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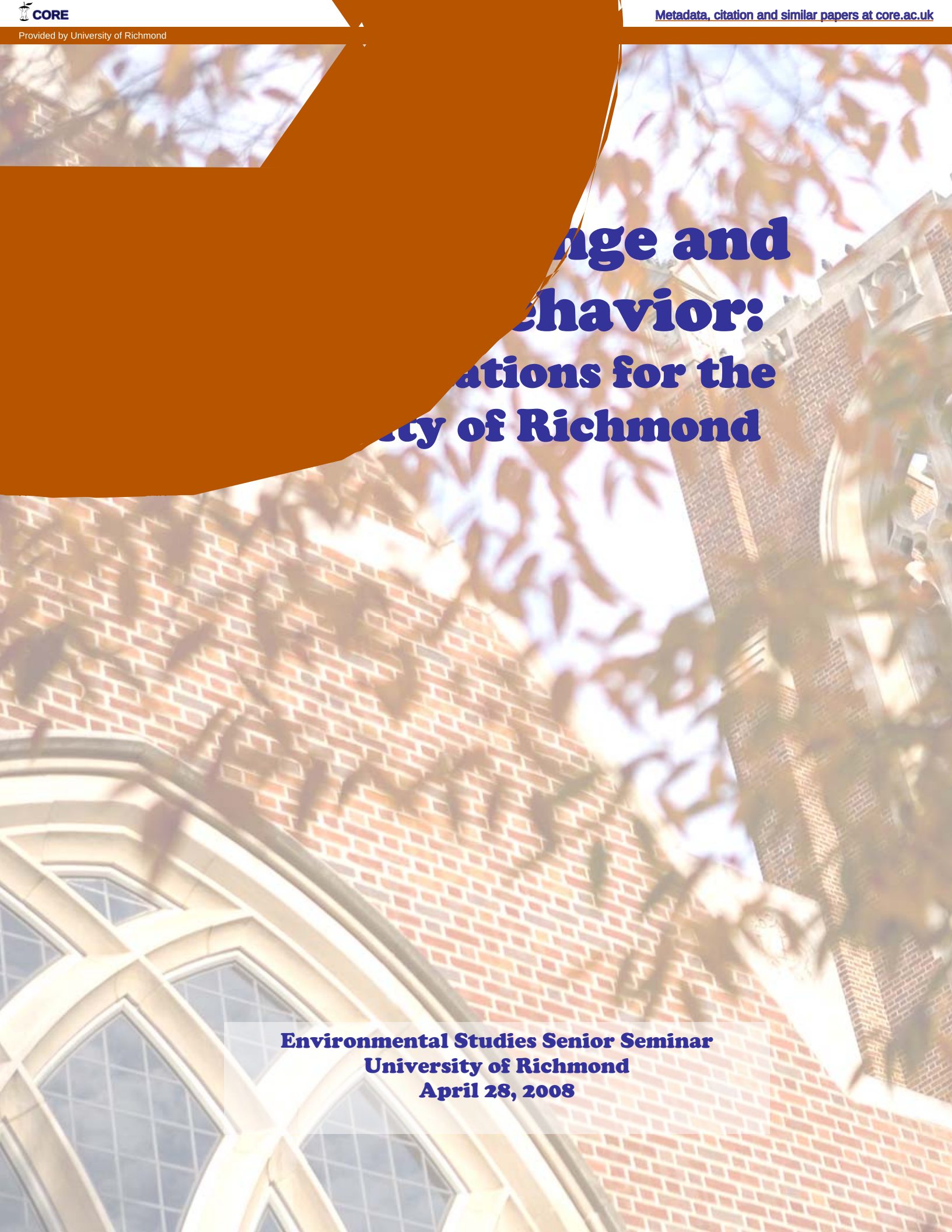

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Environmental Studies Senior Seminar
University of Richmond
April 28, 2008

This report was prepared under the direction of Dr. David Salisbury by the Environmental Studies Class of 2008's Senior Seminar course:

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"Generations of Richmonders have bequeathed us a beautiful place, a landscape that provides the spaces for all that we do. Our generation's responsibility is to steward this place in ways fitting with the care shown by those who have come before us and then to fulfill our responsibility to future generations. For us, that stewardship must include thinking about the larger environmental impact of the decisions we make and by educating responsible environmental citizens. We will."

President Edward Ayers
Inauguration Speech, April 11, 2008

Introduction

Climate change[1] is a natural occurrence; the world has experienced extreme variances in temperature for millions of years. Yet, climate change is likely to be the greatest threat humanity has ever faced. This disparity exists due to the rapid change in climate the world has witnessed over the past fifty years. The implications of unmitigated climate change have the capacity to affect billions of people worldwide with potentially catastrophic outcomes.[2] Backed by the Intergovernmental Panel on Climate Change (IPCC), the National Academy of Sciences, the American Association for the Advancement of Science, and numerous other scientific bodies, rapid climate change is essentially indisputable and the need for dialogue on climate change is necessary for humanity to mitigate climate change related impacts and adapt to a changing planet.

A strong belief in climate change is not a necessary prerequisite for action. A minority of scientists still contest climate change. Science is always developing and changing, ebbing and flowing, and not even the potential threats climate change can be predicted with 100% certainty. Rapid climate change may bring catastrophic droughts, hurricanes, flooding, famine, and worldwide devastation… or it may not. Based on these choices, what is the wisest action to take? Should we do nothing and risk climate change does not exist? What if we do nothing and the tipping points so illustriously pointed out by many climatologists irrevocably change the earth for the worst? Can we live with that choice?

The University of Richmond has made its choice. Under the leadership of President Ayers, our community has already taken strides to decrease our carbon emissions. When President Ayers signed the American College and University Presidents Climate Commitment (PCC) on November 13, 2007, the University of Richmond joined the other 515 colleges which have declared themselves allies to climate change mitigation. At his Presidential Inauguration, President Ayers boldly declared, “Our generation’s responsibility is to steward this place in ways fitting with the care shown by those who have come before us and then to fulfill our responsibility to future generations.” Our Heilman Dining Center’s initiation as a Virginia Green

[1] Climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.(UN Framework Convention on Climate Change, cited in IPCC Summary for Policy Makers). In this document, the use of rapid climate change, global warming and anthropogenic climate change refers to this same definition.

[2] IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Synthesis Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, NY USA.

Restaurant, the LEED Silver Certifications present on campus, the university's alliance with the GRTC public transportation system, and the successful Eco-Spider Challenge each illuminate initiatives taken by the university to convey environmental stewardship as a campus priority.

We, the Environmental Studies Senior Seminar Class of 2008, choose to recognize climate change as an imminent threat. After rigorous examination of the scientific, social, and political aspects of climate change, we initially wanted to help construct the carbon emissions inventory required in the PCC. However, citing their ability to build the inventory through existing University institutions, our administration steered us towards the Scope 3 emissions inventory, a component which focuses on student behavior. While we found Scope 3 too limiting, we decided our goal as a class was to impact student climate change awareness on campus. Therefore, we separated into three "working groups" and developed three distinct projects to meet our goal: 1) develop a database of projects and initiatives other universities have implemented to address climate change; 2) execute a comprehensive survey of the student body's understanding of global climate change and energy consumption patterns and; 3) present the University of Richmond with options and recommendations for addressing climate change on campus.

Our goal is to inspire individual responses to climate change. Raising awareness does not indicate everyone will or should agree with our beliefs and convictions, but it will enable individuals to come to their own conclusions. We wholeheartedly believe climate change is an issue we cannot disregard and we stand by the belief that the risk of doing nothing is the biggest danger of them all.

The Science of Climate Change

As college students, faculty, and administrators, we must understand climate change is one of the most important issues of our generation. We will collectively have to deal with the consequences of future human caused climate change not only for ourselves, but for future generations as well. Climate change is a problem that affects and connects the entire world regardless of international boundaries. It has the potential to dramatically change the earth systems we as humans depend on and is consequently related to all world issues.

The problem of climate change also requires a global solution with leadership at international, national, institutional, local and individual levels. Colleges and universities have a unique responsibility as institutions of higher education to lead by example and educate students to become informed innovators for change. Universities have valuable resources and the ability to shape and inform the leaders of tomorrow. Ann Rappaport and Sarah Creighton, co-authors of *Degrees That Matter*, a book on the role of colleges and universities in climate change issues wrote, "Both colleges and universities occupy a unique place in society, and their example and influence will have a disproportionately large and positive influence on climate action."[3]

The University of Richmond has not only the ability but the responsibility of becoming a leader in climate change initiatives and education. Our Senior Seminar class believes that an institution whose mission is to prepare students to pursue lives of "responsible leadership in a global and pluralistic society"[4] needs to be a leader in this issue that affects everybody across all boundaries. To truly uphold our commitment to the Presidents Climate Commitment (PCC), we need to have institutional programs to reduce our university's greenhouse gas (GHG) emissions, but more importantly, we need to incorporate climate change studies into our university curriculum and raise the awareness of all students, faculty, and staff on campus.

There is no time to start but now. Climate change is a universal and urgent issue requiring immediate action. The recent 2007 IPCC analysis validates the urgency of addressing climate change. This organization "is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme

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[3] Rappaport, Ann & Creighton, Sarah Hammond, 2007. *Degrees That Matter: Climate Change and the University*, MIT Press, Cambridge, MA. p 315.

[4] Mission Statement http://president.richmond.edu/mission/index.html Approved March 15, 2005, by the Board of Trustees

(UNEP)" comprised of hundreds of scientists from around the world.[5] Although there is a vast diversity of views and research on climate change, the IPCC represents the greatest international scientific consensus on climate change. The IPCC Synthesis report states, "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations."[6] From 1906 to 2005, the earth's average temperature has increased 0.74 [0.56 to 0.92]°C.[7] A global average temperature increase of 2.0°C is a widely accepted view of the threshold for dangerous climate change or climate change that is occurring at a rate faster than ecosystems and food production can keep up with.[8] To stabilize the levels of carbon dioxide ($CO_{2)}$ in the atmosphere at a point where global average temperature change is projected to be 2.0 to 2.4°C would require a 50 to 85% reduction in global CO_2 emissions below 2000 levels by 2050.[9]

There are already a wide variety of observed consequences showing we are already experiencing climate change. Global average sea levels have risen since 1961 at an average rate of 1.8 [1.3 to 2.3] mm/yr and since 1993 at 3.1 [2.4 to 3.8] mm/yr because of thermal expansion, and the general melting of glaciers, ice caps and polar ice sheets.[10] Mountain glaciers have declined in both hemispheres, and arctic sea ice is shrinking by 2.7 [2.1 to 3.3]% per decade. Precipitation changes have occurred, resulting in significant increases "in eastern parts of North and South America, northern Europe and northern and central Asia but declined in the Sahel, the Mediterranean, southern Africa and parts of southern Asia."[11] This results in flooding in some areas and drought in others. Cold days, cold nights and frost have become less frequent of the past fifty years. Climate change is also resulting in earlier spring events, and a poleward and altitudinal shift in plants and animals. Aquatic ecosystems are also showing signs of shifting in algal, plankton, and fish abundance as well as ice cover, salinity, oxygen levels and circulation. There is also a high degree of confidence that "some hydrological systems have also been

[5] http://www.ipcc.ch/about/index.htm
[6] IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Synthesis Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, NY USA. p 5.
[7] Numbers in square brackets indicate a 90% uncertainty interval around a best estimate.
Ibid. p 2.
[8] Flannery, Tim, 2005. The Weather Makers: How Man is Changing the Climate and What it Means for Life on Earth. Grove Press, New York, NY. p 169.
[9] IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Synthesis Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, NY USA. p 20.
[10] Ibid, p 2.
[11] Ibid.

affected through increased runoff and earlier spring peak discharge in many glacier-fed and snow-fed rivers and through effects on thermal structure and water quality of warming rivers and lakes."[12]

Anthropogenic causes of climate change involve the release of GHGs into the atmosphere. GHGs such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphurhexafluoride (SF_6) allow incoming short wave radiation from the sun to pass through the Earth's atmosphere but absorb and reflect substantial amounts of longwave radiation that would normally pass back through the atmosphere into space. Although the GHG effect is essential for human life on Earth, recent anthropogenic sources of GHGs are resulting in rapid climate change for which current terrestrial and human systems are not adapted.

The graph below (from the 2007 IPCC Synthesis Report) shows the breakdown of anthropogenic GHGs and their human causes.

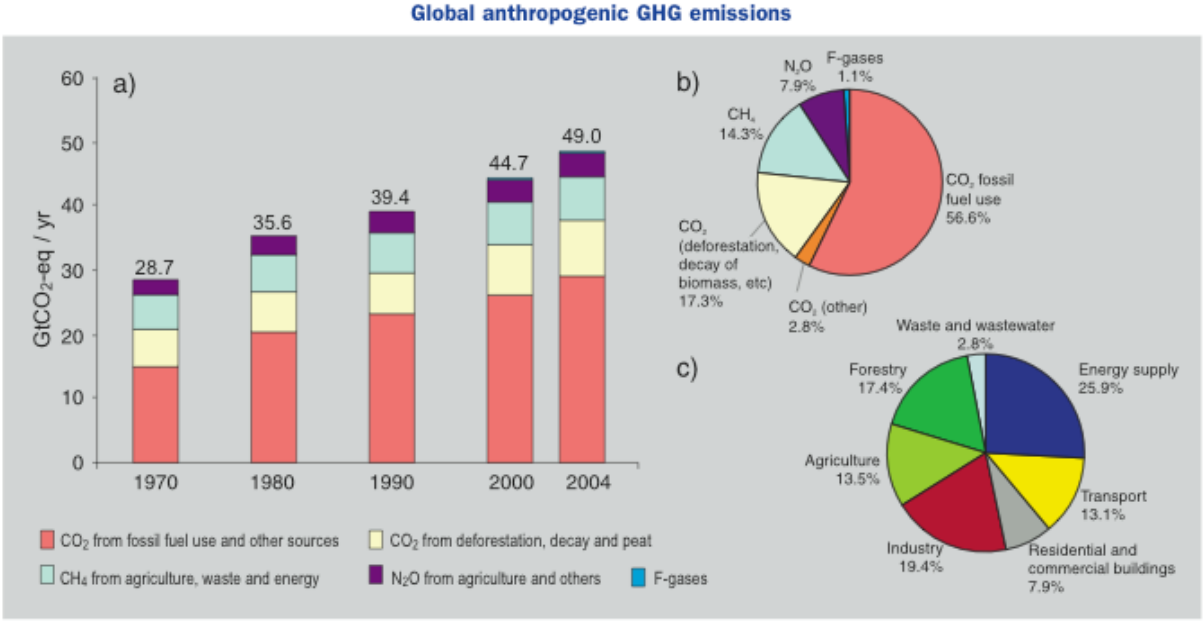

Figure SPM.3. (a) Global annual emissions of anthropogenic GHGs from 1970 to 2004.[5] (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of carbon dioxide equivalents (CO_2-eq). (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO_2-eq. (Forestry includes deforestation.) (Figure 2.1)

Figure 1. Global Anthropogenic GHG Emissions

[12] Ibid.

The IPCC projections for future warming and consequences are based on a variety of scenarios regarding future human activity and population on average warming ranging from 1.8 to 4.0°C.[13] There is a projected *likely*[14] increase in sea level rise, frequency of heat waves and heavy precipitation in certain areas, cyclone intensity and *very likely*[15] precipitation increase in high latitudes. There is also a *high confidence*[16] that many semi-arid areas, like the Mediterranean Basin, western United States, southern Africa and north-eastern Brazil, will suffer a decrease in water resources due to climate change, while the mid-latitudes and tropics will have an increase in water availability and annual river runoff.[17] The danger of widespread species extinction, both aquatic and terrestrial, is also a major potential impact of future climate change. The extent of this impact depends on our course of action.

All of these consequences of climate change will have indirect effects on ecosystems and human systems around the world, including Virginia and the University of Richmond. The below graph shows a few examples of possible consequences of climate change on human systems.

[13] Ibid, p 8.
[14] Likely means greater than 66% probability
[15] Very likely means greater than 90% probability
[16] High confidence means About an 8 out of 10 chance.
[17] Ibid.

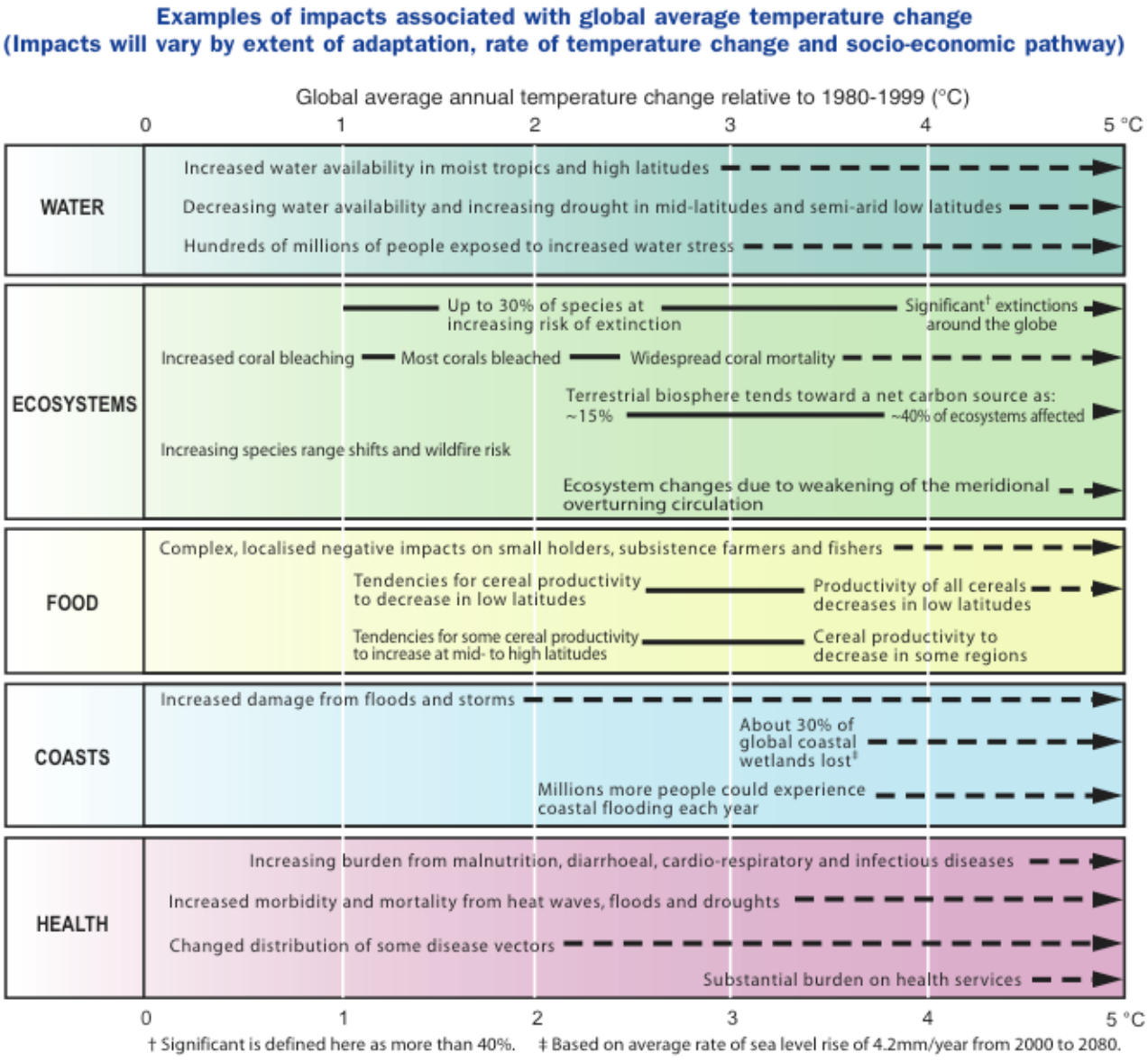

Figure 2. Impacts associate with global average temperature change (1980-1999)

Refer to the 2007 IPCC Working Group Reports and Synthesis Report for more information about the causes and consequences of climate change.

The threat of future climate change cannot be ignored because "unmitigated climate change would, in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt."[18] However, we do have the ability to both mitigate and adapt to the effects of

[18] Ibid, p 19.

climate change and avoid catastrophic change.[19] The stabilization of CO_2 at a tolerable level requires a cooperative international effort and a redesign of our energy sector and technology portfolios. As students of Environmental Studies, we hope to use this document to raise awareness of climate change on campus to better prepare for ourselves, our school, and humanity for a changing future.

[19] Ibid, p 19.

Research from Other Schools

Working Group II was assigned to research various colleges and universities in an attempt to create a comprehensive list of current and future initiatives relative to the PCC nationwide. Sixty-two initiatives from thirty-one different institutions were identified and assembled in a Microsoft Excel document including hyperlinks and descriptions of each project

The colleges and universities studied varied in size and location, as well as the different initiatives undertaken by each institution. Scale, implementation, oversight, and involvement in the programs & projects also varied among the schools. For example, St. Olaf College in Minnesota, with just over 3,000 undergraduates, has purchased and constructed a wind turbine on campus.[20] This expensive and large-scale venture to offset electricity costs is revolutionary, but not practical at the University of Richmond. While similar in size, St. Olaf is located in a rural area with adequate open space for a wind turbine; in a suburban area like Richmond where it is not consistently windy, a wind turbine simply would not be a practical project to implement. At the University of Maryland, a large public school with over 25,000 undergraduate students, a vastly different project established a mandatory campus-wide “green tax”. While University of Richmond bears only a fraction of the total number of students as does University of Maryland, implementing a similar initiative to offset carbon is within reason on our campus, as will be outlined later.

[20] http://www.stolaf.edu/green/turbine/index.html

Initiatives (Hyperlinked)	**School**
Transportation	
Zipcar Program	Bates College
Alternative Fuel Camus Vehicles	Tufts University
Biodiesel buses	Middlebury College
GoLoco Rideshare Program	Tufts University
On-campus driving restrictions	Carleton College
Community bike program	Berea College
Cat Cycles (bike share)	University of New Hampshire
Hybrid Zipcars	Middlebury College
"On Points"- Taxis accept "Flex" dollars	Duke University
Student run bike shop	Middlebury College
Bicycle co-op	Bates College
"Campus-to-Metro" shuttle	George Mason University
HOURCAR (similar to Zipcar)	Augsburg College
Hybrid Fleet Vehicles	Bowdoin College
Curriculum	
Sustainable Business degree offered	Aquinas College
Masters of Public Health Program Focus on Public Health Ecology	University of New Hampshire
Summer Sustainability Internship	Connecticut College
Green Grant Fund (Internship)	Duke University
Climate Neutrality Courses	Cornell
Energy Efficiency	
Energy Star shopping	Tulane University
Eco-Cottage	Furman University
Campus Resource Monitoring System	Oberlin College
EcoVillage	Berea College
WildCAP (partnership with ACE hardware for Energy Star items)	University of New Hampshire
Electric Lawn Mowers	Tufts University
Sustainable Landscaping	University of New Hampshire
Vending Misers	Tufts University
Wind Turbine on Campus	St. Olaf College
Energy Efficient Laboratory Fume hoods	Tufts University
Waste	
Composter	St. Olaf College
Compost Facility	Evergreen State College

Student Outreach/Awareness	
Energy Saving Tips for Students	University of Bath
Home energy seminars	Tufts University
CERToon Competition	Harvard University
The Talloires Declaration	University of Puget Sound
Do It In The Dark	Tufts University
Green Week	University of Bath
Chill Out: video contest	Berea College
Get Clean! Power Your Room Green	Tufts University
Energy Saving Competition	University of Bath
Student Energy Waste Watch Challenge	University of New Hampshire
Guide to Living and Working Green	Tufts University
Environmental Action group	Furman University
Campus Eco-Map	Tufts University
	University of British
Residence Sustainability Coordinators	Columbia
Climate Fest	Tufts University
Eco-Reps	Carnegie Mellon
Community Involvement	
Support Pledge	Duke University
Community partnerships	Furman University
Green Basketball Game	Duke University
Community partnerships	Clemson University
Student/Faculty Coordination	
Energy Task Force	University of New Hampshire
	University of Wisconsin
Sustainability Task Force	Stevens Point
Ecology, Climate, and Health Working Group	University of New Hampshire
Food	
Local food	Middlebury College
Organic farms	College of the Atlantic
Natural and Organic foods	University of Washington
Sustainable Food Project	Yale University
	University of California
Certified Organic Salad Bar	Berkeley
Organic farm	Evergreen State College
University Transparency	
Green Tax (Campus-wide)	University of Maryland
Methods for Conducting a Greenhouse Gas Emissions	
Inventory for Colleges and Universities	Tufts University
Emissions Audit	College of Charleston

Figure 3. Complete List of the Initiatives Studied

Prior to determining initiatives would be the most applicable at the University of Richmond, Working Group II agreed to incorporate student views, gathered from the surveys executed by Working Group I, into their research. The survey sought to understand Richmond students' behavior, knowledge, and recommendations with respect to climate change and our environment. The best way to achieve tangible results and create a significant impact on the sustainable future of University of Richmond is to involve as many students as possible. With a better understanding of the student body we can move forward with initiatives that will be popularly supported and continue for many years. The variation of projects to cut energy use and control carbon emissions on college and university campuses across the country is neatly organized in a document created by Working Group II below, followed by an overview of a few of the most feasible and potentially applicable projects and programs at the University of Richmond.

Student Environmental Awareness and Behavior Survey

In the following section we will examine student awareness of climate change related issues and how the level of awareness relates to behavior. Three hundred and one students completed our survey assessing students' understanding of current environmental issues and their behavior as it relates to energy use and environmental impact. The survey offers school-specific data to provide a framework to base recommendations for education and awareness programs. The survey included questions assessing the respondent's understanding and view of climate change as well as electricity and gasoline consumption. The survey's contributed to our recommendations for environmental programs at the University of Richmond, and will serve as a baseline to evaluate the effect of climate change programs in the future.

Methodology

Through email the entire undergraduate student body at the University of Richmond was requested to participate in the survey. Students were asked to answer the survey questions and enter a raffle for $50 after completion. In a period of two weeks, 301 people responded to the survey. Of the 2,795 total undergraduates more than 10% of the population responded to the survey. Due to the self-selective nature of the survey, there was initially some concern as to whether respondents would represent the student body fairly. However, our concern proved to be unfounded as respondents belonged to every major and the distribution quite even (See Appendix A).

Environmental Studies majors accounted for only 4% of respondents and students involved in environmental organizations on campus did not make up a large proportion of the respondents. Conversely, Business majors were best represented at 24.6%, although business is the most popular major. The monetary incentive seemed to overrule any inherent interest or disinterest in the issue, as each major from the student body was appropriately represented.

The proportion of males to females was slightly skewed in terms of the University population. Although females account for only 51% of the University, 79.4% of the respondents were female. A separate analysis of the two groups confirms no difference between the two sexes understanding of climate change.

First years (26.9%), sophomores (23.6%), juniors (22.3%), and seniors (27.2%) all responded to the survey fairly evenly. The top-heavy distribution actually benefits the survey

analysis because seniors have more University of Richmond experience to draw from. Looking at the data separately can discredit any potential arguments for climate change as an issue addressed only in upper-level classes, which many underclassmen have not taken.

The survey included five major components: climate change awareness, the University of Richmond and the environment, driving behavior, energy use behavior, and behavioral change programs. The survey also elicited basic information so the data could be more thoroughly analyzed: gender, year, residence, major and possible environmental group affiliation. Sixteen of the questions contained comment boxes, which allowed students to give more in depth and personal responses.

Fifteen personal interviews were also conducted relating to the material in the survey to gain further insight into student understanding of climate change and to inform our analysis of the survey responses. Participation was voluntary, and participants were selected in locations on campus based on availability and the appropriate conditions for conducting an interview. Interviews lasted about fifteen minutes and included similar questions to the survey with the additional follow up questions and requests for clarification. Additional interviews were not pursued given the detailed written responses in the survey comment boxes.

Survey questions were placed in an order to keep participants interested. The commonplace questions about basic personal information were placed at the end, and questions about climate change, a relevant world issue, were placed in the beginning. We understood any order the questions were in might bias answers somehow; however we did attempt to order the questions so respondents would give more honest responses. Questions about how much respondents consider the environmental impact of their various actions were put at the end of their respective sections so answering the question would not condition responses.

The first section, climate change awareness, focused on students' understanding of and views about climate change. The first two questions focused on student opinions of the urgency and impact of climate change. These were followed by specific questions on the consequences of climate change and human activities impacting climate change. The survey asked students to identify any classes they had been enrolled in which addressed climate change. Another question asked them to rank their concern with climate change in comparison to other world issues.

The questions in the next section, University of Richmond and the Environment, focused on finding whether or not the students knew our university President, Dr. Ayers, signed the

American College and University Presidents Climate Commitment and if students think we should work to further reduce greenhouse gas emissions on campus. Other questions asked whether students believe they use more or less energy and gasoline than other students and what appliances they own on campus.

The Driving Behavior section inquired whether or not the students use cars on campus, and if so, to where and how often they drive. Another questions asked if students consider the environmental impact of their gasoline consumption and what mode of transportation they use to travel home.

The Energy Use Behavior section addressed whether or not students consider the environmental impact of energy use when setting a thermostat. This section also contained questions about the temperature students set the thermostat and whether on not they turn off appliances when leaving their house or going to bed.

The final section, Behavior Change Programs, allowed students to give feedback about possible programs to help raise environmental awareness on campus. The first question asked how often students would check information about the energy use of their residence hall. Respondents were also asked to choose between options of programs to help motivate them to drive less frequently both on and off campus as well as use less energy. We also asked students to entertain the idea of having a book about human interaction with the environment to replace another book in the required freshman Core course addressing the human experience.

The content and methods of the survey and interviews were approved by the Institutional Review Board (IRB), which formally regulates research at the University of Richmond “as it pertains to the rights and welfare of human subjects.” Survey and interview responses were confidential, and participant names were not connected to their responses. All survey and interview participants signed a confidentiality agreement ensure they understood these parameters.

Overall Results

The following are the results of our survey and representative comments added by the students surveyed. See Appendix B for full results.

Question 2: Is global warming a threat to humans and ecosystems?

Of those surveyed, 60.5% of students identified climate change as a major threat needing to be addressed now, and 22.9% identified it as a moderate threat.

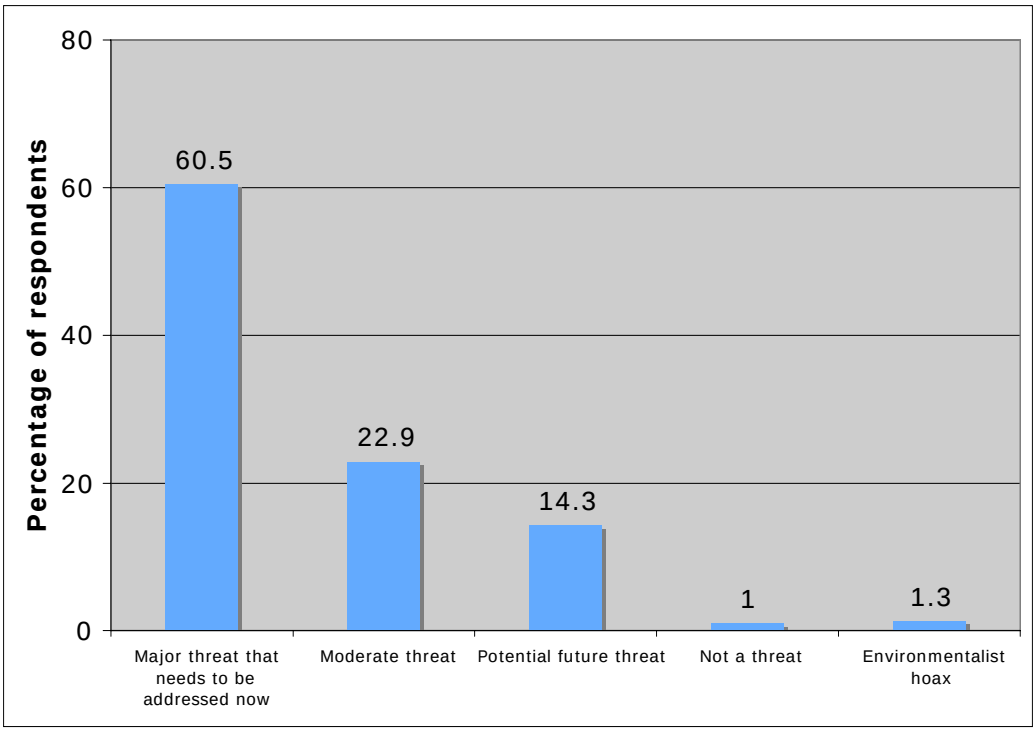

Figure 4. Is global warming a threat to humans and ecosystems?

Many comments on this question emphasize climate change as a significant problem. Examples include:

- "Climate change will affect the way we live because it will erode ecosystems that humans have been functioning in for thousands of years. Climate change will raise water levels across the globe and alter weather patterns to the point that the way we live, grow crops and function as a society will have to adapt to the new geography of the world."
- "Our climate is changing at an alarmingly rapid (on a geological timeframe) rate, and it because of damage humans have done to the environment. Rising sea levels, changing

weather, and a number of other results makes global climate change a topic that needs to be addressed now."

- "I think it global warming is causing a change because I've heard of things like glaciers melting in oceans because of global warming. Averages temperatures are also rising I think. It is a threat because eventually the earth will be too hot for normal living conditions. The sun will be too powerful and UV radiation will not be filtered by the deteriorating ozone layer. The threat means that resources and humans will not be able to survive anymore."

Climate change was identified as a potential threat to humans and ecosystems by 14.3% of students. A number of comments claim we do not have enough information to determine the significance of climate change as a threat:

- "Climate change is an incredibly stupid term. There has been climate change at every moment throughout history. In addition to that, the way humans affect the climate is very ambiguous, and especially the way humans could resolve or influence this process is unknown. Frankly, I don't like any of the multiple choice answers, because I do not believe that environmentalists necessarily want to gain political power (their concern is genuine, but not based on facts). I would like to see the option: we don not have the sufficient knowledge to make judgments on climate change."
- "I don't know if it's real or not, but it could be, so it is a potential threat."
- "I can't see it."

However, many comments demonstrate significant disconnects with understanding the nature of the climate change problem. Some responses categorized climate change as a naturally occurring phenomenon. The wording of the question, "global climate change," can be somewhat vague because the global climate does change as a function of natural cycles. The term climate change means the rate of change in climate that we are currently experiencing. While temperature is a characteristic of natural systems, the rate of change in temperature we are experiencing today is unprecedented and not represented in natural history. Some respondents do not see any impacts on humans. Only 2% did not recognize climate change as a threat to humans

and ecosystems. Surprisingly, nearly the same number of respondents believes global warming is a theory created by environmentalists to gain political power.

Another choice, "[Climate change is] a natural phenomenon that has been occurring for billions of years" elicited the following responses:

- "A natural phenomenon that has been occurring for billions of years. Recent changes may be attributable to human causes but the effects on human life is likely minor."
- "Climate change is a threat to humans and society, and while our behaviors have impacted its severity, I believe that it is part of the natural cyclical process and that there is little that we can do to change that. However, I am well aware of the need to recycle and improve our care of the environment."
- "Because it is cyclical and caused mostly by the earth. The damage is minimal and not anything we can fix at a reasonable price."
- "Because it is a naturally occurring phenomenon that has occurred in the past and humankind and ecosystems have survived multiple periods of changes in earth's climate."
- "There are clear examples of global warming affecting ecosystems, but direct "catastrophic" effects on human are much more speculative."

The majority of students claim to be concerned about the issue of global climate change though some are still skeptics. The question gains significance when used to compare concerned students to apathetic ones.

Question 3: How will climate change impact humans and ecosystems?

The next question concerns the time frame of climate change. 81% of the students believe climate change is already impacting humans and ecosystems.

- "Climate change is a pressing problem because it threatens the security of ecosystems and the human population. It is also pressing because our pollution and dependence on fossil fuels exacerbate the problem, so in order to relieve the threat of global warming, we must find more renewable sources of energy and alter our current habits."
- "In our lifetime, we may likely see the North Pole completely melt, changing/ halting the ocean currents and raising sea levels significantly. This would at the very least displace millions of people world wide."

13% believe climate change is not affecting us now, but will in the future.

- “This question does not really fit with the above multiple choice question. Just because climate change impacts humans, even with dramatic effects, does not necessarily mean it is a problem. I am still unsure of how pressing a problem global climate change is, although I believe it will have strong impacts on Earth in the near future.”

4% believe climate change does not currently impact humans and ecosystems, but has the potential to affect them on a small scale.

- “There have already been small changes resultant from global warming. However I would not say there inevitably will be dramatic effects in the next century as the answer I chose is worded; it certainly is possible but I don't believe it to be inevitable. Note that I'm interpreting "global climate change" as global warming; global climate change would happen regardless of humans, if possibly more slowly.”

2% think climate change will not have any impacts on humans or ecosystems.

- “It is not as pressing as we think. People are taking small environmental issues and assigning the cause global warming without transparent, and complete proof. Simply because weather patterns are changing and some environments have been diminishing does not necessarily mean what it is assigned. I think more research is needed to identify the causes without doubt before one can answer this question about the pressing nature.”
- “It may or may not be a pressing problem, but there is no question that the general rising temperature has already had a noticeable effect on certain ecosystems, though not humans to any considerable effect.”

Question 4: Which of the following are consequences of global climate change?

Given a list of choices, students were asked to choose all those they could identify as consequences of global climate change. Figure 5 summarizes the percentage of respondents indicate the following occurrences are a consequence of global climate change.

Consequence	Percentage chosen
Ice caps melting	95.7
Sea level rise	79.4
Intensification of drought	77.1
Intensification of flooding	76.4
Regional differences in temperature change	74.8
Intensification of storms	72.4
Longer, more intense summers	71.4
Hole in the ozone layer	68.4
Shorter winters	64.8
Changes in the salt content of the ocean	58.5

Figure 5. Consequences of global warming.

Nearly all respondents recognize warmer temperatures melt ice caps. We used “hole in the ozone layer” as a false choice, but the hole in the ozone layer is still indirectly linked to global warming. The chlorofluorocarbons (CFCs), responsible for the depletion of the ozone layer, have also slightly contributed to global warming, so the two cannot be completely divided. Also as greenhouse gases warm the earth’s surface, the stratosphere cools which makes it more susceptible to ozone depletion. Therefore, the ozone depletion choice is more complicated than we anticipated.

The respondents were not as aware of the changes in seasonality and ocean salinity in comparison to other consequences of global warming. The effects on seasonality and impacts on marine ecosystems (i.e. coral reefs, and other tropical communities) are expected to be some of the most immediate effects of global warming. One respondent pointed out that there was not a ‘none of the above’ choice for the question.

Question 5: Has climate change been addressed in your classes at the University of Richmond?

This question was an attempt to see whether climate change has been addressed in classes at the University of Richmond. Only 40% of the students have had climate change addressed in

classes. Faculty members responsible for these classes are listed in Appendix C (sorted by last name).

Question 6: “Current global climate change is occurring due to human activity.”

Students were asked to what extent they agreed with the statement, “Current global climate change is occurring due to human activity.” Modern society has affected the rate of climate change through emissions from burning fossil fuels for electricity and industry. Most students (83%) acknowledge this, and believe human activities are impacting climate change.

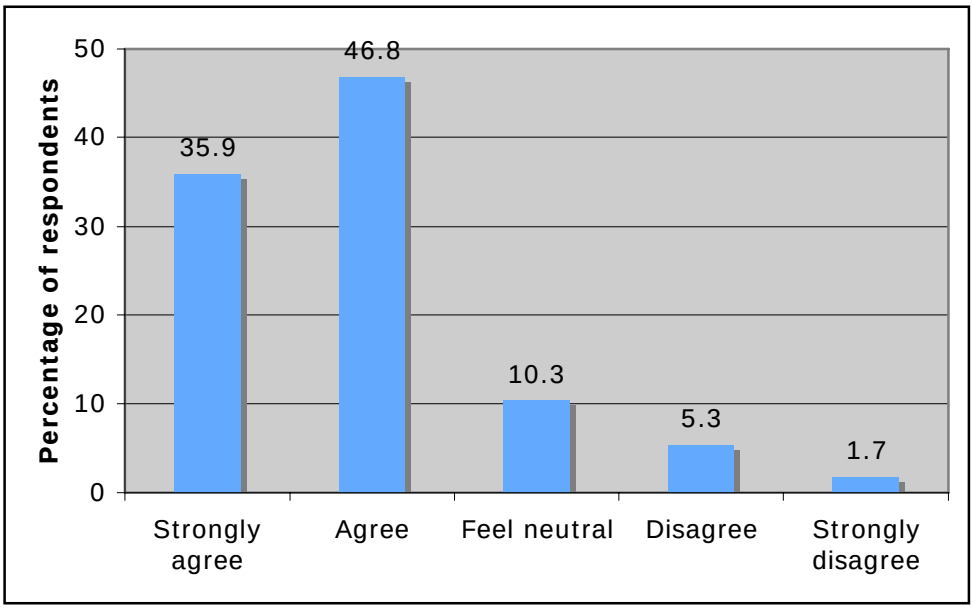

Figure 6. Is global warming occurring due to human activity?

Question 7: Rank these activities in terms of their contribution to climate change.

In order to gain a further understanding of the student body’s knowledge about climate change, we asked them to rank many human activities in terms of their contribution to climate change. In the following table, lower rankings (i.e. one) indicate stronger contributors to climate change.

Activity	Average rank (1-6)
Automobile emissions	1
Coal-fired power plants	1
Burning natural gas	2, 3, 4
Deforestation	4
Modern agricultural production	5
Nuclear power plants	6

Figure 7. The strongest contributors to climate change.

Average ranks were calculated by identifying where one issue was prioritized most frequently. Automobile emissions and coal-fired power plants were ranked as contributing most to climate change (Figure 7). Nuclear power plants were ranked as the weakest contributors. Burning natural gas was ranked in the middle of the activities, with confusion about the exact contribution to climate change. Natural gas was ranked at positions two, three, and four by the same number of respondents. This question demonstrates students are able to identify green house gases as primary agents of global warming.

Question 8: What are you most concerned with?

Apart from global climate change, there are many pressing issues in the social and political spheres. To gauge students' relative concern, we asked them to rank a list of them from those with which they are most concerned (1) to issues with which they are least concerned (8).

Issue	Average rank (1-8)
War	1
Health care	1
Climate change	2
Recession	3
Limited supply of fossil fuels	4
Spread of disease epidemics	4
Nuclear proliferation	8
Species extinction	8

Figure 8. What issues are you most concerned with?

The question tried to identify how University of Richmond students prioritize climate change among other current issues. Most environmental issues were low priorities for Richmond students (Figure 8). Average ranks were calculated by identifying where one issue was prioritized most frequently. The rank of climate change as the number two issue may be misleading; nearly as many people ranked it at four or five (Figure 9).

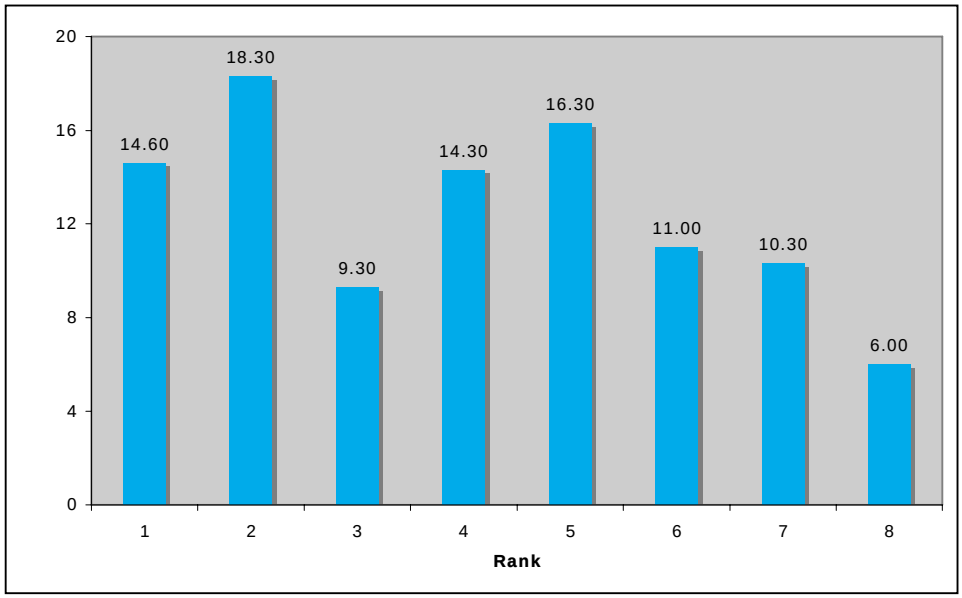

Figure 9. Distribution of Climate Change rankings.

Question 9: Has President Ayers signed the Presidential Climate Commitment?

The American College and University Presidents Climate Commitment, a pledge to reduce fossil fuel emissions, was signed by President Ayers in the fall of 2007, and declared his and the University of Richmond's commitment to environmental awareness in his 2008 inaugural address (the survey took place before the address). We were interested in the level of knowledge of the PCC achievement among the University of Richmond undergraduates. Nearly two-thirds of the respondents knew President Ayers has signed the PCC.

Question 10: Do you think the University should be taking further action to reduce its greenhouse gas emissions?

When asked whether the University should be taking further action to reduce its greenhouse gas emissions, students overwhelmingly responded 'yes' (Figure 10). Very few students oppose taking further action.

Choice	Percentage
Yes	71.80%
No	6.30%
Undecided	21.90%

Figure 10. Should the University take further action to reduce emissions?

Not all of the responses addressed greenhouse gas emissions, but all comments are interesting. The common ideas across all of the responses were: solar panels, elimination of coal plant (use endowment towards alternative energies), bigger/labeled recycling bins, and improved recycling practices. Many people stated that they had no idea how we compared to other colleges on environmental issues: energy use, green building, recycling, etc.

- "I am not sure of what all can be done on our campus because I don't really feel like I am aware what we are doing wrong or what can be uniquely changed."
- "I don't know what we have already done to reduce these emissions."
- "Our campus still relies entirely on coal, there are better ways. We have a huge endowment steps should be taken to gradually change our campus from being coal dependent."

- “I don't know if this is greenhouse gas related, but the recycling system is confusing and not always obvious. Instead of having a bunch of different bins in random places (and people ALWAYS put the wrong things into them), why don't we have standardized wastebaskets with three compartments (metal, paper, trash), like they do in Europe? I'm also never clear if the boxes marked ‘drink containers’ are for paper cups (like from 8:15) or metal (like coke cans) or plastic (like coke bottles) or glass... are we really supposed to put all four types of things into the same container? And in the post office the majority of bins are waste bins, even though the majority of the trash is paper trash (by the way, can you recycle paper that's been written on? What about paper with staples? Magazines? I never know for sure...) So I guess the action the University needs to take is to make it really easy and obvious for people to know what to do. I want to do my part but I'm also really confused.”
- “Maybe not allow first-years to have cars and try to get more buses out here.”
- “The school should actually recycle what we put in the recycling bins. I’ve observed maintenance and housekeeping dumping the contents of the recycling containers into normal trash cans way too many times. not recycling is unacceptable in the 21st century.”
- “Stop using the sprinklers so much in the spring and fall. The way the sprinklers are set up, much water is sprayed onto the pavement, which is a waste of a water and energy.”

Question 11: How much electricity do you consume compared to other University of Richmond students?

About half of respondents believe they use about as much electricity as their peers (Figure 11). More students believe they use less electricity compared to their peers than students who believe that they use more electricity. This is not statistically probable, so it is safe to say that in general students underestimate their electricity use.

	Percentage of respondents
Much less than average	6.3
Less than average	35.5
Average	50.5
More than average	7.0
Much more than average	0.7

Figure 11. How much electricity do you use compared to other University of Richmond students?

Question 12: How much gasoline do you consume compared to other Richmond students?

Similar results were found when asked about students' relative gasoline use. Most believe that they use much less gasoline than their peers. It would be useful to conduct a study on how much gasoline students are using.

	Percentage of respondents
Much less than average	32.9
Less than average	26.2
Average	23.6
More than average	16.3
Much more than average	1.0

Figure 12. How much gasoline do you use compared to other Richmond students?

Question 13**:** How many of each of the following items do you have at school?

We asked students how many of several common appliances they have at school. These responses are in Appendix D. While this question was undoubtedly interesting, it was less useful than we had hoped in further analyses. Even so, the information provided was valuable. 93.7% of students have their own laptop or desktop on campus, despite the hundreds of campus computers available. 62.5% of students also have their own printers. More than 60% of respondents claimed to have their on car on campus, as well. This number is quite high and becomes important as the driving habits of students are addressed below.

Question 14: If you use a car on campus, how often do you use it?

The majority of students (62%) own cars on campus and drive frequently. Of those who have cars, 76% use cars at least two to three days per week, and 19% drive every day or almost every day of the week.

Question 15: If you use a car, where do you drive off campus?

The most common off-campus locations to which students drive are the Ukrop's Shopping Center on Three Chopt Road, followed by Carytown (a popular shopping and dining area) and shopping malls. Many students wrote in responses, which frequently included Broad Street, volunteering locations, and off-campus housing.

Question 16: How many times do you drive to the following locations a week?

Most students do not drive to the on campus locations listed on the survey. The dining hall is the location to which students most frequently drive, with 20% of students driving there at least once a week.

- "It doesn't make sense to drive to campus locations unless it's raining, and then there is not a good chance that you will find a place to park where you won't get a ticket."
- "I walk everywhere on campus, except maybe once a week where I drive to work or the library because I have too much to carry."
- "I work at the gym late at night, and as a woman I don't always feel like walking back… through the woods. I'm pretty sure I'm using less energy than making the [safety shuttle] trek all the way over and back to somewhere else twice."

Question 17: What mode of transportation do you usually use to go home?

Almost half (45%) of students drive personal vehicles when they go home for breaks and weekends. Planes and carpools were the other significant modes of transportation used. A few international students noted in comments they had no other choice for getting home.

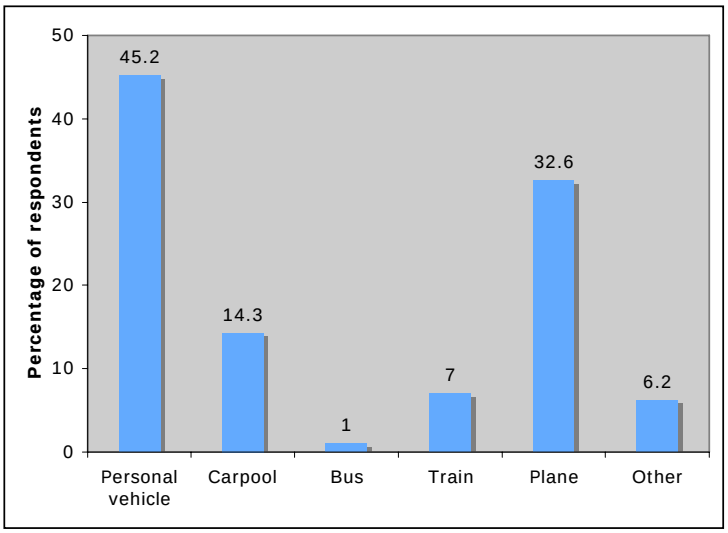

Figure 13. What mode of transportation do you usually use to go home?

Question 18: Do you consider the environmental impact of burning gasoline when you drive?

Students vary in the extent to which they consider the environmental impact of burning gasoline when they drive. Several students stressed economic concerns were more prevalent in their considerations than environmental ones.

- "Sometimes I think about all of the gas I'm using, but mostly this is related to economic reasons although I think environmental concerns have crossed my mind."
- "It's more like the cost of gasoline that I am considering."

Other comments:

- "Yes, but I mean, I need to get home. I live two hours away."
- "Sometimes I just want to get home without worrying about the environment."
- "I like to drive fast, and have a large-engine car. Greenhouse gas fears will not change that."

Questions 19-20: At what temperature do you set your thermostat (degrees F) for the following operations? Do you consider the environmental impact of energy consumption when setting your thermostat?

Almost 80% of students set their thermostats between 65 and 73 degrees for heating and the most common settings for air conditioning are 68 to 70 degrees. Still, many students cited difficulties in setting thermostats in campus housing:

- “Our heating and cooling system in the apartment does not work consistently and the University has failed to correct the problem.”
- “The thermostat in our apartment DOES NOT WORK.”
- “Most of the time we can't control the temperature in the dorms.”

Students are not likely to consider the environmental impact of energy consumption when setting their thermostats.

- “Unfortunately the society has such a horrible impact on the environment; it is often really hard to break from such a culture. Maybe one by one helping the environment will start a trend, but most likely it's the powerful leaders who will set the trend.”
- “My primary concern is whether it is cool enough to sleep at night.”

Again, many emphasized economic rather than environmental concerns.

- “We consider the cost of using the appliance.”
- “I think of cost, not environmental impact.”
- “I think about my wallet.”

Question 21: When you leave your residence for breaks, do you…

When leaving their residences for breaks, a large majority of students always turn off lights (90%), turn off computers (81%), turn off television sets (96%) and turn off stereos (97%). However, only 30% unplug major appliances when leaving for breaks. This indicates a major educational gap in students’ understanding of energy use. If students are willing to turn off their appliances and electronic equipment, taking the time to unplug the same appliances before leaving should not be a burden. Indeed, several respondents expressed uncertainty about unplugging.

- “Should I unplug things? We unplug our hairdryers of course, but never our TV or lamps.”
- “Does it help to unplug them?”
- “I don't know much about which appliances use energy while turned off but plugged in.”

These results represent a excellent opportunity for improvement in energy conservation among students. An educational campaign focusing on the energy savings possible from unplugging appliances could make a significant difference in electricity use, especially if emphasized when students prepare to leave for breaks.

Students are more likely to consider the environmental impact of their electricity use than their gasoline or thermostat, although the slight differences could be attributed to the positioning of the questions in the survey. Again, there were references to economic concerns:

- “I try to save electricity because it saves money, even though I'm not paying directly.”
- “I consider cost.”

Some indicated other experiences had led them to develop conservation habits:

- “I was educated to conserve electricity.”
- “After studying abroad in France, I am much more conscious of turning off lights when leaving rooms.”

These references highlight the importance of education and culture in creating conservation-friendly habits. Consistent with responses to other questions, it is important to create a student culture at the University which emphasizes responsible electricity use. Incentives for changing student behavior are discussed below, but one respondent provides positive feedback for a simple program implemented in the past year:

- “Ever since that electricity conservation contest at the UFA's last semester, we've tried harder to turn off lights when we leave the room.”

Questions 23 through 29 of the survey asked for student input on various strategies to reduce energy consumption and increase conservation.

Question 23: If you could access information about your residence hall or apartment's energy usage online (updated hourly or daily), how often would you view it?

Programs at other schools providing students with information about electricity and energy have been very successful in reducing consumption. Survey results indicate 63% of students estimate they would access this information occasionally or frequently if available

online. Open response reactions to this proposal varied. A few ambivalent students were wary about the information being difficult to read or understand, but most were interested.

- "This would be really interesting!"
- "It would be interesting to see what the peak hours are for usage and try to minimize my usage during those hours….If there was information available about another specific action I could take to modify my usage I would definitely take advantage of that resource."
- "If it's made into a big deal or a competition, for example which hall uses less energy then I think I'll be more cognizant and aware of my energy use and I would make efforts all day to reduce my energy use."
- "As an RA, I'd love to see my hall's use and see we could make it a goal of our community to reduce this use. Make it a competition between other halls, even!"

Question 24: Which incentive would give you the strongest motivation to reduce your electricity consumption?

The most popular incentives for reduced energy consumption among students were prizes awarded to residence halls and apartments using the least electricity. Second in popularity were publicly displayed comparisons of the energy use of residence halls and apartments.

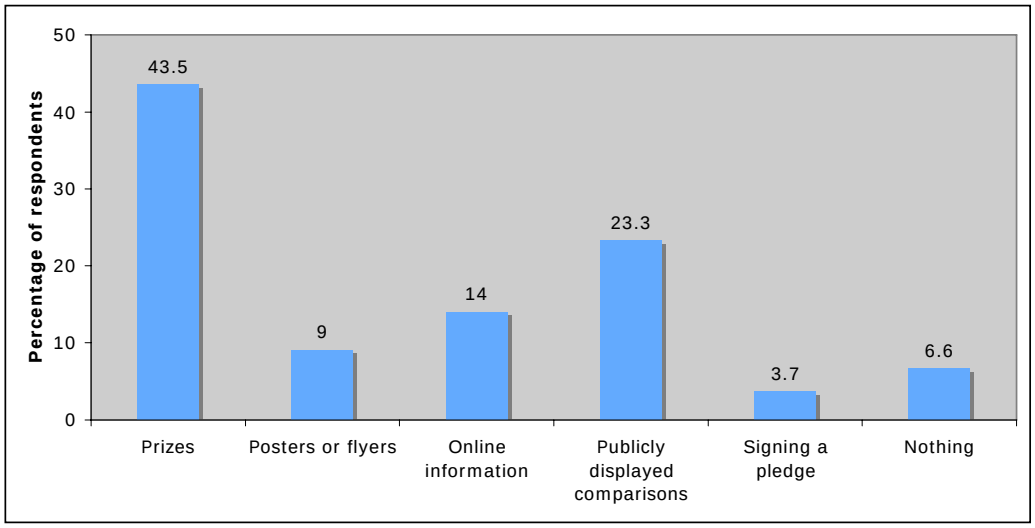

Figure 14. Which incentive would give you the strongest motivation to reduce your electricity consumption?

- “It is not easy to foster cultural change...a combination of all of the initiatives above would probably be just a first step...”
- “Prizes, food, etc. motivate college students. After a period of time competing for a prize, students would learn habits and once the contest was over, the habits would likely stick with them. I think it is a good way to start up an incentive to use less electricity and then keep it going afterwards.”
- “Every one of those suggestions should be used. I think they all help.”

In earlier responses, many students cited economic concerns as prevalent in their energy consumption decisions. Consistent with those responses, many students emphasized the potential benefits of using monetary incentives to change student behavior.

- “Cash refunds to individual apartments that represent a portion of how much money the University has saved as a result of frugal energy use.”
- “Cut out the energy charge for the apartments and bill student per month.”
- “If there were gauges of individual, room, or apartment electricity usage, I think it would be helpful if they came with estimates or totals for how much that electricity costs. Even if they aren't paying for it, students will see that. Money talks.”

Another student questioned the morality of using material incentives:

- “Awarding prizes seems weird to me... you should have to "bribe" people to do the right thing.”

And one student offered a suggestion for an additional program:

- “Maybe work energy-use into a housing decision....students with the least energy-efficient rooms are weighted in the lotto for numbers.”

Question 25: Which of the following programs would most motivate you to drive on campus less frequently?

The most popular program for reducing on campus driving was a day long campus shuttle for men and women, chosen by 42% of respondents. Following is the distribution:

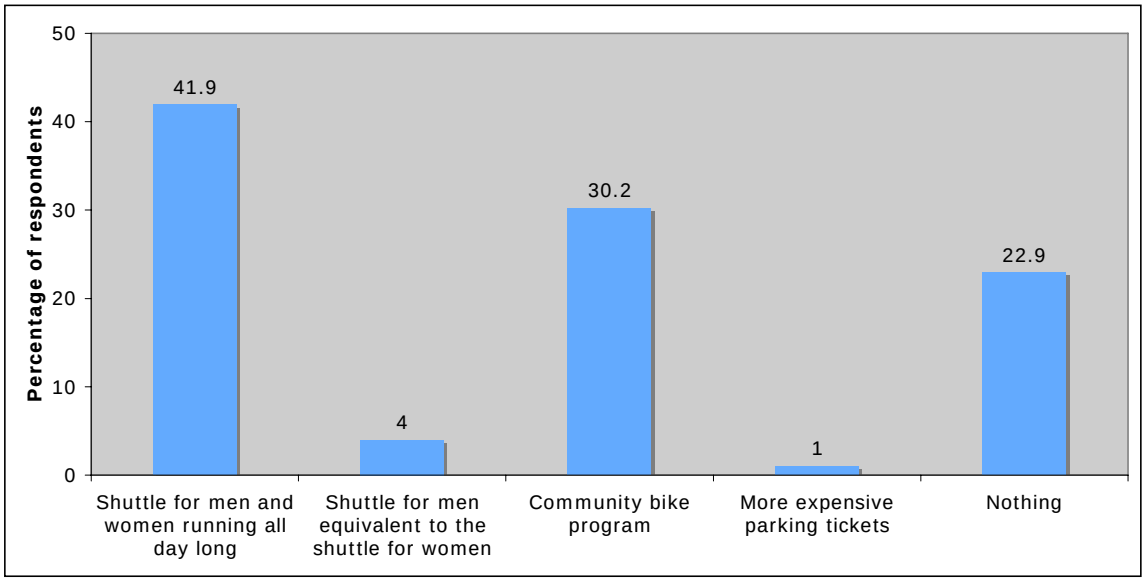

Figure 15. Which of the following programs would most motivate you to drive on campus less frequently?

However, many students wrote that such a shuttle would not reduce energy use because the shuttle itself would require gas and would motivate students to walk less. Most students do not drive on campus frequently, so the benefits of such a shuttle are uncertain. There was also significant interest in a community bike program. 30% of respondents indicated the bike program as the most motivational of the choices.

- "YES!!! A community bike program would be amazing!"
- "I would love a bike program. I never drive on campus because of the lack of parking and the distance I have to walk simply to get to my car."
- "I think it would be nice for the campus to be more bike friendly, maybe not necessarily community bikes, though that would be cool, if there were just more bike paths and it was more convenient to have a bike that would be nice."
- "I think campus bikes are a great idea and I've heard of their success stories at other schools."

Question 26: Which one of the following would most motivate you to drive your car less frequently off campus?

The two most popular programs for reducing off campus driving were better public transportation and free bus passes in combination with additional awareness of bus routes. Students expressed interest in all of the programs.

- "If we had better public transportation than people would probably drive less off campus and save on gas. Most city schools give students free bus passes."
- "Bus passes would be awesome, but also more shuttles and to more locations. I find the hours that our shuttles run can be inconvenient and often I'm unclear as to what time and to which location a shuttle is running."
- "I think the campus needs all of these things."
- "I really think all of these are excellent ideas."

Question 27: If you could do Core over again, would you be interested in reading a book about human interactions with the environment?

When asked if students would have been interested in reading an environmentally focused book in Core, an overwhelming majority (72%) said yes. Of those who said no, many simply wrote in negative opinions of Core in general, or indicated they would never willingly take it again. However, many students wrote that a book about the environment would be very relevant to students' lives and would mesh well with the curriculum.

- "Introducing such a book to the Core curriculum would be an excellent way to reach all incoming UR students and to make our campus really push as a community for environmental awareness."
- "Since this is the only class that everyone on campus takes, it would be a great place to address such issues."

In accordance with these responses, we investigated the possibility of instituting a change in the Core curriculum (see page 46).

Question 28: Do you wish relevant environmental issues had been a part of First Year orientation?

68% of students responded in favor of addressing relevant environmental issues in first year orientation. We did not look into this possibility because the student organization RENEW is already working to institute an environmentally related orientation program. Survey results indicate it should be well received among students.

Question 29: Would you be interested in reading about relevant environmental issues in a Collegian column?

81% of students claimed to be interested in reading about relevant environmental issues in a column in the school newspaper, *The Collegian.* We looked into this and began a weekly column in the spring semester of 2008; Appendix F contains our first three entries.

The preceding discussion represents the student body as a whole, but we were further interested in the differences between students who expressed concern and those that did not. Does their behavior reflect their concern? Has mention of climate change in University classes thus far affected levels of concern? The following analysis compares students' level of concern to their behaviors.

Analysis of Concern

"As an institution of higher education, it is our duty to educate ourselves and our community about sustainable solutions to energy consumption and to act upon that information," says one survey respondent. He is right, of course, and we can use the information regarding people's level of concern as a starting point to see if there is any difference between the resultant behavioral patterns.

Of the 301 survey respondents, 251 (83%) agreed that global climate change is a "major threat and needs to be addressed now" or a "moderate threat to humans and ecosystems." The rest were unconcerned, believing it is a "potential future threat to humans and ecosystems," a "phenomenon that does not threaten humans or ecosystems," or a "theory made up by environmentalists to gain political power." For this discussion, the former group will be considered "concerned" students and the latter will be "unconcerned."

While the fundamental attitudes regarding climate change vary distinctly between the two groups, it is interesting to observe that "level of exposure" and behaviors do not vary. Only 41.4% of the concerned students reported discussing climate change[21] in their University of Richmond classes. Students claiming that climate change is a problem must be getting their information elsewhere. One interviewee, when asked where he got his information from, said, "I don't know… the news and movies… like *The Day after Tomorrow*." Obviously this cannot be considered a reliable source, but such media is affecting the way people think and make decisions regarding climate change. Similarly, 34% of unconcerned students reported having classes addressing climate change. There is very little difference between these statistics, but the key factor is what students are getting out of these class discussions. One unconcerned student stated that although he has been learning about climate change in class, "it doesn't matter, it isn't real." This reaction goes to show it takes more to elicit concern than brief academic reference. Environmental education should not be left to Hollywood's *The Day After Tomorrow* to educate about the science behind climate change. A full-fledged campus-wide discussion and a set of initiatives to back up the claims will be needed to boost the understanding of concerned and unconcerned students and professors.

[21] The potential degrees of discussion vary. This question did not specify whether a large portion of class time was spent on discussing climate change or if it was just mentioned in passing during class.

Current global climate change is occurring due to human activity. The research proves this, but 11.2% of concerned students still feel neutral, or disagree completely. In contrast, 48% of the unconcerned students fall into this category as well. It is interesting that even some students who claim to be worried about the effects of global climate change do not acknowledge humanity's contribution to the problem.

There are many social and political issues that are integral to society's well-being, global climate change being just one. Given a list of global issues, the concerned students, knowledgeable about the present and imminent consequences of climate change, ranked it second overall—"war" being first. On the other hand, students believing climate change to be a distant threat or none at all (unconcerned) ranked global climate change second-to-last, with species extinction last. The connection here is obvious: as soon as people realize the temporal importance of the climate change issue it immediately becomes a pressing issue, trumping many other persistent concerns such as healthcare, disease, recession, and limited supply of fossil fuels.

As it turns out, concerned students and unconcerned students varied little in their level of campus-led environmental awareness. 65.7% and 56%, respectively, knew that President Ayers signed the Presidents Climate Commitment in the fall of 2007. The others were unsure or believed that he did not do so. More work needs to be done to create a campus community knowledgeable and excited about environmental issues.

Most respondents in both categories believed that the campus could do more to reduce its greenhouse gas emissions. Concerned students were strong proponents of LEED Certified buildings and educating students further. Many admitted to not knowing the specifics about their own energy use or how the University compares to other institutions, but they were still supportive of being conscientious about our resource use. Even unconcerned students were upset about lights being on twenty-four hours a day and some of the University's other obviously wasteful traits. Of course, there were some opponents to cutting emissions ("We're going to let China get ahead!"), but the overwhelming majority of statements were in plain favor.

Gauging oneself in relation to other students is always difficult, but this survey asked each individual to do just that. 92.8% of concerned students believe they use "much less than average" to "average" amounts of electricity. Eighteen of the 251 concerned students admitted to using "more than average" electricity and forty claimed to use "more than average" gasoline. The numbers did not vary much for the unconcerned group, though. A full 80% believe they use

"much less than average" to "average" amounts of electricity and 76% believe they use "much less than average" to "average" amounts of gasoline. So, it seems as though most students believe they are doing well to control energy usage.

The following charts (Figures 16 and 17) show the difference between concerned students and unconcerned students as far as their thoughts regarding gasoline and electricity use:

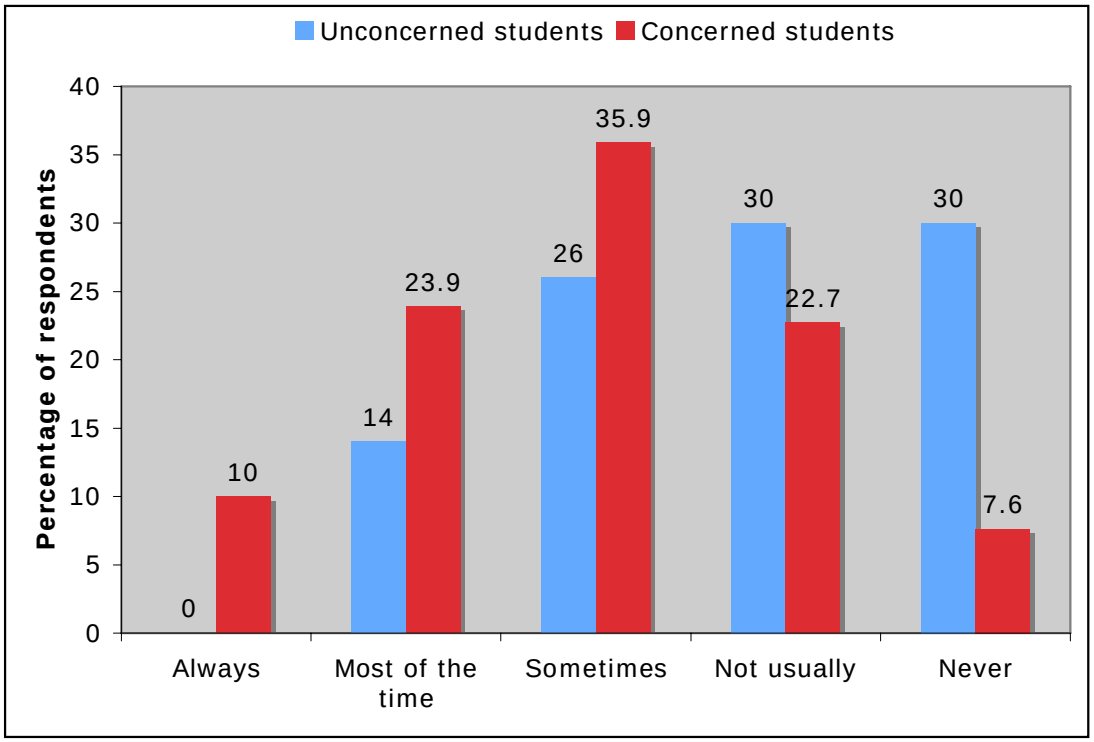

Figure 16. Do you consider the environmental impact of burning gasoline when you drive?

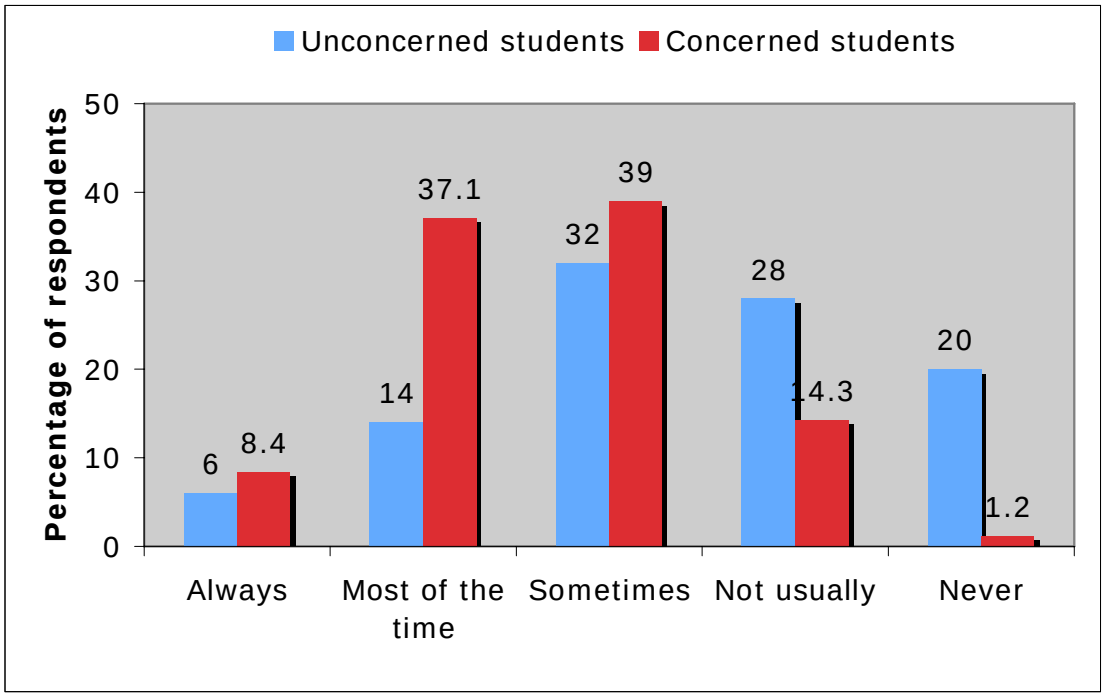

Figure 17. Do you consider the environmental impact of your electricity use?

The largest variation between the groups is in considering the environmental impacts of gasoline when they drive. Other than that, there appears to be very little difference between the two. Nevertheless, 23.6% of concerned and 22% of unconcerned individuals drive their cars four to seven times a week.

At first it may seem quite disheartening that concerned students are not acting any differently than unconcerned students. However, by no means does this signify educational programs implemented at Richmond would be futile. Rather, there are two important ways to interpret the results of the survey. First and foremost, University of Richmond students are generally not knowledgeable about global climate change, even those who think they are. Although many are concerned, they do not behave any differently than the rest of the population, possibly because they do not fully understand the significance of their individual actions. As students of Environmental Studies it is our hope that we can impart this understanding to present and future University of Richmond students through a host of environmental programs to be discussed later. We want to make sure students understand why they should care about climate change and then provide them with the capacity to change their behavior accordingly.

Potential Initiatives

The following section outlines select initiatives that can contribute the most to the University of Richmond's ultimate goal of reducing its carbon footprint. Each initiative was chosen because of its potential for success at the University of Richmond. The incorporation of any one of the programs can put the University of Richmond on the forefront in the fight against global climate change.

Dr. Ayers' signing of the Presidents Climate Commitment (PCC) has begun a march towards climate neutrality for University members. The initiatives in the following pages correspond with the objective of the PCC, creating a carbon-neutral university. These programs can help the University become more carbon neutral. Although the initiatives will not alleviate the complete footprint of the University of Richmond, each would be a giant step in the right direction. There are three main parts to the Presidents Climate Commitment:

1) Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.

2) Initiate two or more of the following initiatives to reduce greenhouse gases while the more comprehensive plan is being developed: Core Program and Climate Change; ECOlympics; Eco-Spider; Zipcar; Collegian Articles and Captain Planet; Biking on Campus; Climate Courses; Green Hoops Basketball Tournament; Campus Residential Monitoring System; Eco-Cottage/Eco-Village; Electric Lawn Mowers; Carbon Offset Investment or; Energy Star Shopping.

3) Make the action plan, inventory, and periodic progress reports publicly available by providing them to the Association for the Advancement of Sustainability in Higher Education (AASHE) for posting and dissemination.

In the PCC agreement universities and colleges are to take 'actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.'[22] The initiatives in the following pages are ideal ways to provide this educational experience.

[22] www.presidentsclimatecommitment.org/html/commitment.php

Core Program and Climate Change

What is it?

After some assessment of the Core program, we believe the introduction of climate change literature would be an effective way to accomplish its goals. Climate change literature has been introduced in other University of Richmond classes. We propose introducing the University of Richmond to a new and interesting perspective of the scientific world by using the only required class on campus, Core.

Why Richmond should do it

Many of the Core program's goals can be connected to the questions addressed by climate change books, and give a fresh new perspective on scientific connections within our lives. Although climate change may be questioned in some circles, the benefits associated with including a new and current topic into the program far outweigh the negatives.

All texts in the Core program focus on similar basic questions; these can be addressed in climate change literature. The new text would address social responsibility, the past and future of American society, global connections, and the difference in America and foreign climate culture. Although climate change may be considered a controversial topic, the variety of perspectives will give each student a better understanding of his own view and its implications.

The three overlapping aims of the program are fulfilled by introducing a climate change book to the Core curriculum. Most climate change literature expands students' knowledge of a current social issue, increases the ability to compare texts, and establishes a foundation for first year students to engage in deep meaningful conversations. Climate change is a pertinent topic within our political arena and popular media. A book such as *The Weather Makers* by Tim Flannery or *An Inconvenient Truth* by Al Gore can bring the scientific complexities of climate change into everyday language, while still maintaining the scientific integrity.

Al Gore's book *An Inconvenient Truth* addresses climate change in a very understandable way. A New York Times review said Mr. Gore's book was "…a user-friendly introduction to global warming and a succinct summary of many of the central arguments laid out in those other volumes…" According to the New York Times review of *The Weather Makers* "…makes sure that you will never again look at an electric-light switch in quite the same way." Climate change

literature will be included in the Core program if we, students and faculty, are committed to the PCC.

The topics connected to climate alter the shape of our society and, as one student said, are "pertinent to the student's life". Climate change, as discussed by *The Weather Makers*, is a global problem with local solutions. Every individual, even those at the University of Richmond, have the ability to shape society by changing their actions. The best climate change book for our campus would look at models and predictions as well as offer solutions and answers to our problems.

How it will work at Richmond

The following summarizes the introduction of new climate change text to the Core curriculum as described by Dr. Leary, head of the Core Program:

> The possibility of a reading on the environment, not on global warming, has come up among Core faculty but no specific action has been taken toward an environmental text. However, the individual Core instructor has a choice of his or her own "ninth text" (in addition to the eight commonly required texts) each semester, constrained only by the reading fit the thematic structure of the common Core syllabus. Currently Professor Erling Sjovold has incorporated "Global Warming: A Very Short Introduction" by George Maslin as the additional text. As for the eight required texts, a process is in place where Core faculty nominate, vote on, study, and then decide if and how a new text would or would not fit into the current syllabus and thematic framework, which changes every 5 years, of Core. In short, any text – on the environment or not – goes through a thorough review before being introduced to the students.

By gaining support from current Core professors, the possibility of introducing a Core book focusing on climate change increases. Professors within and outside the Core program, who have shown an interest in moving the changes forward, are:

Joe Essid of Writing Center (Core): jessid@richmond.edu
David Kitchen of Geology (non-Core): dkitchen@richmond.edu

Steven Nash of Journalism (non-Core): snash@richmond.edu

Erling Sjovold of Art (Core): esjovold@richmond.edu

David Kitchen is a particularly important resource given he is writing a textbook on climate change for liberal arts students. Thus, he is an ideal, although non-Core, professor to recommend a suitable text for incoming students.

If we can, for a moment, re-imagine the Core program as a progressive class that deals with historical as well as modern texts, climate change would be an ideal additional subject and substitute for the current scientific text, *On Evolution* by Darwin. Darwin is taught as a scientific text because it was the first major ecological work teaching us to think about the actual empirical connections within nature. These same connections can be drawn between climate change and society. They would be equally important, controversial, and thought-provoking. Climate change has been an important topic within the media and political realm; to leave such a discussion out of the Core program would be a missed opportunity.

Head of the Core Program: David Leary: dleary@richmond.edu

Core Program: http://Core.richmond.edu/

ECOlympics

What is it?

An ECOlympics competition is designed to raise awareness about waste practices and elicit appropriate responses in student behavior. ECOlympics is primarily an educational tool; one of the major goals is to educate the students on how they can conserve energy. The University of Wisconsin recently held an ECOlympics contest within the university. They outlined the entire process of organizing and executing the competition.[23]

An elementary form of ECOlympics occurred at the University of Richmond in the fall of 2007. The University Forest Apartments participated in an 'energy saving' competition and, although the competition was only mildly successful, with more in-depth planning, higher student awareness and bigger prizes, the competition could be more even more effective.

Why Richmond should do it

If the uses of natural resources are significantly reduced, the university could save thousands of dollars Consequently, ECOlympics would save the university money, support the environment and educates all who are involved. The competition could bring the Richmond community together, creating a unified effort amongst the students to reduce their waste and giving them a sense of accomplishment Residence halls can become closer with the deaneries. The competition has a lasting effect on its participants. Strategies used during competition can be applied to real life situations after graduation. With environmental conscientious graduates reducing their carbon footprint, the ECOlympics competition has lasting effect.

How it will work at Richmond

The concept is simple: The residence hall which reduces their use of natural resources by the greatest percentage wins. Residents' modifications in their uses of water, heat, air conditioning, energy and trash are all taken into consideration. Halls can gain "eco-points" by attending educational events. The more people from a certain hall that attend an educational event, the more points they will receive. Residence halls win by accumulating the most "eco-points," and prizes will be awarded to the winning dorms. These prizes can vary from a hall

[23] http://www.p2pays.org/ref/24/23613.pdf

pizza party, gift certificates, to a nice restaurant. ECOlympics provide incentives for students to conserve natural resources and as a result, help to educate the students about the environment.

During the first three months of school the competition will be advertised by word of mouth and through The Collegian. During this time, judges will need to obtain the resource consumption and waste production data of the residence halls for the previous year, especially data pertaining to electricity, heat (steam), and water consumption, as well recycling rates. It should be displayed in month intervals and obtained for each hall individually. The actual competition will take place for the remainder of the academic calendar year. Each month during the competition electricity and water consumption will be recorded and the dorm/UFA with the lowest per capita consumption will be declared the winner. At the end of the academic year, an overall winner will be decided and awarded a grand prize.

Dorms and University Forest Apartment blocks will be allocated small amount of funding for each month. These funds can go towards the procurement of energy-saving materials such as light emitting diode (LED) light bulbs.

The University of Wisconsin's timeline is published online.[24] As stated before, their competition was for a much larger scale, but the timeline included can easily be adapted to fit Richmond's needs.

[24] http://www.p2pays.org/ref/24/23613.pdf

Eco-Spider

What is it?

This year, the first Eco-Spider Challenge occurred as an inauguration event. One theme of President Ayers' inauguration was the environment, which echoes his recently proclaimed campus priority of environmental stewardship, and the Eco-Spider Challenge was used to promote recycling and sustainability. The Eco-Spider Challenge urged groups on campus to construct a spider out of recyclable materials. With the Recycling Center open until 7 p.m. every day, students had complete access to materials. As an additional incentive, a $50 stipend was available for purchasing additional supplies. The response to the Eco-Spider Challenge was better than expected with a final submission of seventeen Eco-Spiders.

Although the Eco-Spider Challenge is not directly related to the goal of our Senior Seminar, we believe our participation in the challenge was necessary for the Environmental Studies program as a whole. Without acting as a membership organization on campus, difficulties arise when trying to gather support from a certain major. The Environmental Studies major does have an advantage. With eleven graduating seniors this year, we are a close-knit group which made our execution of the Eco-Spider easier. Not only was our Eco-Spider used to promote sustainability, but it also served as our way to promote the Environmental Studies program as an active entity on campus—to students and to the Administration—and as an entity that supports President Ayers and the efforts the Administration is taking to combat global climate change. Refer to Appendix E for more information about our Eco-Spider.

Why Richmond should do it

The Eco-Spider Challenge clearly engaged students and faculty in a campus-wide sustainability awareness initiative. Met with great success, seventeen groups spent their time, energy, and creativity to support the Eco-Spider Challenge. Rallying school spirit with the spider aspect, and environmental stewardship with the creation aspect, the Eco-Spider Challenge readily offers itself to a user-friendly, interactive environmental initiative.

How it will work at Richmond

The Eco-Spider Challenge was sponsored by the Center for Civic Engagement, Recreation and Wellness, Facilities, and the Office of the President. Currently there are no plans

to continue the Eco-Spider Challenge or a similar challenge. Our recommendation is to continue the Eco-Spider Challenge, which could easily become a component of Bellis Fest in the Spring. Additional ideas for continuing the Eco-Spider Challenge include making it open as a Greek competition or giving a monetary prize to the winning team. Overall, the Eco-Spider Challenge was met with great success and united the campus behind the President and environmental stewardship. It would truly be a shame if a similar challenge did not exist in the future. The success of the Eco-Spider demonstrates how a top-down environmentally focused initiative from the President's office can raise awareness of environmental issues. The University would be well served to continue pursuing this and other initiatives.

Zipcar

What is it?

Zipcar is a convenient, inexpensive and environmentally friendly way of commuting. One of This car sharing company's aims is to reduce cars on university campuses while increasing mobility within communities. Zipcar currently has affiliations with over fifty colleges and universities across the United States including Amherst, Bates, George Mason and Middlebury colleges. Zipcar gives members access to over 3,500 cars in the Zipcar network in Boston, Chicago, London, Minneapolis, New York, San Francisco, Toronto, Vancouver, Washington DC.

With twenty cars to choose from, University of Richmond can find a suitable vehicle for campus demographics. The Toyota Prius is the most viable option because of its environmental friendliness. Zipcar charges $1,600 a month for a Toyota Prius model.

Why Richmond should do it

With planned expansion of the Robins School of Business, First Market Stadium and the new Carole Weinstein International Center parking could become somewhat of a problem. Zipcar can alleviate this problem by giving students incentive to leave their cars at home while being environmentally friendly. According to Zipcar's overview provided by Zipcar Inc:

> [E]ach Zipcar takes 20 cars off the road. Approximately 40% of our university members have stated that would have otherwise purchased a car or have stopped their purchasing decision of a car because of Zipcar. With over 20,000 university members to date, Zipcar estimates we have taken about 8,000 personally owned vehicles off of university campuses.[25]

The University of Richmond has made a commitment to combat our carbon dioxide emissions to the best of our ability by signing the PCC. With the inclusion of a Zipcar system on campus, student and faculty carbon emissions from vehicles will be drastically reduced. When asked, "What would motivate you to drive less frequently on campus?" one University of Richmond student answered 'Flexcars'. The University of Richmond has a unique opportunity to join a growing group of universities and colleges who have already initiated a Zipcar system.

[25] www.zipcar.com/press/onlinemediakit_gb/

Richmond should be a leader on the forefront for the reduction of carbon dioxide and a Zipcar system is a viable, inexpensive way to make that happen.

How it will work at Richmond

Mark Mendez, a junior at the University of Richmond, has been in contact with Zipcar. Zipcar responded in a positive way and were very interested in providing a fleet for the university. Zipcar wrote a proposal and sent it to Mendez.

Zipcar asks for the University of Richmond to provide parking, manpower for cleaning and light maintenance, marketing plan execution, and an administrative contact. They also require a revenue guarantee on each Zipcar ranging from $1,500 to $2,200 per month depending on the Zipcar models the University selects. University of Richmond would be responsible for the guaranteed amount less the revenue generated from student use. Zipcar is potentially a smart 'no cost' investment for the University.

- *Parking:* If the University of Richmond were to purchase two cars from Zipcar they can be kept in X-lot, C-lot or a combination of the two.
- *Maintenance:* Maintenance, such as light cleaning and general up-keep, is a sparingly needed activity with Zipcar. When maintenance is required a University of Richmond mechanical services technician can be contacted. Further details can be discussed with George Soulert, University of Richmond engineer. Cleaning will be done by the University of Richmond students who use the program.
- *Costs and Fees:* Zipcar has the potential to cost the University of Richmond nothing. A $25-$35 annual fee will be charged to students who want to use the program. Depending on the rate the University decides an hourly fee will then be charged to use the car. Once a student or faculty member becomes a member of Zipcar they receive a 'Zipcar credit card'. This card locks and unlocks the car electronically. Each car has a gas credit card in the glove compartment. The driver uses the gas card to refuel the Zipcar.
- *How to use:* Once a member you can sign online to reserve your desired time of use. The car *must* be returned by the end of the time allotted. Once finished using the car the member returns the car to the designated parking spot on campus and places the keys in the center console. Once out of the car you use your 'credit card' to lock the doors then just walk away.

Zipcar is ready to provide their service to the University of Richmond. This program will help the Richmond community stay on the cutting edge of environmental issues while providing safe, reliable transportation. Zipcar can provide relief associated with parking problems that have plagued the University of Richmond community for too long. Zipcar is an investment in our students and the environment and is crucial step in becoming a leading university in the fight against global climate change.

Collegian Articles and Captain Planet

What is it?

Having a weekly article published in the Collegian is a new way to increase environmental and climate change awareness here on campus; this initiative consists of a "green box," implemented as a "Captain Planet" section, on the Features page and a weekly opinion column. The opinion column's topics vary within environmental issues addressed, but maintain the goal of starting a campus-wide discussion. Captain Planet's purpose is to inform students – it will provide fast facts about the environment and ways to make a difference.

Why Richmond should do it

The Collegian is a resource that has not yet been fully tapped by our campus' environmental community and although the weekly opinion column and Captain Planet section are already in place, the process should continue (refer to Appendices F and G for these submissions). By establishing a weekly column and quick-facts sections, our campus is able to learn about environmental issues and simple ways to change behaviors every time the Collegian is published. The Collegian is a medium for dialogue and sparking discussions about current environmental issues is a worthwhile endeavor.

How it will work at Richmond

After talking with the current Collegian editor, Megan Wilson, who "really want[s] to make this happen", our task is simple: keep writing. The senior seminar has already honed this relationship with the Collegian through our submission of the Captain Planet and opinion pieces. Two students, Carly Vendegna and Nadia Bukach, will continue submitting pieces to the Collegian over the summer and throughout next year and will be responsible for finding new students to take on the columns in upcoming years. Their job is to gather information or articles from the Richmond community to be submitted for either Captain Planet or the environmental opinion column. Clubs, students, and teachers will be able to contact them about different programs, speakers, or events which can be discussed or advertised in the Collegian. The entire Richmond community, specifically the Environmental Studies and Science departments should be encouraged to contribute and support both of these Collegian sections. Teachers who can be contacted for advice or suggestions are Dr. Chris Stevenson (cstevens@richmond.edu), Dr. Steve

Nash (snash@richmond.edu), Dr. David Kitchen (dkitchen@richmond.edu), and Dr. David Salisbury (dsalisbu@richmond.edu).

Captain Planet submissions must be sent to collegianarticles@richmond.edu by Sunday night. The environmental opinion piece must be submitted by Monday night (also to collegianarticles@richmond.edu). The Editor mentioned publishing a Collegian over the summer for incoming students; the continuing students will be responsible for submitting pieces for this edition as well.

Collegian contact: Megan Wilson: megan.wilson@richmond.edu
Submission contacts: Carly Vendegna: carly.vendegna@richmond.edu; Nadia Bukach: nadia.bukach@richmond.edu

Biking on Campus

What is it?

A biking program would allow for increased bike access around campus. Similar programs have been instituted at Duke, UNC, and University of Colorado at Boulder, which have all experienced success. Duke and UNC have provided better bike facilities, such as on-campus bike pumps and bike shops or work rooms. Colorado has increased the quantity and quality of paths to and from campus for the off-campus riders. Other schools have taken measures to reduce their carbon footprint by giving students a better biking option, and the University of Richmond can also.

Why Richmond should do it

The University of Richmond will benefit on a variety of levels from the introduction of a communal bike system and programs that follows. Other universities, both within our region and nationally, have implemented successful bike programs. Better bike infrastructure does reduce campus traffic, but success is contingent upon the university's action.

The benefits of the bike program include reduced emissions from student transportation on campus and increased pedestrian access around campus. One university with a bike riding programs saw a reduction of on-campus traffic by 13% in one year (UBC). The bike programs and their improvements will also allow for better handicap access to buildings and routes around campus. The narrow walk ways have, in some cases, compromised access. Without adequate facilities, a biking program would not do well at our university.

The survey conducted by the University of Richmond's Environmental Studies Class of 2007 in the Spring of 2007 suggested ridership will increase if biking amenities improve. Of the 15% of students who ride bikes, 82% said they will increase ridership if the conditions improve. The survey cites the largest obstacles are too few bike racks and inadequate/congested trails. Two-thirds of the 85% who do not ride, own a bike but do not have one on campus. They believe storage space is inadequate and inconvenient to use. Based on the 2007 survey, the best improvements to the bike facilities would be more storage space, racks and better trails. Please see Appendix H for an excerpt from this report.

How it will work at Richmond

Increased ridership on campus will have two parts. First bike availability must be increased. Many students travel from out-of-state to study at the university. Packing a bike, a luxury on campus, will not be a necessity for studying at the university. If bike availability on campus increased, the need to bring a bike wouldn't exist. Improvements in bike facilities are the second component. Without a good bike program and adequate facilities in place, the added bikes would go to waste. Poor bike facilities would further discourage the new riders from starting the practice and inhibit the creation of the bike culture we desire.

There are two departments in charge of purchases such as bike racks on campus. Recreation and The Wellness department can purchase racks and provide a bike work rooms. This department will be able to provide storage space at the Weinstein Center, Intramural Fields and other recreation venues on campus. Other student organizations, such as the student government, body can make these larger purchases as well. The Richmond College Student Government Association also has the ability to increase bike facilities such as bike racks, and has done so in the past.[26]

The bike paths and walk paths will be widened if bikes are to get around campus easily. The appropriate department to contact for more information on sidewalk widening would be the facilities department.

Facilities: http://oncampus.richmond.edu/administration/facilities/

Student Government:

Richmond: http://www.student.richmond.edu/~rcsga/

Westhampton: http://www.student.richmond.edu/~wcga/

Recreation and Wellness: http://oncampus.richmond.edu/student/affairs/recwell/

[26] RCSGA Agenda: September 13, 2006

Climate Courses

What is it?

Climate neutrality courses are classroom-based courses that raise awareness of environmental issues. These courses are based on the instructor's willingness to devote a day or even a week to environmental issues. The initiative is not a semester-long course on environmental problems but rather one or two classes devoted to talking about local or global environmental issues. The potential for a wide array of teachers to participate expands the program beyond students in scientific fields of study. Professors in the Jepson School of Leadership, Robins School of Business and other disciplines can be canvassed for their inclusion. Cornell University has started such a program and is widely popular amongst the professors[27]. The engaging nature of a pertinent issue stimulates students to think critically about an issue outside of their particular expertise.

Why Richmond should do it

Critical thinking is the heart of a liberal arts education. While all disciplines at the University of Richmond have critical thinking at their core, not all have the opportunity to focus on one of the more pressing issues of current and future generations. A climate course may only last for a single day, but it still has the potential for a lasting impact. Exposing students to an issue not typically studied in their majors may open doors for future study.

When the voluntary program is overwhelmingly successful, an opportunity for permanent courses outside of science majors becomes a very real possibility. One goal would be the creation of a 'Sustainable Business' degree from the Robins School of Business, already ranking in the top twenty of undergraduate business schools. Such a program could be a first for any one of the top twenty schools. This exciting new possibility can potentially propel the University of Richmond's business school into the top ten.

Climate courses parallel the direction our campus is taking in light of President Ayers signing the Presidents Climate Commitment. Climate change is a topic that can be integrated into almost any discipline due to the global, interdisciplinary, and critical nature of the topic. When President Ayers signed the document, he made a commitment not only to become carbon neutral,

[27] http://www.news.cornell.edu/stories/Oct07/sust.courses.aj.html

but to further the education of Richmond students about climate change. The implementation of these courses would make the University better able to achieve the goals outlined in the PCC.

How it will work at Richmond

The program requires faculty involvement. Professors can volunteer to devote some of their class time to talking about the issue. Teachers who volunteer can create their own 'curriculum,' devoting as much or as little time as they wish to the issue. At the end of the allotted time, each professor would assess the sessions. Students could be surveyed, in a similar fashion to the end-of-semester course evaluations, to see if the program is a worthwhile venture. Course implementation is an inexpensive way of improving the knowledge of environmental issues to students who would have otherwise never studied such a topic.

In the University of Richmond environmental survey, students were asked if they "Would be interested in reading an environmental book in Core?" The overwhelming majority of students (84%) thought it would be a good idea to implement an environmental Core book. It is clear students at the University of Richmond want to learn about global climate issues and voluntary climate classes throughout different disciplines would be a great gauge to how students will respond. If a sustainability coordinator was hired, part of their job could be teaching a one day course within the varied topics of the University curriculum. This would be an exciting way for this person to understand the educational approach here at Richmond.

Green Hoops Basketball Tournament

What is it?

A Green Hoops basketball tournament can be hosted to raise awareness of global warming issues and also collect funding to be donated to an organization that helps fight against this environmental issue. It is a three-on-three tournament for which teams register and are placed into different brackets. There can be co-ed or single-gender teams and various pools as well (such as competitive and noncompetitive).

Why Richmond should do it

The University of Richmond should organize this program because it will raise awareness about global warming and climate change issues around campus through hosting a fun event. In addition, the proceeds from the tournament can be donated to an organization or company that can help with this global issue.

How it will work at Richmond

To get started, Marti Tomlin is the Special Events Manager who would be willing to help students reserve the basketball courts in the Weinstein Center or the courts on the Intramural Fields (depending on whether they wanted an indoor or outdoor event). She would also be able to help set up sound technology so music can be played and microphones could be used. Although organizations can formally reserve either set of courts online by paying a rental fee, Marti suggests directly contacting her to lower the costs of the event—she might even be able to have the rental fee withdrawn. In order for the event to be catered, Nora Trimmer will have to be contacted about food being provided.

As for advertising the event, there are several options. Sending out a Spiderbyte (our schools electronic announcement program) would be a great way to spread the word. Also, reserving a table in the Tyler Haynes Commons for a week and a half before the event is necessary in order for teams to register and pay dues. While sitting at the table, student volunteers can ask their peers walking by, who do not plan on participating in the tournament, to donate to the cause. Making a banner to hang in the Commons as well as writing out chalk messages on the sidewalks in the Forum are other ways to advertise. In order to sit at a table,

hang a banner, and write out chalk messages, you must reserve these spaces at the Student Activities Desk as they have specific schedules for all three.

Another component students could incorporate into the Green Hoops tournament is setting up a raffle by asking local organizations (like Ukrops, Moe's, local restaurants, Kings Dominion etc.) to donate gift certificates as prizes. Then, when students register, they can buy raffle tickets and encourage their friends to donate with the chance of winning great prizes.

This event should be open to the entire campus community (student body, faculty, and staff) but perhaps the Greek system could be incorporated as well by contacting the Panhellenic and Inter-Fraternity Councils about encouraging both fraternities and sororities to participate in the tournament. This could greatly increase participation as these organizations enjoy getting involved with competitive campus-wide events. Additionally, this type of competition could be implemented across sports, from ultimate Frisbee to soccer and so on.

Perhaps the most important part of putting on this event is finding volunteers to help organize it. Willing organizers should email Dr. Stevenson, chair of the Environmental Studies program, as well as RENEW and Sierra Club to see if any of their members would be willing to help. In order to be successful, this tournament needs people to help sit at the table and encourage others to register for teams, to visit with other clubs and organizations to advertise the event, to be there on the day of the tournament to help set up and clean up everything, to organize teams, and to keep time and score of the games.

Campus Resource Monitoring System

What is it?

A Campus Resource Monitoring System would display real-time feedback of electricity and water consumption in dormitories and apartments. A similar system has been installed at Oberlin College.[28] Oberlin, in collaboration with the U.S. Department of Energy's National Renewable Energy Laboratory and Lucid Design Group, have made this successful technology available for other schools. The goal of this system is to translate building performance data so that it is accessible and engaging to a non-technical audience. This is done via touch-screen kiosks, interactive websites, and web-enabled devices. Twenty-four hours a day, seven days a week, students, faculty, staff, and anyone else who may be passing through have instant access to interpretable presentations of animated graphs and gauges and time-lapse photography showing the amount of resources consumed.

Why Richmond should do it

The University of Richmond is adorned with flat screen televisions in our dining hall, our recreation facilities, and many other locations on campus. These displays establish our school as being on the "cutting-edge" and serve to benefit both current and potential students. Interactive touch-screen kiosks will not only fit in among the rest of the Richmond décor, they will provide feedback on our ecological performance, increase awareness, and motivate change and forward thinking. If the University of Richmond wants to take significant steps forward on our initiatives, it is imperative that we have this type of feedback to facilitate a more sustainable relationship between members of the University and their environment.

According to research done at Oberlin College, U.S. citizens spend more than 90% of their lives in buildings. Buildings account for two-thirds of the electricity used in the U.S. and 36% of US greenhouse gases.[29] Electricity contributes to a broad range of environmental and health problems including climate change, lung ailments, mercury poisoning, and acid deposition. Water consumption from buildings causes ground and surface water depletion and pollution and habitat destruction.[30] If the University of Richmond wants to create a more sustainable campus, it is imperative that we improve the environmental performance of our

[28] http://www.oberlin.edu/dormenergy/
[29] http://www.oberlin.edu/dormenergy/news.htm
[30] Ibid

buildings. If the kiosks were dispersed among the most frequented buildings on campus, the easily interpretable real-time feedback could motivate students, faculty, and ultimately staff to change their behavior.

How it will work at Richmond

The monitors acquire data from environmental sensors that measure everything from energy consumption to CO_2 levels to dissolved oxygen levels in wastewater and then wire the data back to computers. Dataloggers collect and process the raw data wired from the sensors before being sent to a PC server for analysis and display on the web. The three dataloggers used are made by Campbell Scientific, Inc., model name CR-10x—standard devices in scientific research communities. The dataloggers upload data once every minute to the PC server via campus-wide ethernet. From here, the information is put into a database were the information is calculated into sensible values. The original version of this software was written by Oberlin students, but has since been rewritten.

Eco-Cottage/Eco-Village

What is it?

An Eco-Cottage/Eco-Village can be any student housing complex operating with as close to zero emissions as possible. At Furman University, a cabin has been built and fitted with energy-saving devices, including electricity-generating solar panels and low-impact faucets and toilets.[31] Insulation and energy-efficient doors and windows have also been installed. Currently, eight students live in the cabin with a pledge to live a more environmentally friendly life by recycling, cutting energy consumption and limiting water use. These students also have agreed to use only recycled paper products and keep a running record of their energy usage and lifestyle changes.

Similarly, Berea College has recently built an Eco-Village with rigorous performance goals which include reducing energy use by 75%, reducing per capita water use by 75%, on-site treatment of sewage and wastewater, and recycling, reusing or composting at least 50% of waste.[32] The Eco-Village incorporates a wide range of "green design" elements including passive solar heating, photovoltaic panels and wind-powered electrical generators. On-site treatment of waste is accomplished through the use of a machine which converts sewage to better quality water, and through a composting toilet. Roof-top capture of rainwater contributes to landscape irrigation and production of fruits and vegetables in the adjacent garden.

Why Richmond should do it

The University of Richmond is committed to sustainable design with all new buildings receiving some level of LEED certification. The addition of a housing complex like the Eco-Cottage or Eco-Village would be an extraordinary step for the University of Richmond to take in the movement to cut our carbon footprint as well as a great way for students to take an active role in learning and living "green". This unique opportunity would challenge students to cut their energy use while providing the entire campus with insight into the challenges and unparalleled experience of truly sustainable living. Having an Eco-Cottage or Eco-Village on campus would generate a new body of student leaders as flag bearers for the University's commitment to our

[31] http://www.furman.edu/if/oct00/green.htm
[32] www.berea.edu/sens/ecovillage/

environment. A student run and faculty advised “green” house/village would put Richmond at the forefront of environmental leadership in the Mid-Atlantic region

How it will work at Richmond

This initiative must begin with a high level of student and faculty support. Students must push the administration to create this type of housing and faculty must be willing to oversee the project. Secondly, the housing department and university building administration must also be willing to support this unique housing design. Most likely, specialized designers with knowledge of how to build such a cottage/village will need to be hired. Also, the initial costs will be much higher than the typical building type on the university’s campus. However, over time the Eco-Cottage/Village will pay for itself with the reduction in energy costs. When completed, this project will leave a legacy for all students on campus. Students will be challenged to cut current uses of energy, water, etc. to create a more environmentally conscious campus, especially for those who have the opportunity to live in the Eco-Cottage(s).

Electric Lawn Mowers

What is it?

Electric lawn mowers are an environmentally conscious alternative to the traditional gas powered mower. The "*Electric Ox*", an electric tractor mower made by the Electric Tractor Company,[33] uses about 2.0 kWh per hour of mowing while a traditional tractor mower uses about one gallon of gasoline per hour of mowing. The *Electric Ox* is quiet and emissions free as it uses an individual motor/gearbox on each drive wheel and an electronic differential. The *Ox* can be completely recharged for less than the price of a cup of coffee with virtually no regular maintenance and minimal operating costs. A multi-purpose vehicle, the *Ox* can mow, tow, grade and throw snow. With a "Quick-Attach" system the operator can change jobs without switching machines as attachments can be changed in less than two minutes. In addition, this vehicle has an optional AC Inverter allowing the *Ox* to become a portable AC power supply which will provide power for the use of electric tools in remote areas. The *Electric Ox* would be the perfect addition to any college or university campus attempting to reduce emissions.[34]

Why Richmond should do it

The University of Richmond would significantly benefit from the incorporation of the *Electric Ox* into the fleet of maintenance vehicles. Mowing for an hour with the *Ox* releases about three pounds of CO_2 into the atmosphere, whereas mowing with a traditional mower for an hour releases about twenty-two pounds of CO_2 into the atmosphere. The *Electric Ox* can help decrease emissions from lawn mowers which would cut our carbon footprint significantly over the course of one year. Following the lead of Tufts University who purchased the *Ox* in 2004, Richmond could replace old mowers and other maintenance vehicles in disrepair with the *Ox* in an attempt to meet the goals of the PCC.

How it will work at Richmond

Implementation is extremely simple. When the University of Richmond facilities manager considers purchasing new lawn mowers and maintenance vehicles, he/she should

[33] http://www.electrictractor.com/
[34] http://www.tufts.edu/tie/tci/Lawnmowers.htm

choose the *Electric Ox*. Once implemented, the mowers should completely replace most gas powered maintenance vehicles, cutting emissions for years to come.

Carbon Offset Investment

What is it?

Students receive an annual investment document with the choice to donate to a carbon offset program. Money received will go directly to Carbonfund's national carbon offset initiatives.[35] Carbonfund.org is a verified non-profit organization involved in renewable energy (wind, solar, methane) purchases, reforestation, and energy efficiency projects.

Why Richmond should do it

The University of Maryland created a similar proposal to purchase clean energy through a "green tax."[36] A student proposal to charge a small fee for clean energy investment received 91% student body support in 2007. The "tax" increases $2 annually beginning at $4 in 2008 and increasing to a maximum of $12 by 2012. This investment would raise enough money to purchase 137,000 Megawatts hours of clean electricity per year.

The University of Richmond's investment in clean energy through donation to Carbonfund.org's offset programs will have significant impact and benefit in the state of Virginia. Carbonfund.org is currently funding seven renewable energy programs/projects, three energy efficiency programs/projects, and two reforestation efforts with support from over 600 partners worldwide. For example, Carbonfund.org purchases and retires certified carbon credits and renewable energy certificates. Pollution is significantly impacted and clean energy cost decreases. The goal is to pull the cost of renewable resources below coal and begin a transition to a nation succeeding on clean energy.

How it will work at Richmond

There are two approaches to the implementation of a carbon offset investment. A campus vote could be held to create a mandatory annual donation similar to the University of Maryland; or a document could be distributed in which the recipient may choose an amount to donate. In both scenarios, the Bursar's Office and other offices would have to be involved to complete the investment process. A vote should follow other visible initiatives on campus (both institution and student led) to gain support among the student body.

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[35] http://www.carbonfund.org/
[36] http://www.greencampus.harvard.edu/CERtoon/about.php

Energy Star Shopping

What Is It?

Energy Star is a label developed by the EPA and Department of Energy to mark energy efficient products. When a company manufactures a product that meets these standards of energy efficiency, the product receives an Energy Star label. This does not mean the product is more expensive, it just means it is more efficient. Some examples of products are: computers, printers, scanners, light bulbs, lamps, cordless phones, clock radios, audio systems, refrigerators, televisions, VCR and DVD players. The University of Richmond could relay this information to first year students the summer before they begin so that they can shop energy smart for their new dorm room. These products can be found anywhere from Best Buy to Wal-Mart and it does not require much effort to make the decision to purchase them.

Why Richmond should do it

According to Tulane University, if students shop energy smart, annual greenhouse gas emissions could be decreased by millions of pounds.[37] In the University of Richmond's quest for climate neutrality and to honor President Ayer's signing of the PCC, this initiative could have a significant impact on our goal.

This initiative requires very few resources on behalf of the university. It would be low risk and could produce extremely high rewards. This is one of the few initiatives that would not place a significant burden on the resources of the University of Richmond.

This initiative would further serve to raise student awareness of how their lifestyle affects them and their environment. By shopping energy smart for college, students can make a direct difference in their climate footprint by reducing their contribution to greenhouse gas emissions. Simultaneously, they will be assisting the University of Richmond in reducing theirs. Furthermore, students can learn at a young age how to save on energy bills when they live on their own.

[37] http://green.tulane.edu/energysmart/EnergySmart.html

How it will work at Richmond

This is a one-step deal. The University of Richmond will send out a letter to each of the accepted incoming freshmen a few months prior to the start to the semester. This letter will inform students of the University of Richmond's climate initiative, educate them on how they can mitigate their impact on the environment while simultaneously saving money on energy bills, and will encourage them to shop for Energy Star products. Students will then use an Energy Star product store locator and shop energy smart for their new dorm room.

Conclusion

The urgency of addressing climate change cannot be stressed enough. The results of our survey show University of Richmond students are overwhelmingly concerned about global climate change and strongly believe the University should be taking further action to reduce greenhouse gas emissions. President Ayers demonstrated similar goals by signing the Presidents Climate Commitment and emphasizing environmental stewardship in his inaugural address. With all parties in agreement on the importance of this issue, now the University as a whole must unite to meet the challenges of climate change with a variety of strategic programs, initiatives, and curriculum changes.

To truly be leaders on this issue, we need to incorporate understanding of climate change and sustainability into our academic fabric. Colleges and universities are in a unique position to have an exponentially positive impact by educating creative leaders knowledgeable of the complexities of climate change, proficient in critical analysis of a wide range of issues and able to communicate effectively to promote sustainable practices and policies. The sustainable initiatives we recommend here address the student body and the institution as whole. This holistic approach therefore requires interdisciplinary collaboration across all five schools if we are to address climate change and sustainability in sufficient depth and breadth. However, our core target, will be the undergraduate student body given their youth, talent, and wide ranging future. Our liberal arts foundation provides the perfect opportunity to address the climate change challenge through interdisciplinary education with an emphasis on leadership and communication.

With the recommended changes in curriculum, and others created along the way, the University of Richmond will become a leader in training global leaders and citizens with the awareness and skills to positively address climate change and move toward a sustainable future.

In addition to changes to the undergraduate curriculum, we must spark a university wide cultural change among the administration, faculty, staff, and students. Environmental awareness cannot be passive, but must incorporate environmental responsibility in our individual actions and the ways in which we interact with the world. Behavioral changes introduced at the University will impact students throughout their lives and will allow them to lead by example in choosing responsible actions. Creating an inclusive culture change will take a collaborative effort among the various actors at the University. A combination of top-down and bottom-up initiatives

will create a greater sense of investment in and ownership of institutional change by all members of the University community. For example, in undertaking this particular endeavor, the eleven students critically analyzed climate change, communicated across disciplines, took risks outside of our comfort level, engaged in a variety of tasks, and trusted each other. As a result, we all felt energized and motivated to create a successful final product to inspire meaningful change. If all students and faculty at the University felt similarly invested, the promises of the Presidents Climate Commitment could soon become reality.

In order to reach this goal, we surveyed our student body and analyzed how best to effect change at the University of Richmond. The recommendations included in this document contain implementation guides specifically tailored to the University of Richmond's infrastructure and organization. Given our investment in this project we also began parallel initiatives to galvanize change. However, our research, preliminary actions, and understanding of the complexity of the task ahead lead us to the necessary conclusion that this University needs an enthusiastic and talented individual dedicated to seeing these programs through and the oversight of the climate change commitment. Therefore, we strongly recommend the school immediately hire a full time Sustainability Coordinator, as many of the environmentally successful schools have already done. A Sustainability Coordinator will provide the constant connectedness, initiative, and knowledge necessary for making substantial changes on this campus. This is a full time job reporting directly to the President given the coordinator must design and inspire the necessary culture change by which students become mindful of the earth around them and their place on it. Additionally, as the University begins to implement changes by way of the programs recommended here and others, it may become necessary to create other new faculty and staff positions, particularly to implement the suggested academic curriculum changes. For example, a faculty member could be hired to integrate the analysis of climate change into Core, and to work with all faculties on how to introduce this global issue into their course, if only for a day. The addition of sustainably directed members to the community will bring energy to climate change initiatives and could exponentially enhance the efforts already made toward a more sustainable campus.

While considering the decisions in front of us, it is important to look to the future. At a university, change requires patience and may only come to fruition five, ten, or even twenty

years after their original implementations. We, as a University, cannot afford to not make climate change and sustainability central to our decisions today.

At this unprecedented time in history, we are faced with the opportunity to rise to this global challenge. The risk of inaction is too high; every moment we wait, we lose an opportunity to lead. Climate change may be a large and complex issue, but we are equipped with the resources and skills to work toward carbon neutrality and, ultimately, sustainability. As an educational institution, the University of Richmond is in a position to create the leadership and understanding necessary to overcome the climate challenge and create a more just and equitable world. This task is both momentous and exciting. We look forward to seeing the University of Richmond seize this opportunity to lead us and others towards a better future.

Appendix A

Survey Results

Question 2:
Global climate change is a:

	Proportion	Number
Major threat and needs to be addressed now	0.605	182
Moderate threat to humans and ecosystems	0.229	69
Potential future threat to humans and ecosystems	0.143	43
Phenomenon that does not threaten humans or ecosystems	0.01	3
A theory made up by environmentalists to gain power	0.013	4
Totals	1	301

Question 3:
Global climate change is:

	Proportion	Number
Already impacting humans and ecosystems and will have dramatic effects on the Earth in the next century	0.814	245
Not having current impacts on humans and ecosystems but will affect these systems in the near future	0.13	39
Not currently impacting humans and ecosystems but has the potential to do so on a small scale	0.033	10
Not going to have any serious impact on humans and ecosystems	0.017	5
Not happening presently, nor will it happen in the future	0.007	2
Totals	1.001	301

Question 4:
Which of the following are consequences of global climate change?

	Proportion	Number
Sea level rise	0.794	239
Intensification of drought	0.771	232
Intensification of flooding	0.764	230
Intensification of storms	0.724	218
Ice caps melting	0.957	288
Hole in the ozone layer	0.684	206
Changes in the salt content of the ocean	0.585	176
Longer, more intense summers	0.714	215
Shorter winters	0.648	195
Regional differences in temperature change	0.748	225

Question 5:
Has climate change been addressed in your classes at UR?

		Proportion	Number
Yes		0.598	180
No		0.402	121
	Totals	1	301

Which ones?

Question 6:
"Current global climate change is occurring due to human activity."

		Proportion	Number
Strongly agree		0.359	108
Agree		0.468	141
Feel neutral		0.103	31
Disagree		0.053	16
Strongly disagree		0.017	5
	Totals	1	301

Question 7:
Rank these activities in terms of their contribution to climate change:

	1	2	3	4	5	6	Average Rating
Automobile emissions	106	58	49	30	13	11	4.68
Burning natural gas	22	59	60	60	49	18	3.59
Coal-fired power plants	60	58	56	52	32	11	4.11
Deforestation	36	58	54	62	41	20	3.73
Modern agricultural products	15	21	25	38	91	84	2.46
Nuclear power plants	33	17	28	29	43	124	2.53

**25 People skipped this question, per the directions in the question above, stating “If you disagree, please skip the following question.”

Question 8:
What are you most concerned with?

	1	2	3	4	5	6	7	8	Average Rating
War	69	39	54	38	33	28	19	21	5.36
Recession	45	36	47	24	33	44	35	37	4.6
Climate change	44	55	28	43	49	33	31	18	4.97
Nuclear proliferation	11	23	21	29	46	46	51	74	3.38
Health care	56	45	44	43	29	30	32	22	5.1
Limited supply of fossil fuels	32	34	44	46	40	31	42	32	4.51
Species extinction	19	24	26	29	27	52	49	75	3.51
Spread of disease epidemic	25	45	37	49	44	37	42	22	4.57

**Given are the actual numbers. The average rating is important as a representation of the whole campus.

Question 9:
Has President Ayers signed the Presidential Climate Commitment?

		Proportion	Number
Yes		0.641	193
No		0.007	2
Unsure		0.352	106
	Totals	1	301

Question 10:
Do you think the University should be taking further action to reduce its greenhouse gas emissions?

		Proportion	Number
Yes		0.718	216
No		0.063	19
Undecided		0.219	66
	Totals	1	301

Question 11:
How much electricity do you consume compared to other UR students?

		Proportion	Number
Much less than average		0.063	19
Less than average		0.355	107
Average		0.505	152
More than average		0.07	21
Much more than average		0.007	2
	Totals	1	301

Question 12:
How much gasoline do you consume compared to other UR students?

		Proportion	Number
Much less than average		0.329	99
Less than average		0.262	79
Average		0.236	71
More than average		0.163	49
Much more than average		0.01	3
	Totals	1	301

Question 13:
How many of each of the following items do you have at school?

	Total	Average
Desktop Computer	12	0.039867
Laptop Computer	287	0.953488
Television	239	0.79402
Stereo	87	0.289037
Refrigerator not supplied by UR	326	1.083056
Printer	204	0.677741
Car	214	0.710963
Microwave	203	0.674419
Light bulbs	532	1.767442

**Totals are the total number owned by the 301 people that took the survey. Average is per person.

Question 14:
If you use a car on campus, how often do you use it?

		Proportion	Number
I do not have a car on campus		0.379	114
0-1 days a week		0.146	44
2-3 days a week		0.243	73
4-5 days a week		0.113	34
6-7 days a week		0.12	36
	Totals	1	301

Question 15:
If you use a car, where do you drive off campus?

		Proportion	Number
I do not have a car on campus		0.372	112
Downtown Richmond		0.286	86
Carytown		0.412	124
Shopping malls		0.432	130
Ukrops/CVS on Three Chopt		0.561	169
	Totals	1	301

Other:

Question 16:
How many times do you drive to the following locations a week?

	I do not have a car	Almost never	1 time	2-3 times	4-5 times	6-7 times
Class	113	147	12	15	7	7
Gym	116	135	13	17	16	4
Dining Hall	115	127	32	19	4	4
Library	116	140	23	13	7	2
C-Lot	116	161	8	8	4	4

**These add to 301 across the rows. For ex, 147/301 people almost never drive to class

Question 17:
What mode of transportation do you usually use to go home?

		Proportion	Number
Personal vehicle		0.452	136
Carpool		0.143	43
Bus		0.01	3
Train		0.07	21
Plane		0.326	98
Other		0.062	14
	Totals	1	301

Question 18:
Do you consider the environmental impact of burning gasoline when you drive?

		Proportion	Number
Always		0.083	25
Most of the time		0.223	67
Sometimes		0.342	103
Not usually		0.239	72
Never		0.113	34
	Totals	1	301

Question 19:
At what temperature do you set your thermostat (degrees F) for the following operations?

	Heating	A/C
Above 75	14	23
74-75	36	23
71-73	106	61
68-70	94	107
65-67	40	69
Below 65	15	30
Turn off	44	43

Question 20:
Do you consider the environmental impact of energy consumption when setting your thermostat?

		Proportion	Number
Always		0.066	20
Most of the time		0.173	52
Sometimes		0.302	91
Not usually		0.309	93
Never		0.15	45
	Totals	1	301

Question 21:
When you leave your residence for breaks, do you:

	Never	Not usually	Sometimes	Most of the time	Always
Turn off the lights	2	1	5	22	271
Turn off your computer or put it to sleep	5	9	11	31	245
Turn off your TV	2	1	1	7	290
Turn off your stereo	2	0	1	6	291
Unplug major appliances	63	66	51	33	88

**These add to 301 across the rows

Question 22:
Do you consider the environmental impact of your electricity use?

	Proportion	Number
Always	0.08	24
Most of the time	0.332	100
Sometimes	0.379	114
Not usually	0.166	50
Never	0.043	13
Totals	1	301

Question 23:
If you could access information about your residence hall or apartment's energy usage online (updated hourly or daily), how often would you view it?

	Proportion	Number
Frequently	0.146	44
Occasionally	0.488	147
Once or twice	0.262	79
Never	0.07	21
Not sure	0.033	10
Totals	0.999	301

Question 24:
Which incentive would give you the strongest motivation to reduce your electricity consumption?

	Proportion	Number
Prizes awarded to residence halls and apartments that use the least electricity	0.435	131
Posters or flyers reminding you to turn off and unplug your appliances	0.09	27
Online information about your energy use in your residence hall or apartment	0.14	42
Publicly displayed comparisons of the energy use of residence halls and apartments	0.233	70
Signing a pledge to turn off lights and appliances when not in use	0.037	11
Nothing	0.066	20
Totals	1.001	301

Other:

Question 25:
Which of the following programs would most motivate you to drive on campus less frequently?

	Proportion	Number
A campus shuttle for men and women that runs all day long	0.419	126
A campus shuttle for men that is equivalent to the shuttle for women	0.04	12
A community bike program with bikes around campus for student use. The program has designated pick up and drop off locations.	0.302	91
More expensive parking tickets	0.01	3
Nothing	0.229	69
Totals	1	301

Other:

Question 26:
Which one of the following would most motivate you to drive your car less frequently off campus?

	Proportion	Number
More frequent university shuttles	0.14	42
University shuttles that go to more locations	0.12	36
A ride board system to find carpools for breaks and weekends	0.047	14
Better public transportation	0.219	66
Free bus passes and more awareness of bus schedules/routes	0.206	62
Access to bicycles and a map of good bike routes around Richmond	0.047	14
Nothing	0.223	67
Totals	1.002	301

Other:

Question 27:
If you could do Core over again, would you be interested in reading a book about human interactions with the environment?

		Proportion	Number
Yes		0.724	218
No		0.276	83
	Totals	1	301

Question 28:
Do you wish relevant environmental issues had been a part of First Year orientation?

		Proportion	Number
Yes		0.322	97
No		0.359	108
Yes, in place of something else		0.319	96
	Totals	1	301

Question 29:
Would you be interested in reading about relevant environmental issues in a Collegian column?

		Proportion	Number
Yes		0.811	244
No		0.189	57
	Totals	1	301

Question 30:
Gender

		Proportion	Number
Male		0.296	89
Female		0.704	212
	Totals	1	301

Question 31:
Year

		Proportion	Number
First Year		0.269	81
Sophomore		0.236	71
Junior		0.223	67
Senior		0.272	82
	Totals	1	301

Question 32:
Where do you live?

		Proportion	Number
UR Residence Hall		0.694	209
UR University Forest Apartments		0.236	71
Off campus		0.07	21
	Totals	1	301

Question 33:
What is your major?

	Proportion	Number
Art	0.03	9
Biology	0.086	26
Business	0.246	74
Chemistry	0.047	14
Computer Science	0.013	4
English	0.056	17
Environmental Studies	0.04	12
Foreign Language	0.143	43
Geography	0.01	3
History	0.073	22
International Studies	0.13	39
Leadership	0.08	24
Music	0.027	8
Math	0.05	15
Physics	0.023	7
Psychology	0.073	22
Political Science	0.113	34
Sociology	0.04	12
Theater	0.013	4
Urban Practice and Policy	0.01	3
Other	0.183	55

**Choose all that apply, so no totals

Question 34:
Are you a member of an environmental organization on campus?

	Proportion	Number
Yes	0.083	25
No	0.917	276
Totals	1	301

Appendix B

Survey Responses

Question 2. Global climate change is a:

1. I think it global warming is causing a change because I've heard of things like glaciers melting in oceans because of global warming. Averages temperatures are also rising I think. It is a threat because eventually the earth will be too hot for normal living conditions. The sun will be too powerful and UV radiation will not be filtered by the deteriorating ozone layer. The threat means that resources and humans will not be able to survive anymore.
2. The polar ice caps are melting, which can cause significant and unpredictable changes tothe ecosystem and affect humans all over the world
3. the body and environment aims for homeostasis or balance when this balance is compromised we should feel threatened
4. Climate change can drastically alter the way organisms adapt to the conditions of their environment.
5. Our climate is changing at an alarmingly rapid (on a geological timeframe) rate, and it because of damage humans have done to the enviroment. Rising sealevels, changing weather, and a number of other results makes gloal climate change a topic that needs to be adressed now.
6. Climate change is a threat to humans and ecosystems because the drastic change weather patterns can greatly affect the stability of ecosystems and can result in a loss of biodiversity. It can also be argued that natural disasters like Hurricane Katrina are and will be results of climate change.
7. It is changing the world around us into something new, there must have been a reason why the world was once a certain temperature so we should try to keep it that way.
8. The melting of the ice caps may flood the earth.
9. Climate change is a threat to humans and ecosystems because some small changes in the environment can lead to dire consequences to the entire ecosytem.
10. possibility of melting ice caps, ozone layer diminishing, more severe weather is partly because of climate changes b/c of humans
11. Climate change contributes to agriculture and migration of animal food sources.
12. climate change is a threat because it affects sea level and humidity and changes the species suitable for survival for each ecosystem.
13. It makes ecosystems more vulnerable to drastic changes in their environments, which leads to a loss of biodiversity. Global climate change could negatively affect the carrying capacity of our planet.
14. Climate change affects the ability of animals to survive and the maintainability of human infrastructure.
15. Climate Change is not a threat to humans or ecosystems because it is a cyclical change that is part of Earth's processes. We have been moving in and out of ice ages. We are currently moving out of an ice age.
16. I don't know if it's real or not, but it could be, so it is a potential threat.

17. Climate change can be a threat if we do not adapt to the changes. But, modeling of future temperatures and weather patterns is so uncertain that I feel we cannot accurately ascertain changes nor account for catastrophic or chaotic events that could result in the modeling becoming obsolete. If we use the modeling as a guide and explore other futures we should be more prepared for what may actually occur.
18. its going to change our accustomed living by seasons, and animal habitats, changing the basic structure of entire ecosystems.
19. the changes in temp & water levels are already affecting the enviroment in negitive ways many auto immune diseases among others are thought to be linked to the increase in pollution
20. Everything humans do negatively affects our environment.
21. It will greatly disrupt the natural balance of all organisms on this earth, and it is not the cause of any natural phenomenon, but man-made which is completely unprecedented in the history of our planet.
22. A natural phenomena that has been occurring for billions of years. Recent changes may be attributable to human causes but the effects of human life is likely minor.
23. saltwater intrusion - as sea levels rise, salt invades our fresh water, changing ecosystems and in turn affecting all levels of the food chain more co2 is being trapped in our atmosphere, warming the earth and forming a sort of blocking layer between humans and the sun, thus preventing the bad rays from bouncing back out of our atmosphere after they enter, reflect off the ice / water and try to bounce out -- the earth warms, climates change, and consequently areas change where we can farm, coastal cities are in greater danger of flooding, and sensitive organisms may be at great risk of dying (changing our whole food chain)
25. It is creating many changes, albeit slowly, to our environment and world today. Look at the drying up of the Aral Sea or the increasingly mild winters. These are not coincidences and are very majorly changing the world we live in.
26. It affects water, air, and atmospheric purity which endangers humans, animals, and beauty.
27. Its a threat generally because it will disturb the dynamic of the planet, in effect changing many systems which will have dire impacts.
28. It changes the cycles for animals of when they can reproduce, hibernate, store food, etc. Ultimately, anything that greatly effects animals will effect humans. Plus, it changes the level of rainfall and precipation to various regions all over the world.
29. "Scientists" can't even predict local weather patterns with much accuracy.
30. Climate changes are both natural and caused by man. Humans should have the goal of limiting their affects on the climate.
31. Human societies are built and organized according to the environment and climate they are located in. Dramatic changes could make entire cities obsolete or economically impotent.
32. Global climate change has the potential to cause melting at the polar icecaps, which could raise sea level high enough to flood major cities, increase ocean temperature enough to disrupt deep sea currents that circulate nutrients, and ultimately lead to the extinction of animals that depend on colder temperatures in their environment.

33. The basic functionality of living systems is very temperature dependent and the fact that within roughly 150 years of industrialization global climate is already changing indicates the immediate need for environmentally friendly practices.
34. because it affects our everyday life, and if we don't do something about it soon, something (i.e. nature) will do it for us
35. While it will re-shape the distribution of habitats and ecosystems, humans will simply re-locate and the environment will adapt. It will be a pain, but not the end of everything; after all, there have been several mass extinctions but life is still here.
36. skin cancer, food chains
37. Global climate change is a certainty, whether or not it is a threat is a complicated question.
38. The evidence is all around us and is ruining our ecosystems more every day.
39. global warming is causing drastic changes on our planet
40. It is a threat more towards ecosystems than humans because we are able to adapt faster than an ecosystem is able to evolve.
41. WE are seeing the effects of climate changes with the natural disaster that's taking place.
42. because it is changing our ecosystem, which affects all forms of life (including humans)
43. because it is real and it will change the weather patterns and coast lines drastically
44. Changing temperatures mess up the balance of things. The polar ice caps could melt and change the temperature/nature of the ocean which will kill marine life. A change in the ocean can destroy coastal towns, etc.
45. The world’s climate has always been changing and humans have had to adapt to those changes in order to survive. With such an emphasis today on the human’s ability to control, I think people have the common misconception that they are above the environment. We need to adapt willingly.
46. After last year being one of the coldest in a long time, teamed with the new lawsuit from the weather channel's founder against Al Gore and his global warming team of scientists and the exposure of their incorrectly using data I am not convinced that global warming can be directly tied to carbon dioxide as they state. It would appear to me after reading many sources on the information, that the earth is doing a much better job protecting itself than these people would like you to believe. I believe in protecting the environment but I feel like the green movement has become hip and we have lost track of the actual causes in a trend. I am interested to see what becomes of this new court case and what the comparison of data will tell us as to how much of a threat global warming is.
47. Because it changes the environment that humans live in and changes ecosystems that other animals live in and that we derive certain resources essential to life from
48. Ecosystems develop within a mostly unchanging environment so any change to that environment will undoubtedly result in a change in the balance between the ecosystem and its environment.
49. Because as the climate changes, all life-sustaining mechanisms will eventually change, threatening life as we know it.

50. We have not yet come to know the full effects of climate change, but from what have learned from the IPCC and the world's scientific community, we know that much damage could be done if we choose not to act.

51. Its a matter of resource allocation among countries that have already begun to fight with each other for access. If the situation is not addressed immediately global conflicts will continue to worsen and affect the current generations, not just future ones. Ecosystems will suffer severely under the current conditions and will become unsustainable in the near future if global climate change is ignored, and the change in those systems will have a major impact on the lives of human beings everywhere.

52. It is a threat because it could permanently alter the fragile environmental balance on Earth.

53. We are between ice ages, so some climate change is natural, but I think human activities are exacerbating that change. Climate change is something that should concern us because it has an effect on things such as our physical health or our economy.

54. It will change the balance of ecosystems, causing weather changes and damage.

55. atmospheric CO2 levels are already higher than ever in earth's history, leading to unhealthy ice melting in both poles, disappearance of glaciers around the world, stronger storms, bigger floods, more intense droughts, and changes in ecosystems.

56. Human society is not prepared for the effects of global climate change.

57. My knowledge is a little patchy. I know some ecosystems are already being affected by rising temperatures - penguins driven out of traditional breeding grounds, etc - which, at a guess, will lead to a fair few extinctions. I understand that if temperatures rise too much, the ocean currents will start to shift and make a lot more ecosystems go haywire. As for human beings - a huge percentage of the population lives close to sea level. If the ocean starts to rise, lots of people will be flooded out.

58. Changing any aspect of the world will affect everything else.

59. Habitats are changing, animals nor people can survive it. (floods etc)

60. It causes melting of ice caps which leads to flooding of the earth/deterioration of land.

61. As the climate increases glaciers melt, eliminating the habitat for many animals such a polar bears. The water levels rise and threaten the homes of people and the habitats of animals.

62. While global warming is a threat to ecosystems, it is unclear how much of an impact rising global temperature will have. Teh most extreme consequences of global warming would be the melting of the ice caps, leading to rising sea levels, extreme weather patterns, and possibly of disrupting the Gulf Stream. Warmer global temperatures could also cause health problems for many species including humans due to increased bacterial and viral growth.

63. because it is causing animals to adapt to environmental changes too quickly and it is causing them to die off...if this continues in the future it will be a huge problem

If temperatures rise or fall in a specific ecosystem it may affect the life of organizms in that area, for example if ocean temp. raises, certain fih would not be able to tolerate the change and would die, in turn affecting the entire food web and ecosystem. Some ecosystems will become wetter and some will be drier this could upset current species populations. Warm temp. can influence pollution and possibility of contracting infectious diseases may increase. People will be more strongly impacted if they are less technologically inclined and depend more on the

64. environment.

It is a threat because it means that our many species will suffer including polar bears

65. and humans.

66. Ozone layer depletion

it is a major threat because it has an impact on the survival of humanity. Ice caps are melting causing a rise in sea levels, this has an impact on shorelines and cities. Also there is the crisis of species loss due to temperature change; species' habits are changing causing them to die. This has implications on ecosystems and their ability

67. to survive and support life.

Global temperatures and climate change are part of a natural cycle by the earth to

68. cleanse itself.

Climate change, whether people believe it is caused by humans or not, is affecting the way the species (including humans!) are living. Land is being submerged in water and people are being forced to relocate, icecaps are melting leaving the polar bear population in ruins, and the climate is becoming so varied that many delicate species (both plant and animal) are having a very difficult time adjusting and are

69. dying out.

As we progress into a highly developed society, constant changes in technology

70. create immediate threats to the environment.

A single species being affected by global warming (which I assume is the specific type of global climate change you are referring to) can throw off an entire ecosystem. Meanwhile, signficant climate change can change the agricultural and foresteral properties of areas entirely, in addition to affecting animal (hunting) populations, thus affecting humans sigficantly. It already is, certainly, a threat that

71. needs to be addressed, but I would not say it is yet critical.

It is clear that our actions have an impact on the environment, but I am skeptical of

72. the degree to which it is emphasized in our culture today.

Global warming poses various threats such as increased disease and ocean level rising. Ecosystems with species unable to adjust to large changes in temperature will lose those species, undermining biodiversity and threatening the health of the

73. ecosystem and the world as a whole.

Our resources are being used up, life is being killed off, the environment is

74. disappearing and we continue to drain the world of its natural products

Global climate change effects the entire planet. What we do in America will effect humans across the entire earth. If we continue upon the path which we have embarked, many species of animals will go extint, and we jepordize our natural

75. resourses.

Climate change is a threat to humans and society, and while our behaviors have impacted its severity, I believe that it is part of the natural cyclical process and that there is little that we can do to change that. However, I am well aware of the need to
76. recycle and improve our care of the environment.
The things we do now will impact the environment for perpetuity. Once we realize
77. the significance of the problem it will probably be too late to do anything about it.
Because it throws the tenuous ecological balance out of whack at a faster pace than most organisms can adapt. Even human technology and political structures are a
78. little behind in terms of their ability to cope.
79. every species is effected, every species is a reason.
I think the science of Global Climate change has not convinced me that there is anything we can do to stop it. I believe the earth is in a warming cycle that we cannot stop. However, I believe strongly that we need to conserve and treat our
80. environment with respect.
the question is not whether its a threat to present ecosystems (it is.). rather let us ask
81. if it is a natural process or a result of the human race.
82. Because it affects the climates temperature.
Changes in weather patterns could affect agriculture. If global warming melts more ice caps, certain coastal regions could face the threat of flooding or complete
83. destruction.
84. Look at the weather
Although I believe we have much more to learn, we have to assess the threat potential. Climate change has the potential to fundamentally alter our way of life so
85. its important we address it.
86. There are so many other threats to humans that climate change may not be relevant.
87. i cant see it
88. global warming
because if we dont do something now in 50 years we will be fighting wars over
89. water.
90. Global Warming is real
Global climate change can disrupt the established balances in ecosystems. These
91. imbalances can lead to the damaging of food chains of which humans are involved.
It can change the natural habitats of certain animals (polar bears, for example), and
92. cause pollution.
Threatening the future of life on earth because of changes in temperature affect
93. organisms and the melting of the ice caps can cause flooding.
I think that Climate Change is a very important threat, but that it is unfortunately taking away attention from what I feel is the real issue- that we are polluting the environment- not just the atmosphere and using it with an unsustainable philosophy. I feel that people think that as long as they off-set their carbon emissions, they can do whatever they like. Thus, I feel that the most important environmental issue is a
94. change in our approach to nature overall.

We will most likely kill ourselves before any threat of our current lifestyles affects everyday lives. It's survival of the fittest. If other animals do not evolve to the mental capacity as Human Sapiens Sapiens, then they lose the battle regardless. In a nuclear winter, all will perish except incests such as cock roaches. Ergo, does it even matter if we try to increase our current living standards. All the green movement is doing is creating another societal movement that will be looked back in history classes 50

95. years from now as a movement that did not succeed/change the course of the future.
Because it is endangering species, will overflood low land territories, and is causing

96. extreme weather that is a danger for people and animals.
Climate change significantly affects the wellbeing of all life which walks upon it. The destruction, extinction, or high death rate of any plant or animal due to change in climate could subsequently alter the food chain and codependence of animals and

97. their ecosystems.
The quality of the environment is gradually creating problems for its inhabitants and

98. has been statistically proven.
It will create a new population of refugees displaced by climate change, and alter

99. ecosystems in negative ways.
First, it depends upon how much you mean by "change". Obviously depending upon this level of change the problems become different. It could mean the potential death of organisms. On some level though, it's pushed too hard as a political motivation (like how Al Gore invented the internet) and I think it could be more effectively dealt with if lobbyests didn't act like they're saints and everybody else is in with the

100. devil for not wanting to spend the EXTRA money to drive a hybrid.
Increased greenhouse gases in the atmosphere causes numerous warming affects and

101. may have disastrous consequences if allowed to go unchecked.
Humans are causing devastation to the environment and therefore the climate and ecosystems. We continue to avoid addressing solutions because we are unwilling to

102. make the necessary changes.
It's causing major changes to the Earth's climate, which is negatively affecting the

103. health of many plants and animals on this planet.
drastic changes in temperature interfere with the ecosystems that animal make their habitats. Climate changes can eventually submerse our coastal cities, changing the

104. way we carry on with life.
Because it is cyclical and caused mostly by the earth. The damage is minimal and

105. not anything we can fix at a reasonable price.
everything on the earth is being killed by the increase in climate and overtime no

106. resources will be available.
Global warming is a fact, but only backed by data collected the last 100 years (at most). It could be part of a natural global cycle, and we have just not observed this cycle before. However, there is an unprecedented amount of global carbon

107. monoxide, and we must acknowledge this as a threat to the planet.

Climate change is a huge threat because humans and animals are used to living within a certain temperature range. So if that range changes our lifestyle would have to change or our lives could be threatened if it got extremely cold or hot. A prime example are the glaciers that are melting because of the climate change which in turn effects another myriad of things, like water levels and even animals. When climate begins to change, an animal's home can be destroyed and then they are left homeless and begin the process of extinction. Therefore it is a huge threat. The reason I picked a moderate threat is because it isn't affecting me directly so climate change seems
108. kind of distant. When it begins to hit closer to home, I will consider it a bigger issue.
Well, from what I understand, the climate changes, like becoming too warm, and then an ecosystem changes (like a tree doesn't produce the same amount of nutrients as before, and then an animal doesn't get all the nutrients it needs, and at some point
109. this lack of nutrients reaches humans.)
110. changes in weather patterns affects the oceans which in turn affects all life on earth
The threat is moderate at this time as shown by increasing drought and worsening natural disasters. It needs to be addressed now, however, so that it will not become a
111. major threat that is has the potential to be.
Global climate change could result in cataclysmic changes in our environment that
112. may be irreversible.
It could drastically change weather patterns and increase water levels around the
113. world.
The world's temperature is rising and more and more animals are losing their
114. habitats, including humans.
Global warming means that the polar ice caps melt, resulting in a raised sea level that changes the area of land covered in water, disrupting ecosystems and in turn affecting humans and their use of resources. Climate change changes the land and water that are used for growing certain crops or extracting resources. Along with the
115. change in ecosystems, food supplies and economies can change completely as well.
If one cares about sustaining the planet for future generations it is very clear that the threat of global warming needs to be addressed to avoid extinction. It may not be a significant threat to current generations, but it must be recognized that future
116. generations will suffer if nothing is done.
It is a large threat, but there is still speculation as to what can be attributed to a
117. natural change in climate and what is caused by civilization.
118. Animals extinct, affects human migration, strain of social and economic resources
119. seriously?
120. Glaciers are melting, flooding, etc.
121. Global climate change could destroy many ecosystems in the world.
122. Change in weather patterns, melting of ice, affects temp. sensitive organisms.
I believe that is a natural cycle of the earth's climate that is just being accelerated by humans. To think that we have such an impact on the earth that we are the sole cause
123. of such a change is extremely self-centered.
Because it is a naturally occuring phenomenon that has occured in the past and humankind and ecosystems have survived multiple periods of changes in earth's
124. climate.

125. it kills ecosystems
It is a threat because it is melting the ice caps and causing extreme weather
126. conditions.
Climate change will affect the way we live because it will erode ecosystems that humans have been functioning in for thousands of years. Climate change will raise water levels across the globe and alter weather patterns to the point that the way we live, grow crops and function as a society will have to adapt to the new geography of
127. the world.
If the climate changes, especially on a global scale, then plants and animals cannot survive in the same way that they had before due to changes in water availability,
128. temperature, possible geographical alterations (ex. sand spread) etc.
129. Putting stuff into the air does not seem like a good thing
changes happening now cannot easily be reversed ... we need to prevent further
130. damage before it is too late
Global climate change has contributed to more severe weather patterns, such as
131. hurricanes and tsunamis, which threaten millions of people.
No matter how urgent it is something should be done soon to ensure we don't
132. destroy the planet before we figure out a way to get off it.
I think that the world goes through hot and cold periods and we are in a warmer period right now. Because of global warming, we are speeding up this cycle. I think global warming is a problem that needs to be addressed now so that it can be managed better in the future. Although I see no immediate threats posed to my
133. generation, there is the potential for serious threat to generations to come.
It will change entire ecosystems and environments which will endanger many species as well as humans. It will erode the beaches and change our world. However, I've heard that apparently 50 years ago the world thought we were about to enter a new ice age, I'm not entirely convinced that its not just a momentary peak in a
134. varying environment.
The continued raising temperatures are changing our worlds landscape and harming those who are not responsible. Potato growers in rural countries have to go to higher altitudes to grow their crop just because the of this change. Changing all of the
135. ecosystems will mean global changes the world is not ready to deal with.
The damages takes so many years to fix, we need to start now, not when they reach
137. catastrophic proportions.
138. We're abusing our resources on this planet - it won't last forever.
Climate change is an incredibly stupid term. There has been climate change at every moment throughout history. In addition to that, the way humans affect the climate is very ambiguous, and especially the way humans could resolve or influence this process is unknown. Frankly, I don't like any of the multiple choice answers, because I do not believe that environmentalists necessarily want to gain politial power (their concern is genuine, but not based on facts). I would like to see the option: we don not have the sufficient knowledge to make judgments on climate
139. change
140. Small mistakes now, make huge impacts in the future
It is a fast change that the environment and humans cannot react to in a fast enough
141. way

142. Climate change is certainly a relevant issue, but I think it is slightly overemphasized and blown out of proportion but zealous environmentalists.
143. Because there are increasing amount of vehicles and pollutions endangering the air composition.
144. Not real, liberal propaganda. Remember global cooling a few decades ago? rofl
145. Climate change is causing changes in temperature cuasing droughts and famine in many parts of the world. It also causes an increase in bad storms like Katrina.
146. Everyone is affected by the changes to the climate weather they or positive or negative. Due to the recent negatives affects on the global climate, it is our duty to address the problem now.
147. I believe that we are on the brink of the moderate threat becoming severe. If we can take action now, and people in other countries do so as well, we can make a difference and reduce our chances of running into major problems in the future.
148. The Earth is warming which could cause flooding of major cities, extreme weather events, lower variation in temperature from day to night, and many others.
149. There are clear examples of global warming affecting ecosystems, but direct "catastrophic" effects on human are much more speculative.
150. i studied the activity of specific glaciers in alaska for a research paper last semester and i was appalled at how much the environment has changed in the past few years. not just in alaska, but everywhere, energy is becoming a real problem, and america is at the heart of it.

Question 3. Global climate change is:

1. I think it is a problem because animals and humans will not be able to evolve fast enough to adapt to the new, higher temperatures.
2. there is record awkward weather occuring and some ills that occur that we not the cause of may be a result of this climate change which in essence is a threat to desired homeostasis
3. CLimate change is not a problem that will go away by itself. Action must be taken towards preserving the environment.
4. Look at the island of Togo. People are already having to move because the ocean is rising above their low-lying island. Polar bears are running out of habitat. All over, results are happening now.
5. Climate change is a pressing problem because it threatens the security of ecosystems and the human population. It is also pressing because our pollution and dependence on fossil fuels exacerbate the problem, so in order to relieve the threat of global warming, we must find more renewable sources of energy and alter our current habits.
6. I do not know of specifics but I feel that what we do everyday is constantly destorying part of the ecosystems.
7. Climate change is a pressing problem because CO2 emissions have increased every year and along with it, the years are getting hotter and hotter. The polar icecaps are melting and in years to come, the polar bears will become extinct and the world maybe submersed underwater.
8. It's a pressing problem, is a danger to living organisms on earth, not just humans

9. The glaciers melted and the sea level increased somewhat and affected coastal residents.
10. It is already affecting animal populations in the arctic and antarctic (ex: drowning polar bears) and is affecting the tropical rainforests, making them more vulnerable to destruction.
11. Warming of the ocean is affecting coral reefs, thus affecting all life related to the reefs.
12. Its natural
13. Since it's a potential threat, I don't know what the future holds. It is quite possible that it will be harmful in the future.
14. Global climate change can be a pressing problem if we do not adapt to new climate patterns. Access to water and growing food would be affected by a dramatic climate change, but a slow cilmate change may allow humans and ecosystems enough time to adapt to new environmental requirements.
15. drought is already a problem in many areas the ice caps are melting at an increased rate endangering costal areas in some places there is speculation that earlier warming trends are already having impact on mating & migration patterns of many bird species
16. We can already see the effects of increased storm systems, and especially of glacial melt which is disrupting the habitats and migratory patterns of many organisms.
17. It is a largely natural and unavoidable issue.
18. because of human activities (production of co2, mostly), the amount of co2 in our atmosphere is increasing much more rapidly than it ever has before - there is no sign that it will stabilize, and there is no sign that we as humans will cut down our co2 use. we may be able to prevent some of the effects of global warming, but it will very hard to reverse them once they occur...
19. Earth resources are not infinite and climate change contributes to making earth's life shorter.
20. Slight changes in weather patterns, the dying off of certain species, lack of water in parts of the world and the melting of the glaciers are aspects of climate change that are in effect now, and the list will continue to grow in the near future.
21. It is getting worse everyday.
22. It might be, nobody knows enough to make it a top priority. And nobody knows really how much humans affect it. But researchers don't receieve grants unless they jump on the "global warming" bandwagon.
23. Because there is a significant lag effect of human actions on climate change. Therefore even the most environmentally sound actions taken today will not have an effect until several or many years from now, severe environmental and human damage could be felt during the lag period.
24. Pieces of the ice caps have already melted and global average temperatures are already increasing. Polar bears have drowned by being stranded away from land on melting ice.
25. The impact of greenhouse gas emissions, CFCs, etc. will only increase as their use is continuted, and by the time more serious effects are observed they will most likely be irreversible.

The re-shaping of the coasts and future droughts will have social and political consequences that will be addressed best in the presence of planning made
26. beforehand.
27. skin cancer
Responses not well worded- Only options are that it is already impacting us and will have a DRAMATIC effect, or that it is not influencing us, period. I say that yes, it is impacting us but will not have a DRAMATIC effect in the next century. Attempted to skip answering this question but the computer/surveymonkey would not allow it.
28. Please disregard the answer I was forced to put.
29. The changes are evidently detrimental.
30. Globe is warming which is a big fear for the future.
The loss of some ecosystems will affect others and this snowball effect will cause
31. humans to be affected as well.
32. Glaciers in antartica are already melting.
33. because it is already changing our ecosystem
34. the ice shelf is melting
Climate change has caused many natural disasters that have forced people to relocate
35. their lives and lose everything they have.
It is not as pressing as we think. People are taking small environmental issues and assigning the cause global warming without transparent, and complete proof. Simply because weather patterns are changing and some environments have been diminishing does not necessarily mean what it is assigned. I think more research is needed to identify the causes without doubt before one can answer this question
36. about the pressing nature.
Because of the changes it will and already has begun to cause, which will force us to
37. change our ways
It may or may not be a pressing problem, but there is no question that the general rising temperature has already had a noticeable effect on certain ecosystems, though
38. not humans to any considerable effect.
Climate change is very gradual, and the changes are hardly noticeable because they are so slight from year to year. In the long run, these changes are more dramatic and
39. will affect the way the world functions.
40. because we see the affects even now!
Some island states are already experiencing rising sea levels and stronger hurricanes
41. like Katrina threaten cities in all coastal areas.
The war in Iraq, genocide in Darfur, famine across Africa, Hurricane Katrina and the recent tsunami are just a handful of events that have happened in the past couple of years that have ben related to shifts in the global climate. How much worse does it
42. need to be get before we take action?
43. Climate change is happening now and permanent damage may already be present.
44. see previous answer
in our lifetime, we may likely see the north pole completely melt, changing/halting the ocean currents and raising sea levels significantly. this would at the very least
45. displace millions of people world wide
46. Human society is not prepared for the effects of global climate change.

47. Again, limited knowledge. But I know it's already going on, it's going to be hard to stop as is, and a lot of the consequences are pretty dire.
48. It's happening right now. For example, low-lying islands in Oceania are disappearing due to sea levels rising.
49. The issue of climate change has not received enough attention it is already affecting us in subtle and not so subtle ways. Climate change is causing increasing wildfires, water shortage from melting ice caps, and increases in tree killing insects.
50. Weather systems become more unpredictable and extreme, resulting in storms such as Katrina or the recent tsunami.
51. It is a pressing problem because the consequences are unknown and oculd be devistating to life on earth
52. because it is something that will affect every future generation forever once it is done
53. Climate change is a pressing problem because we are already experiencing effects in the weather and in glacier regions. The ocean levels can potentially rise destroying major cities and populations.
54. Drastic changes in weather
55. see previous answer; ice caps melting, species dying, water sources drying up, famine, ozone layer depletion
56. It is a problem that in reality humans have an insignificant contribution towards.
57. Climate change is a pressing problem because many of its effects are irreversible or will take many many years to reverse.
58. There have already been small changes resultant from global warming. However I would not say there inevitably will be dramatic effects in the next century as the answer I chose is worded; it certainly is possible but I don't believe it to be inevitable. Note that I'm interpreting "global climate change" as global warming; global climate change would happen regardless of humans, if possibly more slowly.
59. Sea level is already rising, glaciers are melting...the damage is already done in some ways.
60. (see above)
61. If the polar ice caps continue to melt, areas like New Orleans will be under greater threat. The ecosystem is delicate, and we must stop releasing harmful greenhouse gasses. Each year, the Sahara Dessert increases by 5 kilometers (I think?... I just read a text on Darfur, and part of the problem is increasing drought b/c of this phenomenon).
62. People tend to drown when the seas rise, and starve when the deserts get larger, and fight over water when due to changing weather patterns the water isn't necessarily where it used to be
63. melting ice caps, extinct species, rising temperatures
64. its a pressing issue only if we discover that it is humans causing the change.
65. Weather!
66. because its too damn hot
67. You would have to be ignorant to say that it is not happening now
68. Temperatures in many areas are historically higher than normal, and global warming has also caused more weather problems, like hurricane katrina

69. See above.
see above- it is affecting us, but the way in which it is is even worse for the other
70. abuse the environment has already suffered.
Climate change is beneficial to all, but not a necessity. Obviously eliminating the current gas consumption will benefit the air and what not, but it there is nothing that can be done immediately. The sale of oil is too profitable and OPEC controls too much of the economy. In my lifetime, I highly doubt that there will be a serious change in the entirety of the globe that will cut down on a reasonable consumption
71. of gas/oil.
72. Because it impacts species and humans around the world.
73. It is dangerous and has the potential to hurt us and our earth.
74. things die, coastlines change from the melting of icecaps
75. The damage won't greatly effect this generation, but will effect future generations.
Humans are dumping so much carbon dioxide into the atmosphere that if they don't
76. stop, the problem will only snowball and get worse in the (near) future.
There are already small islands being put underwater by the rising sea levels due to
77. global warming and this is just a precursor to the effects just around the corner.
78. species have already become endangered and extinct due to global climate change
it is a pressing problem because as animals we depend on a balance of the ecosystem
79. to exist
80. Reasons explained above. Humans can survive all over the earth.
Like I said, it is a pressing problem because it threatens lifestyles, homes, and
81. existence.
Some creatures are already exhibiting problems, like in South America I think. Some species of spiders or lizards or something is dying out right now because of climate
82. change.
it will create droughts and floods in different regions and this change will have a
83. major impact on food production
Melting polar caps are changing the water level of the ocean impacting ocean life.
Changes in temperatures contribute to climate change which destroys its livability to
84. non-human animals and plants.
There have been hurricanes in South America, polar caps are melting, and increased
85. heat strokes in American cities.
86. could have. not will have.
87. Because we are not doing anything to stop it.
88. we may have to experience its effects within our lifetime.
Ecosystems are being destroyed at an unprecedented rate and nothing can adapt as
89. fast as it needs to.
Although the majority of people probably don't see the affects now, if action is not taken now to stop its progression, the global climate change will be very serious and
90. possibly irreparable.
It is causing extinction among some species of animals, polar ice shelves to melt, increased exposure to harmful solar rays, and similar imbalances in our fragile
91. ecosystem.
It is pressing because we can not turn back and change what we have "messed up."
92. We can only stop where we are now.

Just look at how the Mid-Atlantic states no longer have winter seasons with snow
93. and blizzards.... It's still fall-like weather until JANUARY which is unusual
94. Resources will run out/ dry up/ flood. Reasons below.
Because it is inevitable and will not be more serious than any other natural
95. environmental occurances that already occur or have occured in the past.
96. its already changing ecosystems with melting glaciars and changing temperature
97. It is happening now and the more the climate changes, the bigger a problem.
98. The same reason I mentioned above.
melting icecaps, rising water levels, changing temperatures effect plant and animal populations, ecosystems, crop growth, human ability to survive the heat of summer
99. and cold of winter, especially for the ill, elderly, childre, etc.
100. Same as above.
I think this is a result of global climate change, but the Sahara desert is spreading across Africa and is causing a lot of people to relocate, not to mention the wildlife
101. issue.
Events like Hurricane Katrina and the tsunamis were definitely influenced by the
102. changing global climate and these events may continue to occur.
The warmer temperatures are melting the ice caps and causing weather changes that
103. will severely impair the areas it is affecting.
uo, what he said and the fact that the titantic sank.....meaning we can t be talking about the people there like that....yo shut up, you shut up....but the moral of the story is that climate change is a problem...and then we take survey's...amnd thus life is complete. i mean, i care about penguins and polar bears and shit....but at the same
104. time diesel fuel and librarians are pretty fucking sick too,
105. See above.
106. There is no denying that the climate is changing already.
107. No evidence.
108. Different species are having to adapt to the changes in their environment
109. The earth is heating up.
110. It isn’t real
Climate change is causing desertification of many places especially in Africa. The
111. changes in the environment is causing millions of people to starve.
Climate change is a pressing problem because it affects our ecosystem which affects
112. how we live.
I live in Florida, and I can personally relate to the recent intensification of the normal hurricane seasons. Climate change is impacting us now - but the dramatic effects have yet to set in. This may explain why so many people can still claim to be
113. ignorant of the growing problem.
114. It will change our ways of living.
This question does not really fit with the above multiple choice question. Just because climate change impacts humans, even with dramatic effects, does not necessarily mean it is a problem. I am still unsure of how pressing a problem global climate change is, although I believe it will have strong impacts on Earth in the near
115. future.

Question 10. Do you think the University should be taking further action to reduce its greenhouse gas emissions?

1. Sure. The more reduction the better!
2. help the environment in ther university taking such action more indiviruals will follow and the individuals can get others to follow as well
3. Stop using the sprinklers so much in the spring and fall. The way the sprinklers are set up, much water is sprayed onto the pavement, which is a waste of a water and energy.
4. get rid of the coal plant behind the commons
5. Take Political action
6. I think we should do whatever we can. I would need more info about what we're already doing before I knew what actions we should take.
7. The University should be taking further action to reduce its greenhouse gas emissions because it will serve as a good example to the community and it will decrease our negative impact on the environment. Although I know it may not be economically feasible, the best way to reduce this school's greenhouse gas emissions would be to get rid of the coal power plant and replace it with a renewable source of energy.
8. Use less paper, turn off lights when no one in building.
9. hand dryers rather than paper towels, windows that are able to open in classroom, more solar power dependance
10. more green buildings
11. Athletes should not be riding around on golfcarts if they are able to walk. There should be more recycling bins around campus. Handouts from classes should all be online as to not waste paper.
12. Make more buildings like Dhall and Weinstein 'green certified'
13. Educate students more and give them an incentive to take action.
14. I am unaware of how our current greenhouse gass emissions ranks with other institutions.
15. We should all be constantly aware of our effect on the environment and should strive to reduce that effect in any way possible. The University could do any number of things, including investment in solar energy, reduction of waste, etc., to reduce its greenhouse gas emissions.
16. Yes, any action is better than no action, but I'm not exactly sure what should be done.
17. Being environmentally conscious is important. We sholud have a recycle bin for cans and bottles next to every garbage can.
18. I don't know our present state or how much more we could do.
19. If the University is capable of further action to reduce greenhouse gas emissions it should do so. Encouraging community support with education, events and by example.
20. Use only environmentally friendly light bulbs, keep natural lighting in mind when constructing dorms and classrooms, energy-efficient laundry, provide more recycling bins and make them more convenient in dorms!!, collaborate with Sierra Club and other environmental groups on campus.
21. Everyone can do something more than they already are. Specifics, I don't know.

universities are often forerunners of change & should take that position responsibily you have a population ready to learn & to who will hopefully be able to make positive changes in the future so teaching them reponsible stewardship of the planet is a must it is in everyones best interest to start making changes both as insitutions &

22. individuals
23. The food they cook, the trucks being driven...
24. Increased use of renewable energy on campus.

Greatly reduce Coal use on campus. Easier bike systems on campus. Buy more

25. locally grown foods

electricity is not greenhouse gas emissions, but while we are on the subject of the university being terrible about its environmental consciousness, we consume SO MUCH ELECTRICITY. we leave lights on everywhere - in the library, all the time, in the laundry rooms, in the hallways in the middle of the night .... so many places. i noticed that in some buildings, like weinstein, the lights will go out if nobody is in the room (like the bathroom) and go on again when someone enters. why don't we have that everywhere? and students here need serious recycling education. they don't know what is recyclable, first of all, and there are enough recycling bins, second of all, for them to use - they should be beside every trash bin. there just doesn't seem to be a huge number of students that truly care that they are throwing away plastic that will just sit underneath the earth for a million years. also, students here leave on their laptops all the time, and they leave them plugged in all night, or on sleep all night,

26. taking up so much unncessary electricity.

I believe that reducing greenhouse gas emissions is never a bad thing, but I'm not sure what sort of sacrifices I would be willing to make in order to support a greener

27. campus.

Thsi campus is horrible when it comes to habist of environmental awareness and

28. friendliness.
29. Not many people are aware of or are doing anything about this matter.

Reduce use of plastic bags, decrease the reliance of maintenance/school vehicles on oil, more efficient use of heating/AC, increased use of renewable energy like solar

30. power, etc.
31. I am unaware of the actions the University is taking right now.

Providing better access to public transportation to reduce students' use of cars, make more of an event to make the buildings "green", increase awareness, make change

32. accessible to people.

Everyone should be making efforts to reduce greenhouse gas emissions. Since the

33. University is like its own small town, we should take on this initiative also.

No, China builds a new coal factory every three days. Small cooking fires in India account for more pollution than all the factories in the US. Tuition is already high enough, we need more scholarships for smarter students, not worthless

34. environmental policies.

We have enough money to do it. I am not sure what actions to take, I will leave that

35. to the experts.
36. I don't know specifically what actions are already being taken.

Though we are a small university and our own changes may be neglible, we ought to uphold the same standards we would expect larger institutions and organizations to
37. practice.
38. this university is very wasteful...lights, food, gas
39. Getting "Green" ceritifications for all University operations.
Measures that promote sustainability would tend to improve the efficiency of the
40. university, reducing waste and maximizing the effective of its economic resources.
I'm the one paying for any action ultimately. I'm not sure whether, with tuition costs already astronomical, I want large scale projects undertaken to reduce greenhouse
41. emission that will cost a lot of money.
I think the University in general could use improvements when dealing with the environment including motion sensor lights in the hallways, turning off the lights in
42. the bathrooms, ect
Cost benfit analysis, education, if we lower our emissions it does nothing for the world, if we lower our emissions and encourage others to do the same on a global
43. scale it would help
Increased recycyling efforts, increased efforts to save energy (more auto on/off
44. lights, different bulbs, etc.)
45. I think we're doing ok as of now
46. yes, but i believe it is moving in that direction; more recycling
the school should actually recycle what we put in the recycling bins. i've observed maintenance and housekeeping dumping the contents of the recycling containers into normal trash cans way too many times. not recycling is unacceptable in the 21st
47. century.
I think we just got an email about how the dining hall just turned green, so it sounds like we're moving in the right direction. I think the university could be more efficient
48. about recycling.
49. Maybe not allow first-years to have cars and try to get more buses out here
more motion sensored lights to conserve energy. the ac seems to pump out like one
50. temperature so that seems weird too.
One could always do more, but the University has done a lot to reduce their
51. emissions. Our dining hall is only one example.
I know that Lakeside is a "green" building as well as dhall. As far as college campuses stand I think Richmond is in good standing. I think we can do better but I am not sure how we can do so. I think the university needs the help of the students and that is where they should start. Perhaps encouraging students to use less water and turn lights off when they leave housing or reduce trash. I am not sure how a program like that could be created but that should be the start. With such a small and intelligent campus it should not be too difficult to create awareness and encourage
52. student cooperation in this respect.
53. stop waisting so much energy day and night
The University needs to take action to either close or decrease the emissions from
54. the on-campus coal plant.

Coming from the Western US, the waste of the general student at school appalls me. The u needs to better educate about the effects and promote the environmentally
55. conscious behavior that is quite easy to do.
As an institution of higher education, it is our duty to educate ourselves and our community about sustainable solutions to energy consumption and to act upon that
56. information.
To be honest, I am not sure of what we are currently doing or could be doing, but I
57. feel that we could always push ourselves to do more.
58. Only build green buildings
59. don't we have a coal burning plant on campus? that can't be good
I don't know if this is greenhouse gas related, but the recycling system is confusing and not always obvious. Instead of having a bunch of different bins in random places (and people ALWAYS put the wrong things into them), why don't we have standardized wastebaskets with three compartments (metal, paper, trash), like they do in Europe? I'm also never clear if the boxes marked "drink containers" are for paper cups (like from 8:15) or metal (like coke cans) or plastic (like coke bottles) or glass... are we really supposed to put all four types of things into the same container? And in the post office the majority of bins are wastebins, even though the majority of the trash is paper trash (by the way, can you recycle paper that's been written on? What about paper with staples? Magazines? I never know for sure...) So I guess the action the University needs to take is to make it really easy and obvious for people to
60. know what to do. I want to do my part but I'm also really confused.
61. I don't know!
I'm not sure of the extent to which the University has already taken action to reduce
62. its greenhouse gas emissions.
Basically, because every little bit helps, and we're going to need it. As for how,
63. though, I don't really know.
Everyone should do their own part to help the environment, including this university. We should encourage students to recycle and turn their lights off. We should also provide more shuttle services so that students are encouraged not to
64. bring their cars onto campus.
Our campus still relies entirely on coal, there are better ways. We have a huge endowment steps should be taken to gradually change our campus from being coal
65. dependent.
66. I do not know.
The university should provide more transportation off campus by providing shuttles or bus passes so students do not have to drive themselves off-campus. Also I think the university could do a much better job of conserving energy by turning off the lights in buildings after hours since currently there ar always lights on in the dining
67. hall and the basement levels of the library even after they close.
i am not sure of what all can be done on our campus because i dont really feel like i
68. am aware what we are doing wrong or what can be uniquely changed
69. because we are in a position to make an impact due to our power and funds

70. The University has just begun to take greenhouse gas emissions into consideration by creating a green dorm and supporting programs to lower wasted electricity and water. I think the University should support more of these programs and create a stronger awareness of greenhouse gases.
71. We have a coal plant-not cool buy more locally use more recyclable materials in the pier and 8:15
72. Solar panels
73. Yes I do. As cheesy as it sounds, students are the future and teaching students how important their impact is (especially on a small campus) will hopefully equate into the same philosophy being used in the daily lives of these students after the graduate--possibly even affecting what their career will be.
74. More 'Green' buildings; less vending machines; more recycling options in residence halls
75. I am not sure of what the university's greenhouse gas emissions are, nor how efficient it is relative to other universities or what is possible. I would suspect the university could at least come up with a more environmentally friendly heating system than the current coal-powered one, though.
76. -find fuel alternatives to the coal plant -student involvement perhaps through composting, recylcing/energy use incentives, connecting to university movements throughout the country such as Recyclemania
77. There is always more to be done.
78. We should take all actions technologically possible/feasible to reduce greenhouse gas emissions.
79. I am not sure how to do this.
80. Work with GRTC to get mote students to use the bus, try to further reduce power needs of buildings. Why? Because we have a lot of money as an institution, we as a community are privileged to have what we have, and we therefore have a responsibility to be ethical consumers of the world's resources.
81. From what I am aware of, the University has already taken big strides in becoming "green"
82. Less plasma televisions. There are multiple large displays in every university building on almost 24/7, for crying out loud. It is the small things that matter.
83. improve recycling program (lodges, paper towels in bathrooms) turn off unnecessary lights and heating while students are on break
84. -Charge students for usage of electricity in forest apartments to encourage them use it wiser -Limit number of parking spots -Introduce more Environment Studies courses, field trips and on campus projects as a requirement to education
85. i'm not convinced that humans are at all the cause for global warming. having said this, i would like to breath with out inhaling carcinagens
86. Move away from steam heating of our water and move towards geothermal energy.
87. People in academia are generally more aware about issues impacting the environment and impacting life in general. Universities should set an example for other organizations, and for their students, who will likely be tomorrow's leaders. UR should enforce its recycling policies. It should also make efforts to reduce power usage.

The University should be contributing all of its resources to making the campus CO2 neutral, as Middlebury and Oberlin (along with many other schools) have already
88. done or are more actively working towards.
89. the more the better
make sure all the buildings green and use limited power. use only locally or organically grown foods in the dining halls. set up a shuttle system to take students to the ukrops shopping center and downtown that runs late because then students
90. don't have to drive their cars all time.
91. More public transportation
92. Make people more aware of ways to individually reduce
93. provide more recycling containers and make buildings more energy efficient.
As I said, I agree that climate change is a pressing environmental issue, but I feel that it is taking the spotlight away from other equally pressing issues. Recycling, or even better, a new approach to "waste" should be addressed. Landscaping at the university should be looked at- what are we doing to make all of our grass look perfect, and do we really need to? This can also be expanded into a campaign for the surrounding suburban houses- aka the ones whose fertilizers are helping to speed along the eutrophication of the lake. Wouldn't it be nice if we could actually one day
94. SWIM in that lake?
Because universities educate the next generation, and young people need to learn how to address this issue. The university should raise awareness and take steps to
95. reduce greenhouse emissions.
The University doesn't have any more or less responsibility than the next person. However, it should facilitate avenues for those who do choose to be concious of the issues to make changes in their own lives. I don't think it should be forced, for example, that I have to turn off my computer when I'm not using it so I use less
96. energy.
97. Make it easier for students to make changes.
Find a solution to the on-campus coal-fired power plant and raise student awareness
98. about conservation and recycling among many others.
99. Start using less energy.
Everyone is responsible for promoting a positive change in current habits that are causing further destruction to the Earth. The University could remind students to turn off lights when they are not needed, make recycling bins more prevalent, work
100. to recycle plastics with numbers besides 1 and 2, and reduce it's use of coal.
the University should take more measures to emphasize the need to preserve an reduce waste. Also to raise awareness of the limited amount of natural resources we consume so frequently in the country. The University should create more eco
101. friendly dorms.
The cost. Then again, we have such a huge endowment and such a rich student body that can afford to pay, it might not be so bad. Principles of good stewardship say,
102. however, not to waste money, even if you can afford to waste it.

103. I think it would be a good investment because in the future, everything will be built more eco-friendly and the University might as well start now. Plus, its not like we don't have enough money to do this so thats another huge reason. It would probably boost applications to the school because some people really appreciate when institution takes steps to help the enviroment, and it would also put us on the cutting edge. Clearly this last reason shouldn't be the sole reason, but it is definitely another factor. About reducing greenhouse gas emissions, I don't really have any knowledge on how to do it but the school should definitely try.
104. I think our new buildings are green buildings. What other policies are being considered?
105. Companies, Universities, and individuals should always take further action. More electric car parking spaces. Fellowships to professors and students researching climate change.
106. Waste of money.
107. Regardless of how much impact human activity is or is not having on the global climate, there are clear and calculable effects of pollution on both species/genetic diversity and human health.
108. Use alternative lightbulbs, make efforts to improve recycling.
109. Turning bathroom lights off at night if it's not in use, installing air dryers instead of paper towels.
110. Switch from coal power plant
111. Major institutions have the power to make a difference.
112. Use new "green house" techniques for construction projects (tactics used by Habitat for Humanity)
113. More Green buildings. Other power sources.
114. further measures are useful, but univewrsity has already made great progress with great improvements to coal plant and other systems
115. Conservation is always the best policy not only because it saves the environment but it saves money as well.
116. be efficient with electricity
117. I don't know what we have already done to reduce these emissions.
118. Limit unnecessary electricity use in campus buildings, especially in the sparsely used areas of the (old) gym
119. we are doing fine as is
120. this survey is too long. does anyone make it to the end? this doesnt answer the question, sorry.
121. I think UR has made major strides towards "going green," but some of the older buildings are not as efficient as the newer ones
122. Use less power, do things to motivate and inform the students.
123. Using less unnecessary electricity, diminishing the amount of waste we make.
124. No because greenhouse gases shouldnm't be discriminated against..its just as relevant in today's society as black or white gases..Furrthermore, who knows if president ayers is working to reduce his green house gases. I dont give a whoot what he does with is gases you know....green, black, yellow, orange. I have a dream that one day gases of all clasifications and colors will one day join together in harmony and peace

I feel like the university as a whole wastes much, even just in electricity. I believe solar panels may be a good investment, and I also would like to know if we harness hydro electric from the lake, why or why not and if so how much. I feel like we could take a more active roll on somethings, for example clearly marking recylcing bins. I am not aware of the process, but since we have specificly marked bins i assume we need specifically sorted recycling, which often gets mixed by people who dont read the labels, or by unclear labels. Many schools have mixed recycling bins, I feel we should use them, or if we already do, don't mark the cans specifically because it reduces use. My dorm has a "paper" bin, but none for cans, plastic, etc. If

125. I knew I could put anything in it, I'd use it much more.

I think there should be more student awareness about simple things - such as how much is saved by turning off the lights for a hour or saving water. Students need

126. incentives to make a change.
127. It does not harm the world to reduce. Responsible energy use is good.
128. In their buildings, they should be made to more environmentally safe
129. Again, Global Warming isn't real

The university received a horrible rating on how we treat the environment. We also use and serve to many plastic items. Everything at the pier comes in plastic. Plastic

130. is not biodegradeble and not to mention needs petroleum to make it.
131. Increase recycling

Greenhouse gases directly cause the warming of the planet and CAN be reduced easily. The University should implement a magnetic train system throughout campus so that people don't unneccesarily drive to Dhall or the Library. Solar panels on all

132. roofs.

Universities can impart knowledge to students that they will retain all their life. I think biggest thing the University should do is to teach environmental awareness across the curriculum, so that students really know what's going on. Frankly, the classroom is the only place where students listen (and many don't even listen then).

133. It's not like it'll be financially taxing -- our University has all the money it needs.

more encouragement for students to simply turn off the lights when they leave

134. would be a big help

Question 15. If you use a car, where do you drive off campus?

1. Church on Three Chopt, Volunteer on Three Chopt
2. Church, friends' houses
3. I live off campus. I commute to school every day.
4. volunteer at Boaz and Ruth once a week
5. Broad Street for restaurants/Target
6. Broad Street
7. everwhere am a commuting student
8. home, shopping elsewhere
9. I live off campus, so to my apartment
10. Kaplan Classes, volunteer projects
11. Highland Park and Horsepen Apartment-area
12. church
13. church, hair dresser

14. I live off campus
15. Volunteer location about 30 minutes away
16. home
17. Home
18. Bonner Scholars Service Sites
19. Teaching/Tutoring
20. Volunteering
21. Highland Park, Lakeside, Brandermill, Mechanicsville
22. broad street
23. Dinners out.
24. home to Connecticut for breaks
25. I live off campus and drive to school.
26. Volunteer site
27. Kroger, Dinner Dates with Alums
28. to campus from off campus housing
29. tanning salon
30. home
31. Blacksburg Va
32. home
33. Charlottesville, VA
34. I mostly use my car to drive from the appartments to the on campus bus stop.
35. Tournaments for club sports team
36. blue ridge mountains
37. Volunteer sites across the city
38. home
39. UNC to see friends and boyfriend
40. visit friends who live off campus
41. Please Note: Downtown Richmond and my Job Location are the same thing.
42. friend's houses
43. other places to eat on Grove and Broad.
44. Wal-mart, Target
45. Home (Pittsburgh)
46. Chiropractor on Patterson Ave.
47. School where I tutor
48. Friend's houses
49. Southside for doctor appointments
50. Mechanicsville 5 days a week for student teaching
51. these questions are messed up. i live off campus and use a car to get to school usually.
52. South Richmond, Chesterfield County
53. VCU
54. Fan
55. Joe's Market
56. my bitches' places
57. various friend's houses near UR
58. I live off campus

59. Robins Center for practice
60. equestrian team practice.
61. I live off-campus, drive everywhere.
62. Yoga, airport
63. target
64. off campus houses

Question 16: How many times do you drive to the following locations a week?

1. If I drive anywhere on campus, it's usually to dhall on weekends.
2. Never
3. It doesn't make sense to drive to campus locations unless its raining, and then there is not a good chance that you will find a place to park where you won't get a ticket.
4. I never drive myself to places on campus
5. have to drive live off campus & no bus route to u of r from short pump area
6. I live off campus so this is not really appropriate, unless I was supposed to say I do not have a car on campus, but that also would not be very telling -- ?
7. I only use my car to drive off-campus, never just around campus.
8. I live off campus.
9. In regard to the "how much electricity/fuel do you use compared to other UR students" question, how am I supposed to know how much electricity/fuel they use? I'm guessing I'm about average, but have no inkling of what is considered "average" or "above average" etc.
10. Only if it's very cold or rainy.
11. I make my friends drive me a lot. Bad as it is, I'd still drive a lot of places if I had one
12. The campus is so small anyone who drives to other places on campus under normal circumstances is a moron.
13. Most of the trips I make to campus I combine my activities on campus as well (I go to class, then the gym, then the library, etc.)
14. i walk everywhere on campus, except maybe once a week where i drive to work or the library because i have too much to carry
15. The only time I drive anywhere on campus is when I'm planning on leaving campus directly from wherever I'm going on campus.
16. I do, however, drive with my friends to the Dining hall and the gym sometimes.
17. I don't drive laces on campus
18. Usually only when the weather is bad if it is late, otherwise I ride my bike
19. *About the light bulb question on the previous page; I use 3 lightbulbs because I live in an appartment and we have to light the entire living room by ourselves...
20. when I lived in the dorms, I only used 1 light blub for my desk lamp.
21. It's more convenient to walk, parking is nearly impossible unless it is evening. I've only driven from R lot to the Law School once for a late night lecture.
22. I live far away
23. I always walk to places on campus unless I am coming back from somewhere off campus and want to stop somewhere.
24. I never use my car to drive to campus locations.
25. Can zero be an option? Good job...

25. Walking to the parking lot is almost as far as walking to these places, so there is no point in driving and it would just be lazy to drive and be bad for the environment.
26. I play soccer and live in Lora Robins, so we carpool to practice each day.
27. I work at the gym late at night, and as a woman i don't always feel like walking back to north through the woods. I'm pretty sure i'm using less energy than making the raper trek all the way over and back to somewhere else twice
28. I think that because campus is so small, students should not be able to use their cars other than to leave campus. It's silly to drive to the gym to work out.
29. almost never means never.
30. I usually don't drive on campus, except when I am running late for rehearsal in Modlin. (which happened a lot one week, but otherwise, doesn't happen regularly)
31. i drive on campus once a day, sometimes i go back to my house and then return. it is a total of a 5 minute drive, and the only reason it is that is because there is traffic.
32. I live off campus, so I have to drive everywhere.
33. I park in C lot behind Ryland & walk to classes all day long. I also commute with my sister, so we're carpooling.
34. I drive to and from the Robins Center.
35. These answers are misleading because I live off-campus.

Question 17: What mode of transportation do you usually use to go home?

1. I used the train freshmen and sophomore years
2. Amtrak
3. OR plan I would say its about even
4. Exchange student
5. I share one of 2 family cars with my parents
6. international student - go home by plane to europe
7. Live abroad, so no other way
8. Train to DC and then the Bus.
9. I drive the carpool. Mostly 2 other students at a time. By doing so, other services such as airplanes and buses are avoided.
10. BIcycle
11. Also carpool and train occasionally.
12. unicycle
13. hot air balloon
14. I do not live in this country

Question 18: Do you consider the environmental impact of burning gasoline when you drive?

1. Sometimes I think about all of the gas I'm using, but mostly this is related to economic reasons although I think environmental concerns have crossed my mind.
2. Sometimes I just want to get home without worrying about the environment.
3. am sad that there is no public transportion in richmond so am forced to use my car more than i like also no sidewalks in henrico am only 1.5 miles from some stores & services but as they are on main roads without sidewalks it is unsafe to walk to them 2 people i know were hit by cars there 1 biking 1 joging both died try to batch trips out to reduce car use have lived in cities with good public transport

I like to drive fast, and have a large engined car. Greenhouse gas fears will not
4. change that.
I make $12.00/hr and pay for my own tuition. I don't have time or money to consider alterations to my life style that I believe will not seriously impact the environment. But, I try to conserve power/fuel as much as I can because I was taught by my
5. parents that it's the right thing to do.
I drive a standard transmission Ford Focus, which allows me to use less gas by
6. coasting downhill - however it is not as fuel efficient for city driving.
I say sometimes because I purposely purchased a car that consumes less gas and has better emissions than most SUV's out there. That would be much higher if I drove a
7. Hummer.
I am actively waiting for an affordable hybrid or electric vehicle to hit the market so that I can reduce my impact, but I also try to ride my bike as much as possible around campus. However, I do often drop friends off who live on the other side of campus with my car, making several short round trips from the apartments to the
8. Richmond College side of campus each week.
I try to combine trips as much as possible and walk when I can so that I can be as
9. efficient as possible with my gasoline use.
10. I feel like I can't really do much about it though
11. I never drive.
Yes, but I mean, I need to get home. I live 2 hours away. Riding a plane to Harrisburg would be silly. I carpool often (take underclassmen) and at home my
12. family has a Prius).
13. I turn off my car if I'm going to be idling for more than a minute
14. Really? Why would I think about that. I'm using a convenient form of transportation.
I am aware that driving slower is reduces the amount of gas used, but unfortunately I
15. like to drive fast.
16. I hate that I drive so much, but other people rely on me to.
17. It's more like the cost of gasoline that I am considering
I have a Honda Civic, which I chose because of the status as a Low Emissions Vehicle and because it doesn't eat gas unlike some SUVs and other cars. I get 40
18. mpg highway.
I usually pray when i drive that the CO2 gods will loose against the ozone gods. i mean, im a religious person and who's to say that the co2 gods dont exist? Fuck you! I bet you think that they dont exist. Speaking of life without Co2, we probably wouldn't have crazy economies and lackluster living statuses...right. Honestly, who
19. could give that up? And for what...the possibilty of an environment or some shit..
20. Don’t care

Question 20: Do you consider the environmental impact of energy consumption when setting your thermostat?

1. Always when I am at home
feel bad re using so much heat but have arthritis & have painful joints when am too
2. cold

Unfortunately the society has such a horrible impact on the environment, it is often really hard to break from such a culture. Maybe one by one helping the environment will start a trend, but most likely it's the powerful leaders who will set the trend. (for
3. example, if walmart bans paper and plastic bags and insists on "green bags")
4. but my roommate always turns it back on when i turn it off, so it cancels out
I like my room comfortable during the day in the winter and frigid all through the
5. summer.
Though for Air Conditioning, it doesn't matter much since the University doesn't turn it on until the last couple of weeks of school. We almost always have our windows open and the thermostat turned off. The above temperatures are what I
6. would set them at if it were unbearably cold or hot with the windows open.
7. I think about my wallet.
I only use air conditioning when I am at UR. At home, my family does not have air
8. conditioning.
9. usually only set it at night
Our heating and colling system in the apartment does not work consistently and the
10. University has failed to correct the problem.
11. At home in Wisconsin, I use my thermostat much more than I do here in Virginia.
I try to keep from turning up the heat or the air as much as possible by opening windows to ventilate and wearing layers at home to warm up. I use the ceiling fan a
12. lot also to keep air flow constant and to avoid using the air conditioning.
The thermostat in our apartment DOES NOT WORK. We just have to move it up or down based on whether we want heat/cool air to come out. Otherwise, the temperature fluctuates madly. Our apartment is cold in winter and hot in summer ---
13. I don't think it's well-insulated.
We can't really set teh thermostat in our room, so we just leave it alone and opent he
14. windows a lot
My primary concern is whether it is cool enough to sleep at night. Usually it's plenty
15. warm already even in the winter so I usually don't turn the heater on at all.
16. Environmental and economical.
I don't like to use the Air Conditioning most of the time but my roommate is from a
17. northern state and loves the cold.
the thermostat in my room doesn't work correctly so sometimes its set at 90 but the
18. room is 50
19. Most of the time we can't control the temperature in the dorms.
20. We consider the cost of using the appliance.
At home we dont have airconditioning, so I am shocked to see how much they crank the airconditioning on campus (e.g. dhall!!), when there is no reason to do so and it
21. is already cold enough.
our thermostat is not accurate. neither our heating or cooling systems actually work
22. more than 20% of the time.
23. The thermostat in our room is controlled by the university
our temperature is controlled by the University. we do not have a digital thermostat
24. just a high, low and off switch.

25. Again, I live in Florida and air conditioning becomes extremely important when the average temperature during the summer is above 90 degrees.
26. i think of cost, not environmental impact

Question 21: Do you unplug your appliances?

1. I do not have a stereo or TV.
2. I don't know much about which appliances use energy while turned off but plugged in.
3. The last time we unplugged the fridge it smelled horrible afterwards because of rotten food. Otherwise I think I do fairly well at conserving power in this category.
4. Should I unplug things? We unplug our hairdryers of course, but never our TV or lamps.
5. I turn off my power strips completely.
6. I leave my fish tank plugged in
7. I unplug the things that aren't necessary to be on while I'm gone. I keep my refrigerator plugged in, but I unplug most other things.
8. We also always turn off AC and heat.

Question 22: Do you consider the environmental impact of your electricity use?

1. It doesn't seem like as much of a threat as car pollution that you can see (and smell) every day.
2. Ever since that electricity conservation contest at the UFA's last semester, we've tried harder to turn off lights when we leave the room.
3. I leave my laptop on during the day. I make myself believe that that does not use of a lot of energy... I hope I am right.
4. After studying abroad in France, I am much more conscious of turning off lights when leaving rooms

Question 23: Would you access online info about your energy use?

1. if it's made into a big deal or a competition , for example which hall uses less energy then I think I'll be more cognizant and aware of my energy use and I would make efforts all day to reduce my energy use
2. n/a; live off-campus
3. It would be interesting to see what it was, and I'd probably come back every few months when I got bored, but I wouldn't check it several times a day like Facebook.
4. If there was a prize especially.
5. I would be interested to see how much energy we use/waste. It is something residents should care about. Many of them, including my roommate, think the university pays for it all so it does not matter. They do not think about the environment at all, unfortunately.
6. I would love this!
7. If it was sent to me and I didn't have to make the effort to go find it, I'd be more likely to read it. General Comment for one of the previous questions-- the University should put the lights in the halls and in the bathrooms that turn on automatically when you come in or enter that area... that'd save more than my own personal efforts probably
8. I'd probably check it a couple times for the novelty.
9. If I had this information, I would check once or twice out of curiosity but as long as energy is free for me, I will not regularly check it.

As an RA, I'd love to see my hall's use and see we could make it a goal of our community
10. to reduce this use. Make it a competition between other halls, even!
11. Off campus

Question 24: What would motivate you to reduce electricity use?

I think the online information would also be helpful. There should be a link that is clearly visible for info on the "on campus"/"current students" page that is normally the homepage
1. for the computers in Gottwald or other on campus computers.
Let's make students pay fines for awful energy consumption - that will do it. Motivation is good but mandatory things or punishments are much more effective - and the
2. consequences make the lessons last beyond college...
I always like to win a prize, but I'm honestly not too concerned with electricity use. I turn
3. my lights of, but that's about all I'd ever do.
People need to understand the importance, prize is not sustainable motivation. Environmental culture in this University and this country at large needs to be developed
4. first.
I feel that I am conscientious about turning off lights, television, and water when not in use, and it would make me feel better that other people are also paying attention to this. The habits we have for life are developing or are already in place, so I feel it is important
5. for students to be aware of the impact of their actions.
6. I also like the posters and flyers reminding you to turn off or unplug appliances.
I'd like to reduce my energy consumption. I just don't always remember to do so. Online info I might mean to look up but not get around to, but a flyer would come to me, more or
7. less.
The use of posters and flyers would be pretty ironic considering we are trying to lesson
8. our impact on the environment.
I think it's already decently low. A by-room comparison might help reduce usage in the rooms using the most megawatts, but in the end it would probably just transfer to another room. But I don't really care if Dennis Hall or Moore Hall uses less electricity - my room is less than 2% of the total either way. Flyers might help with my roommate, though. He kind of blows at the turn-off-the-lights category. Though flyers and my example haven't succeeded at getting him to recycle. I guess some people are just too apathetic about the
9. environment to care.
10. Housing discount--using less money, more cost efficient resident
It's common sense. Give people a prize, they'll try harder. Like this survey... I hope I get
11. the 50$... also, I like Geoff, he's nice.
I think all these are great ideas, and it would be a lot of work, but they would all be effective I think. The only one I question is the prizes because people shouldn't need material incentive but I guess by encouraging people do to this it'll make it habit which would be the purpose. I would either do it every other year or every first semester to
12. maintain students' awareness.
13. Cut out the energy charge for the apartments and bill student per month.
prizes awarded to specific rooms or apartments would be better... i don't see a block of
14. apartments or a hall really working together since they probably aren't all friends

Prizes, food, etc. motivate college students. After a period of time competing for a prize, students would learn habits and once the contest was over, the habits would likely stick with them. I think it is a good way to start up an incentive to use less electricity and then
15. keep it going afterwards.
Maybe work energy uses into a housing decision....students with the least energy-efficient rooms are weighted in the lotto for numbers. Or something. Or possibly creating formal recognition, such as a graduation award or other sign for the top 10% energy efficient
16. people on campus. If that could be computed?
17. flyers explaining the true impact of electricity consumption

Question 25: What would motivate you to drive on campus less frequently?

1. bikes or scooters (not gas/battery powered)
YES!!! A community bike program would be amazing! That's what they did in the city in France where I studied abroad. Although people still might not be too inclined to do this if
2. it would mess up their hair/outfit, or if they're carrying to much stuff (books/binders).
Campus shuttle would only increase number of people choosing lazy transportation over
3. simply walking.
but the campus would have to put in some bike paths where the stairs are ... and stop
4. putting boulders where the bike-made dirt paths are
5. Only having a shuttle for women never has seemed fair to me.
6. Make campus more bike friendly! More bike racks and possible even bike lanes.
Most students live on campus. I don't see how a shuttle for students who live off campus would be efficient. Maybe a shuttle for the students who live in the apartments would be
7. good, I'm sure a lot of them drive over.
8. Flex car, can only be parked in designated spot.
I don't think that another shuttle / encouraging men or women to shuttle is the best way to
9. go about avoiding driving on campus. That just encourages burning gasoline.
10. I don't drive, so I can't drive less frequently.
11. I don't drive on campus
It doesn't take that much gas to drive to the gym. I feel most people don't use their cars around campus... I mean we can't drive to class in them (tickets). So it's just the couple times a week that I go to the gym. Oh, but also, they should put a public bus stop somewhere near the commons. The Gateway stop is a 20 min walk from my apartment, so that's why I drive to the lodges' parking lot when I have to catch the bus for my
12. internship.
13. Don't even dare raise the price of parking tickets. Some people can't afford it.
I think it's ridiculous that so many people drive on campus in general. Unless you live in
14. the apartments, it's more convenient to just walk everywhere.
15. I don't drive that often; mostly to the gym or when it is raining.
16. I don't drive on campus!!!
Tell people that walking is not harmful, but good and that fresh air is good to breathe once
17. in a while...
18. Maybe actually putting bike racks or bike trails would help too.
19. The inability to park elsewhere.

WE DEFINITELY DO NOT NEED MORE EXPENSIVE PARKIN TICKETS. THIS
20. WILL ONLY ANGER STUDENTS AND PARENTS.
21. (answered as if I had a car on campus)
And more frequent shuttles off campus with a clear schedule posted and clear pickup/drop
22. off locations.
23. I never drive on campus
24. PLEASE BRING BIKES TO CAMPUS!!!!
I love to bike, but it's hard to get a bike here and then get it home. Plus, the campus isn't actually very friendly to bikers, your stuck weaving between people, and especially
25. crossing the lake from the direction of the forum.
26. Everyone's gifted with two legs—walk!!

Question 26: What would motivate you to drive off campus less frequently?

For going to church or volunteer, I'd probably still take my own car for convenience. For going into Carytown, I'd like a free bus pass... This would encourage me to take the city
1. bus.
The University shuttles don't go to enough places. What about other banks? Not everyone
2. has First Market. Richmond's too dangerous to ride bikes in- there are no sidewalks!!!
the fact that Richmond has no sidewalks in the suburbs is a huge deterrent - it just isn't
3. safe
I only ever drive off campus to make a quick errand in the shopping center, so it would be inconvenient for me to have to wait for a shuttle to drop me off and pick me up. However,
4. when I usually make errand runs, I will ask my friends if anyone also needs to go.
University shuttles that leave from more locations. I'm not going to walk to x-lot from
5. south to take a shuttle when I can borrow a friend's car that is right outside.
6. I think both better shuttles and better public transportation would be good.
Any sort of more frequent/efficient shuttle system to major shopping/bar/restaurant locations university run, or better if it could at least partially utilize public transit already in effect. even if students could use spidercards to pay for bus tickets/taxis to these locations, i think they'd be much less inclined to drive themselves. a ride board for breaks is MUCH needed (maybe online?), but something similar could also work for carpooling/DDing to bars or shopping areas at nights/on the weekends...maybe C lot or some other location could be designated as a carpool spot at certain times (afternoon and evening) thurs-sun. People who don't have a car/don't could want to drive could wait (like a bus stop), then cars with open seats could drive past on their way off campus and pick
7. up anyone hoping to go the same direction.
8. ALL OF THE ABOVE!!!! THESE ARE ALL EXCELLENT IDEAS
9. I don't drive off campus.
I think our shuttle system is great. I use the public bus system already. If I want to go to
10. short pump though, sorry; I'm going to use my car...
11. I really think all of these are excellent ideas.
12. I like all of these ideas a lot, besides the ride board one.
Bus passes would be awesome, but also more shuttles and to more locations. I find the hours that our shuttles run can be inconvenient and often I'm unclear as to what time and
13. to which location a shuttle is running.

14. AND BIKES!!!
    When I go off campus, generally it is to a specific point for a specific reason....public transportation cannot provide me with the flexibility a college student needs. Often I go between classes or need to get back before work or another event. Shuttles are hard to keep track of and can leave you stranded if you're not paying attention. I'd rather see the university invest in fuel-efficient vehicles [hybrids/solar/battery] cars that students could
15. rent
    The equestrian team does carpool - but the barn where we practice is 40 minutes away.
16. This is the main reason I drive off campus.
17. I am not aware of the public transportation system, bus routes, etc.

Question 27: Would you be interested in reading an environmental book in Core?

1. That would be incredibly beneficial I think.
2. n/a; transfer student
   yeah, we read about all these other important issues - the environment is something
3. everyone should talk about
   As long as it wouldn't be some boring nonfiction account of "my PhD research in the
4. rainforest."
   This type of book doesn't seem to blend with a typical CORE book. We all have to take a
5. science class. It should be emphasized there.
6. That would cause resentment. Seriously.
7. I would not do CORE again. It is imbalanced and unfair.
8. Maybe we could replace Darwin with a relevant modern environmental book?
9. I would never do CORE over again...
10. Would never take core again
11. I WOULD NEVER WANT TO TAKE CORE AGAIN.
12. Fifth Sacred Thing!!!! [BOOK BY STARHAWK]
    That's like forcing someone else's opinions on a current issue on us. This is NOT the purpose of CORE (I was the Westhampton CORE Course Advisory Committee
13. representative)
    This probably isn't applicable because I transferred here and therefore have never taken
14. core.
15. NO
16. Anything to make CORE better!
17. The World Without Us
    CORE books should be books that are pertinent to the student's life, not theoretical books,
18. or great "classics" anyway.
19. Yes, as in possibly. I would never do Core over again, even if you paid me.
20. ... It would be even better if it was in place of Adrienne Rich or Augustine.

Appendix C

Faculty Who Have Addressed Global Warming in Their Classes

Professor		Department	Course	Email address
Ashworth	Neil	Business	EnvManagement	nashwort@richmond.edu
Bren	Karl	Urban studies	Built Env	kbren@richmond.edu
Carleton	Lee	English		lcarleto@richmond.edu
Congdon	Kelly	Rhetoric	Public Address	kcongdon@richmond.edu
Cox	Kelly	Psychology	Contemp. Psych	ksears2@richmond.edu
Earl	John	Business	Portfolio management	jearl@richmond.edu
Eisen	Joel	Law	Plsc362	jeisen@richmond.edu
Erkulwater	Jennifer	Political Science	Intro PolySci	jerkulwa@richmond.edu
Essid	Joe	English	Engl383	jessid@richmond.edu
Finley-Brook	Mary	Geography		mbrook@richmond.edu
Green	Linda	Biology	Ecology	lgreen@richmond.edu
Harrison	Mike	Geography	Earth Systems	mharriso@richmond.edu
Hayden	John	Biology	Biology of plants	jhayden@richmond.edu
Hill	Malcolm	Biology	Integrative I	mhill@richmond.edu
Howell	Yvonne	Russian		yhowell@richmond.edu
Kandeh	Jimmy	Political Science	Intl Relations	jkandeh@richmond.edu
Kingsley	Roni	Political Science	Oceanography	rkingsle@richmond.edu
Klinker	Kimberley	Geography		kklinker@richmond.edu
Leopold	Mike	Chemistry	Chem210	mleopold@richmond.edu
Luitel	Hari Sharan	Business	Env econ	hluitel@richmond.edu
Maurakis	Eugene	Continuing Studies	Env Biology	emauraki@richmond.edu
Mayes	Rick	Political Science	Pub Policy	bmayes@richmond.edu
Peebles	Ted	Spanish		tpeebles@richmond.edu
Roof	Tracy	Political Science	Intro PolySci	troof@richmond.edu
Salisbury	David	Geography	Amazon	dsalisbu@richmond.edu
Smallwood	Peter	Biology	Comm Ecology	psmallwo@richmond.edu
Stedman	Jeffrey	Philosophy	Contemp Moral Issues	jstedman@richmond.edu
Stevenson	Chris	Chemistry		cstevens@richmond.edu
Talley	Virginia	Spanish	Span221	vtalley@richmond.edu
Treonis	Amy	Biology	Integrative 1	atreonis@richmond.edu
Valencia	Carlos	Spanish	SpanMedia	cvalenc2@richmond.edu
Williamson	Thad	Leadership	LDST101	twillia9@richmond.edu

Appendix D

Number of Electrical Devices Owned by UR Students

Item	Number of item	Percentage
Desktop computers	1	4.3
Laptop computers	0	8.2
	1	89.4
	2	2.3
Televisions	0	27.3
	1	68.4
	2	3.5
	3	0.8
Stereo	0	76.6
	1	23.0
	2	0.4
Refrigerators	0	28.5
	1	66.8
	2	3.9
	3	0.8
Printers	0	37.5
	1	61.7
	2	0.0
	3	0.8
Cars	0	39.4
	1	60.5
Microwaves	0	36.3
	1	62.9
	2	0.8
Light bulbs	0	24.6
	1	87.0
	2	17.6
	3	8.5
	4	4.3
	5	6.3
	6	2.0

Appendix E

Eco-Spider Challenge for the President's Inauguration

"Atlas Spider"

Submitted by the Environmental Studies Class of 2008

Located in Maryland Hall; front hallway next to the bench on the left hand side (right as you walk in building)

Eco-Spider Challenge Essay

The spider, weaver of webs, symbolizes the complex relationship between humans (the spider) and a human modified earth (the web as a life support system). We weave, or construct, our lives and landscapes, but must live with the modifications, intended or not, we create in the natural universe. John Muir, a conservationist, once said, "When one tugs at a single thing in nature, he finds it attached to the rest of the world." This remains true on our increasingly modified planet

where the choices we make can unsettle the balance of nature, a balance made increasingly tenuous by the threat of climate change. This Eco-Spider, known as Atlas Spider, parallels the Greek myth of Atlas, sentenced to hold the heavens on his shoulders for eternity. Here the spider holds the weighty world, a woven web of plastic on her shoulders, symbolizing our simultaneous impact on and accountability to the world. Here the spider is a steward who must recognize the interconnectedness between the weaving or her web and her survival.

Submitted by Environmental Studies Class of 2008 Eco-Spider Team

Kim Huson
Blake Ramsby
Mariela Rich
Claire Calise
Frankie Hazera
Jennifer Fitts
Naoum Tavantzis
Geoff Cox
Christine Wrublesky
Sam Pugsley
Kellen Seligman

Appendix F

Collegian Article Submissions

April 10, 2008

It's getting hot out here...
Environmental Studies - Class of '08

Do Richmond students care about the environment as much as our president does? On November 13, 2007, President Ayers signed the American College and University Presidents Climate Commitment. Since then, the president announced environmental stewardship to be a priority on campus and has followed this pronouncement with actions: D-Hall's certification as a Virginia Green Restaurant, a commitment to the Leadership in Energy and Environmental Design (LEED) certificated Silver certified construction projects, the pursuit of a program that would allow SpiderCards to be used on the GRTC public transportation system and the Eco-Spider Challenge to promote sustainability on campus. Although all of these initiatives are excellent steps for our campus to take, are we, the students, paying attention?

From deforestation, to drought, to climate change, the environment is an issue students may be talking about in conversation, but few are talking about it in terms of Richmond. The Environmental Studies Class of 2008 focuses on human dimensions of climate change in our senior seminar, and we believe the time is right for our campus to seriously address the environment. We surveyed the campus and 81 percent of the respondents believed global climate change was already impacting humans and ecosystems, and would have dramatic effects on Earth in the next century.

These results show that you believe, but now let's address the environment and take on difficult issues like climate change. We urge the University of Richmond to use avenues, like the Collegian, as a forum for debate with rational arguments for both sides of the issues weighing heavily on our generation. We challenge students, faculty and staff to submit articles concerning environmental issues whether personal knowledge, economic analysis, scientific research or beyond and to engage our entire campus with the environmental stewardship and global warming initiatives supported by President Ayers. In the (adapted) words of Nelly and Lil' Wayne, "It's getting hot out here... let's talk it over."

As a supplement to this article, the following survey results were included next to the column:

The Environmental Studies Class of 2008 conducted a survey on University of Richmond student awareness of global climate change.* Here are a few of the results:

81% of students surveyed acknowledge that global climate change is "already impacting humans and ecosystems and will have dramatic effects on the Earth in the next century."

60% of students said global climate change was a major threat and an additional 23% said it was a moderate threat to humans and ecosystems.

Global climate change is the third most concerning issue for students, just behind war and health care.

72% of students think the university should take more action to reduce emissions.

But only 64% knew that President Ayers has signed the Presidents Climate Commitment and only 54% claimed global climate change has ever been addressed in any of their classes.

Why does this discrepancy exist? Students are curious and want to learn more about climate change, but our campus and our classes are not addressing this issue.

And finally, the winner of $50 for taking our survey is (drum roll) Kristina Grimaldi! Congratulations, Kristina!

April 17, 2008

Putting the climate in Core! Additional relevance for an antiquated curriculum
Environmental Studies - Class of 2008

Last Friday, our new president ended his speech at inauguration by talking about the importance of producing environmentally aware students at the University of Richmond. This speech follows his joining 500 other university presidents in the signing of the University President's Commitment to Climate Change. We, the students, are also concerned about global warming; 83 percent of us view climate change as a threat to humans and ecosystems, according to the Environmental Studies '08 survey.

Awareness is great, but how can we prepare at Richmond to address the greatest challenge to our generation? Right now only 54 percent of us ever had climate change mentioned in our classes. One way to make all students think about the issue starts with a four-letter word: Core. 72 percent of students surveyed said they would like to have a book on human interactions with the environment in the Core curriculum. So how could this happen?

Climate change can be taught in the same manner in which Core currently teaches Darwin - from a political, social and cultural point of view rather than a complex scientific one. An enlightened introduction to climate change allows us to analyze how humans act: past, present and future.

By introducing a climate change book early on in the Richmond curriculum, students would be given the opportunity to see the world and their own views, actions and classes at the university with a new globally connected eye. This will feed into existing strengths (international education and business, for example) and new points of emphasis (such as our president's vision of an environmentally prepared Richmond student). So what about the book?

Nobel Prize winner Al Gore addresses climate change in a very accessible way with his book "An Inconvenient Truth." A New York Times review said Gore's book was "...a user-friendly introduction to global warming and a succinct summary of many of the central arguments laid out in [other texts]..." If Gore proves too politically controversial for the Core curriculum, scientist and author Tim Flannery eloquently introduces climate change in "The Weather Makers."

According to the New York Times book review Flannery "...makes sure that you will never again look at an electric-light switch in quite the same way" in his sometimespolarizing text. Gore or Flannery are just two among scores of excellent climate change authors that could replace Darwin or another text in Core if we energize our faculty to follow our president and institution's commitment to addressing climate change.

Energizing the faculty is everything! For a new book to make the Core curriculum, the book will have to be nominated by a current Core professor and be voted on by the 33 Core professors. How can we encourage these professors to make the change?

Start by asking your current or past Core professor to consider the option. If they seem disinterested, ask again reminding them of the importance of the issue. Tell them the United States is the nation most responsible for the rise in fossil fuel emissions and we at the University of Richmond should be learning to be part of the solution, not the problem. If they still appear unenthusiastic, tell them we're not excited about dealing with their emissions for the rest of our lives either. For that matter, neither is the rest of the world. Let's put the climate in Core!

Appendix G

Captain Planet Collegian Submissions

April 3, 2008 – Recycling Facts

In honor of the Eco-Spider Challenge taking place for the Presidential Inauguration, here are some interesting recycling facts:

Each ton of recycled office paper saves 380 gallons of oil.
One recycled aluminum can saves enough energy to run a television for three hours.
Recycling 36 newspapers saves the equivalent of about 14% of the average household electric bill.
Recycling aluminum saves 95% of the energy used to make the material from scratch.
Most glass bottles and jars contain at least 25% recycled glass.
Styrofoam is not recyclable or biodegradable.
Producing one pound of recycled rubber versus one pound of new rubber requires only 29% of the energy.

Sources:
http://library.thinkquest.org/11353/facts.htm
http://www.oberlin.edu/recycle/facts.html

April 10, 2008 – Plastic Bags

Every year between 500 billion and one trillion plastic shopping bags are consumed worldwide.

In the United States, plastic bags cost retailers about $4 billion each year.

Plastic bags photodegrade which means they break down into smaller toxic pieces contaminating soil and water.

Many marine animals, such as sea turtles and whales, mistakenly ingest plastic bags for food and ingest the toxic parts which eventually kill them.

In Ireland, a Plastax of 15 cents per plastic bag was implemented. Within three months, Ireland cut its monthly consumption from 100 million bags to 8 million bags and overall there was a 90% reduction in plastic bag use.

Bhutan banned plastic bags on grounds that they make the country less happy.

Ukrop's offers a 5 cent rebate for each bag you bring in to reuse during checkout.

The widespread use of plastic bags is creating many environmental problems and filling landfills. Please consider your personal plastic bag use and consider buying a more durable bag to bring with you while shopping.

Sources:
http://www.reusablebags.com/facts.php
http://en.wikipedia.org/wiki/Plastic_shopping_bag
http://news.bbc.co.uk/2/hi/europe/2205419.stm
http://www.ukrops.com/gtm_2008/gtm_4_08.asp

April 17, 2008 - Carbon Dioxide Emissions

Driving a truck or SUV will emit 4,485 more pounds of carbon dioxide and burn 232 more gallons of gasoline a year on average. That's $769.08 more spent on gas alone.

How can I limit my emissions:

Keep your car in good running condition. Poorly maintained cars can result in up to 10x more emissions and gas consumption. Follow your manufacturer's instructions on oil and filter changes.

If your gas is black or blue, your car is burning too much gas or oil respectively. If the mixture is off, it can results in excess emissions.

Poorly inflated tires can lower your fuel economy; this is costly to you and the environment.

Excess auto emissions can lead to health problems for you such as lung cancer or even death.

Sources:
http://www.epa.gov/oms/consumer/f00013.htm
http://www.nsc.org/ehc/mobile/mse_fs.htm
http://www.commondreams.org/headlines04/0603-08.htm

April 24, 2008 - Munch on This: A Guide to Organic Food

You might wonder what the recent craze is with organic food. Here is a little bit of information on why you should go organic:

Conventional farmers use around 300 different pesticides to grow foods that are sold in supermarkets everyday and the UK Soil Association reported that 50 to 93 percent of pesticide residues remained on potatoes, apples and broccoli after washing.

Antibiotic residues in milk result in the development of antibiotic resistance in bacteria that are prevalent in humans. This reduces the effectiveness of antibiotics used to treat human diseases.

Organic food must contain at least 95% organic ingredients, which means it cannot use chemicals in the farming process. Just look for the USDA’s Organic label.

Most organic farms are small, independently owned and operated. In the past decade the United States has lost 650,000 family farms due to the large scale conventional farms that are taking over. Organic farming is making it possible for the family farm to survive.

A comparison of the full economic performance of organic and conventional farmers in Pennsylvania found that organic practices cut production costs by 25%, eliminated inorganic fertilizer and pesticide use, reduced soil erosion by more than 50%, and increased yields after the (five-year) transition from conventional systems had been completed.

Here are some conventional foods that are highly contaminated with pesticides. Consider purchasing these organic: peaches, apples, strawberries, nectarines, pears, spinach, bell peppers, celery, and potatoes.

Source:
http://www.downtoearth.org/articles/organic_facts.htm

Appendix H

Excerpt: Environmental Studies Class of 2007's Report

The following is an excerpt from the Environmental Studies Class of 2007's Final Report "Moving Toward a Greener Campus: Proposals Regarding Campus Transportation at the University of Richmond."

Bicycle Transportation

The goal for this project was to quantify the number of people who have and use bicycles on campus and to identify the reasons why more people do not use bicycles. We also attempt to identify the areas that would have the greatest effect on increasing bicycle use. Many other schools of similar size and standing to the University of Richmond have a much larger percentage of the school using bicycles, and we wanted to find out what was different about our school. Through personal observations and a student survey, we were able to identify a couple of core problems that students have with riding bicycles and a few places where small improvements would make the campus more usable. Furthermore, the benefits created by improving bike facilities on campus can be extended to include increased handicap accessibility.

Several universities around the country are working on bicycle initiatives with the overall goals of reducing campus car usage, reducing campus noise pollution from car use, promoting bike usage and other forms of exercise in lieu of driving, and making the campus an overall more bike friendly environment. However, in order to make a college campus more bike friendly several steps need to be taken.

Though the University offers a bike registration program, other universities have made bike registration better. Once the bicycle is registered, the bicycle then gets engraved with its own unique registration number on it. Unlike a sticker that can easily be removed, this engraving is permanent and makes for easier recovery of stolen bicycles. This service is made available by Amherst College of Massachusetts. This program is highly publicized and well known by the students attending this university. Furthermore, throughout the 1990's, the University of Colorado in Boulder increased their biking infrastructure and saw a significant increase in bike riding. They also saw a 13% decrease in the number of single-occupant vehicle trips on campus.

Another way to promote bicycle use on campus and make the campus more "green" is shown by Saint Lawrence University in New York. They recently launched their "Green Bike" initiative. This consists of the university purchasing a set number of bikes and then checking them out to students, faculty or staff that wishes to use them. It is similar to what someone that wants to check out a book from the library would do. The user must return their bike within a two day period to the bike rack where they borrowed it from. The user gets a helmet and a lock with the bike. The coast of the program was around $1,800, and consisted of the purchase of 10 new bicycles and other equipment. This program could be implemented at the University of Richmond and could be regulated by using the spidercard to check bikes out. This type of program has also been very successful since the 1990's in European cities, with some cities in Germany having over 120,000 bicycles in its SmartBike program.

Emory University in Georgia has taken several steps in promoting bike usage on their campus. Similar to Gottwald Science Center, Emory has recently built a new mathematics and science building called The Mathematics and Science Center (MSC). The MSC is a 140,000 square foot building that cost around $40 million. However, unlike Gottwald, this building features a 28 bike rack and 4 showers and a changing room. This promotes students living off

campus and professors and faculty to bike to work. This also has an added benefit of getting an extra point for LEED certification.

Another way Emory promotes bicycle usage is by having ample bike racks by nearly all academic and residence buildings. The campus has over 50 locations where bike racks are present. This is substantially more than Richmond's fourteen. The school has taken the initiative and has set up maps that show where all bike racks are present on campus. This encourages people to ride their bikes because it helps them easily locate the nearest bike rack. Similar to locating where to store bikes, the university provides a detailed map that outlines where the easiest to most difficult bicycle paths on campus are. It uses a rating system of green, least difficulty for bicycling, yellow, medium difficulty, and orange, most difficult. This helps aid students in finding the best path for them to bicycle to class and to their dorms. It also alerts students of which bicycle paths cross with roads. The initiatives taken have had great success on Emory University and have really spurred more students to use their bicycles.

By simply placing more bike racks where students park their bikes most, or providing free bicycles on a loan basis, a university can greatly increase the number of students that use bicycles as their primary means of transportation. This can help decrease path congestion because it minimizes the time it takes to move cross campus. Similarly, it helps to reduce inter-campus driving. The campus currently has problems with illegal parking. This is not a result of not having not enough parking, but not enough parking where it is desired. We feel that one way to alleviate this problem is to increase the amount of bicycle use on campus. If biking on campus becomes a viable transportation option, not only will it assuage the parking situation but it will also significantly reduce the pollution caused by short drives around campus usually by single occupant vehicles.

The results from our survey were broken down into two main categories, bikers and non-bikers. The results from both provide us with a great deal of information. Overall, the majority of students surveyed responded that they would be more likely to have bikes on campus if the facilities were improved. Bikers' responses tell us the problems that our campus has, while non-bikers' responses tell us what would be the improvements that will increase bike riding. About 15% of respondents currently have a bike on campus. However, only about half of the respondents use their bike at least 'Once per day,' mainly to get to classes, to run errands, or for exercise. Bikers list not enough bicycle racks at academic buildings and sidewalks that are too small and congested as the largest obstacles to having a bike on campus. However, 80% of current bikers would use their bikes more if there were improved facilities.

However, of the 85% who do not have a bike on campus, two-thirds have a bike, but do not bring it to campus. About half of these students list 'Not enough storage area' and 'Would not use it that much' as the reason for not having it on campus. Non-bikers also responded that increased bike racks at academic buildings, easier access to storage at residence buildings, and wider sidewalks would be the best improvements to the biking infrastructure. Over half of non-bikers stated that they would be more motivated to have a bike on campus if these facilities were improved. 78% of respondents also reported that they would use a bikeshare program if it was free of charge, but there was not much support for any type of fee associated with it.

As the majority of students responded that lack of bike racks and small and congested paths were the biggest deterrents to using bikes on a regular basis and having bikes on campus, these are the areas where the improvements should be made. In an assessment of bike rack locations using a GIS, only thirteen of thirty-nine (33%) buildings have bike racks outside. However, a number of other buildings have bikes parked outside of them without a bike rack

present. Most notably; Gottwald Science Center, Puryear Hall and Weinstein Hall all have multiple bikes parked outside despite the lack of bike racks at all three locations. These locations are also central spots that are used frequently by a number of students and faculty. As such, the first improvement would be to install bike racks at the following locations: Gottwald Science Center, Weinstein Hall, Puryear Hall, Weinstein Health and Wellness Center and the residential section of North Court (Figure 1). By placing these bike racks, it will increase the availability of storage space at both academic and residential buildings and will encourage more people to ride. The average cost of a six-bike rack is $1,100, so the total cost of the five proposed bike racks would be $5,500 plus installation costs, which would be small. This would create forty new bike spots in locations where they are most needed around campus. It will also increase the aesthetics of campus because you will not have bikes chained to trees and benches as is currently the situation. By creating a greater availability of spots to secure bicycles where they are most needed, students will feel more comfortable riding their bikes to academic buildings resulting in increased ridership. If riding becomes a more viable option, there will be a decreased need for students to drive or get a ride to classes as shown by case studies at other schools.

As mentioned previously, some universities are adopting bike sharing programs, under the names of Smartbike, bike share, or greenbike. We believe that this sort of initiative would flourish on this campus. Looking at the survey results, over three quarters of the people surveyed (78%) said they would use a bicycle if it was provided to them free of charge. This system could easily be adopted by the University.