Report Submitted to:
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Technically Green:
Environmental Resource Website

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Abstract

Our project was to develop proposals for a formal environmental policy, committee, and annual report for the WPI administration to consider. Unlike many universities, WPI currently does not have a visible position on environmental sustainability. We came to our proposals by researching the processes and final products of other universities and institutions. They, along with developmental resources, are presented on a website (Located at www.wpi.edu/~aminakya/ as of 3/6/07). Comments on the development of the proposals are presented in the paper.

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- Professor Jeanine Plummer, WPI
- Associate Provost Lance Schachterle
- Professor Jennie Stephens, Clark University

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Introduction

With an increase in population and the reduction in natural resources globally environmental sustainability is a growing concern. Other concerns such as the release of greenhouse gases into the atmosphere and the threat of catastrophic global warming have taken on a near universal following with calls for more environmental care. Currently over 48 countries have enacted environmental policies and are making greater efforts to be more environmentally sustainable.

Universities are in some ways microcosms of nations. They are a community, living and working together and consuming resources. Policies instituted by the administrations impact what is consumed and how much is used. Universities even have an export in the educated students and the research produced. As such, there is an opportunity in the campus setting to positively influence environmental sustainability.

More than 300 universities have also instituted environmental policies. Many universities are incorporating environmental teachings into their curriculum and have begun programs such as recycling on campus. For example, Tufts University in Boston, MA[1] has begun case studies on energy consumption on campus and is working with students to reduce environmental impacts in their community.

Worcester Polytechnic Institute (WPI), a school that holds the impacts of science and technology so important in all aspects of life, does not have an environmental committee or policy. There have been moves towards operating in a more environmentally sustainable fashion, such as the decision to build the admissions building, the Bartlett Center, to LEED certification along with the addition of an Environmental

[1]Marcell, Kristin, Julian Agyeman, and Ann Rappaport. "Cooling the Campus." International Journal of Sustainability in Higher Education 5 (2004): 1-21. Emerald Insight. Worcester, MA. Sept. 2006

Engineering major. Without a set of guiding environmental principles and the means to monitor the university's environmental impact, there is no guarantee that these beginning steps towards more sustainability will be followed by further action.

Our focus has been to research, environmental policies world-wide, alternative energy and other acts on environmental sustainability to create environmental standards for the campus. Recommendations for an environmental committee, policy, and annual report for WPI, as well as different environmental actions were developed. We presented our research using a web-based tool that includes our proposals and more details on their development. Links to examples from other universities as well as other useful websites are provided.

The presentation of our work is two-fold: the website and this paper. The research and final proposals will not be presented in this paper as they are already viewable at our website, www.wpi.edu/~aminakya/ as of March 6th 2007. This paper will instead present the development of our proposals and our thoughts on the important decisions made during that process. To facilitate this, the paper is presented in the order of the website, with discussion of the home page first, followed by the environmental committee, policy, annual report, and environmental actions.

Home Page and Organization of the Website

The Internet has become a staple in everyday life around the world. It allows people to communicate, spread ideas and gather information from anywhere. Because of the endless sources of information, researching specifics can be difficult. Our IQP project was to create and set up an environmental committee, environmental policy and outline for an annual environmental report for the WPI campus. We chose to go about this by

creating a "how to" web-based guide so virtually anyone could continue using our work. Throughout the background research phase of the project we realized how difficult it is to gather information on creating a committee on campus, as well as creating a proposed policy. Although we had found numerous examples of the enacted items at other universities, we were unable to find information on how they were developed. Our web-based guide turned into not only a how to but also a place where related projects, research and information can be easily found. By including information on how we developed our proposed items, we provide a template for others to follow, not only at WPI, but for those at other universities who want to develop their own environmental program.

There are several advantages to including all of our research and development information on a web-based tool: accessibility, convenience, navigation, bulleted and specific information, and ways to contact others doing related work. If the administration does not believe that our proposed items are entirely appropriate for WPI, by including our research the administration can utilize that information in developing what they consider appropriate. The administration can access our suggestions as well as links to other related websites at their own convenience. .

Upon entering our site, you will find on the first page our mission statement for the IQP, links to what sustainability on campus means, as well as links to other schools that are working towards being more environmentally friendly on campus. There is a brief overview of the pages located on our site: committee, policy, annual report, actions, funding, related WPI projects, success stories, related links, books and index of documents. The overview of the sections give users an introduction as to what information can be found and where.

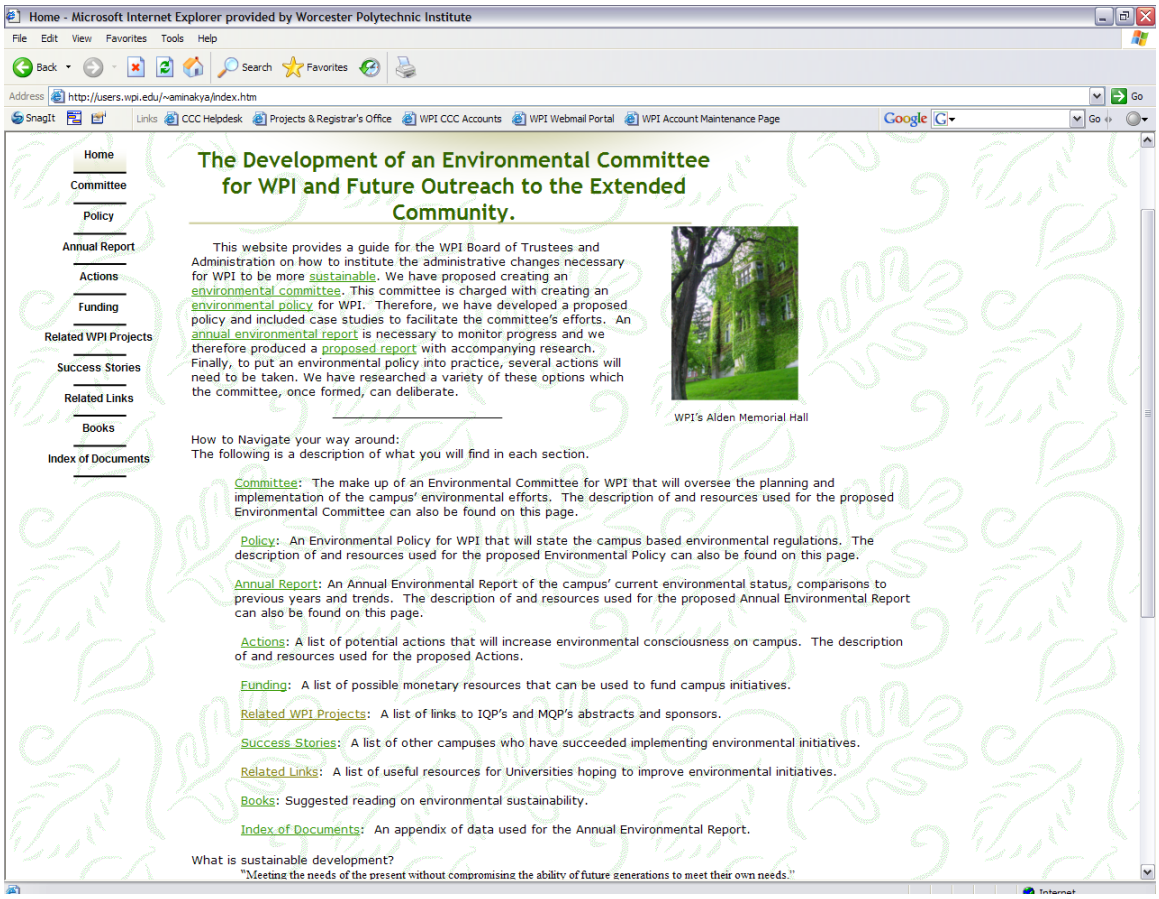

Figure 1: Home Page

We chose to add our project mission at the head of the page to allow users to know what we are doing and why. The mission statement defines what we have done and what we propose the potential environmental committee shall do once they are functioning. Few changes were made on the mission statement which was extracted from the original project proposal.

Moving on to each main page of a section, the reader first views a mock-up of what the official page would look like. There are then links to the developer's comments and methods as well as links to the resources used when researching that particular subject matter. With the resources linked to each main page the administration is able to view the same information we did.

When thinking about sustainability at WPI, we felt this quote best fit our ideas and goals: "Sustainable development is economic growth that will benefit present and future generations without detrimentally affecting the resources or biological systems of the planet."[2] Having an understanding of what sustainability is was important for our group to know where to go with our project and we find that it is as equally important that the viewer of our site also knows a little about sustainability when reading through each section and proposals. The decision was made to include links about sustainability on the home page with a brief definition instead of having an entire section located on the site itself.

Comments on the Development of an Environmental Committee

An environmental committee would be a key component in the success of the policy and environmental report. We envisioned the role of the committee as overseeing the implementation of the environmental policy and coordinating all of the other environmental efforts on campus. We hoped that it would become a group that could do all of the things we as students had been trying to do, like expanding recycling on campus and investigating putting in solar voltaic cells. Most of all we hoped it would have the authority to implement actions on campus and not just produce a list of ideas.

[2] http://www.ecy.wa.gov/sustainability/more_defns.htm

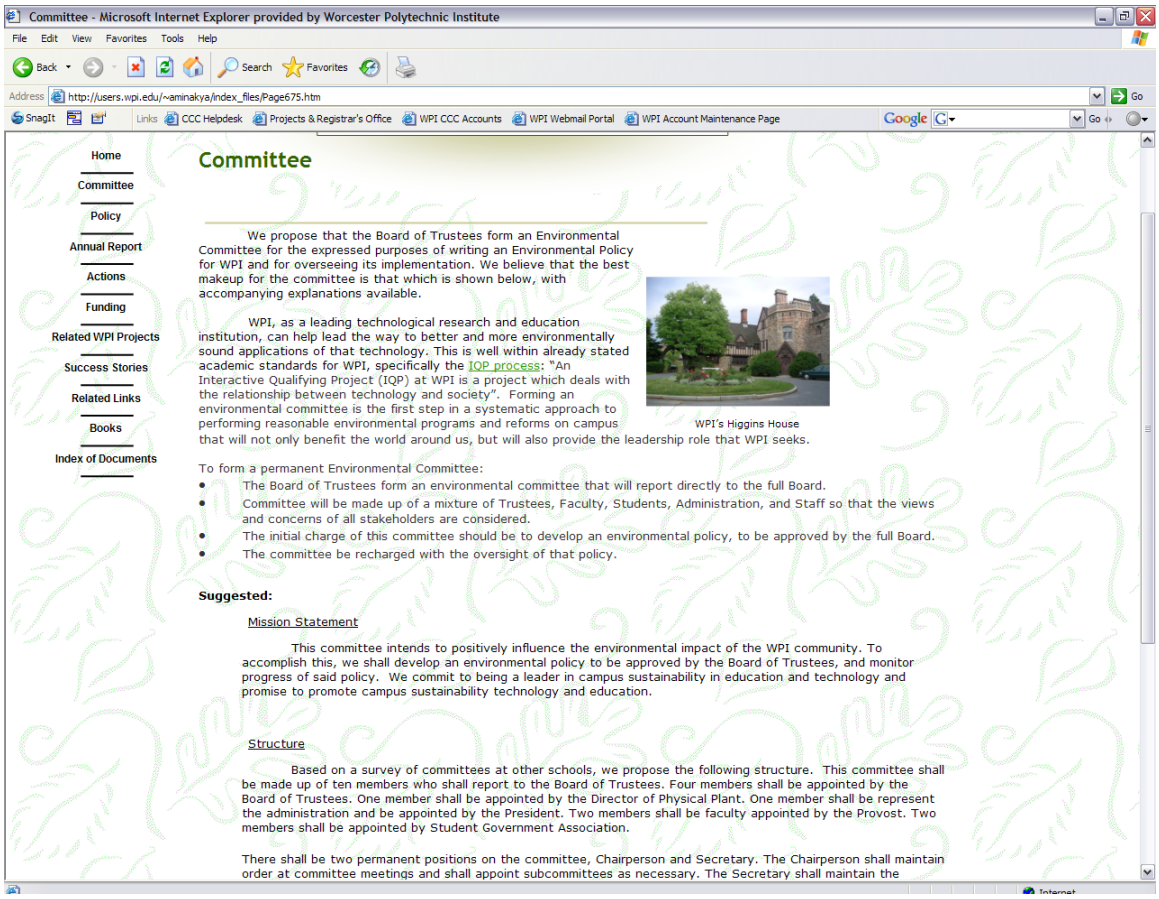

Figure 2: Committee Developers' Comments

One of the most important questions when developing this committee was who would form it and who would it report to. The answer to this question not only related to how high up environmental information would go but also to how much power the committee would have. Initially the committee was to be placed under the direction of the Provost, who is in charge of WPI academics, but in order for the committee to have an impact on budgetary items, which we felt was crucial, it would have to report to one of the Vice Presidents, the WPI President, or to the Board of Trustees. This was reaffirmed by the example of Carnegie-Mellon whose committee produced recommendations but appears to have little power[3]. We decided that the committee should fall under the auspices of the Board of Trustees since they are the ones who have final say over all

[3] http://www.cmu.edu/greenpractices/background/committee_about.html

budgetary matters. Actions such as LEED certification requirements of the newly built Bartlett Center[4] and the new residential hall suggest that the Trustees would be receptive to an environmental committee.

The size of the committee has been one of the aspects we have revised as development proceeded. Originally, we felt that the committee should be large, as many as twenty members. This was based off of the experience of one of our members, Anita Minakyan, who has been on several campus wide committees as a student representative. It has been her experience that getting people to go to committee meetings was difficult; therefore, twenty members would be needed just to ensure seven would attend a meeting. When we met with Professor Jeanine Plummer, she suggested the committee would be too large and unwieldy with twenty members. Her suggestion was a committee of ten to twelve. Later, when we met with Associate Provost Schachterle, he suggested that a committee of twelve people was still too large, that four or five was most appropriate. We took this under advisement while examining how other committees on campus were sized.

Our final decision was to go with a committee of ten for several reasons. By having the committee on the larger end of Trustee committee sizes, we open the variety of backgrounds that can be included. The variety of backgrounds hopefully will also lead to more ideas for improving the community's environmental impact. The larger size lends itself to the formation of subcommittees that can examine particular points of interest, allowing more progress to be made at one time. Finally, the increased size lends itself to better representation of the different stakeholders, from faculty and staff to students.

[4] http://www.wpi.edu/About/Bartlett/green.html

Associate Provost Schachterle stressed the importance of a well defined mission for the committee. He relayed to us his experience with a former committee whose mission was not well thought out and did not accomplish much before being disbanded. We developed a mission statement for the committee to help guide it in how things would work and gave us one last opportunity to imprint our vision on the direction we wanted the committee to go on campus.

The first draft of the mission statement included the committee's authority, and ethics by which they would work. We gave it authority over "budgetary requests" that could be affected by the environmental policy. After further consideration, this kind of information did not seem to fit well in a mission statement. This view was supported by the lack of such statements in the mission statements of universities like Emory[5] and Michigan Tech[6]. We were also concerned about overly defining the committee's role. An environmental committee should be able to meet not only the current challenges but also the future problems discovered as we learn about our impact on the world around us. We therefore limited the mission statement to the basics of what it would do and why it would do it.

Comments on the Development of an Environmental Policy

A policy is a list of actions an institution commits to either do or refrain from doing. An environmental policy not only does this but also creates a more environmentally conscious and friendly university. With this extra significance, creating an environmental policy requires a greater focus on wording and organization.

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[5] http://www.emory.edu/SENATE/Senate/us_cmtes/coe.htm#bylaws
[6] http://www.esc.mtu.edu/OurMission/Default.htm

Our group members originally made up a laundry list of actions and rules, both general and detailed, for WPI's campus. The list contained ideas we found while researching other schools environmental policies as well as original ideas we found would work with what is currently going on at WPI. When looking at site, we found that schools like MIT were very elementary[7] in their write up, while other such as the University of Connecticut had a policy with solid goals and good organization[8]. All ideas are based on a reduce-recycle-reuse mindset. Topics included building and renovating on campus, recycling, using green products and educating members of the community on environmental issues.

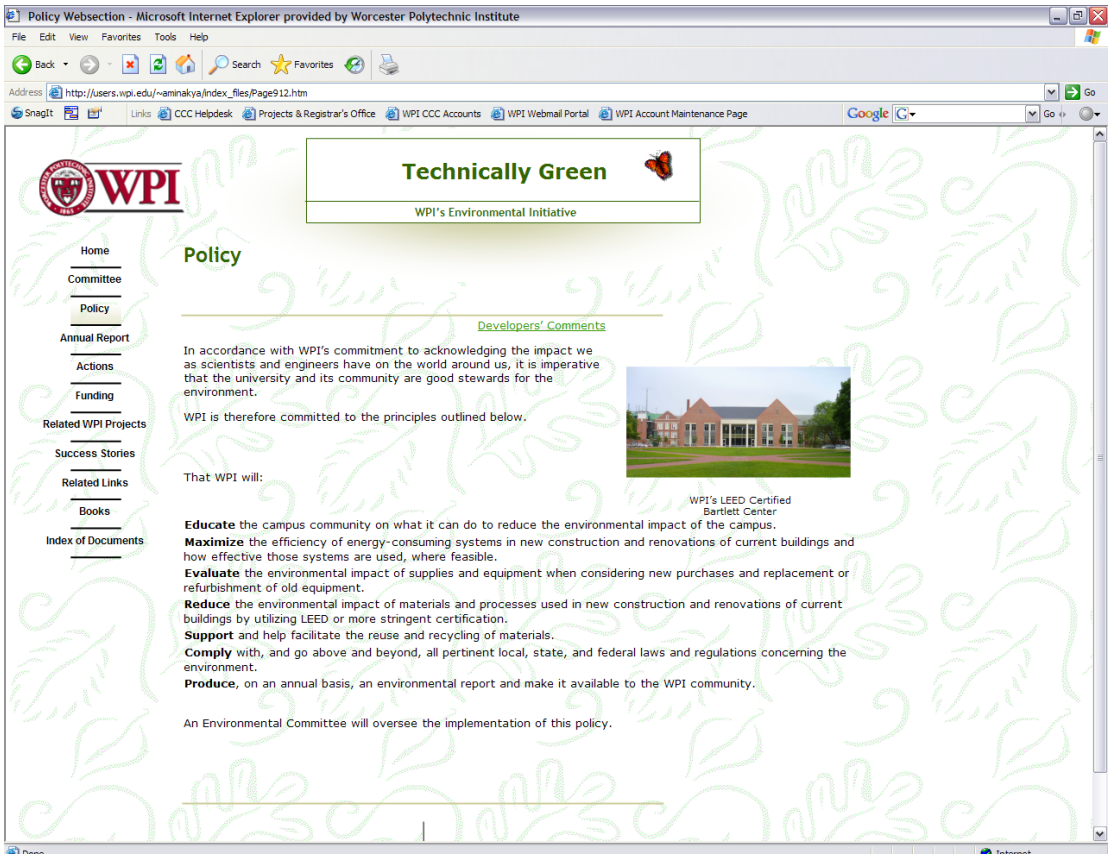

Figure 3: Policy Webseection

[7] http://web.mit.edu/ENVIRONMENT/commitment/e_initiatives.html
[8] http://www.ecohusky.uconn.edu/policystate.html

We then took our ideas and brought them with us to our interviews which were held with the following people: Professor Jeanine Plummer, Mr. John Miller, Professor Jennie Stephens and Associate Provost Schachterle. In these interviews all suggestions and ideas were taken into consideration and the policy was reduced to several main goals/ rules for WPI's campus.

Some of the decisions we had to make with the environmental policy were related to the type of format to use. One of the suggestions we received was to use statements such as, "WPI will commit to reducing the campus' greenhouse gas emissions by 20% by 2020." Such specific statements were avoided because it could require WPI to do something that was technically and financially unfeasible or the goals may not push WPI to its maximum potential. The policy then took on a legalistic tone which we found was common among environmental policies from other schools like the University of Connecticut[9] and consistent with current WPI policies[10].

The precise wording of the legal compliance part of the policy become another concern Originally, the term "above and beyond" was not included due to the lack of such wording in the other legal compliance parts of the environmental policies we reviewed[1112]. It was suggested by group members that an expansion of the statement to include something about the university doing more than just complying with the law but concern was expressed over the lack of precedence and the exact wording. It was eventually agreed to include "above and beyond" in recognition that the very nature of having an environmental policy requires more than bare compliance.

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[9] http://www.ecohusky.uconn.edu/policystate.html
[10] http://www.wpi.edu/Pubs/Policies/
[11] http://www.uiowa.edu/~our/opmanual/v/43.htm
[12] http://www.ecohusky.uconn.edu/policystate.html

There were several drafts of the policy written up. None of the content was removed or added, but debate over the importance and rank of each principal caused several options to be chosen from. The site provides the final proposed policy, as well as a brief developer's comment area indicating what was changed, where and why.

Comments on the Development of an Environmental Report

One of the ways we thought would help move WPI towards becoming more environmentally conscious was an annual environmental report. By providing a report to the community, it would show the impacts of the campus on the environment and offers information on what WPI is doing to reduce these impacts.

Initially we felt the report should be available to all who would want it. By doing so WPI could show the public that we as a community are committed to improvements. Professor Jeanine Plummer pointed out that if anything in the report wasn't flattering to the university, there would be resistance to publishing it. Although other universities could find our annual report useful not only in comparing their environmental impact to ours but also learning from what we have found successful and unsuccessful, her recommendation was accepted and automatic access would be granted only to members of the WPI community. At a minimum the WPI community would be able to see the report and judge their individual impact.

We were disappointed in many of the examples we found from other universities. Their annual environmental reports seemed more like public relations publications of the environmentally conscious activities they perform than thorough analysis of their impacts

on the environment[13]. We believed the analysis was most important, for it shows whether the activities and projects are having any noticeable impact as well as provide direction on what areas are in most need of improvement. We were able to find a description of a model, which closely followed what we were looking for and structured our suggested annual report from that.

Once we decided which sections should be included in the report, we narrowed down the kind of information that should go into each section, based on information we knew was available. For example, under the Materials section placed a report given by Mr. John Miller, Director of Physical Plant, which detailed the amount of various materials recycled during one year. This allows the writer to have an idea of what information is already available and where, so they do not have to "reinvent the wheel" when writing the annual report for the first time. We also felt it would be useful to provide an example of what we see a section of the full report looking like and decided to do this for the Energy section. There were several other IQP groups working under the same advisor examining energy topics on campus, and were able to provide us with information that would make the report more realistic including a green house gas emissions report covering past years. The IQP group was also able to provide resources for their information allowing less stress for those writing the report in the future.

When the original mockup of the Energy section of the report was written, it was done in paragraphs. This lead to debate as to whether it was better for the analysis to be written in a longer, paragraph form, or a shorter, bullet form.. The longer form although very detailed, made the report a longer read and made it more difficult for the reader to identify the one piece of information they were looking for. The shorter bullet form

[13] http://msl1.mit.edu/class_docs/pdfs/corporate/fords_1999_environmental_policy.pdf

provided the reader with the key information at a quick glance, but with less depth In conclusion, each section would have an executive summary in bullet form, followed by the longer, more detailed description. With this combination, we feel the report will provide both ease of understanding for the casual reader and depth of analysis for the more curious.

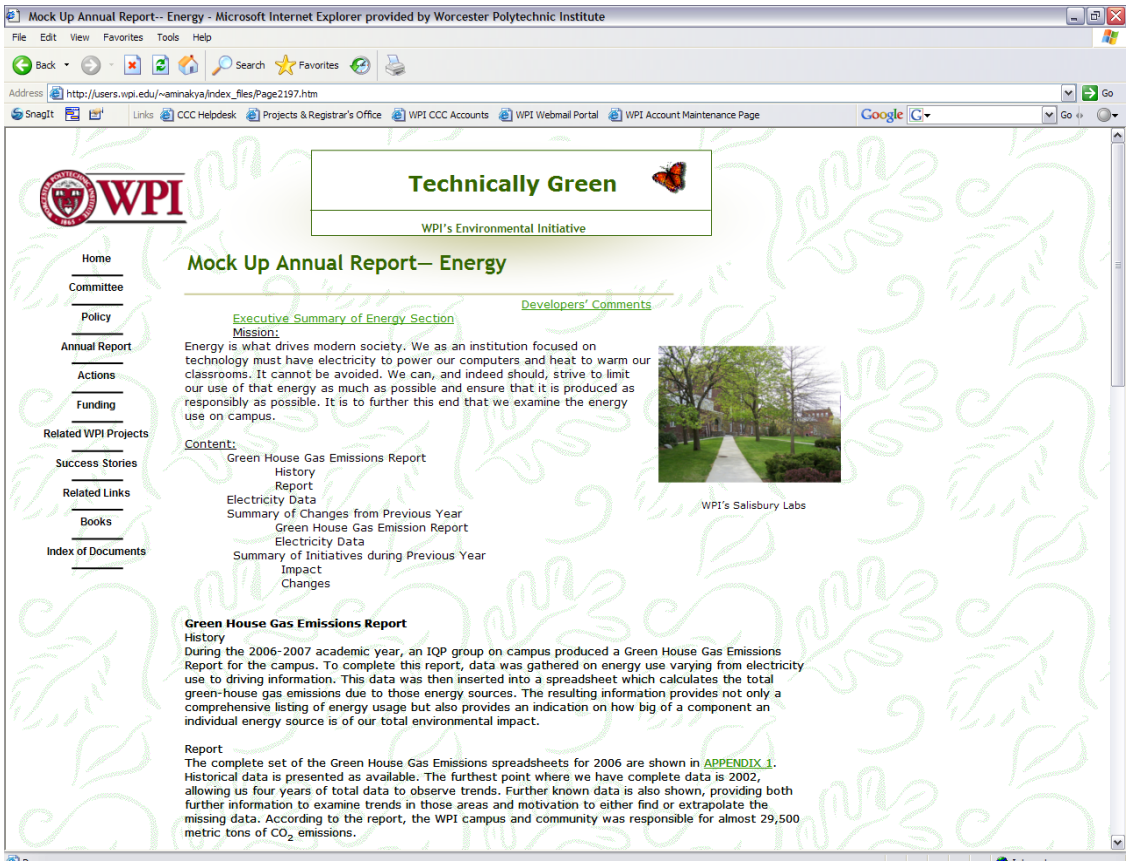

Figure 4: Mock up Annual Report Energy Section

Whether or not to include a Buildings section in the report brought up other concerns amongst group members. It was thought that such a section would provide an area where environmentally friendly construction, such as LEED Certification for new buildings and renovations and other building improvements, could be discussed. The main unease regarding such a section was the wide variability it would impose, for some years there may be large amounts of construction and renovation to be discussed and

other years there may be none. In the end, the formal presentation of the proposed annual environmental report would not include such a section, but it is strongly recommended that years where construction and renovations occur, information about the environmental impact of those activities be included in the annual report.

Comments on the Cataloguing of Environmental Actions

Educating and allowing community members to take action beyond the policy is also useful in setting environmental standards for the community. General awareness of how ones' actions can make a difference and reminders of how one can help (i.e., pamphlets, stickers, mouse pads) reduce-recycle-reuse.

Some of the suggested actions come from both projects currently going on at WPI including vehicles that run on DAKA grease, and GAEA programs to help students and faculty learn to reduce water use, recycle and save money on bills by cutting back on heat use and electricity. Certain WPI students even participated in a contest to win funding for clean energy on campus through ecoimagination[14], sponsored by MTV U and G.E. Other suggestions come from actions students at other universities are doing/ participating in. Carnegie Mellon[15] and Tufts[16] are two universities we used for ideas that also stress environmental education and sustainability on their campuses. .

Guides to being more environmentally conscious, using biofuel to run campus vehicles and purchasing clean energy were some of the many actions on campuses. Lots of the actions we found were more to spread awareness and educate through incentives (parties, gift certificates, etc). Expanding environmental courses or making all courses

[14] http://www.mtvu.com/contests/ecomagination/index.jhtml
[15] http://www.cmu.edu/greenpractices/background/history.html
[16] http://www.tufts.edu/tie/

have an environmental focus gets all students to understand the importance of sustainability in their field.

Conclusion

Tough choices had to be made during the development process of this project. Each decision was given careful consideration, and complete agreement by all was not always achievable and we found that with every discussion and every hard thought decision, our final work became better. Disagreements and debates during an adoption process will hopefully bring about further improvements. What we feel should not be debated is the need for a comprehensive environmental effort at WPI. With the information provided we hope it will be easy to be successful in becoming a more environmentally sustainable campus and our work can help students at other schools have success in their environmental sustainability efforts as well.

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Environmental Resource Website

WPI's Alden Memorial Hall

This website provides a guide for the WPI Board of Trustees and Administration on how to institute the administrative changes necessary for WPI to be more sustainable. We have proposed creating an environmental committee. This committee is charged with creating an environmental policy for WPI. Therefore, we have developed a proposed policy and included case studies to facilitate the committee's efforts. An annual environmental report is necessary to monitor progress and we therefore produced a proposed report with accompanying research. Finally, to put an environmental policy into practice, several actions will need to be taken. We have researched a variety of these options which the committee, once formed, can deliberate.

How to navigate your way around:
The following is a description of what you will find in each section.

Committee: The make up of an Environmental Committee for WPI that will oversee the planning and implementation of the campus' environmental efforts. The description of and resources used for the proposed Environmental Committee can also be found on this page.

Policy: An Environmental Policy for WPI that will state the campus based environmental regulations. The description of and resources used for the proposed Environmental Policy can also be found on this page.

Annual Report: An Annual Environmental Report of the campus' current environmental status, comparisons to previous years and trends. The description of and resources used for the proposed Annual Environmental Report can also be found on this page.

Actions: A list of potential actions that will increase environmental consciousness on campus. The description of and resources used for the proposed Actions.

Funding: A list of possible monetary resources that can be used to fund campus initiatives.

Related WPI Projects: A list of links to IQP's and MQP's abstracts and sponsors.

Success Stories: A list of other campuses who have succeeded implementing environmental initiatives.

Related Links: A list of useful resources for Universities hoping to improve environmental initiatives.

Books: Suggested reading on environmental sustainability.

Index of Documents: An appendix of data used for the Annual Environmental Report.

What is sustainable development?
"Meeting the needs of the present without compromising the ability of future generations to meet their own needs."
More Definitions on Sustainabilit

Many schools have already begun the process of becoming sustainable. Many of them are already successful. Some have even gone as far as helping other schools and businesses by creating guides to sustainable futures. The following are links to a few how to guides by other schools and organizations.

- Greenprint

Michigan Tech's "Greenprint" are recommendations to the administration made by the Environmental Sustainability Committee as well as research about actions Michigan Tech could take to enhance their environmental sustainability. Like a buildings blueprint, this "greenprint" lays out goals, recommendations, a review of activities at peer institutions, and an assessment of their current activities.

- Ecofoot

Not very much information on HOW to start. Group proposed implementing a campus environmental assessment.

- Sustainable Development on Campus

A list of declarations for sustainable development, learning modules on sustainability, policy resources, and other links with useful information.

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Committee

Developers' Comments

Our Mission

This committee intends to positively influence the environmental impact of the WPI community. To accomplish this, we shall develop an environmental policy to be approved by the Board of Trustees, and enforce said policy. We commit to being a leader in campus sustainability in education and technology and promise to promote campus sustainability technology and education.

Committee Members

Employee name 1

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 2

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 3

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 4

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 5

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 6

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 7

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Employee name 8

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Student name 9

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

Student name 10

Type a brief biography of the employee or describe their job.

E-mail: someone@example.com

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Committee

We propose that the Board of Trustees form an Environmental Committee for the expressed purposes of writing an Environmental Policy for WPI and for overseeing its implementation. We believe that the best makeup for the committee is that which is shown below, with accompanying explanations available.

WPI's Higgins House

WPI, as a leading technological research and education institution, can help lead the way to better and more environmentally sound applications of that technology. This is well within already stated academic standards for WPI, specifically the IQP process: "An Interactive Qualifying Project (IQP) at WPI is a project which deals with the relationship between technology and society". Forming an environmental committee is the first step in a systematic approach to performing reasonable environmental programs and reforms on campus that will not only benefit the world around us, but will also provide the leadership role that WPI seeks.

To form a permanent Environmental Committee:

- The Board of Trustees form an environmental committee that will report directly to the full Board.
- Committee will be made up of a mixture of Trustees, Faculty, Students, Administration, and Staff so that the and concerns of all stakeholders are considered.
- The initial charge of this committee should be to develop an environmental policy, to be approved by the full
- The committee be recharged with the oversight of that policy.

Suggested:

Mission Statement

This committee intends to positively influence the environmental impact of the WPI community. To accomplish this, we shall develop an environmental policy to be approved by the Board of Trustees, and moni progress of said policy. We commit to being a leader in campus sustainability in education and technology an promise to promote campus sustainability technology and education.

Structure

Based on a survey of committees at other schools, we propose the following structure:

This committee shall be made up of ten members who shall report to the Board of Trustees. Four mem shall be appointed by the Board of Trustees. One member shall be appointed by the Director of Physical Plant member shall be represent the administration and be appointed by the President. Two members shall be facu appointed by the Provost. Two members shall be appointed by Student Government Association.

There shall be two permanent positions on the committee, Chairperson and Secretary. The Chairperso maintain order at committee meetings and shall appoint subcommittees as necessary. The Secretary shall ma the minutes of each meeting and records of the work of the committee. If the Chairperson is absent from a committee meeting, the Secretary shall assume the duties of the Chairperson for that meeting. The Chairpe and Secretary shall be elected at the beginning of each academic year for a one year term. The student meml may not hold the position of Chairperson.

Mission Statement and Committee Res
Committee Develo

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Committee Resources

Other Mission Statements:

- Michigan Tech Environmetal Sustainability Committee Mission Statement

This is a good example of a short mission statement. In the single paragraph, it states the power of the committee while providing overall goals.

WPI's Higgins House

- Carnegie Mellon Green Practices Committee

The first paragraph, in italics, appears to be the committee's mission statement while the rest provides a brief history of the committee. It is a good example of a clear, concise statement of principles.

- Emory University Environmental Mission Statement

This is an example of a longer mission statement. The format is in a bulleted form which makes it easier to pick out individual points. Much of the content, though, seems more in line with our suggested policy than the committee's m statement.

- Emory University Environmental Mission Statement

This mission statement is part of Emory's "Committee on the Environment" bylaws. It is an example of a longer missi statement. The first paragraph is a brief history of the beginning of the committee. The second paragraph is a discuss of the principles of the committee. The final three paragraphs discuss what kind of actions the committee will take. Unfortunately, the specified actions limit the committee to proposals and discussions.

Other Committees:

- Michigan State University Committee For A Sustainable Campus

This provides a bare-bones example of a committee. As of February 2007, the committee is made up of 18 membe faculty, 4 students, and 7 administration members. From the administration, members include two from Physical Plar Office of Planning and Budgets, allowing for the committee to have input from those who have power over environm issues on campus. The committee reports to the Vice President for Research and Graduate Studies and has an adviso role.

- Carnegie Mellon Green Practices Committee

This committee is a large committee, made up of, as of February 2007, 4 faculty, 17 staff, and 5 students. Many of th staff members are in charge of key offices that are affected by various environmental actions. The recommendations section covers a variety of topics, ranging from energy management to dining services. There are no indications of ac taken by the committee suggesting that they have just an advisory role.

- Emory University Ad Hoc Committee on Environmental Stewardship

This appears to be an example of an informal committee, started by a group of students, faculty, and staff united in concern for the environment. This provides an example of what can be done with just personal interest. Unfortunatel does not appear the committee has accomplished much on a campus-wide scale.

- Emory University Committee On the Environment (COE)

This is the website of the official environmental committee for Emory University. This committee, as of February 2007 made up of 16 individuals. The makeup of the committee is not specified, other than there are to be four student members. This provides flexibility, so years when there will be a lot of capital projects, which is their charge to review there can be extra members with the needed expertise. The membership flexibility also provides for the membership evolve as experience is gained with the committee.

Committee Develop

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Committee Development

Committee Members

The committee makeup went through three distinct drafts, evolving as potential problems were discussed and new ideas inserted.

WPI's Higgins House

In the first draft:

- Made up of a large group, approximately 20.
- Well defined on what types of people would work well. Included people from specific non-academic offices and specific academic departments.

Large number of defined positions on committee: Chairman, Vice Chairman, Secretary, Public Relations, etc.

In the second draft:

- Smaller Group, approximately 12. Advised that 20 would be too large and unwieldy.
- Not as well defined on who would be on committee. Limited to proportion of students to staff to faculty.
- Only had defined positions of Chairman and Secretary. Advised these are typically the only stated positions.

Committee reports to Provost's Office.

In the third and final draft:

- Committee size and basic structure remains the same.
- Committee now under Board of Trustees. Provost's office only deals with academic affairs, so not appropriate to be under them. Trustees have of funds which gives committee more authority.

Draft 1

Draft 2

Draft 3

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Committee Members Draft 1

Proposed List of Committee Members

Civil Department
Environmental Concentrations –Genuine Interest in the environment

WPI's Higgins House

Head of Plant Services –Knows the inner workings of the campus as well as in charge of man power and materials used

Social Science and Policy Science –Knowledge of Policy and experience in policy writing/maintaining

Department of Management – ?

Chemical Engineering Department –Genuine Interest in the environment
Environmental Concentrations

ATC – Thinks like WPI student knows the ins and outs of the forefront of technology and can comment on how useful certain technology cutbacks/ changes will impact WPI's technological community

K-12 Outreach Program –Outreach to K-12 about WPI's policy /general environmental awareness

Marketing & Communications –Outreach to Community about WPI's policy /general environmental awareness

Office of Research Admission –Research Awareness and Coordination

IGSD –IQP Awareness and Coordination

WPI Administration – Will be able to get things done on campus

Students
*SGA –Student Perspective, Possible Funding and Publicity
*GAEA- Strong interest in Environmental Activities and Student perspective

Chairperson
Vice-Chairperson
Secretary
Treasurer/Funding Coordinator
PR Coordinator

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Committee Members Draft 2

Proposed Committee Composition

The committee shall be made up of twelve people. There shall be two permanent members, a representative of the Provost's office, and a representative of Physical Plant. The Provost shall appoint eight members for two year terms, three from the administration or staff and five from the faculty, at least one of whom shall be from the IGSD. The appointments shall be staggered so that four new committee members shall be appointed by the Provost each year. The final two members shall be students appointed by the Student Government Association for one year terms.

WPI's Higgins House

There shall be two permanent positions on the committee, Chairperson and Secretary. The Chairperson shall maintain order at committee meetings and shall appoint subcommittees as necessary. The Secretary shall maintain the minutes of each meeting and records of the work of the committee. If the Chairperson is absent from a committee meeting, the Secretary shall assume the duties of the Chairperson for that meeting. The Chairperson and Secretary shall be elected at the beginning of each academic year for a one year term. The student members may not hold the position of Chairperson.

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Committee Members Draft 3

Proposed Committee Composition

This committee shall be made up of ten members who shall report to the Board of Trustees. Four members shall be appointed by the Board of Trustees. One member shall be appointed by the Director of Physical Plant. One member shall represent the administration and be appointed by the President. Two members shall be faculty appointed by the Provost. Two members shall be appointed by Student Government Association.

WPI's Higgins House

There shall be two permanent positions on the committee, Chairperson and Secretary. The Chairperson shall maintain order at committee meetings and shall appoint subcommittees as necessary. The Secretary shall maintain the minutes of each meeting and records of the work of the committee. If the Chairperson is absent from a committee meeting, the Secretary shall assume the duties of the Chairperson for that meeting. The Chairperson and Secretary shall be elected at the beginning of each academic year for a one year term. The student members may not hold the position of Chairperson.

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Committee Calendar

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	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Schedule of Events

- 00/00/00 — Type the date of an upcoming event. Type the name of the event, the time, location, and a phone number to call for more information.

  More details...

- 00/00/00 — Type the date of an upcoming event. Type the name of the event, the time, location, and a phone number to call for more information.

  More details...

- 00/00/00 — Type the date of an upcoming event. Type the name of the event, the time, location, and a phone number to call for more information.

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Policy

Developers' Comments

WPI's LEED Certified Bartlett Center

In accordance with WPI's commitment to acknowledging the impact we as scientists and engineers have on the world around us, it is imperative that the university and its community are good stewards for the environment.

WPI is therefore committed to the principles outlined below.

That WPI will:

- **Educate** the campus community on what it can do to reduce the environmental impact of the campus.
- **Maximize** the efficiency of energy-consuming systems in new construction and renovations of current buildings and how effective those systems are used, where feasible.
- **Evaluate** the environmental impact of supplies and equipment when considering new purchases and replacement or refurbishment of old equipment.
- **Reduce** the environmental impact of materials and processes used in new construction and renovations of current buildings by utilizing LEED or more stringent certification.
- **Support** and help facilitate the reuse and recycling of materials.
- **Comply** with, and go above and beyond, all pertinent local, state, and federal laws and regulations concerning the environment.
- **Produce**, on an annual basis, an environmental report and make it available to the WPI community.

An Environmental Committee will oversee the implementation of this policy.

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Policy

An environmental policy would be an outline of positive environmental actions WPI's community could adhere to while working their way towards sustainability. The policy would have simple rules and regulations that would potentially be adjusted and improved over the years. The policy would include an annual environmental report, composed by committee members, detailing the changes made on campus and the impacts these changes have made. The report and policy would help the WPI community see where its strengths and weaknesses are.

The following suggested policy can be adjusted but would function properly the way it is currently:

WPI's LEED Certified Bartlett Center

In accordance with WPI's commitment to acknowledging the impact we as scientists and engineers have on the world around us, it is imperative that the university and its community are good stewards for the environment.

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Policy Development

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Policy Resources

Other Policies and Policy Resources:

Sustainable Campus Policies

This site offers a set of a wide variety of policies pertaining to the environment from all over the world. No analysis of the policies is offered and the poor formatting of the policies makes for a difficult read, but it is still a valuable source of information

WPI's LEED Certified Bartlett Center

Draft Environmental Policy for Caltech

This site shows a proposed policy for Caltech. The policy details not only what the points of emphasis are but also describes how they will be implemented. As of early 2006, no information was available on whether the policy had been formally adopted by Caltech.

The University of Connecticut - Office of Environmental Policy

This is an example of a short policy. The policy breaks up the main points into five distinct subjects, with a brief commitment for each.

The University of Texas Environmental Policy Statement

The University of Texas policy deals primarily with waste releases, but is still an example of a short concise policy.

The University of Iowa Environmental Policy

This is another example of a short, bulleted style policy. The first main part gives a set of guiding principles while the second describes the implementation of those principles. The implementation is much shorter than the principles, which can give the impression of little action to implement those principles.

The University of Sheffield Environmental Policy

This is an example of a sorter environmental policy. While the policy covers many of the same points as other policies there is little discussion of implementation, with the second paragraph implying that it may not be enforceable at all.

Duke University Environmental Policy

This is an example of a short policy in the form of paragraphs. The policy is broken up into three main sections, with the educational one taking priority.

Policy Development

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Policy Development

To begin planning an environmental policy, we believed it best to research the environmental policies of other universities and companies. We then compared these policies in format and structure to other policies at WPI for similarities and differences. (see http://www.wpi.edu/Pubs/Policies/Alcohol/02.html, http://www.wpi.edu/Admin/SAO/Policies/nohaze.html, http://www.wpi.edu/Admin/HR/BenMan/confidentiality.html)
After creating the original draft, we

- Met with faculty and staff, Including our advisor, an environmental engineering professor, and the associate provost for interviews regarding their opinions.
- Considered changes in order of points, depth of detail and wording and in most areas changed them due to the comments made.

There was very little in the way of content changes between Draft 2 and Draft 3.

- An addition in the legal compliance component that the school will go above and beyond what is required because of WPI's commitment to being a leader.
- The section discussing LEED was modified so that the school would not be bound to LEED certification if better standards were developed in the future.

The main development was re-arranged five times containing the same points. After deliberation, we decided to go with a combination of Versions 3 and 4, where:

- Education component is moved to the top
- Energy-consuming systems component is moved above the building construction.

With this we feel the policy shows good priority while maintaining cohesiveness.

WPI's LEED Certified
Bartlett Center

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Mock Up Annual Report

Developers' Comments

WPI's Salisbury Labs

ANNUAL REPORT 2009 -- 2010

Committee on Academic Operations

MEMBERS (Year term expires and/or capacity):

Richard E. Smith (Department), Joel J. Smith (96), Steven C. Smith

(97), Rachel M. Smith '96 (96), James K. Smith (97),

William W. Smith (Associate Provost).

MEETINGS:

The Committee met 30 times during Academic Year 2009-20010.

Indicators:

Energy
Wattage
GHG Emissions Report Data Collected for Carbon Emissions Survey (electricity, fuel oil, etc.). Final summary of CO2 emissions good.

Materials
Input: How much paper do we buy, electronics, cardboard, etc. Should be measured in Tons.
Output: Data available from "Recycling Programs Discussion Summary"
Trash
Recycling

Water
Usage How much water did WPI use? Breakdown?

Chemical Release
Academic Releases Chemicals disposed of as
Cleaning Products Amount of Cleaning Products used. Discuss how many of the products are "Green".
Grounds Keeping Pesticides and Fertilizers.

Summary of Changes in Indicators from Previous Year
Actions taken to improve indicators, from use of more Green cleaning products to educating students about recycling paper.

Summary of Initiatives during Previous Year
Discussion of Impact of Initiatives
Discussion of Changes to Initiatives for Next Year

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Annual Report

This Annual Environmental Report consists of information on materials, chemicals, energy and water use on campus. It contains facts and figures explaining the breakdown of usage patterns per year and what actions were used to change these numbers. Also included will be a summary of changes from previous years.

WPI's Salisbury Labs

It would

- Demonstrate what initiatives worked and didn't when trying to educate and reduce the uses of materials on campus.
- Help show WPI where changes can still be made, and what actions worked or did not.
- Allow the WPI community to view this report will hopefully help students and faculty see the impacts of their choices on the environment throughout the campus.

The Environmental Committee will put together the annual environmental report by:

- Gathering data found by the plant services office, or through student projects (such as the GHG, electricity and heating IQP's going on now),
- Organizing data by section, then summarized for the year, by section and by year.
- Including report initiatives and previous year's goals to help readers understand the direction the committee would like to go.

Annual Report Resources

Annual Report Development

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Staples Annual Report

WPI's Salisbury Labs

Though not a university, Staples Annual Report is thorough and is making a conscious effort to reduce its impact on the environment. It might be a Public Relations campaign but increases the publics environmental knowledge.

Environmental Impacts of Temple University

Report is lengthy, includes details of research done and specific facts and figures for their campus.

"Environmental Indicator Report" For an Environmentally-Friendly Living and Learning Community

Not an actual report but more a long the lines of how to go about making a report, creating goals, and how to track improvements.

UB Campus Environmental Audit 1995

Report is out of date by twelve years and includes lots of reading, but does provide numbers for electricity and energy. Graphs and charts would have been easier to follow. Report includes areas such as dining hall and plant services. Recommendations are useful in report.

Michigan State University Campus Sustainability Report

Not only is there a committee for campus sustainability but an official office. Well organized with newsletters, sustainability report and activities. Many projects and funding for projects.

National Wildlife Foundation Campus Ecology Assessment

Good source for finding other school's environmental/sustainability audits. The reports are not as easy to locate specifics and do not include visuals.

Carnegie Mellon Green Practices Campus Environmental Assessment

Report is lengthy, but easy to locate specifics. No visuals, but the report doesn't seem to have as many comparisons to previous environmental efforts.

Carnegie Mellon Green Practices Facts & Figures

Facts and figures pertaining to recycling efforts, energy and electricity use is located here instead of in the campus assessment report. A "did you know" page not only includes general information, but Carnegie Mellon's facts and figures regarding GHG emissions, water use, recycling and wastes.

Emory University Committee On the Environment Annual Reports and Report Articles

Not very detailed report. Goals for the year were indicated at the beginning of the report, making it easier to know whether improvements had been made or not.

University of Washington Sustainability Reporting Resources

Excellent source for designing a sustainability report. Provides definitions for content, supplements and performance indicators. Incorporates economic, social and environmental aspects of a community.

Southern California Environmental Report Card 2006

Created by a university it is not specific for a university's sustainability. It has in-depth information about the Southern California area and increases the public awareness of residents and students of their impact on the environment. The information provided is well processed.

Annual Report Development

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Annual Report Development

The basic outline of the report is inspired by a report developed by Edgewood College in which they develop a set of "indicators" by which their environmental impact can be measured. Their report decided on 5 indicators:

- Hazardous waste and waste minimization
- Energy use
- Solid waste materials and recycling
- Water use
- Other, a primary focus on food and construction material recycling

WPI's Salisbury Labs

Any member of the environmental committee producing this report will be new we feel these "other" items would distract from more pressing needs in the other sections. In the future, inclusion of these items is recommended.
We decided on four indicators.
The following links are to the respective development page for each indicator.

- Materials
- Energy
- Water
- Chemical Releases

By providing data on the campus' impact on the environment in a clear, concise way, members of the WPI community can see the impact that they as individuals have.
Also,

- Quantitative analysis can be done by producing easily understandable indicators.
- Providing this data in a consistent manor, monitoring of trends is more easily done and patterns can be observed, increasing the effectiveness of initiatives to make those indicators more environmentally friendly.
- Detailing the steps the university is taking to improve those indicator values, the campus is more aware of those initiatives and therefore more able to assist in them.

This environmental report outline provides clear, concise information in a quantitative, consistent manor and we feel will suit the needs of the WPI community well.

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Mock Up Annual Report—Materials

Developers' Comments

Mission: Reduce the amount of materials purchased, recycle more materials than what is discarded as trash.

- Composition:
  - Input
  - Output
    - Trash
    - Recycling
- Activities/Objectives:
  - Recycling
  - Publicizing
- Data Spread Sheets:
- Graphs:
- Analysis of graphs

WPI's Salisbury Labs

Summary of Changes in Indicators from Previous Year

Summary of Initiatives during Previous Year

- Discussion of Impact of Initiatives
- Discussion of Changes to Initiatives for Next Year

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Mock Up Annual Report—Materials Development

WPI's Salisbury Labs

We decided to break up the Materials section into different sections for input and output. Input can be measured from requisitions made during the previous year. Data for the output can be derived from the report "Recycling Programs Discussion Summary" produced by Residential Services and Plant Services (a copy of the 2006 report was provided to us by the Director of Physical Plant). This report broke down the output into the following categories: Cardboard; Office mixed paper; Fluorescent light bulbs; Metal; Electronics; Trash. All categories other than Trash represent recycled materials. Inputs, we believe, should focus on these categories. As new items are recycled, new sections can be added to the input and output categories.

It should also be noted that one cannot draw a direct correlation between inputs and outputs. Cardboard output includes boxes in which other materials were shipped and therefore is very difficult to measure intake. Metal input would be all of the stock materials procured for the labs, but the output would not include the finished products but only the scrap sent out for recycling. Electronics purchased in one year would probably not be discarded the same year so the electronics output would reflect older purchases. What these indications would do though is give "ballpark" estimates by which the campus's performance in recycling can be measured.

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Mock Up Annual Report– Energy

Developers' Comments

Executive Summary of Energy Section
Mission:

Energy is what drives modern society. We as an institution focused on technology must have electricity to power our computers and heat to warm our classrooms. It cannot be avoided. We can, and indeed should, strive to limit our use of that energy as much as possible and ensure that it is produced as responsibly as possible. It is to further this end that we examine the energy use on campus.

WPI's Salisbury Labs

Content:
Green House Gas Emissions Report
History
Report
Electricity Data
Summary of Changes from Previous Year
Green House Gas Emission Report
Electricity Data
Summary of Initiatives during Previous Year
Impact
Changes

Green House Gas Emissions Report

History

During the 2006-2007 academic year, an IQP group on campus produced a Green House Gas Emissions Report for the campus. To complete this report, data was gathered on energy use varying from electricity use to driving information. This data was then inserted into a spreadsheet which calculates the total green-house gas emissions due to those energy sources. The resulting information provides not only a comprehensive listing of energy usage but also provides an indication on how big of a component an individual energy source is of our total environmental impact.

Report

The complete set of the Green House Gas Emissions spreadsheets for 2006 are shown in APPENDIX 1. Historical data is presented as available. The furthest point where we have complete data is 2002, allowing us four years of total data to observe trends. Further known data is also shown, providing both further information to examine trends in those areas and motivation to either find or extrapolate the missing data. According to the report, the WPI campus and community was responsible for almost 29,500 metric tons of CO_2 emissions.

Electricity Data

Electricity data is broken down in more, into monthly data. The spreadsheet WPI Monthly Electricity Bills can be found in APPENDIX 2A and details the electricity used between June of 2005 and October of 2006, normalized to energy consumed per day. The data is also presented graphically which highlights which time periods used exceptionally high and exceptionally low amounts of electricity. The spreadsheet Electric Record shown in APPENDIX 2B shows similar data from 1996-2005 along with the average cost of the electricity.

Summary of Changes from Previous Year

Green House Gas Emissions Report

Total equivalent carbon emissions were up by approximately 460 metric tons compared to 2005, an increase of approximately 1.5%. The vast majority of this increase was due to increased electric consumption, which alone had more than 375 metric tons increase. This was approximately a 4.5% increase in electricity consumption. This was not due to school expansion, which increased by approximately 0.5% over 2005 (full time and part time students, faculty, and staff). The only energy usage to decrease in 2006 was that used by the steam plant. When looking at the emissions over the past several years, though, no obvious trends appear. Electricity usage is at its third highest level in the past 10 years, the years which the report gives data, but has had swings as large as 1.5 million kWh, between 2002 and 2003. This variability leads to the conclusion that energy usage improvements are possible.

Electricity Data

The current monthly data for 2006 is incomplete and we are therefore unable fully analyze the electricity data. One point of interest comes from APPENDIX 2A which showed that for comparable time periods in 2005 and 2006 the 2006 periods actually were less than in 2005, even though more electricity was consumed in 2006. This suggests that either consumption levels were much lower in early 2005 or much greater in late 2006, or a combination of both. Once more information is available, the analysis of those areas should prove enlightening.

Summary of Initiatives during Previous Year

There have been a several different studies performed to improve our energy monitoring and usage on campus. They will be highlighted here

Ellsworth-Fuller Heating

Over the 2006-2007 academic year, an IQP group performed a study into the heating of Ellsworth-Fuller apartment complex. The current heating system is electric. While the heaters themselves are highly efficient, it was found that when the entire system is examined from a CO_2 emission standpoint, the electric option his highly inefficient. It was also found to be an expensive form of heat production. The study of the students was incomplete as of the release of this report, but initial findings are leaning towards a recommendation that the electric heating system be replaced by a boiler system similar to that in Founders Residence Hall. While capital costs for the heating system replacement may be high, total electricity bills will be reduced much higher than the fuel cost for the boiler, reducing annual cost. It will also go will towards reducing the total equivalent CO_2 release.

Electricity Metering

Another IQP project during the 2006-2007 academic year focused on the electric metering systems on campus. Their final report is not yet available but their preliminary findings are that many of the on-campus electric meters are not functioning, as seen in when they collected data from multiple meters across campus, shown in Electric Use Buildings 2, seen in APPENDIX 3A. They also found that the meters for each building were not being read and reset on a consistent basis. One possibility the IQP group is examining is the possibility of upgrading all meters on campus to a standard meter. The Environmental Committee is closely following their progress with the hope of endorsing such a recommendation and initiating regular meter reading practices to further enhance the analysis capability of this section of the Environmental Report.

Electricity Purchasing

Every few years, WPI signs a contract to purchase electricity from different suppliers. This will be occurring within the next few months. To assist in this decision, a study was done to examine the equivalent CO_2 release per unit electricity from each different supplier. Three separate suppliers have been looked at: National Grid, Direct Energy, and Hess. The way in which their electricity is generated can be seen in APPENDIX 3B. The relative effect of the differences was compared by graphing the equivalent CO_2 releases for the years 2003-2006 assuming the electricity had come from each of the different providers. The comparison is available in APPENDIX 3C. It is quite obvious from the graphs that National Grid releases the least equivalent CO_2 per unit electricity by a significant margin. The Environmental Committee therefore strongly recommended to the Trustees that National Grid provide WPI with its electricity.

Changes

There are several changes that we suggest to improve the recording of the energy consumption and ways to reduce that consumption. One of the issues found with the Green House Gas Emissions Report is that the transportation section, which is currently the largest producer of green house gas emissions. To accurately address this issue, it is necessary to know the full extent of the driving habits of the students, faculty, and staff. Currently, several assumptions have been made to produce the report. Therefore, it is proposed that a project be done to research the validity of those assumptions and gather further data so that reasonable suggestions may be made to reduce the emissions in this category. Also, after suggestions are received to produce a standardized metering system for the different buildings on campus another project be to devise a standard reading procedure to maximize the effectiveness of the new meters and provide more detailed information about the energy use habits of the campus.

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Mock Up Annual Report— Energy Executive Summary

This summary provides the main conclusions of the Energy section of the 2006 Annual Environmental Report

- Greenhouse gas emissions were greater in 2006 than 2005, with most of the increase due to increased electricity use.
- Electricity usage was lower during the summer months of 2006 versus 2005, suggesting increase related to undergraduate usage.
- Report suggests purchasing renovating Ellsworth-Fuller from electric heating to steam heating.
- Electricity metering for individual buildings inconsistent and equipment is in need of repair and upgrades.
- Report suggests purchasing electricity from National Grid most likely to minimize greenhouse gas emissions.
- More information needed on driving habits of faculty, staff, and students to enhance greenhouse gas calculator.

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Mock Up Annual Report– Energy Development

Under the Energy section, we believe that the efforts of the 2006-2007 Tracking and Reducing Green House Gas Emissions at WPI IQP group can be put to good use. The report details how much green house gasses are emitted by WPI and where they come from. This will allow for better allocation of resources as efforts
will be used on the biggest contributors and not what is perceived to be the biggest. Also, the information sources that the IQP group uses will be of great importance as then the producers of the report can go straight to where the information is located instead of looking in different directions.

WPI's Salisbury Labs

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Mock Up Annual Report— Water

Developers' Comments

Mission: To reduce the amount of water used on campus, and to increase reusable water sources.
Composition:
Activities/Objectives
Usage
Data Spread Sheets:
Graphs:
Analysis of graphs:

WPI's Salisbury Labs

Summary of Changes in Indicators from Previous Year

Summary of Initiatives during Previous Year
Discussion of Impact of Initiatives
Discussion of Changes to Initiatives for Next Year

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Mock Up Annual Report– Water Development

Under the Water section, the amount of water used by the campus can be examined. The amount of detail in this section is dependent on what kind of breakdown of water usage is available. The finer the breakdown, the better the analysis which can lead to better direction of efforts to reduce water usage.

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Mock Up Annual Report– Chemical Release

Developers' Comments

Mission: To safely remove chemicals from laboratories and plant services in an environmentally sound way.

Composition:
Activities/Objectives
Academic Releases
Cleaning Products
Grounds Keeping
Data Spread Sheets:
Graphs:
Analysis of graphs:

WPI's Salisbury Labs

Summary of Changes in Indicators from Previous Year

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Mock Up Annual Report– Chemical Release Development

We decided to break down the Chemical Release section into three sections: Academic Releases; Cleaning Products; Grounds Keeping. Under Academic Releases, the amounts and types of chemicals released and the method of release would be documented. This would give the opportunity to identify which substances are being over-used and identify methods by which releases can be minimized. Cleaning products would be measured by what types and quantities of cleaning products were purchased the proceeding year. These would best be divided into two subcategories: "Green" and "Non-Green". This would lead to discussions about increasing the proportion of "Green" products and an objective look at the costs associated with using them. The final category, Grounds Keeping, would encompass the fertilizers and pesticides used to maintain the grounds of WPI. This gives WPI another opportunity to reduce its releases.

WPI's Salisbury Labs

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Mock Up Annual Report— Summary of Changes Development

The "Summary of Changes in Indicators" section is intended to give a quick view of the impact conservation and recycling efforts have had as well as discuss long term trends. As materials consumption is also dependent on student population, it is suggested that data regarding how the student, and potentially employee, population has changed so that consumption information can better be put into context.

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Mock Up Annual Report— Summary of Initiatives Development

In the "Summary of Initiatives" section, projects initiated to improve indicator numbers should be enumerated and described. Separating projects into subcategories based on what indicator they affect makes for a logical arrangement, but it may be found that groupings based on method to initiate change may prove more useful. What types of initiatives are being performed and what their impact is will affect which arrangement is preferred, and that decision may change from year to year. It is suggested that the arrangement of this section be changed infrequently as it will make accumulating historical data easier in future years.

WPI's Salisbury Labs

In the "Discussion of Impact" subsection a description of what the apparent impact of the initiatives on the indicators is appropriate. Historical data may also prove useful, ex. "Electricity consumption had be increasing 2.4% annually until this year when project X was initiated." This will help provide a quantitative analysis of the effect of the initiatives as well as an avenue for a cost-benefit analysis.

The final subsection of this environmental report is the "Discussion of Changes". In this subsection, the analysis provided in the preceding subsection will lead to decisions on the effectiveness of the previous year's initiatives. With precise data, the recommendation for continuing, modifying, or ending an initiative can be intelligently made. Also, recommendations for beginning similar initiatives for other indicators can be made, ex. "Project X reduced electricity consumption, so a similar approach may reduce water consumption."

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Actions

WPI's Environmental Initiative means nothing without actions. As Gandhi said, "We have to be the change we want to see in this world," and to be the change we must act the change. WPI cannot progress towards a greener campus without taking action and making change for the better. By working towards some of the goals members of WPI's campus and other schools have already begun to do, WPI will undoubtedly become a leading example in environmental sustainability. Not all actions have to be immediate, but creating a plan for the future is a great start. The following are suggested actions the committee can advise the campus to take.

WPI's Higgins Garden

Suggested:

- **DAKA Grease to power campus cars** Biodiesel cross country relay; GEM
- **Mouse pad reminders to turn off computer screens when not in use** Cooling the Campus
- **Energy Efficient floor/department competitions** Cooling the Campus
- Consortium Purchasing Power for Green products (cleaning and educational)
- **Create an incentive system for students to reduce their own energy uses** Cooling the Campus; CMU green initiatives; Harvard Green Cup; Yale Green Cup Yale University students went so far as drafting a purpose and getting lawyers involved in implementing it by setting up a non-profit organization, with a board of directors, which developed on campus programs such as the "Green Cup" energy efficiency competition.
- **Incorporate environmental awareness into all course curriculum**
  At Oberlin College the Environmental Studies program increased in size and created more opportunities for their students. With a larger community to reach out to, environmental studies has increased from being generally only a second major for most students to a program that now has the potential to "emphasize ecological design" on campus.
  The University of Colorado has made environmental sustainability a "top priority." They have revised and continue to revise plans made for construction and land-use planning on campus as well as correct issues with public transportation to campus and reducing campus waste by providing and educating about alternatives.
- UCLA has implemented a campus wide **environmental audit**, entitled *Campus Ecology*, as a student guide.
- Rutgers University realized that they had **purchasing power** and created a competitive market to supply their campuses demands. They used their power to lower the price of environmentally sound products as well as come together with other universities to further increase their buying power.
- The University of Michigan **helps students find opportunities working and volunteering** for environmental companies and organizations. By making opportunities known, the students' potential for benefit increases.
- **Investigate Energy Consumption** Brown University student projects A student intern at Brown University was paid to investigate energy consumption and others have analyzed "appliance purchases in terms of total operating costs rather than initial equipment expenditure, proposed revamping the lighting of exit signs, and created an incentive system for students to reduce their own energy bill."
  The University of Wisconsin-Madison has set up a yearly project, much like the Interactive Qualifying Project, that is done each year. In the project undergraduates, a faculty mentor and a campus staff person "research findings and recommendations for improving campus policies and practices." One project promoted using public transportation to get to campus.
- Multiple **Student Projects were done by a class at Clark University** dealing with their campus' ability to become sustainable and the conclusions and research they came to in the process.

Most of the actions above can be useful for future IQP projects and can be done or analyzed by students. E-mail email@wpi.edu to inquire about IQP possibilities.

Resources

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Actions Resources

Below are sites used as inspiration for suggested actions WPI could take to be a more environmentally sustainable campus, including:

- General information on energy use and consumption, and how to reduce individual environmental impacts.
- Ideas for surveys and how to educate/ bring awareness to students (ecofoot; environment-emory) and
- Promote recycling and waste reduction.

WPI's Higgins Garden

The following sites have multiple links to different actions and include things such as financial benefits to going green.

- Green Practices Committee Key Recommendations
- STEPS TOWARD SUSTAINABILITY: Suggested Actions for Campus Greening
- Campus Greening Initiatives
- Energy-Saving Policies for Colleges and Universities

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Problems funding actions can lead to inaction. The following links are sites that provide help with funding.

Caption describing picture or graphic.

One could argue that it is easier, cheaper and less of a hassle to not consider your effect on the environment. A lot of times it is easier, cheaper and less of a hassle to buy paper and throw it out when you're done with it then to think about how it should be reused or disposed of. Is WPI's public image and the benefits for the environment enough to offset the costs and difficulty of lightening our load on the environment? With enough money, consultants can be hired to think about everything but that is not ideal. For a campus with great thinkers and doers WPI does not need to depend on outside thinkers.

The Government and organizations, such as the following Massachusetts Technology Collaborative, Red, White & Green, and Ecomagination, offer grants and awards for student work for the university to use towards projects. This is beneficial to the WPI campus because of these programs ability to fit right into the IQP process.

- Matching Grants for Communities
- Green Grants for Planning and Implementation of Environmentally Responsible Housing
- Solicitations for Business, Industry, and Universities

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Related WPI Projects

Here are some Projects done by WPI students. We hope you find them helpful in your search for information. Due to copyright laws you must request IQP's and MQP's from the Library directly.

Title of IQP 1

Mission Statement of IQP 1.

Tracking and Reducing Greenhouse Gas Emissions at WPI

Our goal is to account for greenhouse gases emitted by activities directly and indirectly related to WPI campus life. Also we would like to implement new policies at WPI that would make yearly inventories easier to reduce emissions.

Wind Power Feasibility Study for Holy Name HS

The objective of this IQP was to facilitate the eventual construction of a wind turbine at Holy Name High School. A feasibility study based up on the economic and social issues surrounding such a project will be presented, including documentation of the additional steps taken by the group regarding conferences, meetings and presentations to help secure a wind turbine for Holy Name. Our results conclude that it would be feasible for Holy Name to erect a 600 kW turbine on site..

The Development of an Environmental Committee for WPI and Future Outreach to the Extended Community

The objective of this IQP was to provide a guide for the WPI Board of Trustees and Administration on how to institute the administrative changes necessary for WPI to be more sustainable.

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Title of IQP 1

Names of Students

Project Advisor

Project Numbers given by Gordon Library:

Mission Statement:

Abstract:

Facts and Figures:

LINK TO SPONSER:

Caption describing picture or graphic.

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Wind Power Feasibility Study for Holy Name HS

Brian Foley
Tyler Forbes
Hans Jensen
Adam Young

Advisor Alexander E. Emanuel

Caption describing picture or graphic.

Project Numbers given by Gordon Library:

06A027I

Mission Statement:

Abstract:

The objective of this IQP was to facilitate the eventual construction of a wind turbine at Holy Name High School. A feasibility study based up on the economic and social issues surrounding such a project will be presented, including documentation of the additional steps taken by the group regarding conferences, meetings and presentations to help secure a wind turbine for Holy Name. Our results conclude that it would be feasible for Holy Name to erect a 600 kW turbine on site.

Facts and Figures

WPI Students' Research Leads to Major Investment to Build First Wind Turbine in Worcester

Holy Name Jr. Sr. High School; James P. MaGovern; Massachusetts Technology Collaborative

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Tracking and Reducing Greenhouse Gas Emissions at WPI

Adam Haines
Timothy Lawton
Brandon Steacy
GHGatwpi-07@wpi.edu

Advisor Scott Jiusto

Caption describing picture or graphic.

Project Numbers given by Gordon Library

Mission Statement:

Our goal is to account for greenhouse gases emitted by activities directly and indirectly related to WPI campus life. Also we would like to implement new policies at WPI that would make yearly inventories easier to reduce emissions.

Abstract:

Facts and Figures:

Building Space.doc

Oil Consumption and Steam Production History.doc

2003 Fuel Oil Totals.doc

Middlebury Report.pdf

Penn State inventory.pdf

Tuft's Inventory Methods.pdf

Tulane GHG inventory.pdf

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The Development of an Environmental Committee for WPI and Future Outreach to the Extended Community

Katrina Kucher
Anita Minakyan
Charles Smith

J. Scott Jiusto

Caption describing picture or graphic.

Project Numbers given by Gordon Library:

Mission Statement:

The objective of this IQP was to provide a guide for the WPI Board of Trustees and Administration on how to institute the administrative changes necessary for WPI to be more sustainable.

Abstract:

Our project was to develop proposals for a formal environmental policy, committee, and annual report for the WPI administration to consider. Unlike many universities, WPI currently does not have a visible position on environmental sustainability. We came to our proposals by researching the processes and final products of other universities and institutions. They, along with developmental resources, are presented on a website (Located at www.wpi.edu/~aminakya/ as of 3/6/07). Comments on the development of the proposals are presented in the paper.

Facts and Figures:

http://www.wpi.edu/~aminakya

LINK TO SPONSER:

None

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2003 Fuel Oil Totals

Deliveries	JAN	FEB	MAR	APR	MAY	OCT	NOV	DEC
1	8550	7600	7950	8300	8400	8500	8800	8500
2	8650	8450	8350	8500	8400	8500	8500	8500
3	8500	8600	8100	8400	16800	8700	8500	8500
4	8500	8550	8700	8500		8600	8500	8500
5	8400	8300	8450	8500		8600	8500	8500
6	8400	8500	8200	8500		8600	8500	8500
7	8400	8600	8500	8500		8700	8500	8300
8	8300	8600	8500	8400		60200	8500	8500
9	8200	8700	8500	8600			8600	8400
10	8500	8500	8400	8550			8500	8500
11	8450	8200	8450	84750			85400	8700
12	8500	8100	8300					8700
13	8250	8500	100400					8500
14	8500	109200						110600
15	8550							
16	8500							
Totals	135150	109200	100400	84750	16800	60200	85400	110600

TOTALS 702500

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Success Stories

Here are some success stories. We hope you find them motivating in your search for information.

Clark Sustainability Initiative

Although the site does not contain much information at the moment, Clark University has made great strides towards sustainability on campus. Many classes incorporate environmental issues and there is a new sustainability program where students can work towards different alternatives to reduce, reuse and recycle in all aspects of university life.

Environmental Programs Task Force

MIT's environmental sustainability initiative has expanded so much that there are several sub groups that oversee different aspects of the university's sustainability goals. MIT not only works on the most common of environmental efforts like recycling and energy efficiency, but they are doing extensive work with green buildings, food composting, and reducing green house gas emissions.

The Institute for Sustainable Technology and Development

The environmental initiative projects are many and fall in the categories of energy, sustainable business and industry, and sustainable communities.

Green.Tulane.edu

Sections on energy smart shopping for the student and Bike Tulane, a group promoting more cycling on and off campus, provide lots of information and encourage the community on how to get involved and be more environmentally conscious.

Michigan Tech
Environmental Sustainability Committee

Have lists of accomplishments and activities, many include educating communities and younger schools. Recycling efforts not only in effect but widely expanding. Subcommittees which students and faculty can join to be apart of the sustainability effort, sub committees help focus on certain tasks.

Carnegie Mellon Green Practices

Has lots of projects to not only educate students, but outreach to the community off campus. Policy for new campus vehicles to run on alternative energy. Environmental across the curriculum- educate all students of environmental issues.

Sustainable Endowments Institute

Easily accessible information regarding the sustainability practices of 100 American and Canadian institutions. The institutions are graded on their sustainability practices. Grades range from A- to D-.

Sustainability @ Duke

Duke has been recognized as a "Campus Sustainability Leader" by the Sustainable Endowments Institute.

Brown is Green

Est. over 15 years ago, now has multiple projects concerning pollution reduction and energy conservation. Group is well organized and includes a full time Environmental Coordinator position appointed by the Provost. There is lots of information on green buildings, transportation, water conservation and energy efficiency to name a few of the sections on this site.

Tufts Climate Initiative

"Tufts University was among the very first to make sustainability a high priority in its teaching, planning, and operations. TCI is continuing this tradition of being a forerunner by choosing the ambitious approach of fostering change on a university wide level."

The Greening of Rensselaer

Site is easy to follow and projects are well organized. Several grant proposals for environmentally related issues including water conservation, green purchasing and work on the environmental education center were awarded.

Tufts Institute of the Environment

An active member of the Taillores Declaration with a strong concern environmental pollution and degradation. Online communication board for active discussions and updates. Lots of work on the Tufts Climate initiative project.

Ecofoot The Office of Campus Sustainability @ MSU

Not only is there a committee for campus sustainability but an official office. Well organized with newsletters, sustainability report and activities. Many projects and funding for projects.

Environmental Stewardship at Emory

Explains the ecology the school resides in and the campus plan to reduce impacts when expanding, etc. push for people to write articles in the school newspaper on environmental issues. additional resources page, locally, domestically and globally with indications of what you cant find on each page.

To contact us:

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Related Links

Below are some sites that we have found to be helpful to us in our search for information and some we just found to be interesting.

Clark University IDCE Pages
Clark University's Department of International Development, Community, and Environment (IDCE) Website.

Energy Hog
Learn how to improve the energy efficiency of your home. You'll save money, improve the comfort of your home, and help the environment too.

Hog Busters training camp for kids.

Global Reporting Initiative
The GRL vision is that reporting on economic, environmental, and social performance by all organizations becomes as routine and comparable as financial reporting.

University Leaders For a Sustainable Future
The mission of the Association of University Leaders for a Sustainable Future (ULSF) is to make sustainability a major focus of teaching, research, operations and outreach at colleges and universities worldwide.

Environmental Information Resources
The purpose of the site is to provide user-friendly access to the board range of information and resources relating to environmental topics that is available electronically throughout the globe.

What is Sustainability?
A Reflection on Seven Generations and Beyond.

By Walter Wimpson, CEM, LEED AP
Energy Officer
University at Buffalo
State University of New York

CERES
Investors and Environmentalists for sustainable prosperity.

Resource Directory
Links to Business and Environmental Resources Worldwide.

Taillories Declaration Resource Kit
A guide to promoting and signing the Taillories Declaration.

Education for Sustainable Development
In December 2002, resolution 57/254 on the United Nations Decade of Education for Sustainable Development (2005-2014) was adopted by the United Nations General Assembly and UNESCO was designated as lead agency for the promotion of the Decade.

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Books

The following books discuss sustainability and campus sustainability.

Barlett, Peggy & Chase. 2004. Sustainability on Campus: Stories and Strategies for Change (Urban and Industrial Environments). The MIT Press.

Blewitt, John, Cullingford, Cedric. 2004. The Sustainability Curriculum: The Challenge for Higher Education. Earthscan.

Creighton, Sarah Hammond. 1998. Greening the Ivory Tower: Improving the Environmental Track Record of Universities, Colleges, and Other Institutions. The MIT Press.

Dresner, Simon. 2002. The Principles of Sustainability. Earthscan.

Eagan, David. 1998. Green investment, green return: How practical conservation projects save millions on America's campuses. National Wildlife Federation.

Keniry, Julian. 1995. Ecodemia: Campus Environmental Stewardship at the Turn of the 21st Century: Lessons in Smart Management from Administrators, Staff, and Students. National Wildlife Federation.

McKenzie-Mohr & Smith. 1999. Fostering Sustainable Behavior: An Introduction to Community Based Social Marketing. New Society Publishers.

M'Gonigle, Michael. & Starke, J. 2006. Planet U: Sustaining the World, Reinventing the University. New Society Publishers.

Orr, David. 2004. Earth in Mind, On Education, Environment, and the Human Prospect. Island Press.

Toor, Will. 2004. Transportation and Sustainable Campus Communities: Issues, Examples, Solutions. Island Press.

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The documents found to the left were used in the Annual Environmental Report and compiled here for easy access.

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Green House Gases Cool Air-Clean Planet Spreadsheet

Apendix 2A

Monthly Electric Bill provided by the metering group

Appendix 2B

Electric Record of "Electricity Data"

Appendix 3A

Electric Building use 2 document

Appendix 3B

Electricity Generation Sources

Appendix 3C

Electricity Emissions

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