1 gallon flush urinals on campus

- 2010 rates: $11.68
- payback in years: 1.9
- water and sewer cost per 1000 gal, 2010 rates: $6.94
- cost of Toto automatic flush valve: $175.00
- cost of cheapest Kohler urinal: $142.00

Scenario #2: Installing a no-flush urinal instead of replacing non-functioning flush urinal

- Williamsburg Sewer Rate 2008: $2.39
- cost difference between replacing with current urinal style vs. installing Waterless no-flush: $60.00
- Combined Water and Sewer Cost per 1000 gal 2008: $5.95

Scenario #3: Installing Zurn pint flush urinal instead of replacing non-functioning flush urinal

- savings per 1000 gal in 2008: $5.21
- savings per 1000 gal in 2010: $6.14
- cost of fixture: $600.00
- difference between replacing with current urinal style vs. pint flush: $283.00

2008 rates

- payback in flushes or gallons: 14,478
- payback in years: 1.9

2010 rates

- payback in flushes or gallons: 11,686
- payback in years: 1.5