



The Greening of Swarthmore

Sustainability Action Plan

Swarthmore College 2007

Report Structure

The ***Sustainability Action Plan*** is divided into five parts: *Mission Statement*, *Executive Summary*, *Green Action Areas*, *Conclusion*, *Campus Supporters*, *Appendix*, and *Sources*. Below is the purpose of each part and a description of what each part contains.

The ***Mission Statement*** explains the origin and goals of this report. It also places Swarthmore in the broader context of the environmental movement and world-wide efforts to decrease negative human impacts on the natural world.

The ***Executive Summary*** provides a goal-oriented plan for making Swarthmore a more sustainable campus. The steps included are the key actions that need to be taken in order to move forward on a greening campaign. The goals contained in the *Executive Summary* are taken from the *Green Action Areas*, which provide a more in depth look at what Swarthmore is doing now, and what it can do in the future, both short and long term, to meet the goal of becoming a sustainable institution.

The ***Green Action Areas*** divides the Greening of Swarthmore into eight subgroups: Food Services, Administration, Transportation, Sustainability in the Academic Curriculum, Water, Energy, Investments, and Waste and Recycling. The *Green Action Areas* give background and context to the goals in the *Executive Summary*. This section expands on the mission of this document by provided short and long-term opportunities for making Swarthmore a greener institution. The goals are divided between short (within the next 2 years) and long (through the life of the college) term goals.

The ***Campus Supporters*** lists the individuals, groups, offices, and departments that have agreed to support this plan. Many of these people will also work to ensure that Swarthmore continues to move towards becoming greener.

The ***Appendix*** contains information (data, graphs, figures) that are cited in the *Green Action Areas*.

Mission Statement

"If higher education is not relevant to solving the crisis of global warming, it is not relevant, period."

- David F. Hales, President, College of the Atlantic

The evidence is now undeniable: our planet is in a state of environmental crisis. We, the members of a growing global community, have a moral obligation to unite in our efforts to halt the unprecedented environmental degradation which has resulted from our irresponsible use of the planet's resources. Never before has the slogan "think globally, act locally" been more significant.

Swarthmore College, as a prestigious academic institution dedicated to fostering ethical intelligence, has a particular obligation to act. We, the students of the spring 2007 Environmental Studies Capstone Seminar, recognize that the world is reliant on an ever diminishing pool of natural resources. We can no longer afford to overlook the environmental implications of our daily actions and intellectual pursuits. For this reason, the capstone seminar is developing a comprehensive Sustainability Action Plan intended to guide students, faculty and staff towards a more environmentally responsible existence. Sustainable campus development is guided by the central value of promoting development that meets the vital needs of the present without compromising the ability of future generations to meet their own vital needs.

The Environmental Studies Capstone Seminar (Spring 2007) members include Colton Bangs, Juliet Braslow, Martha Hoffman, Aaron Hollander, Elisabeth Jaquette, Jamie Kingston, Kristin Letizel, Sarah Manion, and Jonathan Stott. The class is led by Professor Mark Wallace of the Religion department. We are committed to Swarthmore's leadership among academic institutions in the effort to reduce anthropogenic environmental harm. As a class, we have produced this plan in an attempt to guide a campus-wide and institution-wide greening campaign.

The plan will focus on eight areas of "green action": *Energy* (efficiencies, alternative sources, conservation, green building plans), *water* (source to output including waste), *transportation* (alternative modes, parking and travel dis/incentives), *food* (community supported agriculture, source to output including waste), *sustainability education* (managing the commons as learning objective at all levels of the curriculum), *investments and alumni* (investment priorities, community development, transparency, public relations), *sustainable administration* (institutional commitment to leading by example, sustainable coordination, measurable goals), and *resource management* (recycling, managing plant/animal species and habitats across campus).

Finally, the seminar will lead by example through direct action. We will begin taking action on campus to demonstrate how our comprehensive action plan can be used to create real, immediate and sustainable change on Swarthmore's campus.

We would like to extend special thanks to those who provided support and information in the making of this document: Al Bloom, John Caskey, Richard Clugston, Tom Cochrane, Maurice Eldridge, E. Carr Everbach, Lindsay Gilmore, Stu Hain, Jennifer Halpin, Amy Hart, Raymond Hopkins, Jeff Jabco, Jennie Keith, Steve Lin, Linda McDougall, Arthur McGarity, Rachel Merz, Anne Murphy, Nancy Nicely, Hans Oberdiek, Robert Powell, Ralph Thayer, Rick Vallery, Suzanne Welsh, and Judy Wicks.

Executive Summary

A. Campus Sustainability Committee

Goals:

- Oversight and accountability to ensure the college is achieving both long and short term sustainability goals
- Coordination and sharing of ideas, knowledge, and projects related to sustainability
- Communicate the College's commitment to and progress towards sustainability to the public

Costs:

- Funding for publicity, mailings, and initiatives

See (IIIB) Administration

B. Parking Permit Fee System

Goals:

- Reduce automobile traffic on campus and community roads
- Reduce carbon emissions from various modes of transportation
- Encourage use of public transportation
- Improve regional air quality

Costs:

- Administrative costs associated with permit system
- Additional enforcement demands

See (IIIC) Transportation

C. Green Investment Strategy

Goals:

- Investigate green investment alternatives and identify investment portfolios that adhere to Socially Responsible Investment standards
- Support green companies and make environmentally friendly business practices more economically viable
- Hold markets, businesses, and other institutions responsible for their environmental practices
- Extend social responsibility to Swarthmore's financial decision-making

Costs:

- Potential for slightly diminished portfolio returns

See (IIIG) Investments

D. Green Menus: Purchasing Sustainable Food

Goals:

- Provide healthier food for campus community that is produced with fewer hormones, antibiotics, pesticides, and toxins
- Reduce environmental impact of energy expended to bring our food to campus by purchasing from local farmers
- Take a visible and progressive stance on the environmental importance of food choices that will attract prospective students who are interested in following and creating a healthier, more sustainable university

Costs:

- Higher prices of humane and sustainable food options

See (IIIA) Food Services

E. Greening Dining Services - Materials

Goals:

- Replace disposable polystyrene dishware and plastic utensils with biodegradable alternatives
- Reduce the volume of waste generated by Dining Services
- Reduce the College's consumption of non-sustainable and environmentally deleterious materials

Costs:

- Higher prices of environmentally friendly alternatives

See (IIIA) Food Services, (IIIH) Waster and Recycling

F. Food Waste Composting Program

Goals:

- Compost all pre- and post- consumer food waste
- Save money on garbage pickup

- Save high water and energy costs of garbage disposal in Sharples
- Produce high quality compost near campus
- Decrease carbon footprint
- Decrease local environmental impacts

Costs:

- Capital costs and planning in setting up food waste collection system
- Employee or student in charge of composting program

See (IIIA) *Food Services*

G. Printing Caps on Public Printers

Goals:

- Reduce paper waste by changing habits and attitudes in order to print only the most vital documents.
- Cost reduction in paper/printing costs
- Accrue revenue from student and faculty exceeding the printing quota
- Decrease solid waste production

Costs:

- Capital costs in setting up a printer management system

See (IIIH) *Waste and Recycling*

H. Sustainability Orientation Workshop

Goals:

- Create a sense in incoming freshmen that environmentally-sensitive living is central to the culture of Swarthmore
- Inspire environmentally friendly practices in the student body
- Incorporate sustainable awareness into the general mindset of the students

Costs:

- Time invested in organizing and running the workshops
- Cost of any copies needed for the workshops

See (IIID) *Sustainability in the Academic Curriculum*, (IIIF) *Energy*

I. Faculty Environmental Forum and Networking

Goals:

- Initiate thought among the faculty about environmental sensitivity at the curriculum level
- Create a resource by which faculty who are interested in sustainability can connect with one another
- Help faculty to address a planetary context in the classroom
- Forge links across departments through faculty members interested in the same local and global issues

Costs:

- Time it takes to create, revise, and distribute a questionnaire on sustainability
- Time of the faculty involved

See (IIID) Sustainability in the Academic Curriculum

J. Rotating Visiting Professorship in Sustainability Studies

Goals:

- Permanently and diversely represent the depth and breadth of academic work at the mutually-supportive intersection of culture and nature
- Provide sustainability studies as an intellectually engaging option in all divisions of the college.
- Enable Swarthmore students to learn cutting edge material in the field that is not currently taught by faculty
- Offer engaging new classes in environmental studies without taxing the teaching load of professors who are needed in their own departments.

Costs:

- Salary and other expenses of the additional professorship

See (IIID) Sustainability in the Academic Curriculum

Green Action Areas

A. Food Services:

Mission Statement:

Industrial agriculture in the United States has long been a serious source of damage to the air and water, with unsafe working conditions and radically inhumane use of animal life. Agriculture in this country is the sector that produces the second-highest annual quantity of greenhouse gases: below industry but *above* transportation. Though it is not within our capacity as a university to change the entire area of food production, we can make important choices in the food that we purchase and the practices of our dining services, and thus demonstrate our awareness of a national issue and our commitment to act responsibly when possible. Though of course all choices are limited by budget, we feel that above all it is essential to have environmental responsibility be central to Dining Services' mission. Rather than waiting for specific student pressure to remedy unsustainable behavior and purchasing, we would like to see the necessary communication between the administration and Dining Services to make continual movement towards environmental consciousness financially feasible.

Though the energy use measures needed to make our dining facilities sustainable are essentially similar to those of all sectors of the college, Dining Services has a unique challenge when it comes to purchasing from sustainable sources. Because the industrial agriculture system in the country is inherently problematic - due to its tremendous pollution, dependence on nonrenewable fuels, and cruelty to both workers and animals - we urge that, as much as possible, Swarthmore move towards acquiring food from regional, non-industrial sources. Community-supported agriculture comes with a price tag, but for an institution committed to social responsibility, a gradual divorce from factory farming is essential. By increasing our contracts with regional farms, Swarthmore will cut emissions from cross-country and international importation, support the livelihood of the local agricultural community, vastly increase the health value of the food served at the college, and send a message of non-tolerance to the environmental and social irresponsibility of industrial agriculture.

The College's Role:

Sharples was built in 1964 to serve the food service needs of the entire campus. Operation of Sharples was transferred from Amaco; an outside dining services company, to in-house management in the early 1990s so that the College would have better control of decision making. We recently conducted an audit and found that Sharples has already implemented various sustainability measures, some inspired by the management, and others by student groups and individuals. Management and Facilities initiated environmentally friendly measures include: fluorescent lighting in the kitchen; purchasing of products in recycled packaging; an extensive recycling program (including glass, metal, plastics, and cardboard); reusable plates, silverware, aprons, hats and towels; condiments distributed in large dispensers; and a program where excess food is donated to City Team Ministries in Chester. Additionally, the dishwasher, installed by the Facilities Department last year, uses concentrated detergent and reuses its rinse-water on a two-hour cycle. Dining Services has recently added organic products (cereals, teas, and bananas) and locally grown fruits (including peaches, plums, nectarines, apples and pears) to their menu. There are a wide variety of student groups committed to increasing sustainability and nutrition at Sharples, and they have had mixed success in realizing reforms. We attribute this to two principle

reasons. Firstly, student commitment is inherently inconsistent due to the pressure of work and the fact that students eventually graduate and leave projects without leadership. Secondly, Dining Services is constrained by their budget and therefore unable to implement costly reforms. Successful student driven initiatives include relocating napkins to individual tables to reduce waste, eliminating veal from the menu, and having Fair Trade coffee available at Essie May's snack bar and the coffee bars. The student led Good Food Group, in conjunction with Dining Services, hosted a dinner in March, 2007 to promote awareness around sustainable food and is working to increase the amount of organic food regularly available through the newly formed Institutional Ethics Committee in the Lang Center. There have been several student-initiated composting programs for food waste enacted at different times, but none of these have succeeded in the long term due to student leaders' inconsistent commitment during exam periods and their eventual graduation. Currently, the largest obstacle to composting is student group's lack of access to a vehicle for the daily trip from the dining hall to the compost site. This April, our capstone seminar hosted a 'plate scrape-off' for two nights at Sharples, asking students to scrape their food waste into marked bins in order to raise awareness around issues of food waste. Through a partnership with Dining Services and the Good Food Project, we were able to compost all of the non-meat, non-trash waste collected during the two nights. The compost will be used on Good Food's newly established community garden plot. Evidence from the 'scrape-off' suggests that having students scrape their food waste into designated bins, as is regularly done at many colleges, reduces student waste. In 2003-2004, a student led lighting efficiency program completed 25% of its intended goals. Despite making some headway over the past few years, we believe that there is a significant opportunity for improving environmental sustainability in Swarthmore's food operations both in the short and long term, and that this progress can only be realized through greater coordination and commitment at the highest levels of the college.

Short Term Goals:

1. Increase energy efficiency on campus:

- Air curtains on loading dock door and refrigerators
- Turn off refrigerators over breaks
- Improve sealing on refrigerators
- Turn refrigerator lights off when not in use
- Turn off steam trays in serving lines between meals
- Turn off ovens when out of use, figure out start up time
- Turn off dining hall lights during day / in between meals

2. Promote water conservation:

- Install low-flow faucets where appropriate
- Composting program
- Signs promoting water conservation in kitchen

3. Conservation of solid waste:

- Initiate mug-use incentives at the coffee/snack bars
- Wrap sandwiches with paper rather than foil or plastic take-aways
- Trash bins for students food scraps

4. Composting program:

- Create a food composting pile at the leaf composting center. Instead of the current system of washing food waste down the sink or throwing out with the garbage, save the non-meat food waste from Sharples, Essie Mae's and catering. Organize a system for collecting the various food wastes and picking them up at the end of the day for transport to the compost pile. Sell compost to the public or use on campus as fertilizer. Alternatively, a company, EnviRelations, based in Washington, DC, offers affordable composting services for institutions such as Swarthmore. They provide the necessary bins and pick-up service. They plan on coming to the Philadelphia area sometime in the Summer-Fall of 2007.

4. Alterations of the food menu:

- Sugar shakers rather than individual sugar packets (Completed at Sharples in Spring, 2007, suggested for Tarble Grill, and Coffee Bars)
- 10% food from the region--target
- Student survey to assess sustainable food priorities
- Less food served per plate at Sharples
- Vegetarian night once a week at Center Stage serving area in Sharples
 - This measure may provoke backlash from students who insist on meat at every meal. In the spirit of compromise and free choice of diet we make no greater recommendation for reduction of meat at Sharples. However, a single vegetarian night per week would at least emphasize the reality that industrial animal agriculture is inherently unsustainable. Producing a pound of wheat requires 25 gallons of water while producing a pound of beef requires 2500 gallons of water; the unbalance in energy use and pollution is equally extreme. Though for some individuals, meat eating is an issue of animal cruelty, for every human being it is an environmental and a human rights issue. The air and water pollution from factory farms and manure lagoons is disastrous. Some studies estimate that if the American population reduced its meat consumption by only 10%, one hundred million additional people could be fed from the land, water, and energy use freed up from meat production. One does not have to be a vegetarian to simply eat less meat and make an impact on the planet - this is the rationale for a once-per-week vegetarian Center Stage at Sharples.

5. Administrative actions to be taken:

- Improve website with a focus on sustainability
- Recipe swap feature
- Write letter to food vendors asking for increased recycled packaging

Long Term Goals:

Once a budgetary commitment has been made to increasing the sustainability of the food sector on campus, the following long-term goals need to be implemented:

1. Menu changes:
 - Guaranteed rBGH-free dairy
 - Many industrially-produced dairy products have traces of the hormones injected into the cattle to increase production rates. Recombinant Bovine Growth Hormone

(rBGH), though it has been boycotted by 95% of non-factory dairy farmers and is banned in Canada and Europe, is widely used in the US and need not be identified on product labels. Use of rBGH is linked to least 20 veterinary health risks, including udder infection and mastitis, which contaminates the milk with pus and antibiotics used to treat the infections. Dining Services currently buys all of its milk from Wawa, which claims that its milk is mostly rBGH free and will likely be guaranteed certified within the next year.

- Cage-free, Humane standard eggs
 - Industrial eggs are collected from hens kept in "battery cages", ordinarily with a floor space smaller than a sheet of paper. Without space to move or stretch, and with the wire grids covered in blood and feces, battery caged hens are vastly more likely to become infected, suffer from osteoporosis, and require antibiotics to stay alive. Battery cage production has been banned in Europe for its excessive cruelty and dangerous use of antibiotics.
- Free range chicken; hormone free, humanely raised meats
- Increased purchase of organic and local fruits and vegetables
 - Though the predominant growing season in this area is May through November, other produce such as root vegetables, kale, spinach, and cabbage are available for longer. Through slight adaptations in the menu, we can maximize our use of such foods that are sustainably produced and cost little energy to move to our campus. At the Sharples Wellness Night in March '07, for example, a kale dish was a tremendous success even with students who were less inclined to choose these less common vegetables.
- Fish in accordance with Monterey Bay Aquarium Guidelines
 - The Monterey Bay Aquarium Seafood Watch program is intended to raise consumer awareness of the environmental impact of seafood consumption and enable safe and sustainable purchasing choices. Nearly 75% of the world's fisheries are either fully fished or over fished, and the surrounding ecosystems are often irreversibly damaged. Fish farms have a reduced impact on the oceans, but suffer from a slew of pollution and health issues resulting from heavy use of pharmaceuticals in the overcrowded tanks. By following the Seafood Watch guidelines (at little or no increased cost), we can ensure that the fish we purchase comes from sources that are not ecologically damaging. (See http://www.mbayaq.org/cr/cr_seafoodwatch/sfw_aboutsfw.asp)
- Organic grains

2. Energy

- Identify and replace old, inefficient technology in kitchen
 - Turn off refrigerator lights when not in use
 - Turn off steam trays in serving lines between meals
 - Turn off ovens when not in use
 - Turn off dining room lights during the day and in-between meals
 - Turn off toasters when not in use
- Energy efficiency improvements
- Install low flow faucets where reasonable

- Improve sealing on refrigerators
- Turn off refrigerators during break periods when not in use
- Install air curtains on loading dock doors and refrigerator doors
- Replace light bulbs with more energy efficient models
- Install motion sensors on lights in bathroom, refrigerators, storage rooms, small dining rooms
- Install LED exit signs
- Increase staff awareness of conservation measures
- Create signs to remind staff about water and energy conservation
- Educate staff about their roles in conservation
- Actively seek staff input for increased conservation measures
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3. Administration

- Budget incentives for cutting energy and water use
- Budget increases for sustainable food products
- Sustainability incorporated into Dining Service mission
- Energy and water use should be regularly monitored in Sharples to track the savings and results should be reported to the staff and wider campus for encouragement.

B. Administration

Mission statement:

In order to create a sustainable community at Swarthmore, the administration and the college as a whole must make an institutional commitment to lead by example. Campuses across the nation and around the world are beginning to examine how their institution affects the environment. The push towards a sustainable campus must come from both the bottom, through students and faculty, and from the top, through the administration. An administrative commitment to sustainability would include decisions that affect the day-to-day operation of the college. Such decisions range from short-term, such as what products Swarthmore purchases, to long-term planning of the direction of the college. In order to implement a consistent and successful sustainability strategy, Swarthmore will need to coordinate efforts among its faculty, staff, and students.

A key step in making Swarthmore more sustainable is the formation of a Campus Sustainability Committee. A committee is necessary for the long-term success of a sustainable Swarthmore; it would serve to coordinate campus efforts, provide information to students, faculty, staff, and the wider Swarthmore community, and it would maintain a formal commitment to sustainability. This Committee would play a key role in ensuring that the college is moving towards its long-term goals.

History/Current State of Affairs

Many of those involved with making decisions about the physical plant of the College are already invested in making sustainable decisions for the college. Sustainable alternatives are considered for

building and renovation plans, but often cost, familiarity, and comfort factors outweigh the long term environmental benefits of certain decisions. Some steps have already been taken in that all of the printer paper (including colored) purchased by the college has some recycled content. All renovations and new construction are done with sustainability and efficiency as some of the primary guiding principles of decision making. Student-led efforts to improve recycling and increase wind power purchasing (up to 35% in 2007) have been met by an encouraging and willing attitude from the administration. However, it is difficult for students, faculty, and staff to know whom to talk to about greening campaigns and initiatives or to share information on what measures are already being implemented because the college lacks a coordinated or centralized authority on sustainability issues.

For example, each office makes its own purchasing decisions. The day-to-day purchases are made by the administrative assistants and larger purchases are approved through the department heads. While using a common supplier (Office Basics, an office supply company that delivers directly to the departments), there are no guidelines around what products the college wants its offices to purchase. The decentralized purchasing system is essential to meeting the needs of offices that vary in services provided and each department has unique supply needs. However, the decentralized system currently in place makes it very challenging to create a "purchasing morality" and when individual departments or officers do make sustainable purchasing decisions; this is unrecognized by the larger community.

Short-term Goals:

In the short-term, each individual department and many of the offices on campus have the autonomy to make their own purchasing decisions. This allows the opportunity for each department to immediately commit to and take steps toward sustainable practices and purchases without requiring coordination with other departments. One way to facilitate these decisions is to provide the purchasers with easily accessible information as to what products or services are the most sustainable. For example, a list of the most sustainable products in the Office Basics catalogs from which most departments order should be given to all the administrative assistants along with a pledge to fill out to continue to make these green choices. Taking it a step further would include conducting research and talking to providers about 'life-cycle analysis' and 'full cost accounting' for the products, materials and services the college purchases. This takes into account the origin and fate of the materials used and environmental costs of a material's extraction, manufacture, and disposal that may not be reflected in the price the college pays for it. In this area, immediate goals include commitments to sustainable purchasing from individual departments, administration offices, laboratories, and other facets of the college. The commitment would be in the form of an Environmentally Friendly Purchasing Pledge, which would be circulated to the people in charge of purchasing decisions. Purchasers should attempt to minimize packaging used in delivery of products and make sure it is made of recycled materials, reused, and recycled if possible. In addition to purchasing decisions, the departments and offices can make a commitment to minimize waste and recycle any products that can be processed in this area.

Long-term Goals:

The key to a successful college-wide commitment to sustainability is the creation of a Campus Sustainability Committee (CSC). The CSC would consist of faculty, staff, administration, and students with the aim of reaching as many areas of the college as possible. At a minimum, we recommend members of the committee consist of a member of the Environmental Studies faculty, a Board of

Managers member from the Committee for Social Responsibility, a staff member from Facilities, a representative from the Investments Office, and a staff member from Dining Services. The CSC should also include student representatives from Earthlust, the Good Food Project, and the Animal Rights Coalition. The Committee would also have representatives from courses that address sustainability action that is focused on the Swarthmore Campus. These representatives would fill short-term positions that last for the duration of the course and change on a semesterly basis. We would also recommend that the college extend an invitation to a member of the Swarthmore EAC to sit on the CSC as well. The committee would serve as a coordinating body to ensure that all of the campus efforts are working in the same direction, to make connections between similar efforts, and to avoid conflicting or overlapping efforts. The CSC would also serve as a resource for those who wish to initiate new campus efforts and as an advisory committee for the administration and the college as a whole. Among its first projects, if the CSC deemed it necessary, would be to contract for a sustainability auditor to establish where the college stands now. Finally, the Committee would serve as the voice of Swarthmore's sustainability efforts. The CSC would present the official policy and direct the public relations aspect of the Greening of Swarthmore. In this way the Committee would be a resource to the greater community of Swarthmore, and more generally the community of higher education.

Ideally, the CSC would serve as an interim solution to the broader need for a Sustainability Manager position. A new position will be possible after the successful fundraising required to support a new staff member. This position would centralize the duties of the CSC in a full-time position. Many colleges and universities have already responded to the need for centralized oversight to ensure sustainability plans and actions by creating Sustainability Coordinator positions and some have even developed Offices of Sustainability. For example, Yale appointed a Sustainability Director to critique, strengthen, and formally endorse recommendations before submission to the President. Bowdoin and College of the Atlantic also hired sustainability directors to “ensure sustainable future in all our activities” (COA website). Tufts now has an Office of Sustainability that serves as a resource, catalyst and advocate for environmental sustainability and as a bridge between ideas and their implementation. Following the examples of these institutions, Swarthmore’s Sustainability Coordinator would to provide constant assessment of the current state of the campus and the implementation of the action plan, help support existing programming efforts and recommend new initiatives/plans to the president, and communicate the complexity of sustainability and provide room for growth and evolution of the Swarthmore’s sustainable plans and actions.

Finally, Swarthmore College should adopt an official stance on the issue of climate change and the environmental impact of our current way of life. We recommend that Swarthmore join the 141 college institutions that have signed the President's Climate Change Commitment (see Appendix I). In doing so, Swarthmore would become a part of the movement within the academic community to make our countries institutions of higher education more sustainable through reducing carbon emissions and climate impacts.

C. Transportation

Mission Statement:

The automobile possesses some of the greatest challenges to our environment due to both its energy

consumption and emissions. According to the Federal Highway Administration, on-road motor vehicles account for 33% of America's carbon dioxide pollution, which is considered the major contributor to global warming. Likewise, cars, trucks, and motor bikes are responsible for emitting 51% of all carbon monoxide, 34% of volatile organic compounds, and 34% of nitrogen oxides, each of which contribute to air quality deterioration and smog¹. In terms of energy use, cars are equally problematic. The Environmental Protection Agency has established that cars and light trucks use roughly fifteen percent of the nation's entire energy, and are the largest users of petroleum, consuming 43% of the total.

²Meanwhile, the annual Transportation Energy Data Book shows that commuter trains consumed 22% less energy per passenger mile compared to airplanes and 23% less energy per passenger mile compared to automobiles. Intercity rail consumed 17% less energy per passenger mile compared to airplanes and 18% compared to automobiles³. Mass transit produces much less pollution than automobiles and airplanes. According to the Sierra Club, **passenger trains produce 3 ounces of pollution** per passenger per mile while automobiles produce 9.57 and airplanes produce 15.9 respectively.⁴

Improving transportation efficiency at the College, and thereby reducing our use of automobiles, is an integral part of the school's wider commitment to ethical intelligence and environmental sustainability. Fortunately, there is significant opportunity for intervention at Swarthmore College. Many of Swarthmore's faculty and administration live within close proximity to the campus or in Philadelphia which is served by frequent commuter rail service. Currently, many of these employees drive to the College because there is no incentive to walk/bike or ride the commuter train. Thus, we suggest the College implement parking fees to discourage these users from driving and offer incentives to encourage walking, biking, or using the commuter train. Another significant opportunity lies in the fact that the college is conveniently located near two of the best served passenger rail lines in the country. Consequently, we believe a restructuring of the travel reimbursement system is in order. We also recommend that the college buy green vehicles, such as hybrids, for all future vehicle purchases. In the long term, we hope that Swarthmore actively encourages environmentally friendly transportation by making the campus increasingly friendly to bikers, walkers, and public transit users while discouraging the use of automobiles when feasible.

History/Current State of Affairs:

Currently, there is little being done at Swarthmore to minimize transportation emissions and automobile usage, despite readily available public transportation services, such as SEPTA and the college's "Philly-shuttle". Neither faculty nor students are expected to pay for their parking permits, and while there are bike racks available, there is no incentive to take advantage of them.

Short-term Goals:

¹<http://www.fhwa.dot.gov/>

² <http://www.epa.gov>

³ http://www.narprail.org/cms/index.php/resources/more/oak_ridge_fuel/

⁴ <http://www.sierraclub.org/sierra/200311/trains.asp>

In the short term, we have four major goals. First, we would like to reform the parking system such that parking permits cost money for faculty, administrative members, staff and students, as a way to encourage walking, biking, or public transportation use as an alternative to driving. We suggest parking fees that are significantly higher for faculty and staff that live within 1/2 mile of campus or 1/2 mile of a SEPTA station on the Media/Elwyn line. All other faculty and staff would pay a small fee per/semester. All faculty, staff, and administrators would have the option of receiving a free 'Green Permit' which allows parking on campus only during days/nights of extreme weather including heavy rains, snows, or winds as defined by Public Safety. Further, the 'Green Permit' would come with coffee bar credit. In order to accommodate staff who would like to have a Green Permit but need a car on campus for just some days, the school would offer daily permits online and in the Public Safety office for a small fee.

Benefits:

- Reduced automobile traffic on campus and community roads
- Reduced carbon footprint of college
- Better air quality on campus
- Reduced usage of campus parking lots and associated maintenance costs
- Significant revenues raised from standard permits could be used for a 'sustainability fund' to pay for other projects

Costs:

- Minor costs associated with implementing the changes would be more than offset by money raised from standard permits. As we all ready have a public safety force which patrols campus lots and issues parking tickets, there would be no additional costs for enforcement.

As a supplement to the first goal, we are interested in getting a larger number of bicycle racks installed on campus. Thirdly, we hope to change the travel refund system for trips taken by Swarthmore faculty, staff, administrators, and visitors. We propose that the school should reimburse travel to locations that are serviced by the Philadelphia train routes (North East Corridor and Keystone lines) only when the train or bus is taken. Additionally, we would like to look into bus routes and determine what cities are easily accessible by bus, and then propose a similar conditional reimbursement. For destinations that are difficult to reach via public transportation, travel by car or van will continue to be reimbursed. These changes would make it much more likely that faculty would use buses or trains rather than airplanes or private vehicles, therefore reducing the school's carbon footprint. Finally, we encourage the college to launch an awareness campaign, educating people about the costs to the environment of their actions, informing them about the alternatives to driving that are available from this campus (i.e. the Philly shuttle), and encouraging more conscientious behavior.

Long-term Goals:

In the long term, we would like to work on greening the campus vehicles (public safety vehicles, maintenance, etc.). We want Swarthmore to ensure that as vehicles are replaced, only the most environmentally friendly vehicles that are economically viable would be purchased.

D. Sustainability in the Academic Curriculum:

Mission Statement:

A college can have a great impact on its environment not only in its physical operation, but also through the classroom itself. Educational institutions, Swarthmore included, have tremendous potential to prepare their students to think about the world in an integrated way, balancing our compartmentalization of knowledge with practical evaluation and creative attention to planetary interdependence. We recommend for it to be accepted that part of the responsibility of the college is to demonstrate the continuity of human systems with the natural world, and educate the students to incorporate an ethic of environmental sustainability into their lives. We hope to encourage the school to incorporate the environmental consciousness into all divisions, and make “ecological literacy” a pillar of Swarthmore students' education. In order to make this possible we feel it is best to take a two-pronged approach: working to build broad faculty networks alongside a more “top-down” angle through administration support.

History/Current State of Affairs:

Swarthmore currently offers two programs of study that educate students in environmental fields: an environmental studies minor, and an environmental science major (which is available through the biology department). Both of these programs integrate hard science with social scientific studies and the humanities. While the environmental science major exists, it is very difficult to complete all of the required courses in four years. The environmental studies minor relies on environmentally-oriented classes cross listed with other departments, with a mandatory senior capstone seminar designed to draw together and reflect on students' diverse preparations in ES. ES at Swarthmore is meant to be a broad introduction to this hybrid field and an adequate preparation for graduate school; however, the program suffers because its classes are offered only as the schedules of its participating departments permit. Classes such as Ecology and Intro to Environmental Protection are offered every year, while other important studies in the field - such as Environmental Economics, Environmental Ethics, or Environmental Education - might be offered as rarely as once in a four-year span. Nevertheless, the program inspires creative and passionate students to understand the many intersections of culture and nature and seek to engage with the health of the planet in their everyday behavior and intellectual lives.

Short-term Goals:

a) Establish communication with and between faculty members and create a faculty forum for idea generation and inspiration. The process has already been initiated by circulating a survey to Environmental Studies faculty for first responses (see Appendix - VIII); the survey may then be revised and passed on to all faculty members to encourage initial thinking about the role of a

planetary context in university education. The goal of this initiative is not so much to affect a unified front of faculty with regard to environmental curriculum, but rather to create a resource for faculty with good ideas but without the allies to move forward. As ideas about sustainability on campus and in the curriculum come forward from the surveys, we can put similarly-minded faculty in contact with one another. Ultimately there may evolve a low-maintenance, low-commitment Greening forum where faculty can propose initiatives, weigh support, and inspire partnerships for change across departments and divisions.

b) A rotating visitor professorship: modeled after the Lang Visiting Professorship for Issues of Social Change, a Visiting Professorship in Sustainability Studies would help green Swarthmore's curriculum in multiple, practical ways. We recognize, of course, that faculty appointments are great strains on the budget, and that several appointments in different divisions would not currently be possible. In a certain way, however, a single professorship that rotates between departments could actually better serve an overall goal of environmental curriculum. The Lang Professorship is able to bring highly distinguished scholars with notable social justice experience to temporarily join the Swarthmore community; the classes they teach and the lectures they give are well attended and meaningful to the whole community for the very reason of these professors' singularity. If the funding is achieved, we recommend such a professorship be extended to similarly distinguished scholars with similarly notable experience in effecting sustainability. By having the position rotate between departments and divisions, we ensure that the wide range of possibilities and cutting-edge research in the field is represented, and by distinguishing the professors in a manner recognizable to students (see again the Lang precedent) we help articulate the importance of sustainability to our intellectual pursuits. Though this initiative is marked as short-term, we realize that such a position cannot simply be created out of thin air. The "short-term" designation is to recommend that the *planning* for such an important post (which is itself contingent on funding) be begun immediately.

c) Organize a sustainability orientation workshop for the entering freshman. Drawing on the resources of the Environmental Studies students and faculty, and allying with student groups such as Earthlust, we aim to design a pair of workshops on everyday sustainability. The first would take place during RA training, providing tools and justifications to guide dorm residents to interact sustainably with their environment. The second workshop would take place during Orientation Week and would serve to instill not only the practical behavior of eco-sensitive living, but also the sense that sustainability is central to Swarthmore's community culture. Our goal is to have this workshop operational for the Class of 2011.

d) Create an optional pledge with which graduating seniors can vocalize a commitment to continued awareness of environmental and social concerns. This commitment will be explicit, self-conscious, and visible to others, and form part of the larger rite of passage of graduation from Swarthmore. Other schools, such as Pennsylvania State University¹ and Humboldt University²,

¹ <http://www.bio.psu.edu/greendestiny/projects-iv.shtml>

² http://studentaffairs.humboldt.edu/leadership/graduation_pledge.php

have already instituted such a voluntary pledge. Humboldt's, for example, reads: "I, _____, pledge to explore and take into account the social and environmental consequences of any job I consider or any organization for which I work." By designing and implementing our own unique pledge for the graduates of Swarthmore's Class of 2007 we can declare that the Swarthmore education is completed by its creative, mindful, and committed application in the world.

e) Declare environmental sensitivity in the college's educational mission as a fundraising priority for the coming campaign. This includes funding for new, relevant classes; departmental incentives for an increased presence of environmental consciousness; establishment of the rotating visiting professorship; and support for eco-sensitive or trans-disciplinary scholarship in all divisions.

Long-term Goals:

Looking at a longer time scale, we envision a Swarthmore curriculum in which "ecological literacy" (modeled on David Orr's criteria in *Ecological Literacy*, 1992 - see especially p.109-124) is a committed goal of all divisions in the preparation of their students. We invite departments and individual faculty to cooperate creatively in inspiring and equipping students to live in a mutually supportive manner with regard to the planet, to ask "What then?" in all areas of their lives, and to understand and participate responsibly in the interconnection of nature and culture. Although surveyed faculty were cautious about the possibility of an eco-literacy requirement, it is nonetheless possible and in many ways vital that each department address and communicate across disciplinary boundaries about the environmental imperative that business-as-usual be questioned, contextualized, and transformed. It is important, moreover, that sustainability not be inadvertently consigned to being only a matter of intellectual speculation - many faculty and students also agree that an environmentally sensitive curriculum is ineffectual without aligned institutional behavior. In the longest time frame, we hope to promote meaningful research and collaboration between experts in different academic specialties. On a finite planet, all fields of knowledge and action intersect; forging explicit connections between the natural sciences, social sciences, and humanities is a valuable step towards educating the continuity representative of the present and future structure of the planet.

E. Water

Mission Statement:

An essential part of achieving sustainability on this planet is protecting its waters, be they fresh or salt, ground or surface. Water is a primary component of the Earth's capacity to support life as it makes up 2/3 of the Earth's surface and 3/4 of human body weight. Drinking water sources make up only 1% of the Earth's water, so protecting sources such as Crum Creek are particularly important.

There are two types of water that are used and impacted by the campus; drinking water and stormwater.

Drinking water is the water we direct from the Crum Creek for purposeful use in our day to day lives. We use it to wash, flush toilets, heat buildings and water plants. Stormwater on the other hand arrives on campus not by our choice, though it is useful for irrigation. In fact, some stormwater is purposefully retained and directed for specific irrigation and heating/cooling purposes.

- **Drinking Water:** Water supply and treatment, as well as waste water treatment is done off campus, the former by the private company AquaPennsylvania and the latter by Delaware County. Both of these plants are conventional, which in general means they use large amounts of energy and technology to process volumes that would naturally require greater land use. There is also electricity required to pump the water both to campus and to the wastewater treatment plant. As water conservation can decrease water supply and waste treatment, it brings reductions in cost and environmental degradation on both ends of the water use cycle.
- **Stormwater:** Swarthmore College's primary connection to the hydrological cycle is the Crum Creek. The Crum holds the campus water supply upstream and collects the water that falls on the campus from storms. Within campus boundaries, the college does about as much as it can to protect the Crum from stormwater runoff through green roofs, cisterns, bioswales and other stormwater management practices. However, the creek is plagued by urbanization up and downstream that affects the water quality and quantity of the Crum. In fact, the lower stretch of Crum Creek (including that passing through the campus) is on the EPA's 303(d) list of nationally impaired waters. As part of the Clean Water Act (Phase II), the EPA will be increasing standards for stormwater runoff which should improve the overall quality of Crum Creek.

The college needs to act now to limit its water use and protect the Crum Creek. Current water conservation measures should be continued such as placing low-flow faucets in new construction and renovation. The largest use of water on campus is in the production of steam used to heat and cool buildings, so the administration should work with facilities to schedule building use more responsibly. Increased monitoring and regulation of space heating and cooling will be a solution to more efficient building use. In the long term, it would be ideal if the college could find more natural methods of water and wastewater treatment to avoid the energy intensity inherent in conventional treatments. The college should continue its track record of staying ahead of the curve in stormwater management and take a lead in conservation efforts with regard to the Crum Creek.

History/Current State of Affairs:

- **Drinking Water:** The campus water supply comes from a reservoir system upstream from campus on the Crum Creek. There is a smaller, older reservoir just North of campus across Highway 476 on Beatty Road. Water is taken from this reservoir and treated to make it suitable for drinking. Further upstream there is a larger reservoir called Springton Lake, which was built in the 1930's and holds the majority of the water supply. This system is owned and operated by AquaPennsylvania, a private company which was originally created by Swarthmore Professors and was called the Springfield Water Company. The company has complete control over the flow of water in Crum Creek, as it was grandfathered in past legislation regulating stream flows. Thus, in dry weather, it is able to retain all flow in the creek and allow the level to drop very low downstream of the dams. While the stream maintains itself through groundwater flow, its health is adversely affected by our consumption of its water. Energy is required by AquaPennsylvania to pump the water to campus, and Swarthmore uses energy to pump this water up the water

tower at night. Thus, water use is tied closely with energy use and Swarthmore College can help reduce its carbon footprint by conserving water.

In 2006, the campus used 33.4 million gallons of water at a cost of about \$150,000. Water conservation measures are being taken on campus already and are standard in all new construction. All new and renovated faucets, showers, and toilets are low flow fixtures and have been so for the past 15 years. At this point, about 1/3 of the toilets, faucets, and showers are low flow fixtures on campus. However, the off campus dorms and old buildings such as Hicks, Papazian and Lang do not have low-flow devices. Sharples recently purchased a new dishwasher which has greatly reduced the building's water use. The new machine recycles water for a two-hour cycle before draining and refilling. A large part of the water used on campus is converted into steam and used for the heating and air conditioning of buildings. Thus, more effective and responsible temperature control in buildings can reduce water use.

The campus air conditioning evaporation cooling system accounts for approximately 1/3 (32%: 10.8/33.4 million gallons per year) of the college's water use. It is also a very energy expensive process. This type of air conditioning system cools below a set point temperature to remove humidity and then heats the air back up to a comfortable temperature. 4.8 million gallons of water per year evaporates from the system. The steam-driven heating system also uses a considerable amount of water and energy. About 90% of the water in the steam system is recycled the water used for these processes cannot then be reused for irrigation due to the chemical treatments it has undergone (such as the addition of corrosion inhibitors) and the risk of bacterial growth.

Campus wastewater flows to the sewer where it is gravity-fed down the valley of the Crum Creek to Eddystone. From there it is pumped either to Philadelphia or Chester. The vast majority of the time, it is sent to Chester and is treated at the DELCORA Western Regional treatment plant (owned by Delaware County) and discharged into the Delaware river estuary. The solids (sludge) that are left behind are incinerated. This plant treats about 13 million gallons per day. Only about 20-40% of its capacity is used by municipal sewage. The remaining capacity is used to treat industry waste waters from facilities owned by Kimberly Clark, Sunoco, BP and others. When the sludge is incinerated on site, it releases some of the same pollutants released from the Westinghouse Incinerator that burns solid waste in Chester. These pollutants include HCl, sulfur oxides, nitrous oxides, dioxins, volatile organic compounds and others. The most serious pollutant is arsenic. In 1995, the EPA traced large levels of arsenic in Chester to the Western Regional plant (<http://www.ejnet.org/chester/facilities.html>).

- **Stormwater:** Stormwater runoff is a concern for the college facilities crew and is regulated by the Swarthmore Borough. New construction and renovations are designed to responsibly manage stormwater. While this is regulated by the Borough, the college has consistently exceeded requirements. Swarthmore has used several innovative techniques to reduce and reuse storm water runoff. The paths around the science center and Beardsley, and the path from Wharton to Sharples are made of a porous pavement (asphalt) that allows water to seep through and percolate slowly to get down into soil and groundwater instead of contributing to runoff. A green roof was built on Alice Paul, will be built on Kemp Hall and is being considered for LPAC to reduce storm water run-off. A bio-stream was constructed behind McCabe Library to slow down runoff from the building. Additionally, there are cisterns below ground under the Lang Music Hall circle and under the Science Center lawn that reduce storm water runoff and provide

water for irrigation.

Short Term Goals:

1. Drinking Water

- Increase campus awareness of water conservation
- Crack down on wasteful use of steam for heating and air conditioning. Turn up the thermostat a few degrees and down a few degrees from the setpoint ranges in the summer (75°-78°F) and winter (68°-72°F), respectively.
- Visit and assess the sustainability of campus water supplies
- Efficient scheduling of spaces to reduce water and energy use due to heating and air conditioning of unoccupied rooms and buildings. The classrooms and public spaces should not be air-conditioned or heated (above a very minimal level) when not scheduled for use. For example, classrooms and lecture halls should not be heated or air conditioned after class hours, which would also discourage students to turn on lights and use these spaces while libraries and common spaces are open and available for late-night studying. Faculty and staff offices should not be heated or air conditioned when they are gone over the weekend. Unless there is a thermostat controlling the space, this would require contacting facilities about the start/stop time for the HVAC in the room.

2. Stormwater

- Use GIS to map current storm water practices and model runoff to explore the best ways to prevent flooding and find the most effective ways to treat stormwater.

Long Term Goals:

1. Drinking Water

- Reuse water (gray water) for irrigation, flushing toilets and other non-drinking uses
- Replace all standard water fixtures with low-flow fixtures
- Increase facilities budget to install water meters. The meters will allow facilities to monitor the amount of water use per building throughout the year. Once the meters are installed competitions could be conducted between dorms, academic buildings or departments to encourage water conservation.
- Use water that comes from sustainable sources with minimal environmental impacts

2. Stormwater

- Treat all water being discharged into Crum Creek on Swarthmore College property

F. Energy

Mission Statement

America is addicted to fossil fuels. Based on statistics from the International Energy Agency (IEA), an average US citizen will, in a single day, generate as much of the chief greenhouse gas, carbon dioxide, as someone in China does in more than a week. For someone in Tanzania to generate the same amount

would take a staggering seven months. Swarthmore College is no exception to this. As a responsible member of the global community the College should resolve to reduce its carbon footprint,

The College currently depends upon fossil fuels for almost every aspect of its day to day operation. We depend on petrochemical fertilizers and pesticides to grow the food we eat. We depend on gasoline to bring that food to us and to run our own the campus fleet. We use #6 fuel oil to generate the steam that heats the campus' buildings. And perhaps most significantly, we depend upon coal and other fossil fuels to generate nearly two-thirds of the electricity that we purchase from PECO. While the first three uses of petroleum and petroleum derivatives have increased more or less in proportion to the physical expansion of the College and the demands of its physical plant, our demand for electricity is increasing at much more rapid rate. Between the years 1989 and 2006 Swarthmore College nearly doubled its monthly electricity usage (see graphs, Appendix IV). Granted this period has seen the construction of several new buildings on campus as well as several remodels, but it has also seen a dramatic increase per capita energy use on campus. During the same period of time our use of #6 Fuel Oil and Natural Gas have not shown a similar trend (see graphs, Appendix VI).

"Well, so what?" some might say. "The College has room in its budget and the electricity is being used to power resources that greatly enhance our quality of life and further the College's educational program." In considering our response to this question we should perhaps ask whether there might be a conflict of values between the stated educational goals of this institution and the means by which it provides that education. Granted, the primary purpose of Swarthmore College is to provide its students with a world class education, but if the education that Swarthmore provides is intended to foster a sense a social responsibility and cultivate a degree of ethical intelligence to what extent can we divorce the substance of our education from the resources that support it. Up until now the College, as an institution, has been largely unaware of the unintended consequences of its physical operation. Some of these consequences were enumerated by Carr Everbach in 2001 in an essay entitled, "What I Know about Wind Power:

In the United States, the electricity industry ... contributes as pollutants 70% of the total SO₂ (causes acid rain), 30% of NO_x (causes smog), 30% of CO₂ (contributes to global warming), 18% of all mercury released, as well as high level radioactive waste and air pollution in the form of particulates smaller than 10 microns in diameter. Based upon aggregate emissions data from our "power pool," each year Swarthmore College contributes to the production of 9311 tons CO₂, 63 tons SO₂, 26.6 tons NO_x, and unknown quantities of radioactive waste and air-borne particulates. What's so bad about that? Pennsylvania has the most acidic rainfall and the 4th smoggiest air of any state, and itself emits 1% of the world's CO₂ (more than 84 countries emit). In the Philadelphia metro area, each year 997 deaths (on average) are attributable to power plant pollution (mostly particulates), as well as 654 hospitalizations, 19,000 asthma attacks (40% of which afflict children), 593 chronic bronchitis diagnoses, and 158,000 lost work days. Partly these levels are due to PECO's use of outdated coal-burning power plants that are grandfathered against even the 1972 Clean Air Act standards, and this list doesn't include the harm and environmental degradation resulting from mining, transportation, nuclear wastes and solid wastes (e.g. landfilled fly ash).¹

¹ <http://www.swarthmore.edu/NatSci/sciproject/windpower.html>

Some argue that virtually every product or resource used by the College results in some degree of harm or environmental degradation somewhere. But even if our hands cannot be perfectly clean, we should try to make them cleaner. Our view is that the procedures and technologies for an environmentally sustainable world do exist and that Swarthmore should strive to promote them. Swarthmore shouldn't wait until the US government, or private foundations, or somebody else, makes wind power cheaper than oil before we switch. It is part of our educational mission to set the example, not follow the pack. That leadership, on social issues ranging from slavery to pacifism, sets us apart as an institution. The College's recent decision to purchase wind power credits amounting to 40% of its total electricity demand demonstrates this commitment.

While ensuring that our electricity comes from renewable sources is one part of the solution, it is equally if not more important for the College to work towards reducing its overall use of electricity. Wind turbines do not generate electricity all the time. And while the College's purchase of wind power credits does help to support the growth of renewable energy infrastructure, on a day to day basis the energy we use still comes from non-renewable sources.

The responsibility for reducing campus energy usage is currently placed on the shoulders of the physical plant managers and maintenance staff. They have the task of keeping energy costs within their budget despite ever-increasing demands from end-users. While they have the ability to make system-wide adjustments, their ability to influence end-use patterns is limited. They are constrained by the way students, faculty, and staff choose to use energy. There are technologies the college can invest in to supplement conservation efforts, however we cannot rely on a techno-fix: the success of an energy management plan will ultimately depend upon the choices of individuals. The College will soon no longer be able afford to make a few people responsible for managing the campus' use of energy. It is essential that the College develop an integrated energy conservation and management program, one that draws on participation from students, faculty and staff.

We believe that the benefits of an integrated energy conservation program will be threefold: 1.) the College will decrease its contribution to the generation of Greenhouse gasses by reducing overall electrical load and minimizing peak demand 2.) the College will be able to respond to the potential increase in electricity prices following the deregulation of the energy market in 2010 rather than simply bearing the cost, 3.) the College will help its students to cultivate an ethical intelligence responsive to our times by instilling in them a life-long commitment to energy conservation.

History/Current State of Affairs:

Swarthmore College currently buys 100% of its electricity from PECO. PECO is one of three subsidiary companies comprising Exelon Corporation and is responsible for electric and natural gas distribution in southeastern Pennsylvania. PECO serves “approximately 1.5 million electric customers in the City of Philadelphia as well as Bucks, Chester, Delaware, Montgomery and York counties and 460,000 natural gas customers in the areas outside the city. About 90 percent of its customers are residential and the remaining 10 percent are small commercial and industrial customers.”¹

¹ <http://www.exeloncorp.com/ourcompanies/peco/>

In 2006 the College was billed for 15,972,146 kWh at an average cost of \$0.084 per kWh for generation, transmission, distribution and additional charges. This translates into a total cost of \$1,342,904.32 or an average cost of \$15.54 per square foot.

Every three years since 1989 average kWh use has increased by approximately 100,000 kWh per month. Yearly totals have increased by more than 10% every three years. Current total kWh use for the year ending 12/30/2006 is up 94% over the yearly total in 1989. However, as a result of rate caps, in constant dollars the College's annual electricity bill has only increased 31% (see graphs, Appendix V).

The grid that Swarthmore draws from is managed by PJM Interconnection. In 2002, the Federal Regulatory Energy Commission granted PJM full status as an RTO (Regional Transmission Organization),¹ which is an entity, "authorized by the federal government to manage the reliability of the electric transmission system and the operation of the wholesale electricity market in a defined control area."² PJM's current power-pool generates its power from the following sources: Nuclear 34.2%, Coal 56.4%, Oil 1.2%, Gas 5.9%, Hydro 1.7%, Renewable and Other 0.7%.³

Renewable Energy:

In 2002 Swarthmore joined 24 other Pennsylvania colleges and universities in committing to support the generation of wind-power. Here is a brief history of Swarthmore's commitment to supporting wind power taken from facilities' website:

Swarthmore College is committed to aid in the development of alternate energy sources by purchasing a portion of it's electrical power requirement through a local wind farm developer, Community Energy. Starting in 2002 with an initial annual purchase of 175,000 kWh we have, in succeeding years, gradually increased our percentage of wind power.

In 2005 we renewed our commitment to wind power generation with an additional purchase of power through American Wind to offset increased loads in our newly reconstructed Science Center. As of 2005 the College held 3,102,857 kWh of wind power credits which represents approximately 18% of the annual needs on the main campus. (This portion accessed 3/26/07, now removed)

In 2007 we made a major commitment to off-set 3,200 tons of carbon emissions with a contract to purchase [6,417,000 kWh] of electricity on an annual basis. That represents 40% of Swarthmore College's annual use based on a five year average of 15,973,829 kWh per year.⁴

By purchasing wind power credits the College is helping to offset the additional capital costs of developing and constructing wind farms. As the wind energy industry grows the price will continue to become more competitive. Wind energy prices are already 80% lower now than they were just 25 years ago.⁵

¹ http://www.aep.com/newsroom/resources/pjm/PJM_AT_A_GLANCE.pdf

² PJM's Role as an RTO, 2/13/07

³ PJM Overview Swarthmore College 4/10/07, Presentation given by Bob Hinkel – General Manager, Regional Operations

⁴ <http://www.swarthmore.edu/Admin/facilities/green.html>, Accessed April 29, 2007

⁵ http://www.exeloncorp.com/ourcompanies/peco/pecores/peco_wind/frequently_asked_questions.htm

The PECO Wind webpage offers an excellent explanation of how buying wind power credits helps to reduce carbon emissions. Although the College does not receive power directly from the wind turbines it supports, there is a net reduction in the emissions produced by the grid: “Although buying wind does not mean that electricity is being delivered straight from the windmill to your home, it does mean that more of the electricity being put into the grid comes from wind, rather than other generation sources.”¹ By purchasing wind power credits from producers like Community Energy and American Wind, Swarthmore is reducing the need to generate electricity from other sources.

Energy Conservation:

In addition to ensuring that our energy comes from renewable sources, the College is also committed to reducing its overall energy use through an aggressive program of relamping, temperature control and lighting controls. Facilities have been encouraged and supported in their efforts by the student group EarthLust. As a result of their work, upwards of 80% of the campus is lit by fluorescent lighting, nearly all of the windows have been fitted with insulating glass and the Heating, Ventilation and Air Conditioning Systems continue to be fine-tuned to minimize inefficiencies. Many light switches on campus now feature “Turn me off” stickers that help to encourage students, staff and faculty to conserve energy. EarthLust’s “Storm the Dorms” campaign has taught students how to reduce their own contribution to the College’s carbon footprint by taking simple steps, such as adjusting the power setting on their computers, turning off power-strips, and unplugging cell phone chargers when they are not in use.

Regulation and Deregulation:

Historically, energy utilities have held a natural monopoly because electricity requires an immense physical infrastructure to reach its customers. The capital cost of installing high-voltage transmission lines to reach new customers is prohibitively high and has effectively limited energy companies to their respective geographic regions. Because electricity cannot be stored cost-effectively, it must be produced as it is needed. Reliable supply is essential, as an inadequate supply of electricity can cause brownouts or blackouts over a large region. The supply of electricity is most effectively operated as a network to meet both predictable changes and unforeseen contingencies. Not surprisingly, given these characteristics, the typical electricity supplier is a large, integrated owner of generation, transmission, and distribution. PECO-Exelon, from which the College purchases its electricity, is one such supplier. In exchange for the right to operate as a monopoly, PECO-Exelon has a legal obligation (as a public utility) to serve all customers in an area.

In December 1996, Pennsylvania Governor Tom Ridge signed the Pennsylvania Electric Generation Customer Choice & Competition Act, opening the door for electricity customers in the state to select the suppliers of their electricity. Under the law, competition must be phased in from November 1997 through January 1, 2001—at which point all Pennsylvanians would have the freedom to select their electricity providers.²

Pennsylvania’s law required that one-third of customers in each rate class be able to choose their electricity suppliers by January 1, 1999. Consequently, for 1999 and 2000, the College found that it

¹ http://www.exeloncorp.com/ourcompanies/peco/pecores/peco_wind/frequently_asked_questions.htm

² <http://www.energypa.org/consumer/law.html>, Accessed April 29, 2007

could buy its power more inexpensively from PPL Corp, and signed two successive one-year contracts to do so.”¹ As a result, the College’s annual electricity bill for 1999 was 20% lower than in 1998 (see graphs, Appendix VI). “Unfortunately for PPL, the price of energy skyrocketed in early 2001... and PPL lost hundreds of millions of dollars. It declined to re-bid for Swarthmore's power at the low price we were looking for, and so we returned to PECO-Exelon.”²

After the Pennsylvania Electricity Generation Customer Choice and Competition Act (PA Act) was passed, the Pennsylvania Public Utility Commission (PUC) was charged with reaching restructuring settlements with each Pennsylvania utility in accordance with the new Pennsylvania restructuring law. Although PECO-Exelon was required to open its transmission lines to a competitive market by 2001, the corporation, which was heavily invested in nuclear power, argued that in a deregulated market, it would not be able to recoup the cost of its capital investments. The PUC and PECO reached a compromise settlement on April 30, 1998 which would allow PECO to recover \$5.3 billion of “stranded costs” over the next 12 years. As a result, PECO currently charges its customers a "Competitive Transition Charge" which accounts for nearly 1/4 of the College's electricity bill. To keep prices from rising further, rates were capped during this 12 year transition period.

During the rate cap period, which will last until December 31, 2010, the Pennsylvania Public Utilities Commission retains the right to lower PECO’s rates if they are found to be excessive, and PECO retains the right to seek rate increases following certain events (such as significant increases in Federal or state income taxes or other significant changes in law or regulation that do not allow PECO to earn a fair rate of return).

As long as they remain under the caps set by the PUC, PECO-Exelon’s generation rates continue to be set by PJM’s Energy Market. This operates, “much like a stock exchange, with market participants establishing a price for electricity by matching supply and demand. The market uses location marginal pricing that reflects the value of the energy at the specific location and time it is delivered. If the lowest-priced electricity can reach all locations, prices are the same across the entire grid. When there is transmission congestion, energy cannot flow freely to certain location. In that case, more expensive electricity is ordered to meet that demand.”³ As a result, pricing is higher in those locations. The price of electricity is determined both by Day-Ahead and Real-Time markets. This removes much of the volatility from the market and ensures that the price consumers pay remains constant throughout the day. During periods of peak demand (1-3 PM on weekdays and from August-September annually) congestion on the grid is high and more-expensive electricity must be ordered to meet demand. Consequently, the price of electricity goes up. On peak days customers must reduce their usage if they want to avoid higher peak-demand charges later in the year.

Starting in 2011, the price of electricity will be set every fifteen minutes on the open market. Periods of high demand will correspond directly to increased prices. This could potentially increase the College’s annual electricity bill dramatically if our periods of peak demand correspond to periods of high demand on the market. Alternatively, if the College can effectively manage its use of electricity it could achieve considerable savings, by using most of its electricity during periods of lowest demand.

¹ <http://www.swarthmore.edu/NatSci/sciproject/windpower.html>

² *ibid*

³ PJM’s Markets, 3/12/07

Short-term goals:

In the short-term we would like the College to give more financial support to facilities as they continue their aggressive program of relamping, lighting control and temperature control. We would like the college to commit to replace old lights and appliances with energy efficient alternatives wherever feasible, i.e. incandescent bulbs with compact fluorescent lights (CFLs), and old appliances with EnergyStar approved models. The College should recognize the substantial long-term savings that can be gained by investing in energy efficient alternatives. In many cases these changes can be sound financial investments which offer a higher rate of return than the College's endowment. We propose that the College make a formal commitment to replace all incandescent lights on campus with energy efficient alternatives by the year 2010 (the same year by which Australia has promised to ban all incandescents and the same year in which deregulation will come into effect in Pennsylvania).

In order to better understand the energy use patterns of the campus, an engineering class taught by Prof. Carr Everbach (ENGR 004B *Swarthmore and the Biosphere*) is currently performing a building-by-building energy audit of the campus. The data and recommendations generated by this audit will help facilities to better manage energy use on campus. The preliminary technical recommendations made by that class include the following:

- Replace all incandescent bulbs in 'Exit' signs with "Light Emitting Diodes" LED's
- Replace all incandescent and halogen bulbs in public space with energy efficient alternatives
- Replace energy intensive appliances such as washers/dryers, AC units and refrigerators with more energy efficient models where possible
- Set all public computers to enter "sleep mode" when not in use
- Divert power and heating from classrooms that have not been scheduled for use

However, we expect that the greater part of these recommendations will be to explore ways to encourage individuals to take responsibility for their own use of electricity, whether by active education or through passive feedback mechanisms. In line with these goals, we recommend that the Campus Sustainability Committee collaborate with Earthlust and Residential Assistants to:

- Create a lesson plan on energy conservation to give to first-year students during orientation week.
- And improve consumption feedback by posting the energy demand and/or carbon conversions for public energy intensive services like elevators, electric doors and classroom lights.

Long-term Goals:

In the long term, we believe that the college should resolve to zero-out its carbon emissions. Although this is a daunting task, in moving towards this goal there are enormous opportunities to decrease long-term operating costs (both in terms of money and in terms of damage to the environment) and to engender a sense of environmental responsibility in the student population. This can be accomplished both by reducing our overall use of electricity and by meeting our annual electricity needs through the purchase of wind power or other renewable energy sources.

The College should also build consumption feedback into the design of all new buildings. This was done to some extent in the Science Center, but for it to produce an effect on individual behavior the sources of feedback must be ubiquitous and more clearly linked to individual choices—for instance, placing energy meters in all dorms (two already exist in Dana/Hallowell). This, for example, could be used as the basis of a competition to see which dorm can reduce its per capita energy usage the most. This tactic has met with success at Union College, where the winning house reduced their electricity by 19% from the previous winter. Depending on budgeting, architectural, and metering constraints, this could be done on a floor by floor, or even a room by room basis.

Finally the College should begin to convert both the Arboretum and College fleets to Biodiesel and/or Electric Hybrid vehicles as existing vehicles come up for replacement.

G. Investments

*"In the long term, the economy and the environment are the same thing.
If it's unenvironmental it is uneconomical. That is the rule of nature."*

- Mollie Beattie

Mission Statement:

According to Calvert financial advisors, "Socially Responsible Investing (SRI) is an investment strategy that integrates social or environmental criteria into financial analysis."

Individuals and institutions have been making a statement by investing in companies with socially responsible - or 'green' - practices and products. Among the key ways a college impacts the wider community, whether it be a city, state, country or world, is through its investment decisions. Colleges and universities can positively affect the environment by investing in green companies and supporting renewable energy funds. Because colleges are very public institutions with large endowments, Swarthmore's investment decisions inherently make a statement; we would like to see that statement be proactive in their investment decisions and increasingly commit to socially responsible investment strategies.

History/Current State of Affairs:

Although Swarthmore College is conscientious in its investment practices, it has made no current commitment to green investing. As a small institution, Swarthmore's funds are co-mingled in passively managed accounts overseen externally by hired consultants making it difficult to a) determine exactly which companies are being invested in and b) to alter current investment practices. Our current \$1.2 billion endowment is divided amongst a number of fund managers who monitor our funds in commingled portfolios with other investors and institutions. Currently, our endowment is spread across seven different asset classes including cash (common/fund investments), fixed income (Standish Mellon Asset Management, Internally Managed, Convexity Capital), domestic public (Adage Capital Partners LLC, John W. Bristol & Co., Inc, Marshfield Associates, Ruane, Cunniff & Co., Inc., T. Rowe Price Associates, Inc., Tukman Capital Management), International Public (Capital International Inc., Grantham Mayo Van Otterloo & Co. LLC, Morgan Stanley, Lloyd George), real assets (One REIT,

Eight Partnerships), marketable alternatives (15 firms), domestic private equity (29 partnerships) and finally international private equity (7 partnerships).

Although the board of managers does provide general guidelines for investment management, the school does not participate in targeted investment, nor does it provide any kind of mechanism by which a student, faculty member, or alumnus might be able to engage with the investment process. In addition, Swarthmore has been extremely hesitant to respond to pressure from students to participate in nationwide divestment campaigns such as divesting from apartheid South Africa, and companies with direct economic links to the current genocide in Darfur, Sudan, despite the relatively low risk of diminished return (it was calculated by Swarthmore that divestment from South Africa would have cost the college \$1.5 million in diminished returns).

Despite this apprehension, Swarthmore has already shown that change to investment practices is possible. The Committee on Investor Responsibility (CIR) has initiated a resolution to amend the equal employment policy by adding a non-discrimination clause for sexual orientation. Although this resolution is non-binding, it displays a commitment to responsible investment practices, and offers an example of how Swarthmore can continue this trend by greening its investments.

Both the historic divestment campaign from South Africa during apartheid as well as the current push to divest from Sudan offer more examples of how we can improve our commitment to socially responsible investing. During the international push to divest from companies operating in South Africa during Apartheid, some fund managers decided to offer “South Africa-free” portfolios which institutions could decide to invest in. This meant that they did not need to change managers or risk disrupting long-time relationships with trusted fund managers. This is certainly a rubric that can be followed for increased portfolio options that are guaranteed “green” or at minimum, adhere to preset standards of social engagement and responsibility.

Short-term Goals:

- CIR should issue a non-binding resolution stating its commitment to becoming more educated and opened to the possibility of increasing/diversifying our investment portfolio to include a greater percentage of green funds.
- Begin a dialogue with our domestic public firms about green investments to see if there’s any possibility to create new green portfolios within preexisting partnerships such as John W. Bristol & Co., Inc
- Recognize the way we invest our endowment funds is inextricably linked to long-term sustainability. Greening investments is more than a symbolic gesture, it is a concrete display of our commitment to fostering healthy communities and environments.

Long-term Goals:

In the long term, we would like to see Swarthmore's investment portfolio diversified to include a greater

proportion of certified SRI portfolios. Although in the past green investments have been associated with lower economic yields, this is no longer the case since the worldwide elevation in environmental awareness and the increase in environmentally-conscious corporations. The college should consider collaborating with green investment advisors such as Calvert and LGI to ensure the success and growth of their new green funds.

SRI resources to consider:

1. Calvert - socially responsible mutual funds (<http://www.Calvert.com>)
2. Light Green Advisors: Environmental Investor Resources (LGI) (<http://www.LightGreen.com>)
3. Barchester Green Investment - investor advice as well as a list of ethical companies (<http://www.barchestergreen.co.uk/>)
4. Winslow Green Growth Fund - Environmentally Responsible Investing (<http://www.WinslowGreen.com>)
5. Green Money Journal - a great way to begin the education process (<http://www.greenmoneyjournal.com/>)
6. Co-op America - offers a guide to socially responsible investments (<http://www.CoopAmerica.org>)
7. Social Funds - the largest personal finance site devoted to SRI (<http://www.SocialFunds.com>)

H. Waste and Recycling

Mission Statement:

The three tenants for managing solid waste sustainably are reduce, reuse and recycle, and are prioritized in that order. Thus, to cut back on the amount of material going to landfill or incineration, one should first try to reduce the amount of waste material generated from their lifestyle. This includes buying items with less packaging and refraining from non-essential purchases. After reduction, reuse of materials should be sought as a solution to the solid waste problem. One should look to buy and sell used goods before purchasing new ones. Lastly, if these measures cannot be achieved, then at the *very least* the materials should be recycled to prevent them from entering the waste stream.

History/Current State of Affairs:

Solid waste from campus is collected by Jack Clark & Sons Inc. and taken to the Westinghouse Incinerator in Chester. The incineration process releases volatile organic compounds, dioxins and heavy metals into a region with an already very low quality of air. When the incinerator is at capacity, which is about 90% of the time, our waste is landfilled instead. We believe that it is our duty to reduce our impact on regional air quality by reducing the amount of our own trash being incinerated in the already environmentally-impoverished city of Chester. Storing solid waste in landfills is also an irresponsible solution. It is tempting to think that once trash has been buried it can be forgotten; however research done by the Environmental Protection Agency has shown that over time all landfills leak (<http://www.ejnet.org/rachel/rhwn116.htm>). Even "the 'best demonstrated available technology'

(BDAT) for composite landfills liners will allow leakage rates somewhere between 0.02 and 1.0 gallons per acre per day ... Over 10 years, such a landfill will allow the leaking of 730 to 36,500 gallons of fluid." The toxic materials contained in this fluid will then make their way back in our ground water and into the Chesapeake Bay watershed. For these reasons making a concerted effort to improve the recycling program at Swarthmore College is of the utmost importance to the long term health of Delaware County and the Chesapeake Bay

Recycling at Swarthmore College was first promoted by Earthlust in the early 1990's. Today, environmental services are in charge of the emptying and maintenance of recycling bins. At the beginning of each academic year, Jeff Jabco, Director of Grounds, meets with the Resident Assistants to introduce the recycling system. He also sends out an email at the beginning of the year describing what and where to recycle various materials. Last year the College recycled materials in the categories of antifreeze (0.06 Tons), batteries (0.33 T), carpeting (35.0 T), commingled materials {glass, aluminum, plastic and bimetallic} (34.75 T), construction materials (21.6 T), consumer electronics (6.06 T), fluorescent tubes (0.2 T), plate glass (0.2 T), mixed metals (3.0 T), oil filters (0.04 T), mixed paper (63.04), rubber tires (1.65 T), used oil (0.6 T), and "white goods" {freezers and refrigerators} (3.85 T). (For a full list of the types and amounts materials recycled over the past six years see Appendix VI) All together this costs the college about \$10,000 - \$12,000 per year. While there are profitable recycling markets for high-grade paper and metals, the campus either does not separate these materials, or does not produce enough of them to make a profit. Contamination of recycling bins remains a problem, as any amount of other material can cause a recycling load to be rejected and sent to the landfill, incurring large costs.

The College has reduced solid waste by making double-sided printing standard on public printers in McCabe, by installing air-powered hand-dryers in all new bathrooms, and using washable dishware and metal utensils in Sharples. The College also reuses materials by selling old computer processors and monitors to a computer resellers. The College helps contribute to a market for recycled good by purchasing office paper made from 30% recycled material.

Organic recycling is handled somewhat differently on campus. At present it is limited to yard and leaf waste, but here the percentage is close to 100% at 154.5 tons this year. All of the mulch used on campus is produced on-site from yard-waste collected by the grounds crew and arboretum staff. The college owns and operates a leaf-composting facility across the Crum Creek that composts yard-waste from campus as well as the Swarthmore borough.

Unfortunately solid waste generated on campus still makes its way into the waste stream. It is taken to the incinerator in Chester where most of the county's trash is burned. Thus, we are contributing to the poor air quality in Chester and the wider Delaware County, and as we have mention, when the incinerator is down, or not collecting more waste, Swarthmore College's waste is landfilled. Liquid waste piped through the sewer system which runs down through the Crum Creek valley is also incinerated in Chester. Putting excess food into the garbage disposal in Sharples is therefore not a sustainable way to manage excess food waste.

Goals:

Reduce: The first goal of the College should be to reduce waste.

- Food
 - Sharples should provide bins students to scrape uneaten food into waste bins rather than placing dishes on the conveyor belt. A study done one of Prof. Everbach's Environmental Studies courses in 1992 found that after a week of scraping food the amount of food waste decreased. Without any extra encouragement to take less food or finish what was on their plate, students began to monitor their own portions and/or adjust their eating habits so that at the end of their meal they threw away less food. This strategy has the added advantage of keeping food out of the garbage disposal, thus avoiding added sewage fees. However if this food waste is also to avoid incurring additional tipping fees *and the incinerator*, the College must begin a composting program. Efforts should be coordinated among Dining Services, the Grounds Crew and the Good Food Project to make use of the College's already existing mulching facilities.
- Paper
 - Making double-sided printing mandatory on all printers could cut paper waste nearly in half. Also, by keeping trays for recycling paper near the printers that aren't setup for mandatory double-sided printing, and encouraging use of both sides would help to further shrink paper waste.
 - Instituting printing caps for students and faculty is another solution to reducing paper waste. By setting a limit on the number of pages an individual can print per semester, the administration would encourage responsible use of printing resources. This would result in less careless printing in which printouts are discarded or used minimally. Such a system would require capital costs for setting up the software for the entire system, but this cost would be paid back from student and faculty fees for exceeding their page quota. Columbia University has instituted a printing quota system the details of which can be found at <http://www.columbia.edu/acis/facilities/printers/quota.html>. The initial system was created in 1991, but after it was updated in 2002, Columbia saw a \$50,000 savings in paper costs as well as \$58,000 in revenue over a single year - a total of \$108,000 of increased budget for the campus (see <http://www.edtechmag.com/higher/february-march-2006/the-paper-chase.html>). While Swarthmore is a much smaller campus, it would undoubtedly see large enough financial and environmental benefits to make this investment worthwhile.

Reuse

- Host yard sales for seniors and other students to sell their used goods.
- Create a place for students and faculty to donate gently used items.

Recycle: Increase the amount of post-consumer materials purchased by the College.

- Paper
 - The College should continue to purchase paper with a high post-consumer material content. While 30% recycled material is standard at present for most office paper, in the future we can aim for higher amounts.
- Disposable dishware and utensils
 - Polystyrene dishware and plastic utensils do not biodegrade and are for most practical intents and purposes non-recyclable. Polystyrene is known to produce

harmful chemicals at each stage of its production, use and disposal. The primary arguments in favor of its continued use is that it is sanitary, sturdy, economical, efficient and convenient (http://www.polystyrene.org/polystyrene_facts/facts.html). On this same page the Plastic Foodservice Packaging Group acknowledges that polystyrene does not breakdown in landfills and in fact advertises the fact as one of its selling points! In contrast the biodegradable fiber-ware made distributed by Biocorp (<http://www.biocorpaavc.com/about/>) is designed to break down in compost piles. Biocorp offers a line of products including utensils and trash bags made from molded cellulose, recycled polyethylene, and resin-coated fiber. This is just one of many such companies that could potentially supply the College with a full range of biodegradable disposable serviceware. Another company doing great business in this sector is Excellent Packaging and Supply (<http://www.excellentpackaging.com/pages/1/index.htm>). It is a wholesale distribution company that offers a whole range of "Nature Based Products" for foodservice and other applications. To take full advantage of the environmental benefits these products offer Swarthmore would need to gain access to a large-scale composting facility.

Improve the recycling collection program.

- Increasing the number and visibility of recycling bins.
 - Every waste disposal spot should have receptacles for trash, co-mingled recyclables (i.e. aluminum, glass and plastic) and paper. Bins exclusively for office paper should be placed in libraries and administrative offices.
- Posting recycling guidelines to avoid contamination of recyclable materials.
 - There is often a great deal of confusion and uncertainty among students, staff and faculty as to what is and is not recyclable. Recyclable materials are often thrown away when they should be recycled. Conversely well intentioned (or careless) people will often put non-recyclable materials into recycling bins. This leads to the contamination of recycling loads and increased costs. Creating and displaying detailed guidelines that explain what is and is not recyclable would help to raise campus awareness and streamline the already existing recycling program.

Finally, hiring a composting service would be an enormously beneficial step for Swarthmore College to take. Lindsay Gilmore of the White Dog Foundation has recommended a company called Envirelations¹ for this purpose. If the College can generate enough material this company will remove the waste for a nominal fee and compost the materials offsite. This would keep biodegradable material out of the incinerators and landfills where the anaerobic environments prevent it from decomposing. *Alternatively*, the College could begin a composting program on campus. Ultimately we believe that this solution is much more ideal as it would come at a much lower cost in the long run and would have the added benefit of involving students in an enormously educational process. It would also mean that Grounds Crew and Arboretum staff would have access to free, high quality compost and that this nutrient rich soil would also be available to members of the Good Food Project as they begin to create a Swarthmore

¹ <http://www.envirelation.com/>

Garden. The advantage of a off-site service is the it could more easily deal with meat and bones as well as any biodegradable serviceware Dining Services might decide to purchase.

Conclusions

The issue of Swarthmore's environmental impact extends well beyond the walls of our classroom, and involves every member of the college community - from the president's office to the incoming freshmen, from the office staff to the facilities staff to our generations of alumni. Now is a critical time, and the right time, for this extended community to come together and inhabit the land in a new way, conscious and responsible in our impact and commitment to environmental leadership both within and beyond our academic careers. It is our explicit goal that the sustainability of our institutional behavior and the ecological literacy of our intellectual lives become central to Swarthmore's everyday culture among students, faculty, and staff, as well as clearly articulated in Swarthmore's mission as an institution.

In the introduction to our college bulletin, we find the following statement:

"The purpose of Swarthmore College is to make its students more valuable human beings and more useful members of society. Although it shares this purpose with other educational institutions, each school, college, and university seeks to realize that purpose in its own way. Swarthmore seeks to help its students realize their fullest intellectual and personal potential combined with a deep sense of ethical and social concern."

It is now clear that radical changes are needed in all sectors of society to make our civilization sustainable for the future. Swarthmore's own role in this shift is fully in line with its academic mission; if it is our culture and our responsibility to combine intellectual achievement with ethical and social concern, then it is no great leap to include a commitment to ecological health in this definition. Graduates of Swarthmore College should be sensitive to their environmental impact and have the skills to define and enact their responsibility to the planet. As we act to green our campus and our education, Swarthmore will achieve an environmental excellence on par with its academic excellence. It is our goal to challenge Swarthmore's practices to serve as a benchmark for other institutions in the academic community, as a unique and exciting draw for prospective students, and as a continual, innovative vanguard of environmentally-sound behavior.

Appendix

I. American College and University President's Climate Commitment

(www.presidentsclimatecommitment.org)

1. Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.
 - a. Within two months of signing this document, create institutional structures to guide the development and implementation of the plan.
 - b. Within one year of signing this document, complete a comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, and air travel) and update the inventory every other year thereafter.
 - c. Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:
 - i. A target date for achieving climate neutrality as soon as possible.
 - ii. Interim targets for goals and actions that will lead to climate neutrality.
 - iii. Actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.
 - iv. Actions to expand research or other efforts necessary to achieve climate neutrality.
 - v. Mechanisms for tracking progress on goals and actions.
 2. Initiate two or more of the following tangible actions to reduce greenhouse gases while the more comprehensive plan is being developed.
 - a. 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.
 - b. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.
 - c. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.
 - d. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.
 - e. Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.
 3. Make the action plan, inventory, and periodic progress reports publicly available by providing them to the Association for the Advancement of Sustainability in Higher Education (AASHE) for posting and dissemination.
- In recognition of the need to build support for this effort among college and university administrations across America, we will encourage other presidents to join this effort and become signatories to this commitment.

II. The Talloires Declaration

On the Civic Roles and Social Responsibilities of Higher Education September 17, 2005

In this century of change, we note with optimism that access to university education is increasing, that one-half of the students enrolled in institutions of higher education live in developing nations, and that the number of university students worldwide is expected to double between 2000 and 2025. The

potential for social participation by students young and old, now and in the years to come, is massive. The extent to which this potential can be realized will depend on universities worldwide mobilizing students, faculty, staff and citizens in programs of mutual benefit.

We are dedicated to strengthening the civic role and social responsibility of our institutions. We pledge to promote shared and universal human values and the engagement by our institutions within our communities and with our global neighbors. We urge the one hundred million university students and the many millions of faculty, staff, alumni and members of governing bodies throughout the world to join us in these initiatives.

We believe that higher education institutions exist to serve and strengthen the society of which they are part. Through the learning, values and commitment of faculty, staff and students, our institutions create social capital, preparing students to contribute positively to local, national and global communities. Universities have the responsibility to foster in faculty, staff and students a sense of social responsibility and a commitment to the social good, which, we believe, is central to the success of a democratic and just society.

Some of our universities and colleges are older than the nations in which they are located; others are young and emerging; but all bear a special obligation to contribute to the public good, through educating students, expanding access to education, and the creation and timely application of new knowledge. Our institutions recognize that we do not exist in isolation from society, nor from the communities in which we are located. Instead, we carry a unique obligation to listen, understand and contribute to social transformation and development. Higher education must extend itself for the good of society to embrace communities near and far. In doing so, we will promote our core missions of teaching, research and service.

The university should use the processes of education and research to respond to, serve and strengthen its communities for local and global citizenship. The university has a responsibility to participate actively in the democratic process and to empower those who are less privileged. Our institutions must strive to build a culture of reflection and action by faculty, staff and students that infuses all learning and inquiry. Therefore, we agree to:

- Expand civic engagement and social responsibility programs in an ethical manner, through teaching, research and public service.
- Embed public responsibility through personal example and the policies and practices of our higher education institutions.
- Create institutional frameworks for the encouragement, reward and recognition of good practice in social service by students, faculty, staff and their community partners.
- Ensure that the standards of excellence, critical debate, scholarly research and peer judgment are applied as rigorously to community engagement as they are to other forms of university endeavor.
- Foster partnerships between universities and communities to enhance economic opportunity, empower individuals and groups, increase mutual understanding and strengthen the relevance, reach and responsiveness of university education and research.
- Raise awareness within government, business, media, charitable, not-for-profit and international organizations about contributions of higher education to social advancement and well being. Specifically, establish partnerships with government to strengthen policies that support higher education's civic and socially responsible efforts. Collaborate with other sectors in order to magnify impacts and sustain social and economic gains for our communities.
- Establish partnerships with primary and secondary schools, and other institutions of further and higher education; so that education for active citizenship becomes an integral part of learning at

all levels of society and stages of life.

- Document and disseminate examples of university work that benefit communities and the lives of their members.
- Support and encourage international, regional and national academic associations in their efforts to strengthen university civic engagement efforts and create scholarly recognition of service and action in teaching and research.
- Speak out on issues of civic importance in our communities.
- Establish a steering committee and international networks of higher education institutions to inform and support all their efforts to carry out this Declaration.

We commit ourselves to the civic engagement of our institutions and to that end we establish the Talloires Network, with an open electronic space for the exchange of ideas and understandings and for fostering collective action.

We invite others to join in this Declaration and to collaborate in our civic work.

Adopted by [presidential attendees](#), September 17, 2005

III. Dining Services Audit.

Purpose: To understand how dining hall functions, see where there is room for improvement, and celebrate successful initiatives all ready implemented. Audit completed February 2007.

Loading Dock:

- cardboard in trash-NO
- recycle packaging materials-YES
- energy efficient lighting-YES
- air curtain b/w large opening and dining hall to reduce energy waste-NO

Food/Supply Storage

- over packaged products-NO
- foods bought in bulk-YES
- write letter to vendor asking if they can switch to bulk packaging-NO
- walk in fridges and freezer
 - fridges sealed well-NO
 - clear plastic energy curtains-NO
 - lights in fridges turned off-YES
 - door connected switches-NO
 - fluorescent lamps better-YES
 - shut down policy during low usage-NO
 - Vacation shut off plan-NO
 - switches easily accessible-
- coils cleaned often (every 6 months)-YES
- signs posted reminding staff about energy conservation-NO

Kitchen and Food Preparation Areas

- new technology-NO
- ovens always on-YES
- unused equipment still plugged in/pilot light-YES
- signs posted reminding staff about energy conservation-NO
- energy efficient lighting-YES

Serving Line

- steam tables turned off b/w meal periods-NO
- Lamps in display cases—easy to turn off b/w serving times-
- Plan to reduce serving per plate-NO
- signs posted reminding staff about energy conservation-NO
- energy efficient lighting-NO

Dishes

- reusable plates/silverware rather than disposable-YES
- faucets dripping, left running-
- dish washing equipment—reuse rinse water for pre-rinse cycles-YES
- signs posted reminding staff about energy conservation-NO
- energy efficient lighting-YES
- concentrated detergent-YES
- pricing coffee at bars/table extra costs of plastic cup if person does not bring their own mug-NO
- TARBLE: take-out uses waxed paper, never aluminum foil-NO
- TARBLE: wrap cold sandwiches in wrap paper rather than use plates/plastic container-NO

Dining Room

- trash bins to scrape food into-NO
- collect post consumer food waste and display some days to change student attitudes-PLANNED
- packages of condiments distributed from large dispensers rather than individual packets-YES/NO
 - ketchup, salt, pepper-YES
 - cream, sugar-NO
- bulk cereals rather than individual boxes-YES
- turning off lights between meals, turn lights down during daylight-NO
- daylight sensors-NO
- energy efficient lighting-NO
- ice machine properly adjusted-YES
- water quality test
 - lead/bacteria not a problem-
 - good tap water-YES
- napkins on each table-YES

Office

- reusable aprons, hats, and towels-YES
- program in place for staff to identify drips, leaks of faucets-YES/NO
- recipe swap—actively soliciting student vegetarian recipes-YES
- energy water use part of budget-NO
- Recycling Program for glass, metals, cardboard, some plastics-YES
- dining hall buys products that use recycled packaging materials-YES
 - specify recycled packaging in purchasing products-NO

Food Waste

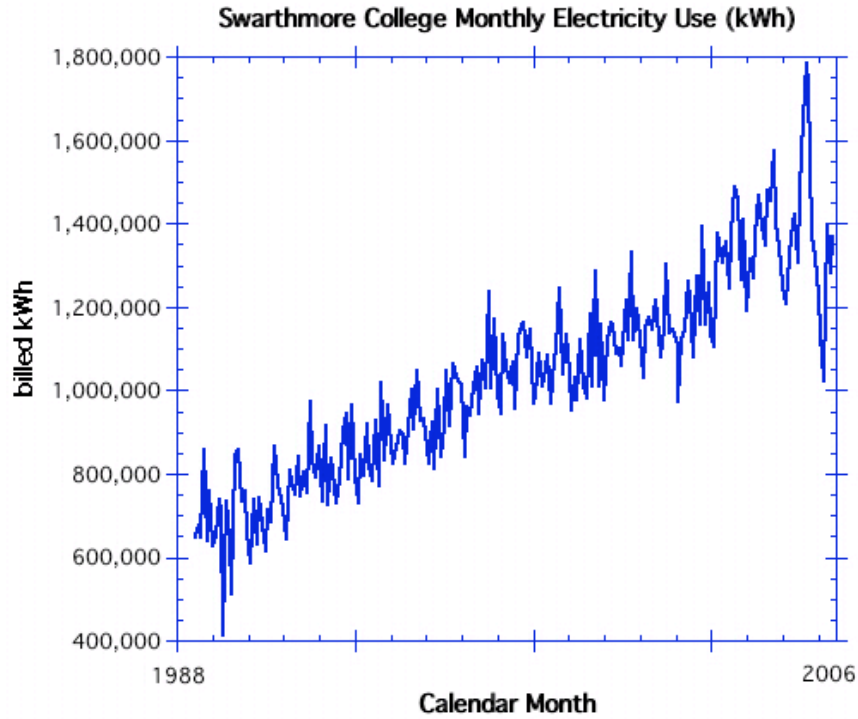
- Excess food to Food Pantry Program-YES
- Compost-NO

-onsite or outsourced
-Wastewater composted-NO (rerouted to Chester, PA recently)

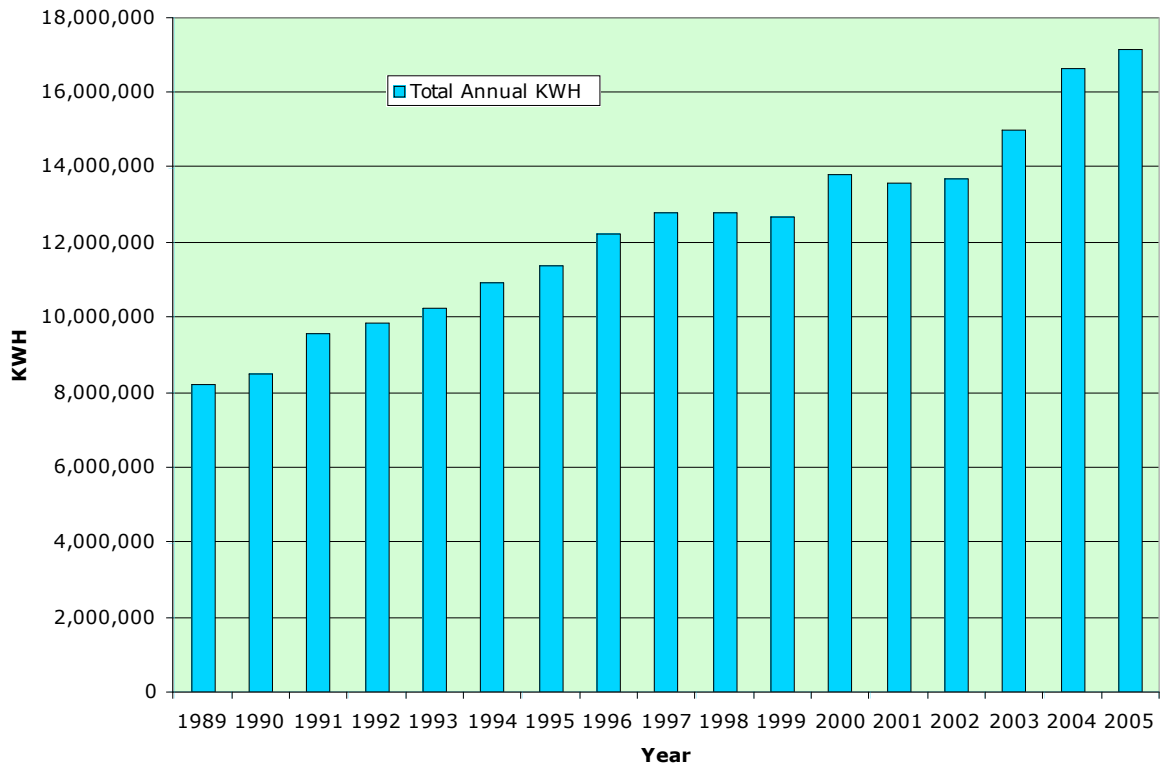
Menu

-concentrated juice, stocks-YES
-humane/cage free eggs-NO
-organic flour used-NO
-rgh free milk-YES
-natural (less antibiotics/chemicals) meat, chicken, dairy, veggies-NO
-local produce-MINIMAL
 -Target percentage of food coming from region: 10%
-fish with Monterey Bay Aquarium Standards-NO
-dedicated vegetarian selection-YES
-meatless nights-(1 per week)-NO

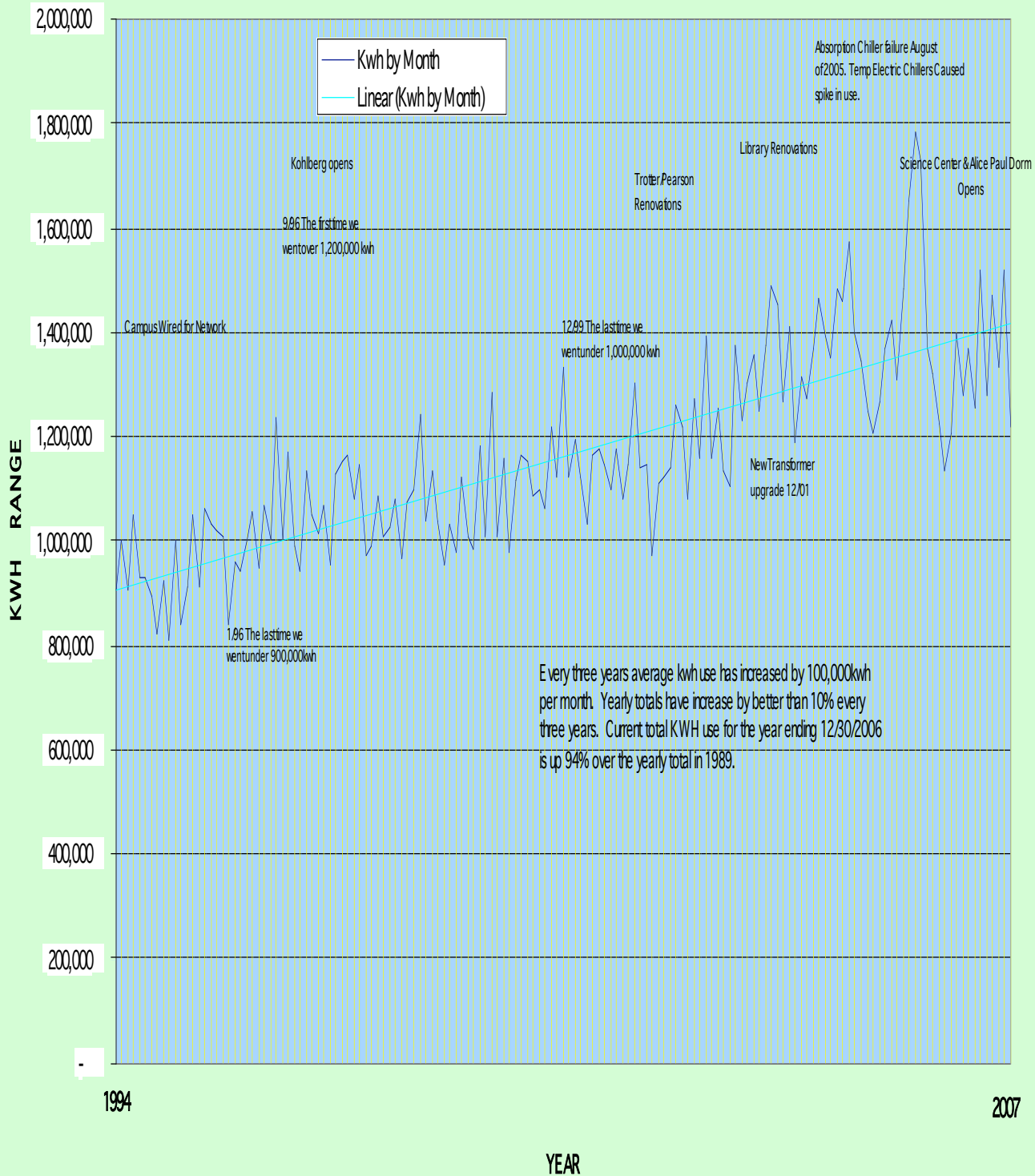
IV.



Total Annual KWH

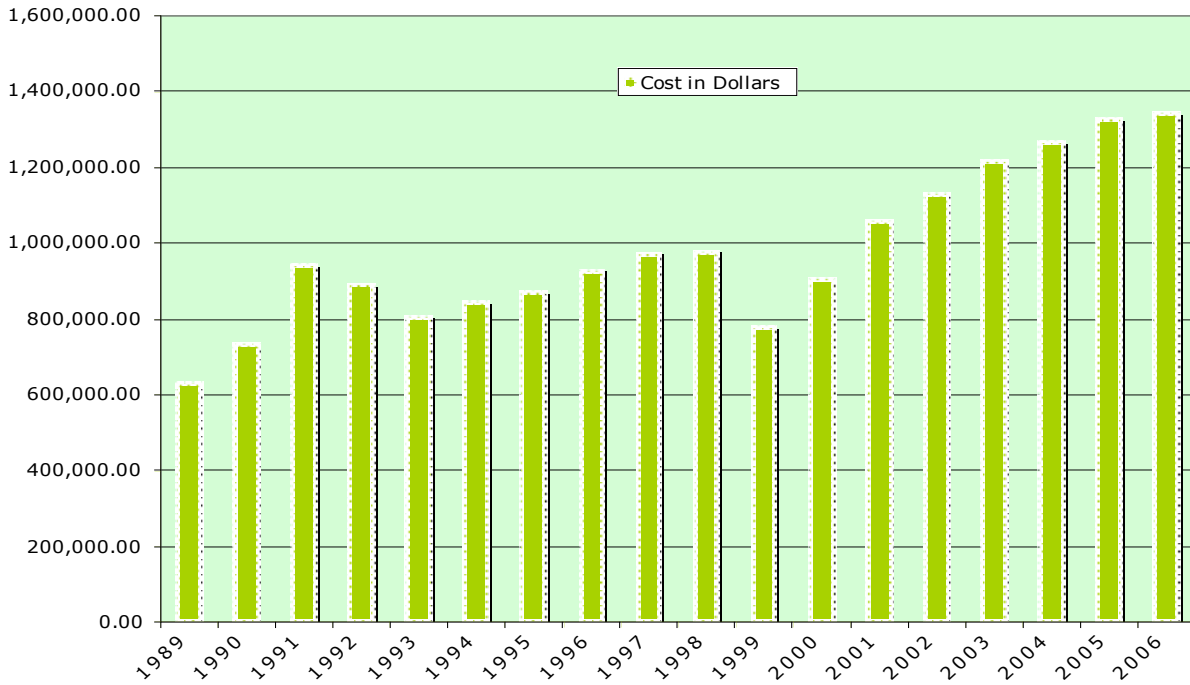


Electric Use Eleven Year Trend 1994-2006

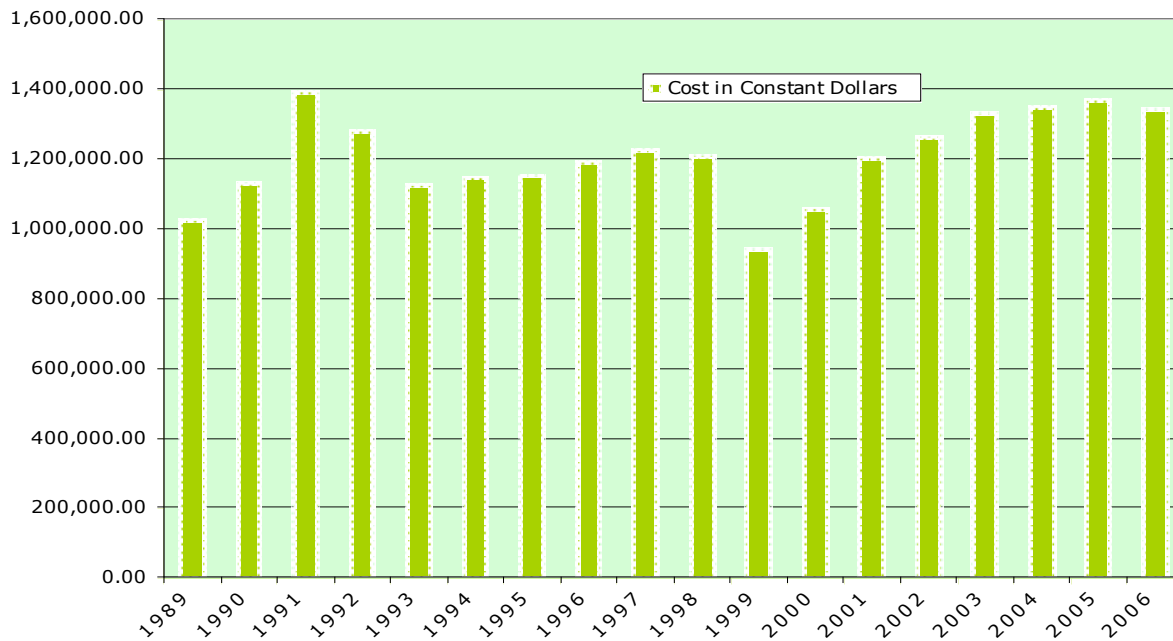


V.

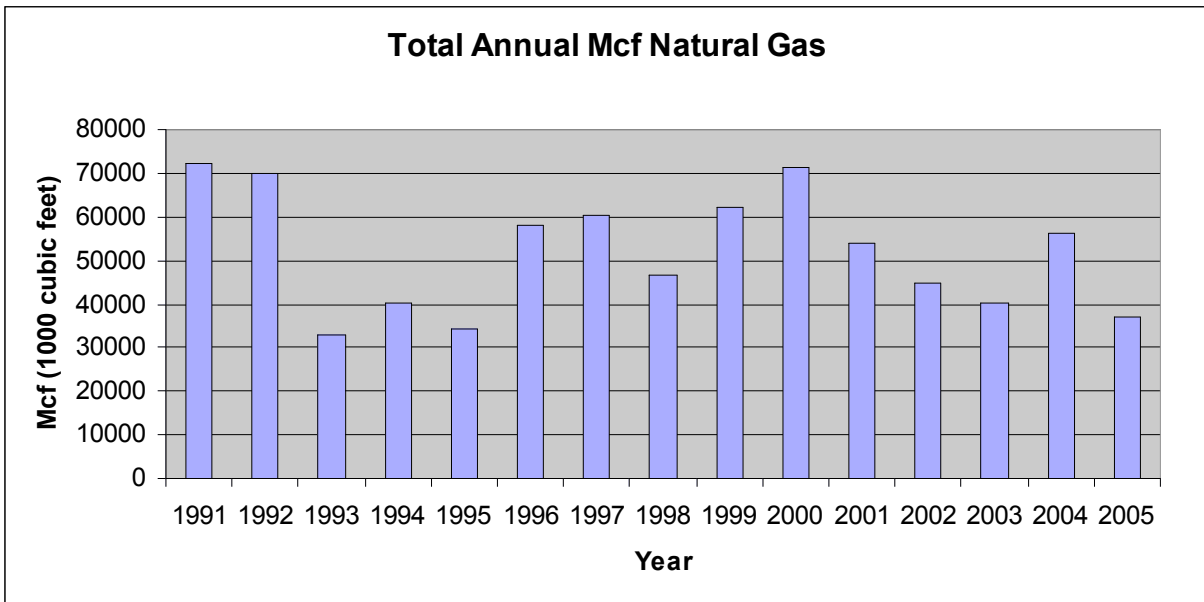
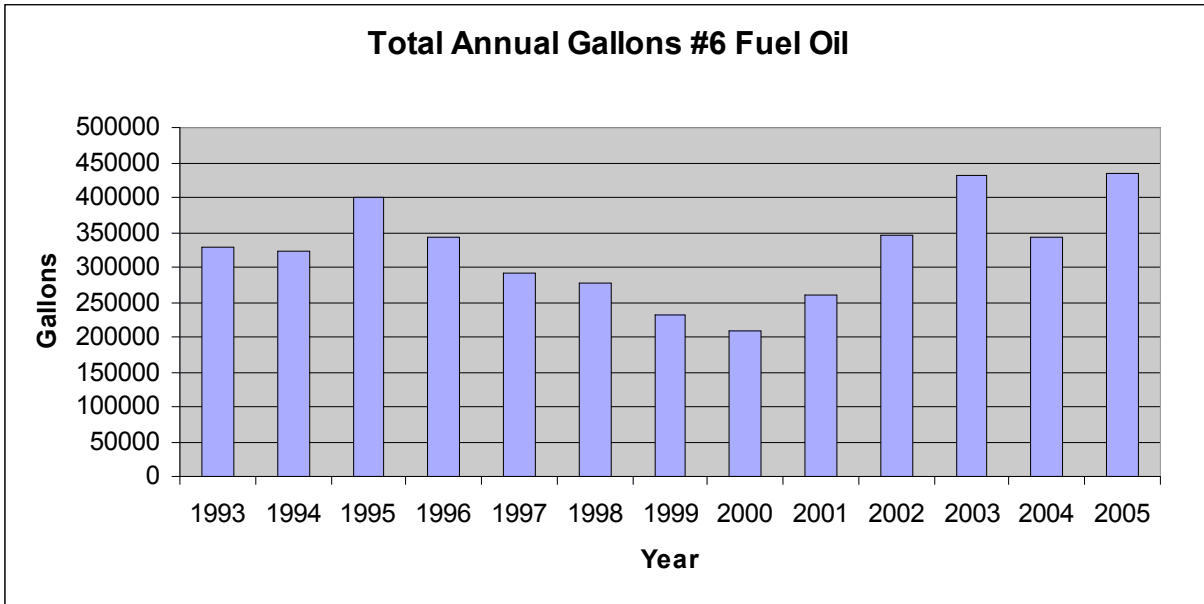
Annualized Electrical Cost in Dollars



Annualized Electrical Cost in Constant Dollars (2006:100)



VI.



VII.

<u>Recycled Materials</u>	2006	2005	2004	2003	2002	2001	2000
aluminum scrap		0.15					
antifreeze	0.06	0.27	0.04	0.119	0.11		
batteries	0.33	0.73	0.43	0.75	0.24		22 pieces
clothing/textiles {carpeting}	35			15			
commingled materials {glass, aluminum, plastic and bimetallic}	34.75	36.25	39.51	37.78	39.58	38.95	39.2
construction materials	21.6		151.2	952.12		3062	
consumer electronics	6.06	7.425	6.39	0.8	0.84		
copper		0.1					
ferrous				130.29			
fluorescent tubes	0.2	0.175					
plate glass	0.2	0.6	0.4				
mixed metals {appliances}	3	3.3	3.125			30+	
oil filters	0.04	0.076	0.05	0.054	0.023	98 filters	
mixed paper	63.04	67.02	61.07	57.2	63.89	55.4	53.51
rubber tires	1.65	1.21	1.41	1.6	0.76	1.34	73 pieces
used oil	0.6	0.76	0.99	0.594	1.59	0.9	108 gal.
white goods {freezers and refrigerators}	3.85						

(*numbers in tons unless otherwise noted)

VIII. Faculty Survey on Environmental Responsibility and Curriculum Greening

- 1) How would you define the concept of a “sustainable society”? What are the barriers currently in its way?
- 2) What is Swarthmore’s role in fostering eco-sustainability? Is this a matter solely for scientists or for all departments? If a dominant paradigm goes unquestioned in the classroom, is it implicitly supported?
- 3) How much of a divide do you perceive between the academic programs at Swarthmore and the daily operation of the university? For instance, are the values embodied in your courses supported by Swarthmore’s institutional practices? Are there ways in which Swarthmore as a community could better exemplify eco-sustainable behavior?
- 4) Does Swarthmore’s current commitment to “ethical intelligence” include ecological sustainability? Why or why not?
- 5) How central to education itself is an understanding of the planet’s functioning and interaction with the human species? Why? What would be the repercussions of an addition to the graduation requirements that asked for a minimum of one class with a loosely defined eco-literacy component?
- 6) Do you see ways of bridging departmental and other boundaries that would lead to fruitful research and teaching possibilities? Are there areas in which you would benefit from interdisciplinary insight – especially with regard to the global context of your work? How might this help students to learn in a new way?
- 7) Do you see a way that the College can help departments offer environmentally-oriented classes more frequently or appoint faculty who have a serious academic and teaching interest in matters of central concern to environmental health?
- 8) [*Current ES faculty*] If the Environmental Studies coordinator asked you to design a class, with no limitations on what is possible, that you would team-teach with a professor from another division, what might you envision?

OR

[*Non-ES faculty*] To what extent do you feel it necessary to address the relationship between your particular field and its larger context – the planet? Are you comfortable with drawing such connections in class? If offered assistance in making such environmental contextualizing possible, under what circumstances would you accept?