Initial Sustainability Report

Barnard College
2007

A report presented to the community and friends of Barnard College .

Initial Sustainability Report

Amanda Rook (BC '08), Alison Powell (BC '09),
and Jason Smerdon (BC and Lamont Doherty Earth Observatory)

Barnard College, 2007

This Initial Sustainability Report on Barnard College was commissioned in the summer of 2006 by Stephanie Pfirman and Martin Stute, co-chairs of the Barnard Environmental Science Department, as a source of information for the community and the incoming Environmental Program Manager, Angelica Patterson. Several staff department directors, including Julio Vazquez, Ann Aversa, Al Sorbera, Goldi Juer, and Paula Newman were generous in providing essential information for the report. Peter Bower, Catherine Cook, and Angelica Patterson of the Environmental Science Department were also very helpful in the preparation of the report, as was Lorna Magee (BC '08). Amanda Rook (BC '08), Alison Powell (BC '09) and Jason Smerdon are the principal authors.

We hope that you, as a member of the Barnard community, take this report and make it your own, building on the environmental progress Barnard has already made to create a truly sustainable campus. In a time in which local environmental impacts carry grave global consequences and environmental stewardship is an essential component of civic responsibility, every Barnard community member is compelled to make the broader College community more sustainable.

Table of Contents

Introduction

The Call to Become More Sustainable

"*We protect nature…because it is the infrastructure of our communities. If we want to provide our children with the same opportunities for dignity and enrichment as those our parents gave us, we've got to start by protecting the air, water, wildlife, and landscapes that connect us to our…values and character.*"

-Robert Kennedy

During its 57th session in December 2002, the United Nations General Assembly deemed 2005-2014 the Decade of Education for Sustainable Development. Among the many objectives of the General Assembly's resolution is the attempt to foster an increased quality of teaching and learning in education for sustainable development. The institutions perhaps best suited to take up this charge are colleges and universities. Within the United States, there are more than 3,700 institutions of higher education, each of which uniquely blends learning environments with complicated infrastructures. In this sense, a college campus is a microcosm of larger integrated systems, be they governments, municipalities or corporations, and holds great promise as a laboratory for research into effective sustainable development; moreover, the greening of our colleges and universities will in itself reduce many environmental impacts. Recognizing this, colleges and universities across the country have begun to consider how contemporary environmental issues are manifest in their own physical environment and institutional frameworks. They have begun to perform environmental audits and curriculum reviews, hire sustainability coordinators and to engage the campus community in discussions on how best to work toward environmental sustainability.

Where Barnard Stands

In many ways, Barnard is keeping pace with national trends in campus environmental performance. Barnard has an extensive recycling program. The National Wildlife Foundation's 2001 *State of the Campus Environment* reports that 85% of colleges and universities in the U.S. also have recycling programs. Barnard's Facilities Office is overseeing a campus energy audit, and has recently installed a Building Management System that will make lighting, heating, and cooling throughout the school more energy-efficient; this puts Barnard within the 81% of colleges that have pursued lighting efficiency upgrades, and the 73% that have put energy-efficient heating and air conditioning systems into place. Barnard accounts for energy-efficiency and other environmental concerns with capital planning projects like the Nexus; this makes Barnard one of the 64% of colleges that seek to improve environmental performance in the design of buildings. Barnard Document Services purchases 30% recycled paper, putting Barnard within the 29% of colleges that require greater than 25% recycled content for office paper. Capital Planning and Facilities are using more environmentally friendly materials as standards in renovations of residential halls and in instructional/administrative areas. Dining Services is seeking to include more local and seasonal

foods in its dining fare and Barnard's Advisory Committee on Socially Responsible Investing makes it part of the 29% of colleges that pursue environmentally responsible investments.[1]

The Vast Influence of Colleges and Universities

"*With over 3,700 colleges and universities in the U.S. that spend over $187 billion annually, educational institutions have significant economic, social, and ecological impacts on local communities and on the Earth as a whole.*"
-Molly Chidsey, National Wildlife Federation

The above efforts, and many others, are laudable and indicate that Barnard College has taken some important first steps toward environmental sustainability. Barnard's institutional management of environmental stewardship, however, suggests that it has fallen behind the developing national standards for sustainability infrastructure in higher education. Over a quarter of American colleges and universities are seeking to integrate environmental stewardship into the operational framework and ethos of their institutions so that their campuses may serve as learning centers for sustainability. Although Barnard has taken significant strides toward sustainability, it is the conclusion of this report that environmental action on campus is compromised by the lack of a campus-wide commitment to the issue.

A Resource for Progress: The Initial Sustainability Report

This report supports the creation of a campus-wide sustainability initiative at Barnard in three ways: (1) it provides a preliminary appraisal of Barnard's sustainability performance, highlighting those areas in which Barnard excels and those in which there is need for improvement; (2) it describes some fundamental steps that can transform the College's environmental stewardship from a series of isolated actions into a unified and efficient collaborative force; and (3) it serves as an action guide for concerned community members by providing information on the practical workings of the College and descriptions of how each department can play a role in sustainability.

The ISR is organized into two main sections. The first section includes steps to campus sustainability, long-term recommendations, and suggestions for how to meet those goals. The second describes relevant efforts within Barnard, acknowledging past accomplishments, current initiatives and opportunities for efforts toward greater sustainability. Additional information can be found in the online Appendices. Supplementary sections include information on the administrative and staff departments, buildings, and current environmentally pertinent initiatives of Barnard College, including the Advisory Committee on Socially Responsible Investing (SRI), and the Nexus building and the Master Plan. The appendices also include helpful summaries and links to models of campus sustainability at other colleges and universities. The ISR and its appendices can be found at (http://www.ldeo.columbia.edu/~jsmerdon/sustain_gate.html).

[1] Data on college and university environmental programs are from *State of the Campus Environment: A National Report Card on Environmental Performance and Sustainability in Higher Education,* published in 2001 by the National Wildlife Federation. Princeton Survey Research Associates conducted the survey from which the report is based. The survey generated responses from 891 colleges and universities in the U.S. (about 22 percent of U.S. institutions of higher education). Margin of error for results is ± 5. Participation rates for schools comparable to Barnard are likely higher than those reported because: 1) the survey included a large number of 2-year schools, which are less likely than 4-year institutions to pursue long-term environmental projects, and 2) the survey included many non-coastal schools, which are also less likely to pursue many environmental goals. It is also important to note that 6 years have passed since the report was published; during that time campus sustainability has become significantly more widespread, so that more recent surveys would likely report higher percentages for all school types.

Steps to Campus-Wide Sustainability

This section makes long-term recommendations for establishing a sustainability initiative at Barnard College. While there are no standardized criteria for implementing such an initiative, there are a host of practices held in common by colleges and universities that have pursued long-standing and meaningful sustainability initiatives. Recommendations are described primarily as they pertain to campus-wide efforts; each section, however, can also apply to individual departments[2].

Practical imperatives for campus sustainability

Campus sustainability initiatives can both strengthen a college's finances and enrich a college community. The financial benefits of sustainability initiatives include direct cost effectiveness and insulation against rising resource costs. The community building aspects of environmental stewardship include: public recognition as an environmental leader, improvement in the quality of campus services, and greater community satisfaction and morale.

Well-run environmental stewardship programs are cost effective, ultimately making rather than costing money. Often administrators are initially deterred from sustainability measures because they assume that incorporating environmental considerations into the daily functions of the school will be costly. Financial studies, however, have found this to be untrue: "*Although most sustainability initiatives lead to short-term cost increases, cost savings from resource usage efficiency measures are likely to be achieved within two years by organizations focused on environmental improvements*" (Hart, 1996). A prime example of this principle is Columbia University's light-bulb exchange, which has replaced standard bulbs with compact fluorescent bulbs throughout several residential halls. According to University Housing administrators, the project will not only prevent 446,000 pounds of CO_2 from being released into the environment over the 12,000 hour lifetime of the bulbs, but will result in an ultimate cost savings of $100 for each $5 bulb purchased (Columbia University Housing, 2006). Additionally, becoming energy efficient and using resources more wisely can protect colleges from rising energy, freshwater, wastewater treatment, and solid and hazardous waste disposal costs in the future. Indeed, "*The fact that most institutions of higher learning plan to exist well into the next century makes long-term thinking and investment in long-term waste reduction prudent*" (Crieghton, 1998).

The improvements in campus services that result from sustainability efforts often make a college a more attractive and comfortable place in which to work and live. Stewardship campaigns can improve the quality of campus services in a variety of ways, including: retrofitting a campus with more modern equipment, granting finer systematic controls over internal environments, and creating healthy and supportive spaces and programs for all members of the college community. For example, local foods initiatives have been implemented at over 200 universities, "*and students are*

[2] This is with the possible exception of the curriculum review, which is clearly a school-wide/faculty initiative and not pertinent to staff departments.

cheering" (Burros, 2005). As the New York Times reports on Middlebury's successful local foods program, "*You don't usually find a college tour guide showing off the school cafeteria to prospective applicants. But at Middlebury College…that was where a student guide made her four-star sales pitch*" (Burros, 2005).

Finally, the sense of rallying toward a common and noble cause also builds community. Peggy Barlett, leader of Emory University's environmental movement, states: "…*This work seems to restore a sense of community—and for some, even a sense of wholeness—that [is] missing in many institutions of higher education*" (Barlett, 2004). Campus activism "*may be exhilarating and provide one with a sense that one makes a difference in creating a more just world*" (Baer, 2002).

Long-term Recommendations

Develop a system of committees for planning and action

To make Barnard's efforts toward sustainability efficient, the administration should establish a multi-level system of committees for planning and action. The system should contain a central planning committee and several specialized committees that report regularly to the central planning committee. A central planning committee containing representatives from each sector of the college can begin a dialogue about Barnard's environmental impacts, determine campus-wide priorities for action, catalyze the implementation of campus-wide initiatives through the formation of specialized committees, and oversee the efforts of these committees. Specialized action committees can fulfill the objectives established by the central planning committee; for example, a specialized committee can write the first draft of a Barnard environmental commitment statement (see below), direct the progress of a campus-wide environmental audit, or represent the efforts of Facilities to become more energy efficient. Barnard's historic sister school, Mount Holyoke, is an excellent example of how a system of committees can streamline environmental progress: at Mount Holyoke, a central Steering Committee oversees the progress of five other sub-committees devoted to school-wide environmental impacts such as waste reduction and energy conservation.

Administrative leadership is essential for establishing and executing a system of sustainability committees.[3] Administrative involvement in a planning committee can encourage environmental action in other sectors of the school. Additionally, administrative representation in task forces and planning committees greatly augments the influence and authority of these bodies, and makes them more efficient by allowing administration to directly shape and approve new policies. Finally, administrative support allows for broader publicity concerning a college's environmental initiatives. Through promotion of the College's sustainability committees on the official college website, in alumni magazines, and in public statements of administrative leaders, Barnard can gain a rewarding reputation for focused environmental stewardship.

The Importance of Administrative Leadership

"*Universities that have a high-level administrator who takes an interest in the environmental action on campus tend to have greater campus-wide participation and cooperation.*"

- Sarah Creighton, Project Manager of Tufts CLEAN! and the Tufts Climate Initiative

[3] Where administrative support of environmental stewardship is not possible, ad hoc committees may be formed by committed faculty, staff, and students; however, these bodies cannot attain the far-reaching impact of an administration-led planning committee.

Columbia, the University of Michigan, and Mt. Holyoke each offer examples of how administrative leadership can foster school-wide environmental stewardship through the creation of an environmental committee. Columbia's efforts toward environmental stewardship have advanced considerably since official administrative leadership was established in the 2005-2006 school year. Robert Kasdin, Senior Executive Vice President, and Will McKoy, Project Director of Administrative Planning and Financial Management, have led the formation of an Environmental Task Force, which has since created an official Columbia University Environmental Stewardship website and hired a full-time Environmental Stewardship Director. Similarly, the leadership of University of Michigan President Mary Sue Coleman resulted in the formation of the University of Michigan Environmental Task Force in 2003; this body went on to perform an environmental audit, determine indicators by which to gage the University's progress toward sustainability, and advise a list of near and long-term recommendations for the University (University of Michigan Regents, 2004). Mt. Holyoke's administration leads environmental efforts by mandating within its 6-year strategic plan the structure and function of a comprehensive Environmental Management System, which encompasses an Environmental Steering Committee and several sub-committees called Working Groups.

It is very important that committees contain representatives from each sector of the College. Having representatives from the administration, different faculty departments, several staff departments, and the student body can create opportunities for collaborative problem solving, allowing committees to fully engage the useful resources and perspectives of each sector. Additionally, representation of each sector within a formal committee structure can allow the College to respond to the requests and opinions of each sector in an organized and efficient manner and to ensure that changes in policy reflect the interests of all sectors. This boosts community morale and encourages broad support for new initiatives. Finally, campus-wide representation can create greater awareness of other sectors' environmental efforts within each individual sector.

A specific opportunity for a central sustainability committee has been suggested by Vice President Gamsu and Associate Provost Davidson in which the previously established Administrative Services Committee would be reconstituted and given the charge of leading a sustainability initiative on campus. Furthermore, student representation on the committee could be established through the newly created EcoReps program, which would provide committed and informed students who are already addressing sustainability initiatives in the campus dormitories. Many staff department administrators have also affirmed the need for such a committee and voiced their willingness to participate.

Publish a formal commitment statement

To affirm Barnard's dedication to campus sustainability, the administration should issue a formal commitment statement. A sustainability commitment statement discusses the environmental values of an institution and its long-term goals for becoming more sustainable[4]. The focus of environmental statements takes a variety of forms depending on the individual needs and nature of each institution. While some environmental commitments concentrate on the academic and educational side of sustainability, others give preference to operational concerns about energy use, wastewater production, and other issues related to natural resources. The format of environmental

[4] Usually campus-wide commitment statements are very general and values-focused. More concrete project goals and deadlines are often documented in separate environmental audits or action plans.

Mount Holyoke's Institutional Commitment to Sustainability

"*[We must] accelerate our progress toward the systematic practice of environmental stewardship, providing an excellent example of synergy between curricular and administrative efforts and a clear focus on cost-effective applications of environmentally responsible principles.*"

-Plan for Mount Holyoke 2010

commitment statements also varies. Some schools, like Brown University, forge an independent environmental mission statement formed to stand on its own and guide the actions of the campus community. Other schools, like Dartmouth and Mt. Holyoke, use a more flexible forum, writing environmental concerns into their strategic plans, documents that may have life spans of only 3-10 years. Some colleges and universities may even incorporate some mention of environmental stewardship into their primary mission statements. Others choose to sign on to a universal statement such as the Talloires Declaration.

A documented commitment to sustainability can promote meaningful discussion about campus environmental priorities, grant legitimacy and administrative support to future efforts, publicize the College's dedication to environmental stewardship, and awaken a sense of common purpose that can build campus morale and strengthen later campaigns. One example of the power of these commitments is President Shapiro's announcement that Barnard will play a leading role in reducing greenhouse gas emissions following New York City Major Bloomberg's pledge to reduce the city's emissions by 30% by 2030. President Shapiro cited the construction of the Nexus as playing a pivotal role in a switch toward a more sustainable campus, as well as replacing certain older units of the campus infrastructure with more energy-efficient ones (Barnard College News Center). Such a commitment should be followed by a more comprehensive dedication to sustainability on campus. Several links to examples of commitment statements can be found in *Appendix 5*.

Hire a Sustainability Coordinator

The Barnard administration should hire a Sustainability Coordinator to oversee environmental efforts across the campus. To be effective, this individual should have the power to allocate funds for environmental efforts and should be granted sufficient power within the administrative structure. While the degree of a college's environmental stewardship is often dependent on the enthusiasm of its administration, staff, faculty, and students at any given time, a coordinator can help maintain a constant commitment to sustainability; a sustainability coordinator whose principal responsibility is to nurture environmental stewardship can have the time and the training to act as a catalyst for action, designing and guiding large-scale programs with significant environmental results.

Recent events at Columbia provide an excellent example of the value of a sustainability coordinator. In Fall 2006, Columbia University hired its first Environmental Stewardship Director, Nilda Mesa, to spearhead environmental initiatives across the University. Mesa has worked on environmental law enforcement and policy issues for the California Attorney General, the Clinton administration, the Air Force, and the White House Council for Environmental Quality (DePillis, 2006). Mesa bears responsibility for "*implement[ing] practical programs to conserve resources and promote a culture of environmental awareness*" throughout the University (Columbia University News, 2006). In just one year, Mesa has successfully forged connections among the many schools and sectors of the University and laid the foundation for future progress in Columbia's environmental stewardship.

Conduct an environmental audit

Barnard administrators, professors, staff, and students should collaborate to conduct a comprehensive, quantitative audit of the College's environmental impact. A campus-wide audit assesses the key environmental impacts of the institution, including: waste production (solid, hazardous, and universal), energy use (including transportation on campus, commuting, and academic related air travel), water use, building construction and renovation, grounds management, food consumption, and purchasing.[5] Typically, an audit identifies specific "indicators" by which to gauge a college's environmental influence in each of these categories. Indicators are usually drawn from measurements that are already being made regularly by staff departments, and are selected for their usefulness in indicating improvement over time.[6]

The Significance of Quantifying Sustainability

"*Sustainability is a whole new way of seeing and relating to the world, and the act of measuring it legitimizes it…institutions measure only what is important to them.*"
-Christopher Uhl, Biology professor and co-author of the Penn State Indicators Report

In a broad sense, an environmental audit accomplishes three chief objectives: 1) it organizes and makes public those data that are typically held privately within individual departments, so that the entire community can understand the college's environmental impacts; 2) it explains the environmental significance of a college's policies and practices in a quantitative manner, so that an objective assessment of a college's sustainability may be made; and 3) it serves as a tool for charting progress over time.

Sustainability audits require the involvement of every sector of a college community: they rely heavily on administrative support and the input and advice of staff, and are usually researched and written by students under the guidance of professors. Staff departments[7] manage the school's waste production, energy use, water use, and purchasing, and keep records (or, at least, are billed for) the school's wastes and resource uses; this makes them the primary resources for an environmental audit's data. Gathering data that will be useful in an environmental audit requires a significant amount of work from staff departments and a willingness to make their records public; for this reason, it is important that staff receive administrative encouragement, assistance, and recognition for their contributions to an environmental audit.

At many schools, environmental audits have been developed by professors who design independent studies and innovative sustainability courses focused on the campus to guide students through the research and writing of the audit. For example, Christopher Uhl, a Biology professor at Pennsylvania State University, spearheaded the writing of the Penn State Indicators Report by inviting students to enroll in independent studies geared toward researching and writing sections of

[5] Many audits are not limited to these categories, however, and also include information on the more amorphous issues involved in broad-based sustainability initiatives, such as life-cycle and full cost accounting and planning, transparency and accountability, responsible investment, etc. In addition, many audits include issues of social sustainability in their audits, discussing social health and wellbeing and other matters.

[6] For example, the "per capita energy consumption" indicator included in the Penn State Indicators Report depends on total energy use and community size data already maintained by the University as standard practice. Being normalized to be a "per capita" measurement means that the indicator can effectively show whether Penn State becomes more or less energy efficient over time, regardless of changes in population size, so long as the indicator is measured regularly.

[7] These departments include but are not limited to Facilities, Dining Services, Purchasing, the Controller's Office, Document Services, and Residential Life.

the Report (Uhl, 2004). Ultimately, the Penn State Indicators Report was compiled by a team of 30 undergraduate and graduate students with the assistance of faculty mentors and young professionals (Penn State Green Destiny Council, 2000).

Perform an environmentally focused curriculum review

To cultivate greater environmental awareness in Barnard students and to make them more capable of tackling the pressing environmental problems of our time, Barnard should perform an environmentally focused curriculum review. A curriculum review would involve: 1) analyzing the environmentally oriented course offerings of the school; 2) conducting research on the curricular changes of other schools pursuing sustainability; and 3) ultimately forming programs, workshops, and incentives for faculty to create new environmentally oriented courses, to integrate environmental components into their current courses, and to coordinate with staff departments on campus to create "on-campus learning environments."

Barnard's environmental curriculum review should engage professors from diverse academic disciplines and encourage cross-discipline collaboration on course development. A curriculum review that includes professors outside of the Environmental Science Department and urges cross-discipline collaboration can result in courses that cultivate in students the cross-disciplinary knowledge and thinking necessary for environmental progress. For example, at Ithaca College, Dr. Tom Pfaff of the Mathematics Department finds that his students find their work more meaningful and interesting when he uses environmental data for Calculus problems (Boburg, 2005). At Emory University, a cross-disciplinary curriculum review also substantially enriched the direction and quality of faculty research and enhanced faculty retention (Barlett, 2004), and at Northern Arizona University the Ponderosa Project was initiated in 1995 and provided the framework and funding for integrating environmental issues into over 120 courses across curriculum.

Important Considerations: Implementing Sustainability Initiatives

Gain practical ideas, models, and support from other colleges and universities

Barnard's pursuit of sustainability can greatly benefit from studying and adopting components of successful models from similar institutions. The body of literature discussing the intellectual and practical dimensions of campus sustainability is substantial and rapidly growing, and there are extensive web-resources focused on the topic. Surveying these materials can stimulate fresh ideas for programs to bring to the Barnard campus. Emulating the successful practices of other colleges can help Barnard become more sustainable in an efficient and cost-effective manner. Forming relationships with colleges and universities that share Barnard's values can help spread awareness of Barnard's environmental stewardship beyond the campus gates, and joining sustainability-focused consortia can offer valuable development resources in workshops and other benefits. A number of online resources for finding information on sustainability initiatives at other colleges and universities are available in online *Appendices 5-7*.

Seek innovative means of funding

For many colleges and universities, the upfront costs of environmental initiatives can seem financially prohibitive, even if these initiatives are associated with long-term cost savings. There are, however, a number of alternative means of funding that can reduce the initial financial burden of focused environmental initiatives, including long-term and full-cost accounting, cyclical environmental funds, shared savings plans, and grants.

Many Barnard departments already employ long-term and full-cost accounting as part of good business practice. Long-term and full-cost financial planning takes into consideration longevity and durability of purchases, the costs of lifelong maintenance, and overhead costs[8] associated with purchases. Most often, full-cost accounting supports the purchase of energy and resource efficient items that employ the latest technology. Although such purchases may require greater initial cost, they save the college money over time. Cyclical environmental funds restore the savings accrued from one initiative to support the next project and such funding mechanisms provide an additional incentive to make environmental efforts cost-effective. Shared savings plans, often called performance contracting, are contracts by which a third party provides all initial funding for a major project, such as retrofitting lights or installing sensory equipment. The college "*pays back the loan based on the calculated savings that result from the efficiency improvements*" (Creighton, 1998). Barnard Facilities is already looking to fund its energy efficiency endeavors through such performance contracting. Grants from private companies and foundations are also often available to fund campus greening initiatives.

There is also no limit to the number of additional and creative means of funding sustainability initiatives. In many instances students have themselves voted for small tuition increases to specifically fund sustainability projects. Another example is capital campaigns that rely on small but sustained donations from students, faculty or alumni. For instance, a carbon-offset program for Barnard College could be established to which members of the college contribute funds based on the number of miles they travel on college-related business. The money from such a fund could be specifically earmarked to go toward environmental projects on campus. Undoubtedly many such opportunities are available to a college that demonstrates sincere commitments to sustainability measures on campus.

Hire students to do sustainability work

In some cases, it is difficult for staff, whose schedules are already full with standard responsibilities, to take on the additional work associated with becoming more sustainable. Student intern programs can relieve the time and labor constraints of environmental initiatives in a cost effective manner, and provide excellent opportunities for students to learn about "*the interaction between business decisions and the natural systems on which [public health] depends*" (Creighton, 1998). Environmentally focused student internships can be created by administration, staff, or faculty departments looking to green College offices, classrooms, and residence halls.

Maintain consistent publicity

Maintaining consistent publicity for sustainability initiatives is imperative for earning the College, as well as the individual community members that implement initiatives, the recognition they deserve.

[8] "Overhead costs" pertain to waste disposal, heat, water, and solid waste handling and disposal (Creighton, 1998).

Additionally, public acknowledgment motivates staff, faculty, and students involved in environmental stewardship efforts.

Uphold greater transparency through the Internet

Beyond the intermittent publicity generated by major sustainability initiatives, it is vitally important that task forces and administration regularly document the College's environmental activities and create a website to describe their progress. It also is imperative that staff better inform the College community about their efforts towards sustainability by adding sustainability-focused webpages to their main websites, or through other means. Having up-to-date, accurate, comprehensive information on sustainability at Barnard available online is important for: 1) generating broad public recognition of Barnard's efforts toward sustainability; 2) fostering on-campus appreciation for environmental programs; 3) recruiting potentially involved faculty and student volunteers; and 4) informing the opinions and efforts of concerned individual actors and student groups, who require accurate knowledge of the school's progress to inform and guide their actions.

Central College of Iowa is an example of how web-based information can enhance the appeal and effectiveness of sustainability initiatives. The Central College "GreenTouchScreen" website contains detailed, animated information on the environmental components of the PODS Residence Hall, a 72 bed residence opened in Fall 2003. Students can look online to view their suite's current energy use in real time, or to compare the amount of energy their suite used last week to their neighbors[9]. Similarly, Oberlin College's web-based "Campus Resource Monitoring System" allows students in 26 dormitories across the campus to track their dormitory's energy and water use in real time. St Olaf College in Minnesota is another model of how web-based transparency can foster efficient environmental progress. Their "Black & Gold & Green" website promises to give "*an honest accounting of our successes and failures*", and provides stories about St. Olaf's efforts toward sustainability in a user-friendly format (St. Olaf College, 2006).[10] On a department-specific scale, Columbia Housing and Dining departments each publish comprehensive and up-to-date information on their websites about their environmental initiatives.[11]

[9] The Central College "GreenTouchScreen" PODS Residence Hall website can be found at: http://pods.centralcollege.greentouchscreen.com/

[10] Find the St. Olaf College sustainability website at: http://www.stolaf.edu/green/.

[11] Find the Columbia University Housing Environmental Stewardship website at: http://www.columbia.edu/cu/housing/docs/about-us/environmental-stewardship.html. Find the CU Dining Environmental Stewardship website at: http://www.dining.columbia.edu/docs/about-us/environmental-stewardship.html.

Summary of Long-Term Recommendations

- Establish a framework of sustainability committees that are administration-led and contain representatives from all sectors of the College
- Publish an official statement describing Barnard's commitment to environmental stewardship
- Hire a sustainability coordinator
- Consistently audit Barnard's environmental performance and make quantitative measurements of Barnard's progress toward sustainability over time
- Perform an environmentally focused curriculum review
- Gain practical ideas, models, and support from other colleges and universities
- Surmount financial constraints by seeking innovative means of funding
- Employ students to work on environmental initiatives
- Maintain consistent positive publicity for Barnard's environmental accomplishments
- Make Barnard's commitment to sustainability visible on the web and Barnard's operations more transparent with department-specific environmental web pages

Sustainability at Barnard

Overview of Barnard's Operations

Each of the sections that follow describe parts of Barnard's operations and are organized in the following sequence: 1) description of the roles and responsibilities of the department at hand, 2) explanation of the department's importance to environmental sustainability, 3) account of the department's current social and environmental accomplishments, and 4) listing of concrete opportunities within the department for contributions to a sustainability initiative. These latter opportunities describe specific actions departments can take to make Barnard more environmentally sustainable. The suggestions are not comprehensive or fixed, but are meant as a starting point for the fruitful brainstorming that leads focused environmental action.[12]

Administration

At the head of the Barnard administration lies the Barnard Board of Trustees, consisting of thirty-eight members. The President, Judith Shapiro, reports regularly to the Board of Trustees. She is assisted by the support staff of the Office of the President and advised by the President's Council, which contains the Vice-President for Administration & Capital Planning, Lisa Gamsu, as well as representatives of each major administrative department at Barnard. These departments include: the Office of the Provost, the Office of the Dean of Studies, the Office of Advancement, the Office of Finance and Planning, and the Office of the General Counsel.

Board of Trustees

i. Description

The Board of Trustees, containing thirty-eight members, is responsible for the management of Barnard's endowment and for ensuring the long-term success of the institution.

ii. Importance to Sustainability

As trustees of Barnard's endowment, the Board of Trustees has the ability to vote on the shareholder resolutions of the companies in which Barnard invests. These shareholder resolutions generally require companies to conduct internal investigations of socially and environmentally pertinent policies or actions, or to attain more accurate reporting and greater transparency. Often, companies respond to this shareholder pressure by changing their practices to become more environmentally and socially sustainable. By actively participating in shareholder-resolution voting

[12] Most information in this section is derived from interviews with staff department directors conducted during the summer of 2006, and Barnard College websites as they appeared at that time. Where other sources were used, specific citations are given.

and by making informed choices, the Barnard Board of Trustees has the power to ensure that Barnard's endowment funds socially and environmentally responsible corporate actions.

iii. Accomplishments
The Advisory Committee on Socially Responsible Investing (SRI) was created in 2002 by the Board of Trustees to "*ensure that Barnard's investment choices reflect the values nurtured by our college*" (SRI website). This committee researches shareholder resolutions, gathers input from the community, and ultimately provides the Committee with information and voting suggestions on upcoming shareholder resolutions. As their website states, "*The Committee advises the Board of Trustees as to the ethical and social issues arising from the management of the College's endowment*".

iv. Opportunities for Greater Sustainability
The Board of Trustees is not required to make public their voting decisions on resolutions recommended by the Committee. In 2004, the trustees did so per the request of the Committee. Further disclosure is to be determined on a case-by-case basis. Also, the Committee is only permitted to verbally share information with the community from the bi-annual investment profiles offered by the Board of Trustees. The Committee must obtain specific permission from the trustees in order to release such information in a written format. To increase transparency, the Board of Trustees can commit to consistently making their voting decisions public and to giving permission to the Committee to share information on investment in a written format.

In 2004, the only year for which voting decisions have been revealed, the Board of Trustees reported to have followed the Committee's advice on only one of the four resolutions addressed. It is beyond the scope of this report to suggest what the greater causes of this apparent lack of compliance may have been. But it is important to note that such low compliance is not necessarily the norm with college and university SRI advisory groups; for example, in the same year the Columbia Board of Trustees reported 99% compliance with the suggestions of the Columbia Advisory Committee on Socially Responsible Investing (Heary, 2005).

SRI community forums at Barnard have historically drawn audiences of only 25-30 people. The SRI Committee can better publicize these events to attain greater community awareness and involvement.

The President

i. Description
The President is the chief executive officer of the College and the head of the Barnard administration. She reports regularly to the Board of Trustees and is Barnard's foremost public representative.

ii. Importance to Sustainability
As the chief public representative of the College, the President is responsible for expressing the values of the school and for promoting its major accomplishments. She, more than any other individual of the College, has the power to create an ethos of environmental sustainability on campus and to help publicize the successes of sustainability initiatives on campus. She can seize these opportunities by signing her support to a commitment to environmental stewardship and by presiding over publicity that portrays Barnard's achievements in sustainability. Official upper

administrative support for sustainability can create a "*cascade of improvement*" throughout the school, reinforcing the involvement of staff leaders and creating the momentum necessary to make environmental regard a daily institutional expectation, rather than an exception (Uhl, 2004). The President's promotion of Barnard's sustainability initiative also can help earn Barnard public recognition for its efforts, alumnae approval, and the enhanced interest of prospective students.

iii. Accomplishments
Barnard's President, Judith Shapiro, consistently promotes and supports Barnard's commitment to nurturing women's issues, diversity, and civic responsibility. In June 2007, President Shapiro also announced the commitment of Barnard College to join New York City's goal to reduce greenhouse gas emissions. At the event, announcing Mayor Bloomberg's environmental initiative, President Shapiro remarked that "*[Barnard] represents leading institutions in our country's leading city, and it's only fitting that we lead the way in this critical endeavor [to create a 'greener cleaner city']. At Barnard, on a four-acre campus filled with beautiful historic buildings, we face the challenge of making our cherished old buildings energy efficient and non-polluting*" (Barnard College Office of the President, 2006).

iv. Opportunities for Greater Sustainability
The President, as the head of Barnard's upper administration, can grant her support to an environmental commitment statement. She can publicly recognize that Barnard's strong commitment to the public good necessitates devotion to restricting the College's negative impacts on the environment and public health, and to encouraging the study of pressing environmental issues. The President can also help to create a system of committees to plan and implement Barnard's environmental initiatives, establish a Sustainability Coordinator, mandate an environmental audit, and can support an environmentally focused curriculum review.

Office of the Provost and Dean of the Faculty

i. Description
The Provost oversees all Barnard academic departments and faculty. Amongst her many duties, she is responsible for shaping the faculty budget, for curriculum review, and for overseeing the educational considerations involved in academic building renovations and capital projects.

ii. Importance to Sustainability
The Provost is the chief academic officer of the college, overseeing all educational affairs and activities, including research and academic personnel. She can support directed changes in the focus of the curriculum, provide funds for sustainability research and incorporate sustainable building practices in renovations and new capital projects. The Provost can also use her leadership role to garner support for a sustainability initiative on campus within the faculty, Board of Trustees and the higher administrative leadership.

iii. Accomplishments
The Provost fosters Barnard's commitment to an integrated curriculum that explores and promotes women's issues and other matters of global social significance, including issues of culture and diversity. This curriculum "*recognizes the importance of gender in all forms of human endeavor*," "*promotes understanding of global issues*," and encourages students to take advantage of the "*cultural abundance*" and "*diverse neighborhoods and peoples*" of New York City

(http://www.barnard.columbia.edu/academics/cur.html). Thus, the Provost assists in enhancing the social awareness of students and in preparing them for lives of judicious service to society.

Beginning in 1997, the Provost coordinated an $8 million renovation of Altschul Hall, which houses Barnard's Environmental Science, Chemistry, Physics, Biology, and Astronomy departments. This renovation has greatly enhanced the quality of science education at Barnard, thus making the scientific environmental component of Barnard education stronger. Provost Elizabeth Boylan also helped in revising the first draft of the ISR in 2006.

iv. Opportunities for Greater Sustainability

The Provost can play a key role in supporting an environmentally focused curriculum review and in integrating an environmental component into the Barnard general education requirements. A curriculum review would involve analyzing the environmentally-oriented course offerings of the school, conducting research on the curricular changes of other schools pursuing sustainability, and ultimately encouraging faculty to create new environmentally oriented courses or to integrate environmental components into their current courses. The Provost can also work to hire new faculty with sustainability expertise and support interdisciplinary research on sustainability between existing Barnard faculty. Creating a program to foster environmental issues in the Barnard curriculum can cultivate greater environmental awareness in students and can make them more capable of tackling the pressing environmental problems of our time. Integrating an environmental component into the Barnard general education requirements can bolster Barnard's commitment to sustainability and enable the College to create greater environmental awareness in all of its students.

There are already courses offered at Barnard that can serve as examples of environmental teaching and learning. For instance, the interdisciplinary course "Environmental Literature, Ethics, and Action" (ELEA) in Barnard College's Science and Public Policy Program seeks to deepen students' understandings of how humans have transformed the planet. Students examine the consequences of human activities and are given the opportunity for moral reflection on their own role and leadership responsibility as stewards of the environment. ELEA does this through readings and class discussions, research, bi-weekly progress reports, and term environmental stewardship projects, which are tracked on the ELEAblog throughout the course. Courses such as ELEA represent an important resource for modeling and directing an environmental curriculum review on campus.

The Provost can also support the integration of sustainable building concepts into the bidding, contracting and design process of academic renovations and capital projects.

Office of Advancement

Alumnae Affairs

i. Description

Alumnae Affairs publishes the *Barnard* alumnae magazine and coordinates reunions and other events and programs for Barnard alumnae.

ii. Importance to Sustainability

Alumnae can be a useful resource for creating environmental sustainability on campus, provided that they are adequately informed of Barnard's involvement and invited to participate. Passionate alumnae may desire to contribute in a variety of ways including serving on committees, writing

articles or otherwise aiding publicity, and contributing money. In addition, alumnae "*may be good sources of expertise about energy efficiency*" or other technical issues facing the College, and "*may be willing to donate their services*" (Creighton, 1998).

iv. Opportunities for Greater Sustainability
Alumnae Affairs can reach out to alumnae through the *Barnard* alumnae magazine or other forums, describing the environmental initiatives on campus and inviting alumnae to contribute.

Office of Public Affairs

i. Description
The Office of Public Affairs manages the Barnard News Center and "*works to raise Barnard's profile among key audiences and build understanding of its unique niche in higher education*" through media relations, publication design and production, management of the Barnard website, and major event planning.

ii. Importance to Sustainability
The Office of Public Affairs can play a key role in earning Barnard the recognition and support it deserves for its environmental initiatives and in helping Barnard to earn the publicity-related benefits of becoming environmentally sound.

iv. Opportunities for Greater Sustainability
Public Affairs can work to promote Barnard's efforts towards sustainability through the official College website, the Barnard News Center, and other forums.

Students and Faculty

i. Description
Students include the entire body of active students at Barnard College, and can also be expanded to include the alumni. There are approximately 2,356 students enrolled at the College. The Barnard Student Government Association sponsors fifty-seven cultural, performance-based, pre-professional, and special interest student groups.

Faculty includes all professors, instructors, and lecturers of the college. They comprise 34 academic departments and are overseen by the Provost.

ii. Importance to Sustainability
Students and faculty play an essential role in campus sustainability initiatives. Without their active support and engagement, environmental initiatives are bound to remain in the background. Faculty and students, with help from alumnae, can encourage coordination and community engagement in sustainability issues, and most importantly, pride in Barnard as a leader and model for positive change.

iii. Accomplishments
There are several student organizations on campus that have actively pursued various environmental initiatives on campus including recycling efforts, local foods in the dining halls and participation in numerous workshops and meetings related to campus sustainability. The fall of 2007 also marks the beginning of the EcoReps program, which was established through a student lead effort to employ a

group of student environmental advisors within the first-year dormitories. The EcoReps have organized a number of environmentally themed events within the dormitories, including field trips to various parts of campus facilities.

Many faculty already offer environmental science or studies courses within the Barnard curriculum. Barnard also actively participates with the Earth Institute of Columbia University to provide training and research opportunities for Barnard students.

iv. Opportunities for Greater Sustainability
Students can actively participate in the environmental efforts already existing on campus. In collaboration with faculty, they can comprise an important part of the effort to evaluate current environmental impacts of the college and innovate new approaches to sustainability on campus. They should also be involved in any environmental committees that are established as part of a sustainability initiative.

Faculty should also become actively involved in sustainability efforts on campus, including promotion and participation in environmental committees and a general sustainability initiative on campus. They can also work to acquire grants to fund sustainability research and involve students in that research. Faculty can also actively support a curriculum review, as well as work independently to incorporate environmental material into their coursework. They can also consider the impacts of work related travel and support a carbon offsets program for Barnard College.

Administrative Services Departments

The broad category of Administrative Services includes: Facilities, Dining Services, Residential Life, Academic Technologies, Purchasing, the Controller's Office, and Document Services. These departments are responsible for the day to day operations of the College and collectively employ nearly 300 staff members.

Facilities

i. Description
Facilities is responsible for "*the maintenance, repair, cleaning and renovation of the academic buildings, residence halls, grounds and infrastructure of Barnard College*" (Barnard College Facilities, 2006). Facilities is the department with the most significant influence on Barnard's direct environmental impact. It is responsible for Barnard's waste, water, and energy management and helps to establish fixture and finish standards in renovations of buildings and new construction. The participation and enthusiasm of Facilities is essential to a successful environmental sustainability initiative at Barnard College.

Trash and Recycling
ii. Importance to Sustainability
Barnard's trash production is significant because its transport and disposal create air and water pollution. The decomposition of Barnard's solid waste contributes to air and water pollution. The transportation of Barnard's trash requires significant fossil fuel consumption and also burdens public roads and potentially increases "*noise, congestion, and air quality problems for communities*" along the truck

route, at the sorting facility, and at the dumpsite (Creighton, 1998). Since the closing of the local Fresh Kills dump, New York City has had to ship its solid waste to transfer stations in New Jersey and then on to dumpsites as far as Virginia and Pennsylvania (Lipton, 2001). Although Barnard chooses not to use the city waste services[13], our trash follows a similar route.

Barnard's trash production is also financially significant because Facilities chooses not to use the free city solid waste services, but instead to contract a private service to pickup and dispose of solid waste (this decision was made because city pick-up times often proved to be unreliable and there is insufficient space at Barnard for storage). The fees charged by this service take into consideration not only the labor and operating costs of their fleet of trucks, which pick up Barnard's trash and recycling on a daily basis, but also the landfill and incineration fees paid by the company to dispose of Barnard's waste.

Recycling is important because it saves both natural resources and energy. Recycling also diverts used materials from the waste stream and saves money. Diverting used materials from the waste stream can reduce the amount of waste disposal fees an institution has to pay. While disposing of recyclables usually also entails fees, these charges are significantly lower than those for landfill use and incineration. Barnard does not directly pay landfill or incineration fees, as they contract a private service to pickup and dispose of their solid waste. Nevertheless, by hiring the same company to handle both their trash and recycling, Barnard indirectly receives a cost benefit from recycling. It costs the company less to handle Barnard's recycling than it would for them to handle additional waste, and thus they charge less for pickup services.

iii. Accomplishments

Facilities manages a successful recycling program on the grounds and in the academic buildings and the residence halls of the campus. In accordance with New York City policy, Facilities supports two different categories of recycling: commingled, or "bottles and cans" recycling, as well as paper and cardboard recycling. Currently, there are 5 commingled recycling bins on the grounds, paper recycling bins in most administrative and faculty offices and in computer labs, and commingled and paper bins on each floor of each academic building. Recycling facilities vary in residence halls, depending on the dorm.[14]

To streamline the process of correcting the everyday logistical problems of the recycling program, Facilities added a Recycling option to their online Work Request format in Spring 2005. This allows concerned Barnard community members to alert Facilities about daily issues such as black bags incorrectly placed in recycling bins (only clear bags should be used for recycling), incorrect labeling of recycling bins, recycling bin overflows, and ineffective placement of recycling bins.

iv. Opportunities for Greater Sustainability

Facilities has the power to reduce Barnard's air and water pollution and to save money by encouraging waste reduction, re-use of materials, and recycling among all sectors of the Barnard

[13] Facilities made this choice after trying the city's services and finding them unreliable. Trash was picked up at irregular hours and Facilities received complaints from the Barnard community and local residents about trash sitting on the curb for hours, blocking the walking path and creating unpleasant odors.

[14] Although Facilities is involved in residential recycling because they are responsible for managing waste and recycling pick-up and disposal, Facilities does not control the availability of recycling bins in residential halls. Residential Life controls purchasing of residential recycling bins.

community. Education is an essential component of a successful waste reduction program, no less important than the physical presence of recycling bins. Without adequate education and awareness, Barnard cannot attain its full re-use and recycling potential. Some opportunities for reducing Barnard's waste production, including educational awareness, are:

- Encouraging waste reduction and re-use of materials among its own maintenance, grounds, janitorial, and construction staff
- Requiring that construction and demolition debris be recycled[15]
- Ensuring that recycling bins are always accompanied by trash bins to encourage appropriate placement of waste[16]
- Effectively informing janitorial staff of trash and recycling pickup station policy and conducting occasional ground checks to ensure that all paper recycling and cardboard is being placed to the side of trash and commingled recycling at trash pickup stations[17]
- Becoming involved in outreach to educate the community on recycling options through the following means:
    - Publishing a Facilities newsletter, or an e-newsletter to minimize paper consumption
    - Initiating a flyering or increased sign campaign
    - Submitting information about the recycling program to the New Student Orientation Program (NSOP) and Residential Life for inclusion in the packets of information given to incoming students
    - Increasing collaboration with Residential Life to provide recycling information to RAs (and EcoReps) and students in the residential halls

Hazardous and Universal Waste

ii. Importance to Sustainability

The proper management of hazardous and universal materials is important to avoid harm to human and environmental health. Hazardous wastes produced in the science labs and the darkroom have

[15] Construction debris is often quite marketable. It is also important to divert from the waste stream because it is bulky and thus entails significant landfilling and incineration costs.

[16] In academic buildings, recycling bins are effectively placed near trash bins. However, many of the grounds recycling bins are not directly adjacent to trashcans.

[17] Trash and commingled recycling are picked up by a separate fleet of trucks that manage paper and cardboard recycling. For this reason it is important that cardboard and clear bags filled with paper recycling be placed at the edge of the main trash and commingled recycling heap at the trash pickup stations; otherwise, paper recycling will be carried to a sorting facility that does not support paper recycling, and all paper will be disposed of as trash. Adam Pasqual, representative of the company that manages Barnard's trash and recycling, reports that incorrect placement of paper recycling bags is occasionally a problem at Barnard.

the potential to create air, soil, and water pollution. Motor, heating, and lubricating oil as well as paint products also have potential negative environmental effects. Universal wastes such as fluorescent bulbs and ballasts; computers, monitors, and other electronics; and batteries contain heavy-metals which can be very damaging to human health. Recycling hazardous and universal materials wherever possible can reduce the likelihood of contamination and the College's overall waste production.

iii. Accomplishments

In 2007 Barnard conducted an EPA hazardous waste self-audit. Lab procedures as well as storage and disposal protocol were reviewed. Signage was implemented to ensure appropriate disposal, and protocols were established for systematized disposal of hazardous materials, record keeping, and faculty, staff, and student training in hazardous materials management.

Facilities Grounds workers use urea for de-icing walkways; unlike many other options for ice management, urea does not contain chlorides, which can pollute soil and waterways (Trade Press Publishing Corporation, 2006).

Academic Technologies, in conjunction with Facilities, runs a computer part re-use program. The department accepts discarded computers and strips usable parts from the machines in the Lehman Computer Lab. Those parts of the computer that are not re-usable are disposed of as universal waste.

A battery-recycling container is located in Sulzberger.

iv. Opportunities for Greater Sustainability

Facilities can look into reducing potentially hazardous waste by re-refining and recycling used oils, antifreeze, and degreasing agents; selling used tires to a reclamation facility; and ensuring that painting is done in a way that minimizes waste.

The Grounds sector of Facilities has many opportunities for reducing potential chemical environmental contamination, which include: developing an integrated pest management system (IPM) that reduces pesticide use; increasing compost use and selecting plants, grasses, and surfaces that are highly compatible with the region and climate to reduce fertilizer use; and using organic and non-toxic pesticides, fertilizers, and herbicides whenever possible.

Regarding universal waste, Facilities can sponsor a general electronics disposal (or even recycling) program, offering some means of convenient drop-off or pick-up and taking care to advertise the program on their website and other appropriate forums.

Facilities can improve community awareness of the importance and availability of battery recycling. Currently, it seems that few students are aware of the battery-recycling program on campus. Student groups may be good liaisons for this project.

Energy

ii. Importance to Sustainability

Barnard's use of oil, gas, and electricity is likely the largest adverse environmental impact of the College. On site, burning oil and natural gas for heating and cooling buildings and for heating water

generates air pollution. Off site, "*the mining of oil and gas and their transport…have serious implications…for air quality, water pollution, climate change, and ozone depletion*" (Creighton, 1998). Additionally, Barnard's use of electricity to operate the College's heating and cooling components, lights, appliances, and laboratory equipment makes the College culpable for the release of carbon dioxide and other pollutants at the utility providing our electricity.

Barnard's dependence on non-renewable sources of energy like oil and gas makes it vulnerable to the risks of rising and unpredictable energy costs. The global demand for oil and gas is increasing rapidly as the supply decreases, and production is often based in regions where complex political situations make supply unreliable. The Energy Information Administration, a division of the U.S. Department of Energy, predicts that global demand for oil will increase 40% by the year 2025 (Energy Information Administration, 2006). Meanwhile, oil supplies dwindle, and the oil reserves remaining are hard to reach and require great investment to refine (Chevron Corporation, 2001-2006). Many oil and natural gas reserves are located in developing nations where the governmental infrastructure is not firm enough to support an open, reliable business environment with fixed rules on production and ownership. Improving energy efficiency and turning to renewable forms of energy can protect Barnard from the financial risks of dependence on increasing and erratic fossil fuel costs.

Energy efficiency measures can also realize large financial savings that quickly compensate for the costs of retrofitting equipment. At the University of Michigan, "*energy conservation since 1973 has saved $78 million in energy costs*" (Michigan Tech Environmental Sustainability Committee, 2005). The City University of New York estimates its savings from lighting changes alone at $3.6 million annually (Creighton, 1998). Improving energy efficiency also can improve building occupant satisfaction and "*provide…incentive for individual conservation efforts*" (Creighton, 1998). Much of Barnard's current HVAC (heating, ventilation, and air conditioning) systems are inefficient, built before the broad social comprehension of global warming and when energy was relatively inexpensive. When inefficient heating systems outside of individuals' control make rooms unnecessarily hot, this palpable indication of institutional waste can seem to dwarf the usefulness of an individual's own daily acts of environmental stewardship. When the College enhances its control over heating and cooling systems, the general community will be pleased to no longer suffer from over-heated classrooms, and environmentally minded community members can believe that their own acts are important contributions to the College-wide sustainability initiative.

iii. Accomplishments

In the past year Facilities has begun to take steps towards becoming more energy efficient. These efforts are supported by Vice President for Administration Lisa Gamsu. In Spring 2006, Facilities completed an assessment of the campus's HVAC (heating, ventilation, and air conditioning) and lighting systems with contracted engineers to determine potential areas of efficiency improvement; this review led to the "Energy Conservation Measures Proposed for Study at Barnard College" document. This document was included in a proposal submitted to NYSERDA (New York State Energy Research and Development Authority) for funding of an initial study that could determine which changes, out of all the potential opportunities for energy efficiency listed in the document "Energy Conservation Measures", would have the greatest financial and environmental impact. This study was conducted in Spring 2008 by the engineering firm TAC under the supervision of the Clinton Climate Initiative. Barnard Capital Planning and Facilities will use the information provided by this study to determine the most cost effective options for meeting the PlaNYC commitment to reduce carbon emissions by 30% by 2030.

The first steps of Facilities' energy efficiency program have already been taken: in Spring 2006 the Building Management System was upgraded from a DOS platform to a Windows based one. This system will require the installation of temperature and occupancy sensors before it can be fully functional; ultimately, it will allow Facilities the ability to centrally control temperatures as well as lighting throughout the College. Once sensors are in place to detect changes in room temperature, the system will register fluctuations from the programmed base temperature and automatically correct for these changes. Facilities will be able to set lighting and heating schedules for rooms based on their expected occupancy, with the potential to dramatically reduce unnecessary lighting and heating. With the installation of occupancy sensors, Facilities will have the power to make heating and lighting schedules flexible, so that if a person enters a room during a time when it is not usually occupied, lights and heating will automatically turn back on. Remote computer energy management systems like the one installed by Facilities have been proven to reduce institutional energy use by 10 to 20 percent (Decision Focus, 1988). In 2006 Facilities programmed nighttime, weekend, and vacation heating and cooling temperature setbacks. Programmed heating and cooling reductions for these extended periods of time when buildings are not occupied saves a significant amount of energy.

Altschul, McIntosh, Lehman, the gym in Barnard Hall, and renovated sections of Milbank already house sensors to inform heating and cooling. Occupancy sensors in the recently renovated Environmental Science Department offices and labs allow for lights to be turned off automatically when rooms are not in use. As of Summer 2006, Facilities has installed occupancy sensors in classrooms on the 3rd floor of Milbank to test public reception to central lighting control.

A lighting retrofit was completed around the 1999-2000 school year to replace outdated T-12 fluorescent bulbs with more energy efficient T-8s throughout the school. Where there has been very recent construction or renovation, the maximally efficient T-5 fluorescent bulbs are in place; for example, renovated areas of Elliot contain T-5 bulbs. Similarly, the Nexus building will likely be equipped with T-5 bulbs.

All buildings except Elliot contain dual-fuel boiler units that are capable of burning either oil or natural gas, and Facilities is committed to using cleaner-burning natural gas when it is financially feasible. Natural gas is environmentally preferable to oil because its consumption releases fewer carbon emissions[18], nitrogen oxides, sulfur dioxide, and particulate matter.

iv. Opportunities for Greater Sustainability

At this point, an extensive network of temperature sensors does not exist to make fine control of temperature possible in all buildings; also, occupancy sensors are not yet fully in place to permit lighting and heating schedules. Facilities can continue to install temperature sensors in Barnard Hall, the unrenovated sections of Milbank, the Quad, and the off-campus residential halls. If the trial run of central lighting control on the 3rd floor of Milbank is well received, Facilities can install occupancy sensors in all academic and residential buildings and program lighting schedules for all rooms.

[18] The combustion of natural gas emits almost 30 percent less carbon dioxide than oil (U.S. Department of Energy, 2006).

Facilities can build on its success establishing heating and cooling setbacks for night, weekends, and vacations by working with the Registrar to consolidate periods of room use and allow for longer setback periods.

Encouraging community awareness, discussion, and approval of the change to central energy control can be essential to winning a positive reception for these changes. To involve the community, Facilities can work with the upper administration and the Student Government Association to host a community forum concerning energy efficiency changes. Facilities can establish an energy committee composed of members from all sectors of the College to address the community's concerns with central energy control and to draft an official heating and cooling policy. Facilities can disseminate information on changes to heating and lighting control through their website, newspaper articles, articles written for the official Barnard website through the Barnard News Center or for the *Barnard* alumnae magazine, campus-wide emails, hallway postings, information delivered to students in residential halls by RAs, or a variety of other means.

A key component of educating the community about the magnitude and impacts of its energy use is making information about individual building energy use easily available to the public. If Facilities maintains and publicizes data on the energy use of specific academic buildings, residential halls, and even distinct offices and rooms, administrators, faculty, and students can realize their direct effect on the College's energy consumption and energy efficiency competitions can be developed.

Until full remote computer energy management is in place, Facilities can train and regularly remind its maintenance and janitorial staff to turn out lights, close windows, turn off water, and otherwise prevent energy waste in their daily tours of the campus.

Facilities can collaborate with Capital Planning and Administration and other pertinent departments to explore specific financing options for energy efficiency and sustainability projects. The options include establishment of an endowed fund or student body agreement to pay more in tuition and fees to fund environmental projects.

Water

ii. Importance to Sustainability

Unpolluted sources of water are increasingly scarce, and freshwater supply as well as wastewater treatment can be expensive. Conserving water can preserve unpolluted water supplies, reduce costs for freshwater supply and wastewater treatment, and reduce the amount of energy needed for hot water heating, which accounts for 15 percent of residential energy use (Creighton, 1998).

iii. Accomplishments

The online Work Requests offered by Facilities allow community members to easily inform Facilities of leaking water pipes and fixtures and malfunctioning toilets, so that Facilities may solve these problems quickly before much water is wasted.

iv. Opportunities for Greater Sustainability

Facilities can conduct a water audit to identify and evaluate water-using equipment. This audit can examine not only appliance and HVAC-related water use, but also water use in campus laboratories.

Facilities can replace conventional toilets, faucet aerators, showerheads, and other appliances with low-flow and automatic turn-on/shut-off models, or make modifications to existing equipment to make them more water efficient.

Facilities can perform regular leak inspections to identify potential leaks and prevent water waste.

Facilities can investigate Grounds watering techniques to make certain that they are maximally water-efficient and implement xeriscaping practices in available regions of the campus.

Capital Projects

ii. Importance to Sustainability

Facilities is involved in capital projects to the extent that they work with architects, engineers, and construction services to ensure that parts and systems installed are compatible with the current systems and standards of Barnard College buildings. This involvement allows Facilities the leverage to encourage the incorporation of energy efficient, water conserving, and sustainable material components into new and renovated buildings.

iii. Accomplishments

The new Nexus building integrates several components of green design including: a green roof, low flow faucets and other water efficiency measures, daylight dimming systems and occupancy sensors, a highly efficiency HVAC system, low emmissivity glass, and incorporation of recycled materials. More information is available at http://www.barnard.edu/nexus/about/green.html.

Capital Planning and Facilities include environmental criteria in choosing architects, engineers, construction firms, and other service providers for capital projects. Capital Planning and Facilities require construction services to separate and recycle debris from construction, in accordance with industry standards.

iv. Opportunities for Greater Sustainability

The Capital Planning Office and Facilities can expand their efforts to include environmental criteria in the selection of service providers by incorporating these criteria into the literature sent out in the bidding process for architects, engineers, construction firms, and other service providers, and can write environmental criteria into the contracts of these service providers. Life-cycle costs of building components should be considered. Often the initial investment is more expensive, but environmentally sustainable materials will pay off over time through reduced operation and maintenance costs.

Dining Services

General Information

i. Description

Dining Services operates Hewitt Dining Hall, McIntosh retail dining area, Java City, and Catering Services. Aramark, an outside corporation, is contracted to provide Barnard's Dining Services. Thus, Dining Services staff are not Barnard but Aramark employees.

ii. Importance to Sustainability

Dining Services completes nearly 3,000 food purchase transactions each school day. Growing, preparing, cooking, and serving the large quantity of food served by Barnard Dining Services involves the application of chemicals, the production of waste, and the use of energy, all of which have significant environmental impacts.

iii. Accomplishments

Dining Services is generous in supporting numerous on-campus community events. They host special holiday dinners; assist student groups in hosting their own special dinners in the dining halls; provide catered evening study spaces during mid-terms and finals periods; and collaborate with the Student Government Association, the McIntosh Activities Council (McAC), and other student-led groups to manage special events such as The Big Sub, Midnight Breakfast, Breakfast in Bed, and Take Back the Night.

Dining Services donates all un-served food to City Harvest, a nonprofit food rescue organization that picks up excess food from restaurants, caterers, cafeterias, and other suppliers and delivers it to community programs.

When requested, Barnard Dining Services is eager to assist local community initiatives with their culinary needs. In the past, Dining Services has supported the Morningside Area Alliance and has prepared boxed lunches for groups cleaning up neighborhood parks. Furthermore, the new Local Foods Initiative has engaged Dining Services in more extensive support of local businesses and engagement in the local economy.

Dining Services also uses only EcoLab's Ecologic cleaning supplies, which are free of bleach, carcinogens, chlorine and are biodegradable and packaged in recycled materials.

Trash and Recycling

ii. Importance to Sustainability

"*Dining Services in a residential undergraduate college can contribute 10 percent or more to a college's solid waste stream*" (Creighton, 1998). Waste generated by Dining Services includes packaging from received goods (cardboard boxes and plastic sacks); packaging of served products (plastic sandwich wrap, etc.); disposable plates, cups, and utensils; and food waste. Reducing the amount of waste generated can reduce the use of natural resources, reduce the transportation of goods and packaging, and reduce the material disposed of in landfills and incinerators (Creighton, 1998).

Because Hewitt Dining Hall is an all-you-can-eat dining venue rather than a retail one, it employs many waste reduction practices such as buying bulk foods, serving foods in bulk dispensing units, and using ceramic plates and plastic cups rather than disposable ones. Java City, as a retail venue, make a more significant contribution to the overall Dining Services waste stream. Many of the suggestions of the Opportunities for Greater Sustainability section, therefore, are primarily directed towards Java City.

iii. Accomplishments

Dining Services recycles corrugated cardboard and #10 metal cans. Corrugated cardboard can account for up to 1/3 of a dining hall's solid waste (Creighton, 1998).

Dining Services has cut down on packaging waste by using bulk dispensing units for cereal, sugar, and other items in the Hewitt Dining Hall.

At the College's request, Aramark catering no longer serves bottled water, and may soon eliminate its sale of bottled water at Java City.

Construction of the Kosher kitchen has greatly reduced the Hewitt Dining Hall's use of disposable plates, silverware, and cups. Previous to development of the Kosher kitchen, which opened in Fall 2005, all Kosher meals were served using disposables. In order that those with Kosher meal plans could eat pizza, all pizza was served on plastic plates. Also, because many Kosher meals were pre-made and shipped daily, packaging waste rates were much higher. Now, Kosher meals are made on-site and do not involve unnecessary packaging and disposables are only rarely used.

Dining Services has several successful programs and policies for reducing waste, including: the 8-Steps food production computer program, which anticipates consumption of food items and advises how much of each type of food to prepare so that a minimal amount will be left over; a commitment to donating un-served food to City Harvest, a non-profit organization that delivers the food to community programs; Hewitt's one entrée at a time policy that discourages students from taking more than they will consume; and collaboration with the student group BarnardEarth to sponsor waste audits and public waste awareness campaigns.

Dining services and Facilities also teamed up to purchase a BioX Machine in the Summer of 2007 to reduce organic waste to carbon dioxide and non-toxic waste-water. This will decrease the amount of landfill waste leaving Hewitt kitchens, as well as force students to think about their leftover food as they separate organic waste for the BioX Machine (paper cannot be processed in the machine).

Java City offers a 10% discount to customers who bring in their own mugs.

iv. Opportunities for Greater Sustainability

Dining Services can commit to buying in bulk, and can conduct an investigation of the packaging for received goods to identify products with unnecessary packaging. The department can find different versions or vendors for those products identified.

For its take-out and retail needs, Java City staff can purchase containers and plates of lower weight and volume than those used now. Normally, these criteria for disposables are connected to reduced environmental impact and reduced cost.

Java City can encourage the community to take advantage of the 10% discount they offer to customers who use their own mugs. Employees can include a mention of the discount as part of their greeting to customers.

Dining Services can consider the viability of recycling leftover vegetable oil for biodiesel.

Energy

ii. Importance to Sustainability

Dining Service's kitchens and serving areas employ a large quantity of industrial-sized appliances that are operated for long hours throughout the year, consuming significant quantities of energy.

Additionally, Dining Services occupies a large physical space on the Barnard campus, and thus their lighting policies have a considerable effect on the energy use of the school.

iv. Opportunities for Greater Sustainability
Dining Services can make a commitment to purchasing energy efficient equipment when appliances need to be replaced.

Dining Services can work with Facilities to install energy efficient lighting throughout its facilities.

Dining Services can investigate whether the appliances it currently uses are being run with optimum energy efficiency. The department can ensure that refrigerators and freezers have tight door seals and energy curtains to prevent energy loss and that equipment is periodically checked for operating efficiency and repairs. All appliances that are not regularly used can be unplugged.

Dining Services can train its employees to turn off equipment and lights when they are not in use and to keep appliance and loading dock doors closed. It is important that Dining Services establish an expectation of compliance with this policy and initially offer rewards and incentives for compliance.

Packaging is energy intensive and can account for up to 20% of energy use in the food production process; reducing packaging of received bulk goods and served food items can save energy in addition to reducing waste (Backman, 1983).

Reducing water consumption can also reduce energy use, as energy is used for heating and sanitizing water. According to the Electric Power Research Institute, 15 to 20 percent of an electric commercial kitchen's energy use goes towards wastewater sanitation (Architectural Energy Corporation).

Water

i. Importance to Sustainability
Water is used by Dining Services primarily for washing dishes, but also for cooking, food preparation, and ice. Conserving water is important for three main reasons: to preserve dwindling supplies of unpolluted freshwater, to save money on water supply and wastewater treatment costs, and to save energy used to heat supply water and sanitize waste water.

ii. Opportunities for Greater Sustainability
Dining Services can make a commitment to purchasing dishwashers that have water-saving functions, such as recycling water from the rinse cycle to subsequent pre-rinse cycles.

Dining Services can train its employees to save water. Opportunities for saving water include: filling dishwashers to capacity for each load; presoaking and basin-washing hand-washed dishes, rather than using a continuous water spray; reducing reliance on garbage dispose-alls, which use large quantities of water; and otherwise not leaving water running unnecessarily.

Dining Services can develop a routine schedule to check for leaking faucets and pipes, and can encourage employees to immediately inform management when they discover leaks. A dripping faucet can waste seventy-five to a thousand gallons of water a week (Creighton, 1998).

Dining Services can consider installing aerators in some faucets to reduce water flow.

Food Purchasing

i. Importance to Sustainability

Most of the food offered at Barnard dining venues is conventionally produced. Usually, the term "conventional agriculture" refers to an agribusiness model of food production in which relatively few, very large farms owned by multi-national corporations grow food in a maximally cost efficient and productive way. Conventional farms optimize their production through the intensive use of man-made chemicals and the employment of mechanical tools for cultivation and processing.

Purchasing locally grown food can allow Dining Services to support the local economy and small family farmers; preserve the health of the Barnard community; reduce the pollution, loss of soil fertility, and global warming indirectly related to Dining Services's purchasing patterns; and provide their customers with fresher and more flavorful food. Local food is generally grown using only organic, non-polluting fertilizers and pesticides and without antibiotics, growth hormones, or genetic engineering. Additionally, the small scale of local farming usually involves less intense land use and reduces the distance that food is transported from the farm to the market.

There is often confusion regarding whether local farming or organic farming is preferable; additionally, a number of other more specific terms such as "cage-free", "hormone-free", and "naturally-produced" can complicate a Dining Service's ability to determine which foods will be best for the health of their customers and the environment. Although the issue is a complicated one, it is the conclusion of the ISR that purchasing locally grown foods offers the most social and environmental benefits and consumer value to Barnard Dining Services. It is true that organic food is generally more environmentally and socially sustainable than conventional food because it must be grown using only organic, non-polluting fertilizers and pesticides and without antibiotics, growth hormones, or genetic engineering. Organic food is costly, however, and many organic farms use land intensively, use organic fertilizers and pesticides shipped across long distances, and ship their own food products to distant locations (Pollan, 2001). Locally grown food, however, offers the same—and some argue, better—environmental and social benefits of organic food, but is also more economical and produces less transportation-related greenhouse gas emissions.

iii. Accomplishments

Dining Services, in collaboration with the student group BarnardEarth, introduced a local foods program in Spring 2006. Dining Services has been enthusiastic in working within their Sysco contract to discover the geographic origin of food shipped to the Hewitt Dining Hall and to create concrete standards for which foods may be considered locally grown and locally manufactured. In Spring 2006, Dining Services introduced signs labeling locally grown and locally manufactured items and ingredients, and hosted a special Local Foods dinner to educate the community about locally grown food.

iv. Opportunities for Greater Sustainability

Dining Services can advance its local foods program by making a commitment to purchasing locally grown produce whenever possible. This will entail making some alterations to the menu to better embrace seasonal fruits and vegetables; if constructed wisely, a seasonal menu can expand the dining

options for the Barnard community and provide them with more flavorful, fresher, and more sustainable food.

While Dining Services serves some locally produced food in its retail operations, including Eli Zabar sandwiches, the department can undertake a more extensive adaptation of its local foods initiative in the retail dining area in McIntosh Hall.

Residential Life and Housing

i. Description
Residential Life offers a comprehensive set of services to students living in residential halls. Some of these services are practical, such as facilitating room selection and overseeing check-in and check-out. Other Residential Life services are social and personal: the department's Residential Advisor program offers referrals, guidance, and community events to students, and the department organizes the First Year Experience and the Senior Year Experience programs to ease students' transition into and out of college.

ii. Importance to Sustainability
Residential Life is responsible for purchasing recycling bins for the residential halls; thus, the department is accountable for the expansion of the residential recycling program.

Residential Life plays a role in the bidding process that selects furniture providers for new residential buildings and contracts the washing machine and dryer vendor. Choosing vendors who supply environmentally sustainable products and services can enhance Barnard's environmental stewardship.

The RAs, or Residential Advisors, are excellent resources for encouraging environmental stewardship in the residential halls. In general, they can be a strong presence and act as educators especially with regard to the environment and resident's role in campus sustainability. RAs can also oversee responsible use of recycling bins; report leaks and inefficient appliances in residential common areas, kitchens, and bathrooms to Facilities for prompt repair; post signs to encourage recycling, energy efficiency, and saving water; and organize environmentally oriented residential hall events.

Residential Life has the ability to collaborate with Facilities and encourage expansion of the remote computer energy management system to the residential halls. Remote temperature control and motion-sensitive lighting in the residential halls could dramatically reduce the College's energy use.

iii. Accomplishments
Residential Life is committed to steadily expanding the residential recycling program, and adds new bins to residential halls each year.

The student group BarnardEarth has worked with RAs to develop a program in which RAs supervise dorm recycling, refer students with environmental questions and concerns to either Facilities or BarnardEarth, and post information regarding recycling and other environmental concerns. As part of this program, BarnardEarth made presentations to several building staffs during the 2005-2006 school year and worked with individual RAs in Spring 2006 to coordinate

special environmentally focused events such as planting activities and apple strudel baking using local and organic ingredients.

Residential Life initiated the EcoReps program in the 2007-2008 school year to increase environmental awareness and community involvement at Barnard. EcoReps work closely with first-year RAs and provide environmental programming for first-years and the entire student body. They also act as liaisons between students, student government, staff departments, faculty, and administrators in the attempt to increase transparency of operations at Barnard and reduce Barnard's environmental impact. Funding for the pilot year of the program was provided by Residential Life, a "Conscious Lifestyles" grant, and a $2,500 grant from alumna Samantha Unger.

iv. Opportunities for Greater Sustainability

Currently, students in off-campus dorms must carry their recycling to the basements of their buildings. If students were allowed to leave their recycling alongside their trash at hallway pick-up locations and waste closets, more students would probably recycle. Residential Life can work with Facilities to develop the Facilities staff policies and training that will make this possible; it can also distribute information to residents to inform them of this change to recycling policy if it occurs.

Residential Life can work with Facilities to organize residence hall recycling and energy efficiency competitions.[19]

Residential Life can contractually require the laundry machine vendor to provide optimally energy efficient equipment.

Residential Life can include promotion of recycling, energy efficiency, and saving water as a standard responsibility for Residential Advisors. Residential Life can distribute laminated signs for RAs to post in residential halls concerning recycling policies, energy saving washing machine choices, and tips for saving water. Residential Life can encourage RAs to discuss environmental stewardship in beginning-of-the-year meetings and can include information on recycling and energy efficiency in the information packets distributed to students at the beginning of the year.

Residential Life can encourage Facilities to expand the remote computer energy management system to residential halls and offer them logistical support in securing funding and installing temperature and occupancy sensors.

Academic Technologies

i. Definition

Academic Technologies is a subdivision of the broader Information Technologies division, which also manages the Office of Administrative Computing (or MINS), the Library, Media Services, and the Archives. Academic Technologies manages student computer labs, offers desktop support to students and faculty, builds academic websites, and assists faculty in fully utilizing CourseWorks and other web-based applications, amongst other responsibilities. The department is divided into two

[19] In order for this to be feasible, Facilities must regularly keep records of waste and recycling production and energy use of the residential halls and be willing to make this information public.

subunits: Residential Computing addresses student concerns, and Educational Technologies addresses faculty concerns.

ii. Importance to Sustainability

The printing policies of Academic Technologies greatly affect how much paper is consumed in student computer labs. Conserving paper is important because paper production is the third most energy-intensive of all manufacturing industries in the U.S., consumes significant quantities of water and wood, and is culpable for about 1/3 of the solid waste generated in the United States (Environmental Defense, 2006).

As director of student and faculty computing, Academic Technologies is in a position to encourage energy efficient computer use amongst students and faculty and to ensure that computer labs are being run in an energy efficient manner. Energy used for computers often makes up a large percentage of the overall energy use of colleges and universities; for example, the University of Michigan found that computer operation accounted for about 12 percent of all electricity consumed by the university (Michigan Tech Environmental Sustainability Committee, 2005). For this reason, establishing energy efficient computer use can bear a significant effect on the College's environmental impact.

iii. Accomplishments

Academic Technologies sets all printers in student computer labs to automatically print double-sided sheets. Academic Technologies also enforces a 100-page weekly printing quota for all Barnard students. These two policies greatly reduce the amount of paper consumed in computer labs.

Academic Technologies operates a computer part re-use program. The re-use of computer components reduces energy consumption and potential pollution because many computer components are energy intensive to produce and contain polluting heavy metals.

iv. Opportunities for Greater Sustainability

Currently, computers in computer labs are left on 24 hours a day. Academic Technologies can develop reasonable protocol for computer shut-down periods that balance the obligation for energy efficiency with the need to maintain 24 hour computer availability for students. An audit of computer use can determine the average use of computers during night and vacation periods; Academic Technologies can use these data to determine how many computers need to be kept on over these periods to satisfy student need and how best to use automatic standby features. Computers can be set to shut down automatically according to the established protocol, and signs can instruct students how to appropriately turn on computers.

Residential Computing can develop literature on energy efficient computer management to distribute at Residential Computing events, post in computer labs, and include in the ResNet website. Residential Computing Assistants, who provide consultations for students regarding their computing problems, can discuss energy efficient computing with students during help sessions and help to distribute energy efficiency literature.

Educational Technologies can also post information on energy efficient computer management on their website. The department can also offer workshops to faculty that teach how to use computing technology to reduce paper and energy use.

Academic Technologies can also support computer reuse and recycling endeavors on campus when possible. Efforts at the Columbia University Medical Center are a useful example of a computer reuse program (http://www.environment.columbia.edu/printable/news/cumc/index.html).

Purchasing

i. Description
Purchasing oversees purchases made by almost all Barnard offices and completes a variety of other purchasing and payment-related duties, such as coordinating payments between Barnard and Columbia accounts.

ii. Importance to Sustainability
The Purchasing Department has the authority to determine preferred vendors for many products bought by staff, faculty, and administrators of the College. This gives Purchasing significant power to help the College become less wasteful and polluting, and more energy and water efficient. Barnard's large purchasing power also grants Purchasing the opportunity to bear a positive environmental influence on business production standards and to bolster markets for recycled materials.

iii. Accomplishments
The Mission Statement of the Purchasing Department delineates a commitment to "providing necessary supplies, equipment and services which offer the best quality, performance and overall value, while assuring equal opportunities for small businesses, women owned and minority run firms." One example of this commitment is Purchasing's employment of the Barnard alum-owned company A+ Shredding. A+ Shredding handles all sensitive documents for Barnard College. Purchasing also allows departments to purchase office supplies from Ivy League Stationers or Janoff's, the school's "preferred local vendors." By using local vendors, Purchasing reduces the distance needed for transportation of products, which in turn reduces air pollution and green house gas emissions.

In conjunction with Capital Planning, Purchasing works to purchase environmentally friendly and EnergyStar products whenever financially possible. This practice was established in 2007.

iv. Opportunities for Greater Sustainability
Purchasing can make an official, published commitment to purchasing Energy Star and environmentally friendly materials and describe this commitment on their website.

Purchasing can hire a student intern to research environmentally friendly brands that are financially competitive with current non-sustainable products bought by the department. Increasing the amount of sustainable products bought can reduce the College's solid waste by supporting vendors of products that are long-lasting, made of post-consumer recycled materials or otherwise environmentally sustainable materials, and encased in packaging that is recyclable on campus.

Purchasing can write environmental specifications into vendor contracts. Purchasing can also request that vendors identify and quantify their own social and environmental practices as part of the contract/purchasing process.

Purchasing can build awareness of its efforts by drafting communications to the Barnard community to build awareness of environmental options, and by promoting environmentally friendly products through newspaper articles and other venues.

In cases where environmentally sustainable products are more expensive, Purchasing can give community members the option of choosing either the standard or the more expensive option, taking care to advocate the environmental benefits of the more expensive product to departments[20] and to make the option readily apparent on request forms and catalogues. When a certain sustainable product is financially viable or of special environmental significance, Purchasing can mandate its purchase.

The buying power of the Purchasing department may make vendors willing to change their policies to keep the College's business. Purchasing can send letters or organize meetings with vendors to express the College's environmental commitment, explain that environmental criteria will be an ongoing consideration in purchasing goods, and invite them to join the school in improving their products.

Purchasing can reduce its own departmental waste by accelerating the transition to a paperless ordering system. Currently, almost all forms and requests submitted to Purchasing are in paper form[21].

Bibliography

Architectural Energy Corporation and Pennsylvania State University. *Model Electric Restaurant.* B24-B39.

Backman, Mikael. 1983. "Energy in the Food-Producing System". *Energy in Packaging and Waste.* Ed. A.V. Bridgwater and K. Lidgren. London: Van Nostrand Reinhold Co.

Baer, Hans A. 2002. "On the Nature of Our Workplace as Academic Anthropologiests: Implications for Critical Teaching and Research." *Practicing Anthropology* 24(3):46-48.

Barlett, Peggy. 2004. "No Longer Waiting for Someone Else to Do It: A Tale of Reluctant Leadership." *Sustainability on Campus: Stories and Strategies for Change.* Ed. Peggy F. Barlett and Geoffrey W. Chase.

Barnard College Facilities. 2005. September 16, 2006. < http://www.barnard.edu/facilities/>

Barnard College Office of the President. 2006. Office of the President. October 15, 2006. < http://www.barnard.columbia.edu/president/>

Barnard College SRI. 2006. Barnard Committee on Socially Responsible Investing. September 23, 2006. <http://www.barnard.edu/sri/index.html>

[20] Advertisement of environmentally sustainable purchasing options can be posted on the Purchasing website, at the Purchasing Office, at the Stores counter, on Purchasing forms, through e-mail, through changes to general information given to faculty and staff (i.e., the Faculty Guide developed by the Office of the Provost), and a number of other forums.

[21] Community members may request items from Stores through an online form. Stores is the small supply of basic office equipment maintained by Purchasing.

Boburg, Meg. 2005. "Professor Bikes, Brews Beer, and Bakes Brick-Oven Pizza." The Ithacan Online. <http://www.ithaca.edu/ithacan/articles/0610/05/news/9professor.htm>

Burros, Marian. August 24, 2005. "Fresh Gets Invited to the Cool Table." New York Times.

Chevron Corporation. 2001-2006. English Print Ad: Trillion Barrels. September 8, 2006. <http://www.chevron.com/about/advertising/docs/real_issues_print_02.pdf>

Columbia University Housing. 2006. About Us: Environmental Stewardship. August 10, 2006. <http://www.columbia.edu/cu/housing/docs/about-us/environmental-stewardship.html>

Columbia University News. September 13, 2006. "Nilda Mesa Named Columbia's First Director of Environmental Stewardship." September 21, 2006. < http://www.columbia.edu/cu/news/06/09/mesa.html>

Creighton, Sarah Hammond. 1998. *Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions.* Cambridge: Massachusetts Institute of Technology.

Decision Focus, *TAG Technical Assessment Guide,* EPRI P-4463-SR (Palo Alto, CA: Electric Power Research Institute, October 1988), vol. 2, pt. 2, pp. 5-106, in OTA, *Building Energy Efficiency,* 49.

DePillis, Lydia. September 14, 2006. "CU Names Mesa to Green Post." Columbia Spectator. September 21, 2006. <http://media.www.columbiaspectator.com/media/storage/paper865/news/2006/09/14/News/Cu.Names.Mesa.To.Green.Post2271964.shtml?sourcedomain=www.columbiaspectator.com&MIIHost=media.collegepublisher.com>

Energy Information Administration. 2006. Forecasts and Analysis of Energy Data. August 27, 2006. <http://www.eia.doe.gov/oiaf/forecasting.html>

Environmental Defense. 2006. Partnerships-Environmental Defense. August 30, 2006. <http://www.environmentaldefense.org/partnership_category.cfm?categoryID=1>

Forbo Holding. 2003-2006. Forbo Flooring US-Marmoleum and the Environment. August 30, 2006. <http://www.themarmoleumstore.com/framework/DesktopDefault.aspx?menu_id=870&old_menu_id=870&ssm=1>

Hart, Stuart. 1996. "Does it Pay to be Green? An Empirical Examination of the Relationship between Emission Reduction and Firm Performance." *Business Strategy and the Environment,* Vol. 5.

Heary, Owen. November 26, 2005. "Concerns Aired at SRI Meeting." Columbia Spectator. <http://www.columbiaspectator.com/media/storage/paper865/news/2005/11/16/News/Concerns.Aired.At.Sri.Meeting-2029718.shtml?norewrite200608231246&sourcedomain=www.columbiaspectator.com>

Lipton, Eric. March 24, 2001. "City Trash Follows Long and Winding Road." *New York Times.*

Michigan Tech Environmental Sustainability Committee. April 8, 2005. Energy Efficiency: ESC @ MTU. <http://www.esc.mtu.edu/WhatTheESCDoes/energyEfficiency/Default.htm>

Pollan, Michael. May 13, 2001. "Beyond the Organic-Industrial Complex." *New York Times.* <http://www.mindfully.org/Food/Organic-Industrial-Complex.htm>

Penn State Green Destiny Council. 2000. *Penn State Indicators Report.*

St. Olaf College. 2006. The Black & Gold & Green. October 15, 2006. <http://www.stolaf.edu/green/>

Trade Press Publishing Corporation. 2006. Facilities Net: Targeting Ice and Snow. August 28, 2006. <http://www.facilitiesnet.com/ms/article.asp?id=3354>

Uhl, Christopher. 2004. "Process and Practice: Creating the Sustainable University" from *Sustainability on Campus: Stories and Strategies for Change,* ed. Peggy F. Barlett and Geoffrey W. Chase.

University of Michigan Regents. April 20, 2004. Environmental Task Force Advisory Report. September 21, 2006. < http://www.umich.edu/pres/committees/envrpt/>