A Greener Freshman

Encouraging Sustainable Practices in the Freshmen Class

By Ashley Amos
Introduction

Williams College has made clear that it is concerned about its impact on the environment. The ubiquitous recycling containers, the solar panels on Morley Science Center and the Offsite Library facility, the Do it in the Dark campaign, the cogeneration heating plant and the hydro-power generated electricity the college uses are all indications that the college is trying to reduce its impact on the Earth. The students support the college in its effort to reduce by recycling, participating in conservation competitions and encouraging their peers to reduce, recycle and reuse, but as we have not reached our carbon dioxide emissions goal of ten percent below 1990-91 levels (Williams College), clearly we need to continue and expand upon our conservation habits.

Though the entire student body needs to participate in sustainable living in order to have the greatest change on campus, special attention should be paid to the “green” education of the freshmen class. Freshmen year is a formative year and the freshmen look to other students and the college to discover what is expected of a Williams student. This is a great time to instill greener habits in the freshmen that will continue to be pertinent throughout their college careers.

Many Williams freshmen arrive on campus with pro-environmental habits, but those who may not be used to sustainable practices need not expect radical life changes in order for our campus to keep reducing our impact on the Earth. By asking the freshmen to make small changes in their everyday lives, Williams will continue to decrease its environmental impact. This paper will outline the small
steps freshmen can take to be more environmentally responsible and ways the college can assist in these steps. These suggestions require some small expenditures from the college, but the college is already considering the more expensive suggestions, such as installing thermostats. Therefore, the college can expect savings in energy use and reduced energy costs without having to spend additional money. The amount of money required for recycling is undetermined, but the increase in recycling could outweigh any potential extra costs.

Though many students are willing to practice more sustainable behavior, this paper addresses ways to encourage the entire freshmen class to participate in the steps by using methods based on social psychology such as gaining commitment and using prompts (McKenzie-Mahr, 2009). These ideas have proven successful in other instances of promoting sustainable behavior and could easily be applied to the freshmen.

The three energy and waste practices in the freshmen class being examined in this paper are recycling, the amount of energy used to heat water for the hot water cycle on the washing machine and average student room temperature. The campus has already made an effort to promote recycling on campus, but the amount of hot water used for washing clothes and acceptable room temperatures have not been addressed as actively. While it is still necessary to reduce electricity use in the dormitories, this paper will uncover how much energy could be saved if students used the cold water setting on the washer. Though the college has just installed meters to measure the amount of energy being used to heat the dormitories, the data was not available to determine how much energy lowering the thermostats
could save. This paper makes the assumption that energy will be saved if the thermostats are set at a lower temperature. By addressing student use in these areas, the college can determine what is necessary to increase conservation practices and lower Williams' impact on this planet.

**Freshmen Housing**

The freshmen spend their first year in one of two locations, Frosh Quad or Mission Park. These dormitories are organized into blocks of rooms called entries that are supplied with two Junior Advisors. The entries are arranged vertically in Frosh Quad where each floor also has a common room and horizontally in Mission where four hallways converge at one large common room and kitchen. The freshmen are supplied with recycling bins in each of the common rooms for cans, plastic containers, glass and paper as well as with a waste basket for recyclable paper in each room. Freshmen are responsible for taking their cardboard and chipboard to the trash rooms located in each building; the custodians collect the recyclables in the bins.

In Mission, the freshmen have thermostats in their rooms that allow the individual to adjust the heat from 50° to 90°. There is a similar thermostat in the common room so the freshmen and their JA's have almost complete control over the heating of their living space with no regulation other than the inability to turn off the heat once it is available in the fall.
Individual thermostats in each room are not available to the freshmen in Frosh Quad and the thermostats are not designed to be controlled by the occupants. These thermostats are caged and permanently set the 68°, but according to Utilities Program Manager, Donald Clark, many of these thermostats have been tampered with so they no longer work properly. Therefore, measurements of the room temperatures are unlikely to be accurate.
In order to gauge how environmentally conscientious the current freshmen class is, I conducted a survey on recycling practices, energy use and heating (See Appendix: figure 11). From this survey I was able to gain insight on where the freshmen need more direction and instruction in conservation practices. This survey specifically asked about the students recycling habits for various materials, whether they used the cold water setting on the washing machine, and some question about the heating in their rooms and common rooms.

Results from the Survey
54% of students polled did not use the cold setting on the washing machine.

Mr. Clark indicated that the greatest amount of energy used on campus is for heating hot water. As there are a hot, warm and cold cycles on the washing machines, it was necessary to calculate how much energy is used to wash clothes in hot water versus cold water to determine what affect encouraging the students to wash in cold water would have on energy use and carbon dioxide emissions.

A front-loading washing machine holds anywhere from 10 to 24 gallons and the average Williams student washes 30 loads of laundry during the year. There are roughly 273 freshmen living in Mission Park and 265 freshmen residing in Sage or Williams Hall in Frosh Quad. The water heating systems for Mission and Frosh Quad are different as the on campus steam plant supplies hot water and heat for Frosh Quad and the hot water for Mission is heated by an electric system.

Table 1. Energy used per wash Assumptions: 10-24 gallons of water used per wash, 83.2% of water used during cycle heated for washing, 0.166 kWh to heat one gallon of water 1°C F.

<table>
<thead>
<tr>
<th>Wash cycle</th>
<th>Energy used in kWh</th>
<th>Difference in energy use compared to cold cycle</th>
</tr>
</thead>
<tbody>
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<td></td>
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</table>
Washing clothes in hot water uses up to 92% more energy than washing the same load in cold water. Though the actual amount of electricity used to wash in hot water versus cold seems like an insignificant number, when the annual amount of electricity and Number 6 fuel oil is calculated for just the freshman class the numbers are more interesting.

Table 2. Energy used annually to wash freshmen clothes at Mission Park and CO2 emissions associated with the energy used for each cycle. Assumptions, 83.2% of water used during cycle heated for washing, 0.166 kWh to heat one gallon of water 1°F, Grid Electricity 0.41 kg of eCO2/kWh (Johns), and Transcanada electricity 0.179 kg of eCO2/kWh (Johns).
Table 3. Energy used annually to wash freshmen clothes in British thermal units (Btu) and gallons of Number 6 heating oil and the emissions associated with the energy use for each cycle. Assumptions: 8.33 Btu to heat one gallon of water 1°, 153,200 Btu from one gallon of No.6 oil, 26.033 lbs. of CO₂ per gallon of No. 6 oil, 0.62 kWh to power one cycle of washing machine without heating water, and Transcanada electricity 0.179 kg of eCO₂/ kWh (Johns).

<table>
<thead>
<tr>
<th>Water Temperature</th>
<th>Gallons of water</th>
<th>Energy used annually for heating water in Btu</th>
<th>Energy used annually to run the washing machine in kWh</th>
<th>Gallons of No. 6 oil used to heat water</th>
<th># of Kg of CO₂ emissions annually per gallon of No. 6 oil</th>
<th># of Kg of CO₂ annually per kWh on grid and Transcanada</th>
<th>Total CO₂ emissions annually to wash clothes with Transcanada electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot cycle (123 F)</td>
<td>10-24 gal.</td>
<td>37433052-89513820 Btu</td>
<td>2067 kWh</td>
<td>244.3-584.3 gal.</td>
<td>2884.7-6899.6 kg</td>
<td>Grid=847.47 kg TransCanada=370 kg</td>
<td>3254.7-7269.6 kg</td>
</tr>
<tr>
<td>Warm cycle (100 F)</td>
<td>10-24 gal.</td>
<td>23599098-56692086 Btu</td>
<td>2067 kWh</td>
<td>154-370 gal.</td>
<td>1818.5-4369.1 kg</td>
<td>Grid=847.47 kg TransCanada=370 kg</td>
<td>2188.5-4739.1 kg</td>
</tr>
<tr>
<td>Cold cycle (60 F)</td>
<td>10-24 gal.</td>
<td>0</td>
<td>2067 kWh</td>
<td>0 gal.</td>
<td>0</td>
<td>Grid=847.47 kg TransCanada=370 kg</td>
<td>370 kg</td>
</tr>
</tbody>
</table>

If every member of the freshmen class only used the hot water cycle, the emissions generated by the energy used would be between 5658.9 and 12488.6 kilograms per year. If every freshman only used the cold-water setting, 751.2 kg of CO₂ would be emitted, so our carbon emissions would decrease 4907.7-11737.4 kilograms compared to the amount emitted when the hot water setting is used. If every freshman washed in warm water, between 3845.1 and 8184.2 kg of CO₂ would be emitted annually and between 1813.8 and 4304.4 of CO₂ would be kept out of the atmosphere compared to the amount emitted when the hot water cycle is used. By using the warm setting instead of the hot water setting, emissions associated with
washing clothes would decrease 32-34%. By using the cold-water setting instead of the hot water setting emissions associated with washing clothes would decrease 86-93%.

Figure 5. Estimated room temperature during winter 2008-09 in Mission Park

60.6% of students polled kept their rooms at 70° or higher this winter. This is two degrees above the campus standard. More information about the electricity and oil used to heat the dorms is not available.
Figure 6. Student response to recycling at Williams

93% of students polled recycle at Williams. Various reasons for why they chose to recycle include, “It’s good for the environment,” “Easier at school,” “Because they gave us each a recycling bin,” “Because everyone else around me does.”

Table 4. Student responses to how often they recycle each of these materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>56.8%</td>
<td>36.36%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Magazines</td>
<td>39.5%</td>
<td>37.2%</td>
<td>23.25%</td>
</tr>
<tr>
<td>Newspapers</td>
<td>56.8%</td>
<td>34.1%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Cans</td>
<td>70.45%</td>
<td>27.27%</td>
<td>2.27%</td>
</tr>
<tr>
<td>Drink Bottles</td>
<td>65.9%</td>
<td>31.8%</td>
<td>2.27%</td>
</tr>
<tr>
<td>Other plastics</td>
<td>23%</td>
<td>70%</td>
<td>7%</td>
</tr>
<tr>
<td>Corrugated Cardboard</td>
<td>44.2%</td>
<td>48.8%</td>
<td>6.9%</td>
</tr>
<tr>
<td>Chipboard</td>
<td>24.4%</td>
<td>51.2%</td>
<td>24.4%</td>
</tr>
<tr>
<td>Ink Cartridges</td>
<td>12.8%</td>
<td>20.5%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Compact Fluorescent light bulbs</td>
<td>11.2%</td>
<td>37%</td>
<td>51.8%</td>
</tr>
</tbody>
</table>

Students are generally conscientious about recycling the more common materials such as cans and paper, but materials that are used less often such as cardboard and ink cartridges are not taken care of as consistently.

**Discussion**
Laundry

Based on the answers to the survey and other calculations and observations, students at Williams have made an effort to conserve (fig. 4 and see Appendix fig. #), but there is more the students can do if properly educated. Though the majority of students responded that they do not use the coldwater setting (fig. 2), there are no signs or labels in the laundry rooms to indicate the temperature settings on the washer or how much energy is saved by washing in warm or cold water (fig. 6). The six setting on the washer are whites, colors, bright colors, delicates and knits, woolens and permanent press. The actual temperature of the wash cycle only appears on the digital screen after the setting is chosen. Considering the decrease in emissions by 32-93%, it would be in the college’s best interest to encourage students to wash in cold or warm water, which would be the colors and bright colors settings.

Figure 7. Photo of washing machine setting
Thermostats

The college recently installed meters to determine how much energy is being used to heat the freshmen dorms, so in the future there will be more data on the impact of student room temperatures. Currently there is no way to calculate how much energy is being used to heat the freshmen dorms, but the average room temperature of polled Mission residents is 69.2°. This is not far off the campus standard of 68°, but students could be encouraged to set their thermostats one or two degrees lower in the winter. Middlebury College is comparable in many ways to Williams and recently the students organized the Midd68 campaign to try to reduce the college’s energy used for heat. The campaign asked all students to lower the
thermostats in their dorms from the average 70° to 68°. Middlebury projected saving 50,000 dollars on heating and reducing green house gas emissions associated with heating by 800,500 lbs (Middlebury College). In the 2008 fiscal year, the college emitted 21,848 metric tonnes of eCO₂ roughly 66% of which was from the steam plant and boilers on campus (Williams College, 2008). Though there is no hard data yet on the energy associated with heating Mission Park and Frosh Quad, it would seem that encouraging students to keep their room temperature at 68° would reduce some the emissions associated with campus and save money on fuel and electricity.

Recycling

Students are making an effort to recycle based on both the survey and conversations conducted with the custodians. The student responses for why they recycle indicate that many are concerned about their impact on the environment, but many also responded that the college made it easy to recycle. The custodian interview for this project indicated that since the college has supplied the students with the recycling bins in each common room, there has been a noticeable increase in recycling and decrease in recyclable materials in the trash. But, the custodian also indicated that some things are better recycled such as cans and bottles than other materials, namely paper, cardboard and chipboard (Churchill). The issues surrounding paper stem mostly from the confusion regarding newspapers and brown paper bags. These materials do not go in the yellow bins supplied by the college for paper. Newspapers are recycled by placing them on the newspaper racks around campus and brown paper bags unfortunately cannot be recycled on campus.
After investigating a common room paper recycling bin and the larger collection bin in the recycling room at Mission, it was apparent that newspapers and brown paper bags are being put in the paper containers. There is a similar informational issue with chipboard as a common question asked when the surveys were distributed was, “what is chipboard?” Chipboard is any paperboard material such as a cereal box or a tissue box and should be broken down and recycled with corrugated cardboard. The barrier that keeps the freshmen from recycling cardboard seems to be the inconvenience of carrying the cardboard to the recycling room. The custodian interviewed indicated that cardboard tends to collect in the common rooms of the Dennett house until someone transports it to the trash room, which at times has been the custodian himself.

**Solutions**

The first step in encouraging the freshmen on campus to conserve energy and try to adopt new, sustainable habits involves gaining commitment from the students regarding their participation in reducing, recycling and reusing. A written commitment has proven the most effective way to ensure participation in an activity as well as interaction with another person (McKenzie-Mahr, 2009). To gain the commitment from the incoming class, Williams could create posters outlining some ways to conserve on campus and distribute these to the entries. The JA’s can address the different ways the freshmen can reduce during First Days and encourage their entry to sign the poster committing them to try some of the conservation practices. This combination should increase the actual practice of some of the conservation ideas as commitment has been shown to increase
participation by as much as 50% (McKenzie-Mahr, 2009). Once the students are aware of the ways they can help reduce, prompts can help each remember to practice the new sustainable habits.

Laundry

The settings on the washer do not indicate what the water temperatures are for each cycle therefore; signs should be put up in the laundry room to inform students about the temperature of each cycle. The prompts should also include a reminder to use the warm or cold cycle and indicate how much energy and greenhouse gas emissions would be avoided by using the cold or warm setting. Another prompt could also address the concern about clothes being as clean after a warm or cold wash. Clothes only need to be washed in the hot setting if they are heavily soiled or have grease or blood on them. By having these prompts in the laundry room and encouraging cold water washing on the commitment poster, the college can encourage students to use less energy and decrease our CO₂ emissions without a drastic lifestyle change.

Thermostats

Prompts can also be used to encourage students to lower their thermostats next winter. As Mission is the only dorm that allows the student complete control over their heat, prompts would only be effective in this dorm. The students should be asked on the sustainable poster to keep their room at no more than 68° and the JA’s should talk to the entry at the beginning of the heating season to discuss the thermostat in the common room. The JA’s can encourage the entry to keep the thermostat in the common room at 68° and encourage the students to do the same
in their rooms. A label on the thermostats indicating 68° and reminding students, “It’s winter, it is ok to wear a sweatshirt even inside” or “If it were 68° outside you’d be wearing shorts!” would act as another reminder to keep thermostats at the campus standard.

College projects

The college can aid the students’ greener practices by installing new thermostats in Sage and Williams Hall and switching to a single stream-recycling program. The thermostats in Frosh Quad are antiquated and dysfunctional which makes it difficult for the residents to conserve energy by monitoring and lowering their thermostats. The college is experimenting with a new thermostat designed to allow each student to control the heat in his or her room to a maximum temperature of 72°. This will allow students greater control over their room temperature and help reduce energy use by limiting the range of the thermostat. The thermostats cost 150 dollars each, but the college is hoping to negotiate a lower price by buying in bulk. Thermostats with limited range have also been considered for Mission Park, but the college has been unable to find a compatible model with the electric heating system (Jensen).

Harvard University has recently switched to a single stream recycling program where all recyclable materials can be put in the same bin excluding electronics, ink cartridges, compact florescent light bulbs and other such materials that require more careful disposal. The Office of Sustainability at Harvard expects a 20% increase in recycling due to the new system (Office of Sustainability at Harvard). Williams could adopt such a program through Waste Management, waste
disposal and recycling company that has a single-stream recycling program. Waste Management would take all of the recycling currently separated in bins at Williams in one bin, which would eliminate the confusion of what material goes in what bin (Waste Management). The nearest Waste Management recycling facility is in Springfield, Massachusetts.

**Conclusion**

Williams College has made a great effort to reduce its impact on the environment, but there are more changes the college and students can make to decrease our emissions and waste. These changes require little effort on the part of the students and should be instilled in the students early in their college careers. By encouraging the students to use the warm or cold setting on the washing machine or setting their thermostat to 68°, the students will be able to make a large impact on the College's greenhouse gas emission with little effort if they continue these practices throughout their time at Williams. Based on the responses to the short survey, students are willing and ready to make these small changes so all the college must do is ask and it shall receive.
Figure 9. Mission residents' response to thermostat setting during Winter.

Figure 10. Student response to common room temperature during Winter.

Appendix
Figure 11. Student response to energy conservation at Williams

Figure 12. Survey used to collect data
Green Freshman Questionnaire:

Recycling and Trash
1. Did you recycle before you came to Williams? Yes  No
2. Do you recycle at Williams? Yes  No
3. Why do you choose to recycle? Please limit your response to a sentence or two.

4. Where do you get the most information about recycling on campus?
   a. Posters around Williams
   b. My JA’s
   c. The sustainability web site
   d. My friends
   e. Other (please specify)

5. Do you feel that you can find a place to recycle everything you want to? Yes  No

6. How often do you recycle these materials? Please circle one response:
   a) Paper  Always  Sometimes  Never
   b) Magazines  Always  Sometimes  Never
c) Newspapers Always Sometimes Never
d) Cans Always Sometimes Never
e) Drink bottles Always Sometimes Never
f) Other plastic Always Sometimes Never
g) Corrugated Cardboard Always Sometimes Never
h) Chip board (Kleenex boxes, cereal boxes) Always Sometimes Never
i) Ink Cartridges Always Sometimes Never
j) Compact fluorescent Bulbs Always Sometimes Never

7. How often do you use a refillable water bottle instead of a disposable plastic bottle?
   a. Always
   b. Sometimes
   c. Never

Energy Conservation

1. Did you try to reduce your energy use before you came to Williams? Yes No
2. Do you try to reduce your energy use at Williams? Yes No
3. Which of these appliances do you have in your room? Please circle any that apply and give a rough estimation of how many hours the appliance is plugged in during a week:
   a) Mini refrigerator
   b) Desktop computer
   c) Laptop computer
   d) Printer
   e) TV
   f) DVD player
   g) Stereo
   h) Game console
   i) Cell phone charger

Please answer the following three questions only if they apply to you:
4. If you have a mini refrigerator did you know that there would be a common room refrigerator? Yes  No

5. How much do you need your mini fridge?
   a. I always use my mini fridge I couldn't live without it.
   b. I use it regularly and like the convenience
   c. I use it occasionally
   d. I rarely use it and should not have brought it

6. How often do you shut your desktop down?
   a. Every night
   b. Once a week
   c. Once a month
   d. It is always on

7. Do you put your computer to sleep or hibernate when you will be away for 15 minutes or more? Yes  No

8. Do you use compact florescent light bulbs? Yes  No

9. Were you aware of the Do It In The Dark competition? Yes  No

10. Did you participate by trying to conserve during the month? Yes  No

11. Do you use the cold (bright colors) setting on the washer to save energy? Yes  No

12. Would you consider using a drying rack instead of the dryer to save money and energy if there was a drying rack provided by your entry? Yes  No

Heating

For Mission residents:

1. What temperature did you keep your room at this winter? Please give a rough estimation.

2. Were you able to keep your room at a comfortable temperature? Yes  No

3. Would you consider lowering your room temperature by 2-5 degrees? Yes  No

4. How many months during the school year would you say you have not been needed to turn on the heat?
   a. 1
   b. 2
c. 3
d. 4
e. 5
f. 6+

5. How would you describe the temperature of the common room and hallways?
   a. Too hot
   b. A little warm
   c. Perfect
   d. A little cold
   e. Too cold

6. Which of these options would you choose regarding the temperature of the common areas:
   a. Lower the temperature by 5°
   b. Lower the temperature by 2°
   c. Don’t change the temperature
   d. Raise the temperature by 2°
   e. Raise the temperature by 5°

For Frosh Quad residents:

1. How would you describe the temperature of your room, the common room and hallways?
   a. Too hot
   b. A little warm
   c. Perfect
   d. A little cold
   e. Too cold

2. Which of these options would you choose regarding the temperature of your room and the common areas:
   a. Lower the temperature by 5°
   b. Lower the temperature by 2°
c. Don’t change the temperature

d. Raise the temperature by 2°

e. Raise the temperature by 5°

Thank you for taking the time to complete this survey!!! I really appreciate your input!!

Interviews conducted for Paper

Charles Churchill, Custodian
Kenneth Jensen, Mechanical Maintenance Supervisor
Donald Clark, Utilities Program Manager
Edward Bourdon, Supervisor of Custodial Services
Stephanie Boyd, Director of the Zilkha Center for Environmental Initiatives
Amy Johns, Environmental Analyst
Works Cited


Davies, Alison and Davies, Rebecca, 2006, Doing It in the Dark, On a Serious Note: Reducing Student Energy Consumption in the Residence Halls of Williams College.
