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Independent Study on Changing Student Behaviour to Increase Energy Sustainability and Efficiency at the MacDonald Campus of McGill University

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Independent Study on Changing Student Behaviour to Increase Energy Sustainability and
Efficiency at the Macdonald Campus of McGill University

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Sincerely,
Andrew, Jaaved & Peter

Abstract

This paper explores social perception towards energy consumption on Macdonald campus, as seen by different subsections of the Macdonald community: undergraduate, graduate, faculty and staff. Methods used to collect information, specifically surveys and interviews, are described in the first half of the report.

Main findings of our research suggested that, as a whole, community members believe Macdonald Campus to be a relatively energy-efficient place. However, results indicated a discrepancy between students and faculty/staff in terms of their perception of energy efficiency on campus. Furthermore, there was broad agreement regarding the inaccessibility of information on energy use on campus, suggesting that this was a primary leverage point to enact social change.

Various initiatives, including dashboard advertising and monthly informational events, are presented, aimed towards increasing information accessibility. With a planned implementation date of Fall 2012, these initiatives are expected to have a significant impact on environmental awareness, ultimately decreasing energy use on campus.

Cet article met l'emphase sur la perception sociale de la consommation d'énergie au campus Macdonald abordé par différents groupes présents sur le campus. Ces groupes sont: les étudiants en 1^{er}, 2^{ème}, ou 3^{ème} cycle, les membres du personnel de la faculté et les employés. La première partie du rapport présente les méthodes utilisées afin de recueillir les informations, notamment la distribution de questionnaires et les entrevues.

L'un des résultats principaux de la recherche est qu'une grande majorité de la communauté croit que la consommation d'énergie sur campus Macdonald est efficace. Par contre, une fois ces résultats analysés en détail, elles montrent un désaccord parmi les étudiants et les membres du personnel de la faculté. De plus, l'inaccessibilité à de l'informations concernant la consommation d'énergie sur le campus a été mentionnée par plusieurs. Ces derniers suggéraient qu'une fois ce problème fixé, cela permettrait l'initiation d'un changement sociale sur l'utilisation d'énergie.

Plusieurs initiatives, notamment l'utilisation des écrans d'informations et des activités d'information mensuelle sont présentés dans cet article. L'objectif est de rendre accessible l'information sur la consommation d'énergie à la communauté. À partir de la session d'automne 2011, nous espérons que ces initiatives auront un impact majeur, notamment sur la sensibilisation à l'environnement pour, en fin de compte, réduire la consommation d'énergie sur le campus.

Introduction

In 2006, a group of McGill students on Macdonald campus published a report assessing the campus' environmental sustainability. The *Ecosystem Sustainability Assessment Macdonald Campus* focused on various aspects of environmental sustainability, including energy; apart from identifying key areas of improvement, such as the lack of sustainable technology, a dearth of meters and gauges, and wasteful social behaviour, the report also provided a detailed list of initiatives the campus could implement to improve its energy use (N. Castellanos, Fall 2006). While not explored in further detail at the time, these initiatives were resurfaced by CERES (Committee for Environmental Responsibility, Education and Sustainability) in 2011. CERES assigned groups of students to different sections of the report, ultimately intending to enact the recommended initiatives.

Originally intended as a follow-up to the "Energy" section of the 2006 report, our research project has since evolved to serve another purpose. Upon further research, we discovered that the majority of initiatives are already underway; be it the Macdonald Campus Energy Project or the McGill Energy Project, improvements to the technical aspect of energy use abound. However, to our greatest knowledge, there has been no formal attempt at Macdonald campus to change social behaviour with regards to energy use. Contrary to popular belief, the 2006 report clearly indicated areas of social behaviour on Macdonald campus that are anything but environmentally friendly (N. Castellanos, Fall 2006). Hence, our research project sought to address this wasteful behaviour, while filling the absence of social initiatives to energy use.

There are numerous advantages to creating a sustainable environment on campus. First and foremost, the impact of technical improvements can be compounded if community members similarly decrease their energy demand. Furthermore, there are undeniable environmental and social benefits; lowering energy use will decrease CO₂ emissions and lessen McGill's impact on the environment (Governors, 2010). Not only would this assist in meeting McGill's energy goals and bolster McGill's reputation as a leader in the field of sustainability (M. Luke, Fall 2011), it would also translate to significant amounts of savings in electricity bills over time (McGill, 2010). These savings could be reinvested in energy-efficient technologies, leading to a self-sustaining loop of cost savings and energy efficiency. Hence, the potential benefits of this research project are plentiful; compared to costly investments in advanced, energy-efficient technology; this research project offers an alternative approach to decreasing energy consumption that is both cheap and potentially long-lasting.

Our research objectives were formulated with the above reasons in mind. Through the use of interviews and surveys, we wished to gain greater insight on social perception towards energy efficiency at Mac Campus. More specifically, we wished to obtain a comprehensive understanding of whether community members are concerned with their energy use, and whether their degree of concern is reflected in their actions. Furthermore, we sought to develop effective, implementable methods of promoting energy-conscious behavior, targeting leverage points identified by the surveys. As will be seen, our report focuses on research-informed solutions to reduce energy use that can be implemented in the near future.

Methodology

In order to better understand the Macdonald Campus community's attitude towards energy efficiency, a survey was designed for distribution throughout campus. Questions in the survey were designed to explore the different aspects of social perception with regards to energy efficiency. Key areas of interest included the respondent's awareness about energy efficiency, and whether this was reflected in the respondent's consumption patterns. The respondent was also asked to gauge the general culture at the Macdonald Campus, and whether it was conducive to promoting energy efficiency and environmental awareness.

To maximize the number of respondents, we sought to make the survey as succinct as possible. Thus, we made extensive use of the Likert Scale, which takes minimal time to respond to while providing useful, quantitative results (Neil J Salkind, 2007). In areas where numerical responses were insufficient, however, we made use of semi-structured questions, which allow for greater freedom of expression from the respondent while still providing relevant answers (Bert Klandermans, 2002). This effort to keep the survey succinct- yet informative- assisted our effort to obtain results, as potential surveyors were more receptive to short surveys than long ones.

Over the course of two weeks, we spent two hours per weekday gathering responses from members of the Macdonald community. The first half of this period was spent collecting data from respondents in the Link Café and Centennial Center; this was because the two locations act as focal points on Mac Campus, with the vast majority of community members at Mac Campus passing through these areas at one point or another. Soon, however, it became evident that the vast majority of responses were solely from undergraduate students. As a means of ensuring that the data samples were representative of the community as a whole, the second week was primarily spent targeting underrepresented groups (i.e. graduates, faculty, and staff). This was done by visiting areas where these members could be found, including offices, classrooms, and dorm rooms. Overall, a sizeable total of 118 survey responses were collected, with the demographic breakdown of the responses being representative of the Macdonald community.

Results/Discussion

The following sections will address results for different questions in the survey (shown in Appendix 1). Each section will state the results, following up with a short discussion of said results.

Section 1: Occupation, fume covers, windows, and recycling

Relevant questions:

- Question 1 - *Occupation*
- Question 2: *How often do you do the following on Mac Campus?*
 - *Close fume covers when not in use*
 - *Keep windows closed during winter*
 - *Sort waste into proper recycling bins*
- Question 5 - *Have you been at Mac Campus over the past 3 years?*

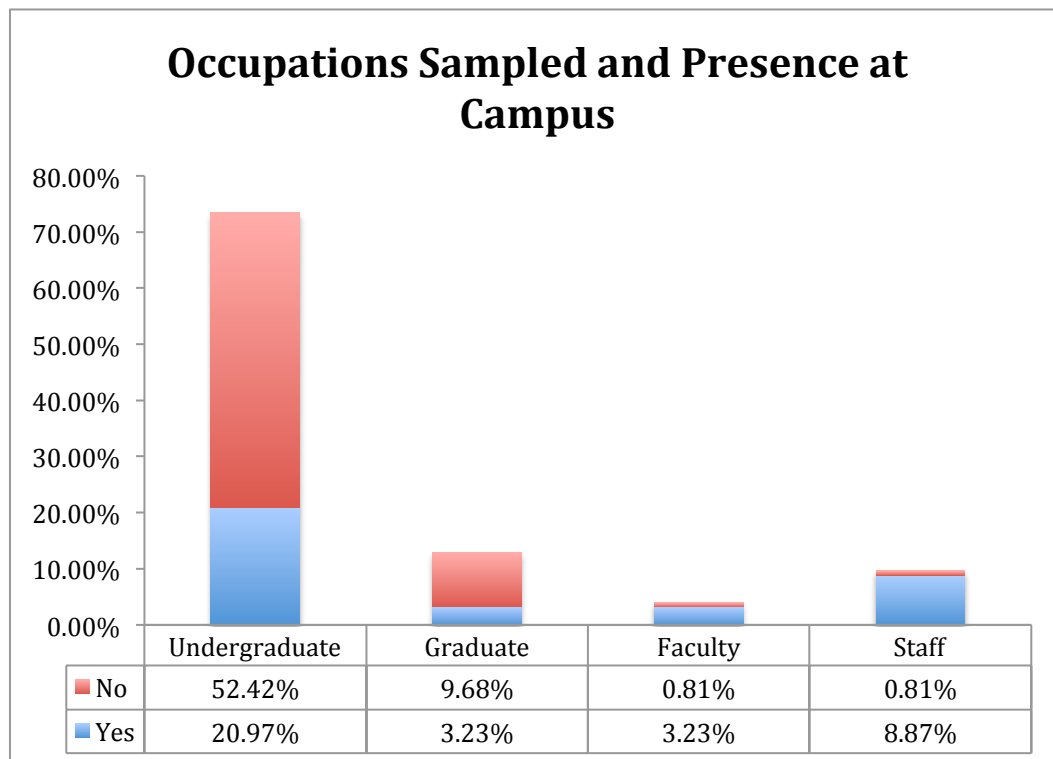


Figure 1.1

(Question 1 and 5) Respondents classified according to their occupation and their response to question 5. Respondents that have been on Macdonald campus for 3 or more years were placed in the “Yes” category, and the “No” category otherwise.

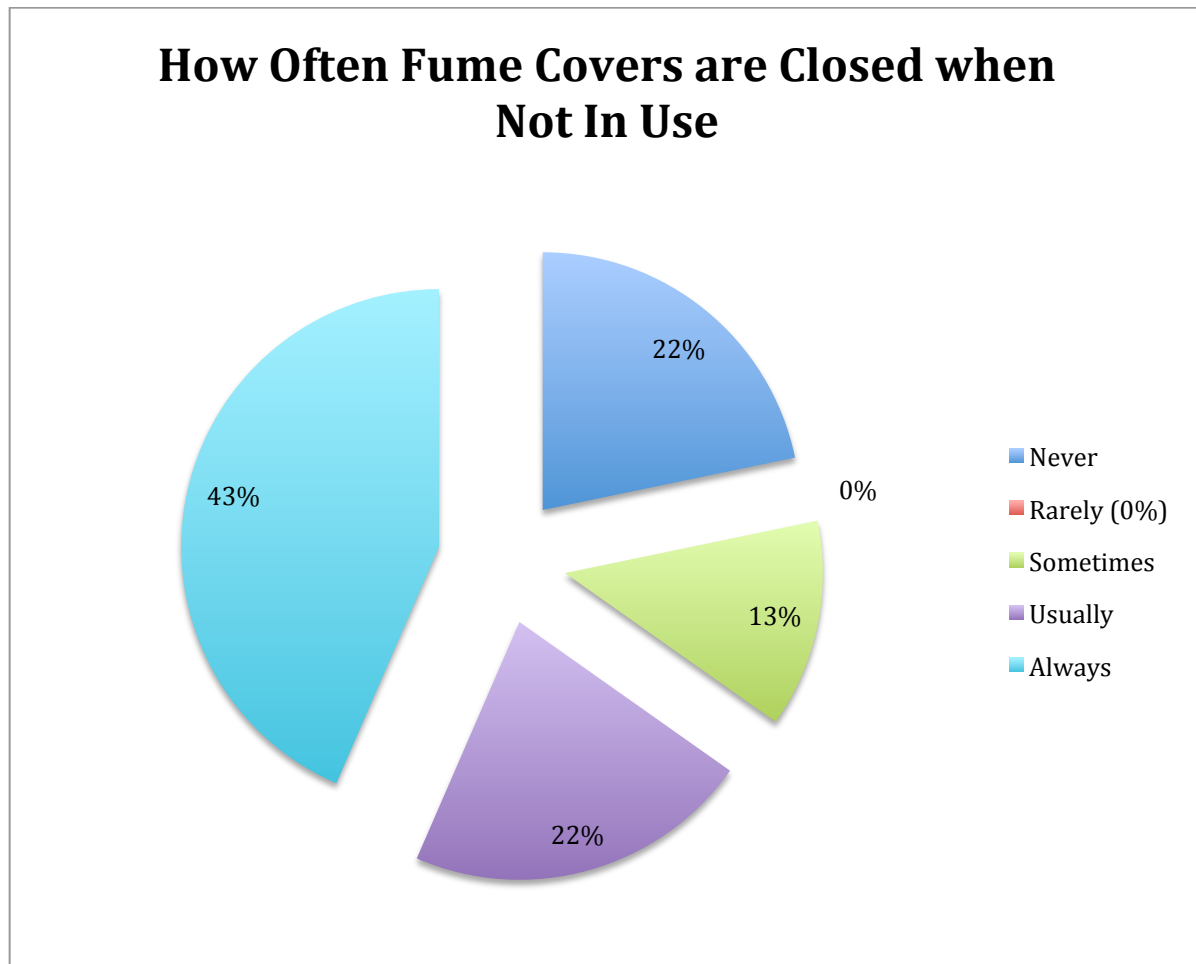


Figure 1.2

(Question 2) Responses regarding the relative frequency of closing fume covers when not in use. The results represent a cumulative answer from all occupations.

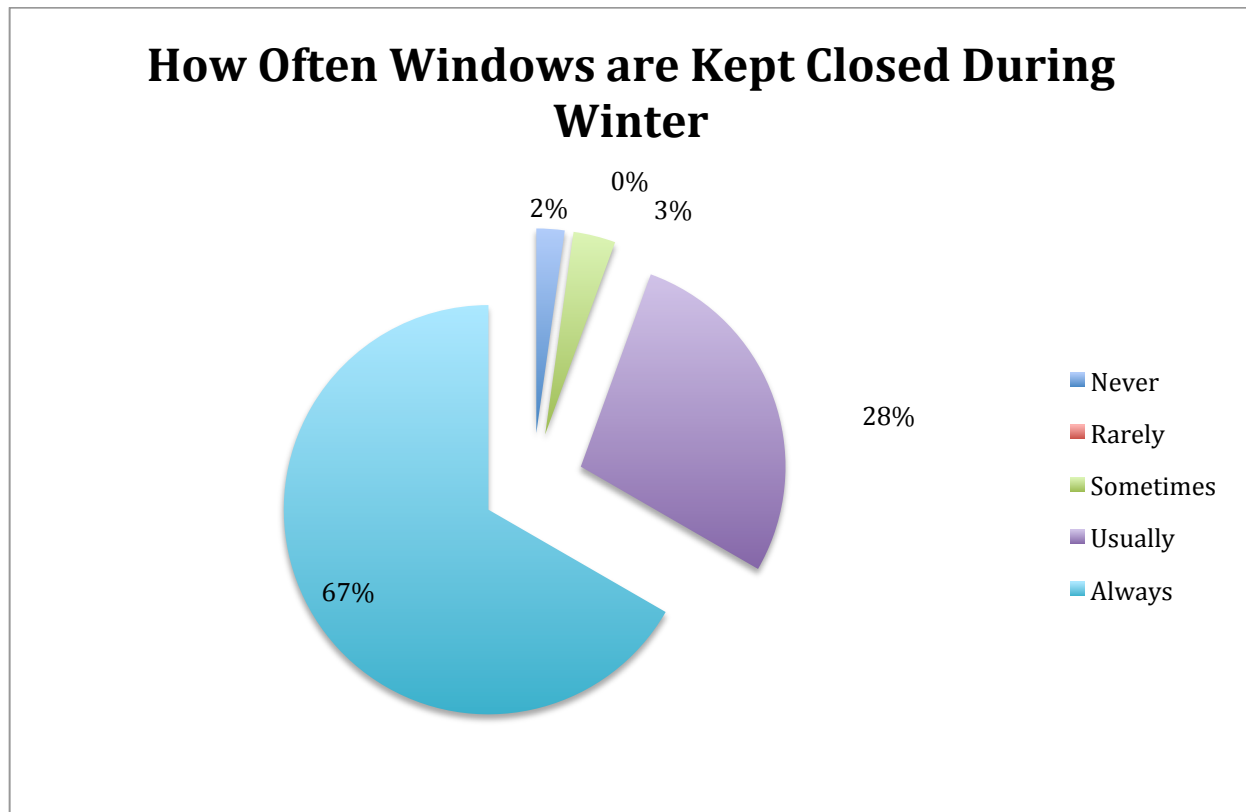


Figure 1.3

(Question 2) Responses regarding the relative frequency of keeping windows closed during winter. The results represent a cumulative answer from all occupations.

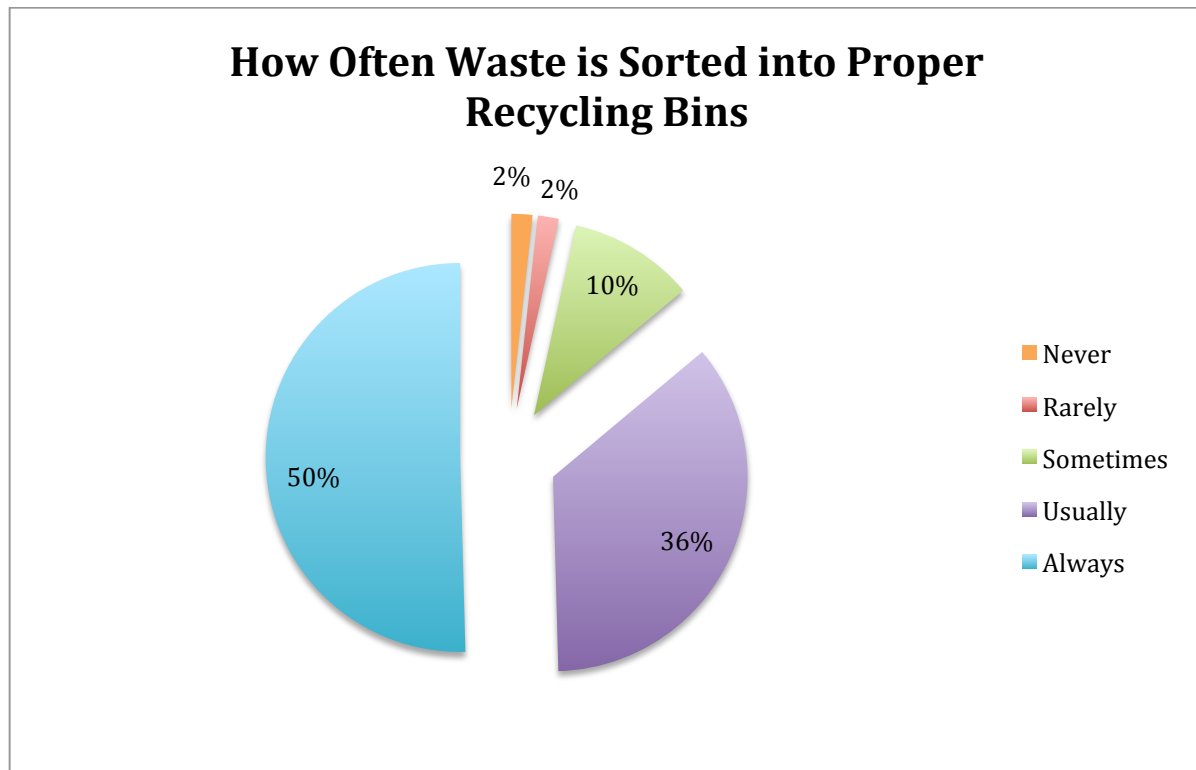


Figure 1.4

(Question 2) Responses regarding the relative frequency of sorting waste into the proper bins. The results represent a cumulative answer from all occupations.

The results of the survey were grouped into four categories according to the participants' occupation: undergraduate, graduate, faculty and staff (see Figure 1.1). To ensure that survey results were representative of the general population, we had to distribute surveys such that the number of respondents in each category corresponded to the proportion of each group as part of the general population. While representatives of the undergraduate population were relatively easy to find, representatives of the graduate student population proved to be a bit more difficult to access; hence, we engaged in selective targeting at Laird Hall, to increase the number of graduate students surveyed. Both staff and faculty members were also difficult to record, as most were either busy or may have lost the survey once it had been given to them. Overall, the sample sizes for each group were relatively small, but are reflective of the composition of the Macdonald Campus community. The survey respondents consisted of 72% undergraduates, 14% graduates, 10% staff members, and 4% faculty members, compared to the Macdonald community of 60% undergraduate students, 25% graduate students, 10% staff members and 5% faculty members (Doan, 2012).

In contrast to findings of the 2006 report results indicate that the majority of the Macdonald community members now take time to close fume covers in laboratories and to keep windows during winters (95% of respondents "always" or "usually" closed windows during winter, while 65% "always" or "usually" closed fume covers when not in use- see Figure 1.2 and 1.3) (N. Castellanos, Fall 2006). It should be noted that this question was originally designed with the habitants of Laird Hall in mind, given that a considerable number of windows can be seen opened during winter at Laird Hall (based on casual observation). Numerous locations on campus use windows that do not open, meaning that some respondents may have associated keeping windows closed with the inability to open windows. Nonetheless, the results suggest that- to a certain extent- there is a preexisting culture of sustainability, as certain energy-saving habits are already ingrained in individual behavior. Similarly, a significant proportion of respondents regularly engage in recycling (86% "always" or "usually" properly sorted waste- see Figure 1.4). However, it should be noted that improvements can still be made; a waste audit done by CERES in 2011 concluded that 10% (11.72kg out of 122.37 kg of waste measured, a relatively small but noticeable amount) of garbage is composed of recyclable material (CERES, 2011). Given this proportion of misplaced recyclable materials, it is reasonable to conclude that improved education with regards to proper recycling behavior needs to be implemented if a culture of sustainability is to flourish on campus.

Section 2: Energy efficiency and consciousness

Relevant question:

- Question 3 - *On a scale of 1 (strongly disagree) to 5 (strongly agree), how do you feel about the following statements relating to how environmental Mac Campus is?*
 - *Mac Campus is an energy-efficient place*
 - *People at Mac Campus are conscious about their energy use*

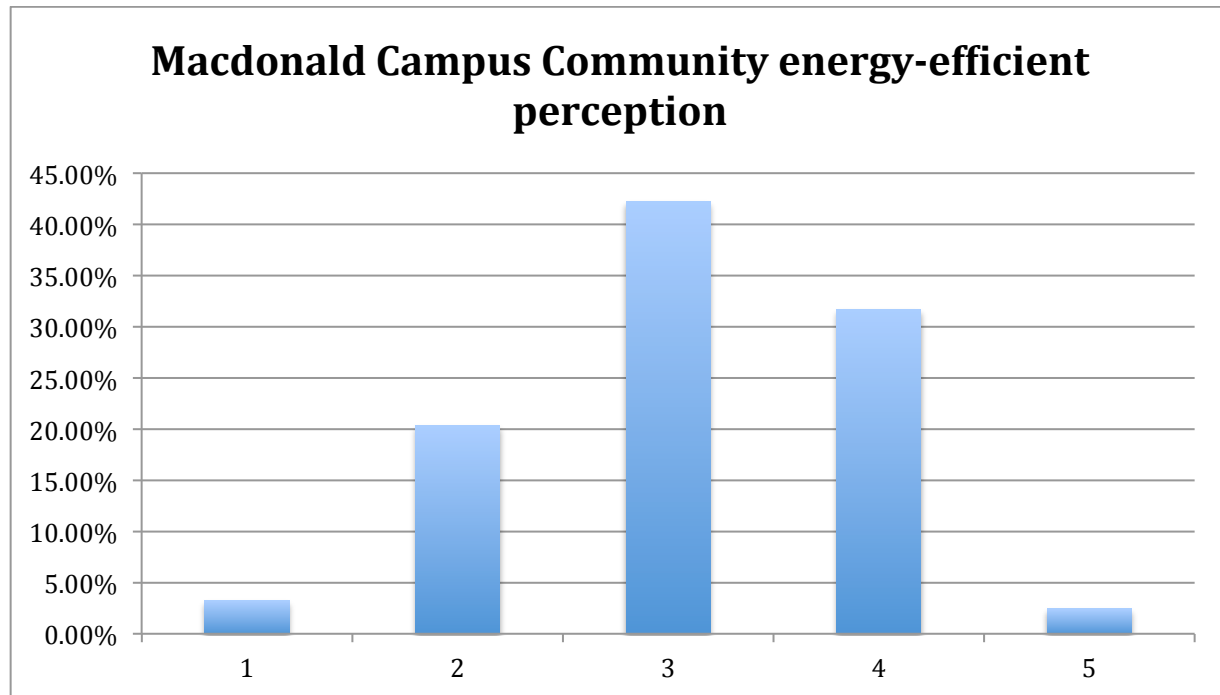


Figure 2.1

(Question 3) Macdonald campus' perceived energy efficiency, on a scale of 1 (a perception of low energy efficiency) to 5 (a perception of high energy efficiency).

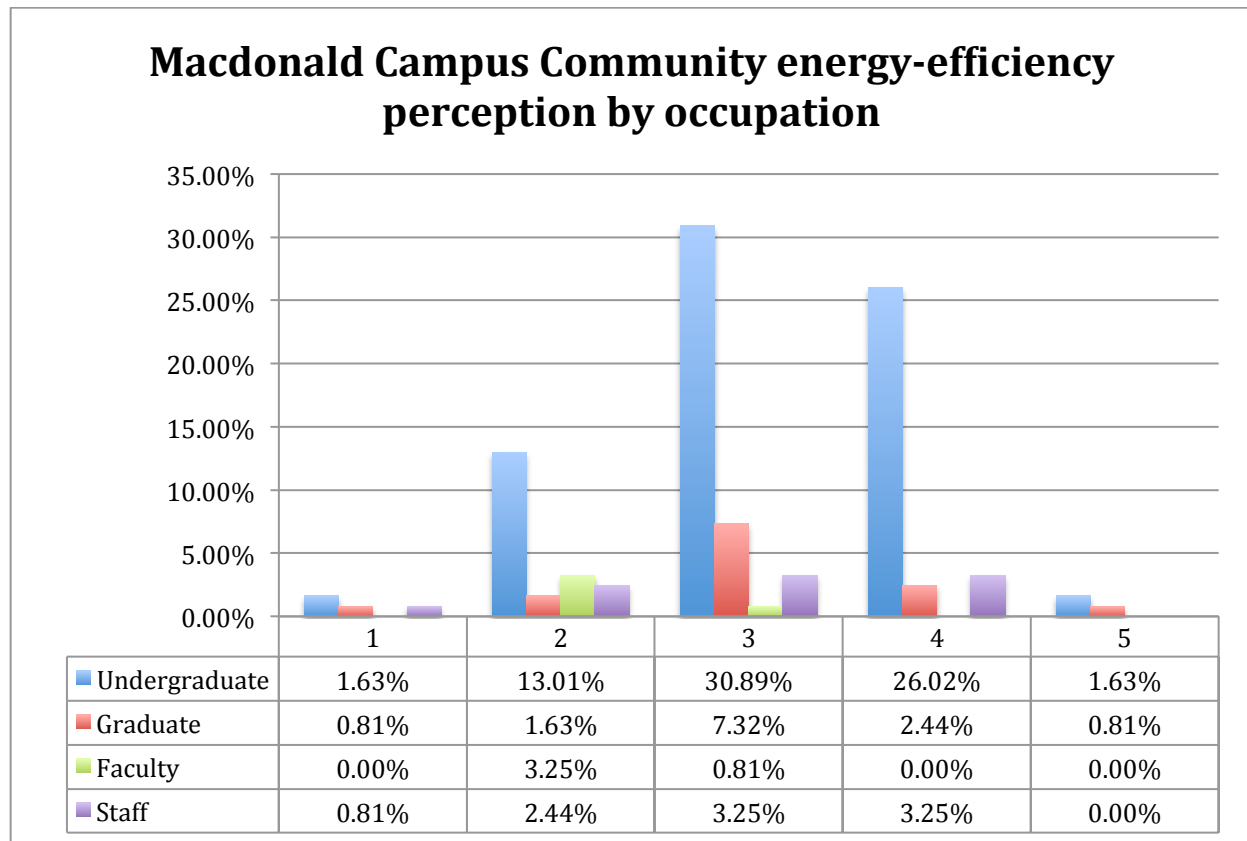


Figure 2.2

(Question 3) Macdonald campus' perceived energy efficiency on a scale of 1 (a perception of low energy efficiency) to 5 (a perception of high energy efficiency), broken down into respective occupational groups.

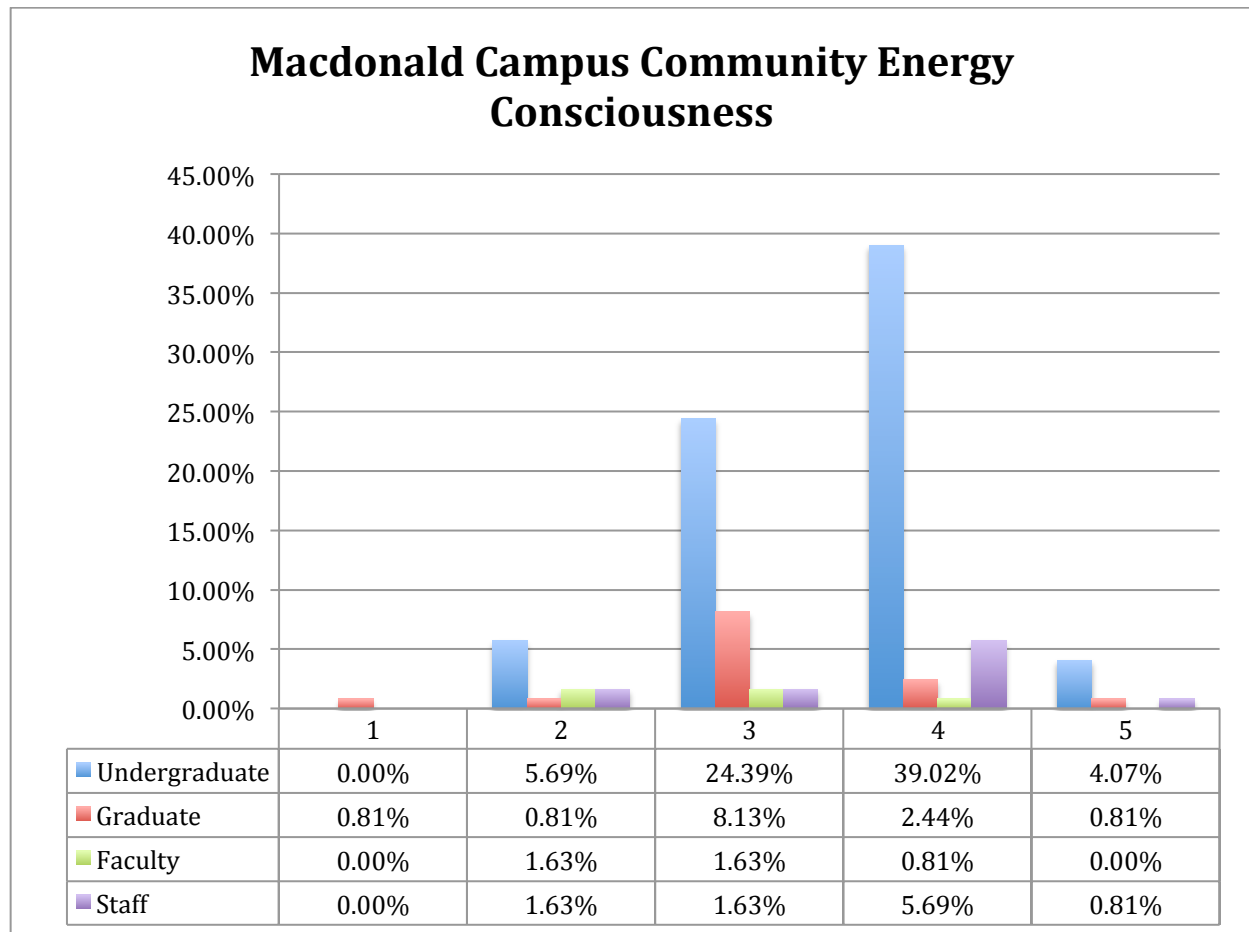


Figure 2.3

(Question 3) Macdonald campus community's perceived energy awareness, on a scale of 1 (a perception of low energy awareness) to 5 (a perception of high energy awareness), broken down according to occupation.

Figure 2.1 shows 34.15% of surveyed individuals said the campus was relatively energy efficient while 42.28% believed the campus to be of standard energy efficiency. While these results seem to suggest that the campus community views itself to be generally energy efficient, a deeper analysis reveals a discrepancy between responses from the different occupational groups (See Figure 2.2). Figure 2.2 shows that faculty members tend to perceive the campus as being energy inefficient, while students tend to think otherwise. On the other hand, the staff is split across the board, with a slight skew towards the “efficient” side. One possible explanation of this is the differences in perception between these groups. Written comments from the survey indicate a general preconception that having recycling and composting bins present on campus makes the campus more energy-efficient (See Appendix 1 - Questions 3, 5, and 6). While recycling and composting can reduce the carbon footprint of the campus, these actions alone are insufficient and do not address the primary issue of energy efficiency. The staff and faculty, on the other hand, are more aware of energy use on campus. Faculty members are primarily responsible for running the laboratories, which are a significant source of energy consumption; many are also experts in fields related to environmental issues. Hence, it is reasonable to conclude that they possess a certain level of awareness about an energy-inefficient side of campus that many students simply have not been exposed to. This divergence in perception towards energy efficiency may need to be remedied if sustainability efforts are to be properly carried out.

Section 3: Individual Action and Your Action

Relevant question:

- Question 4 - *On a scale of 1 (not important at all) to 5 (extremely important), how do you feel about the following statements relating to sustainability?*
 - *How important is individual action in promoting sustainability (as opposed to institutional action)?*
 - *How important do you believe your actions are in promoting sustainability?*

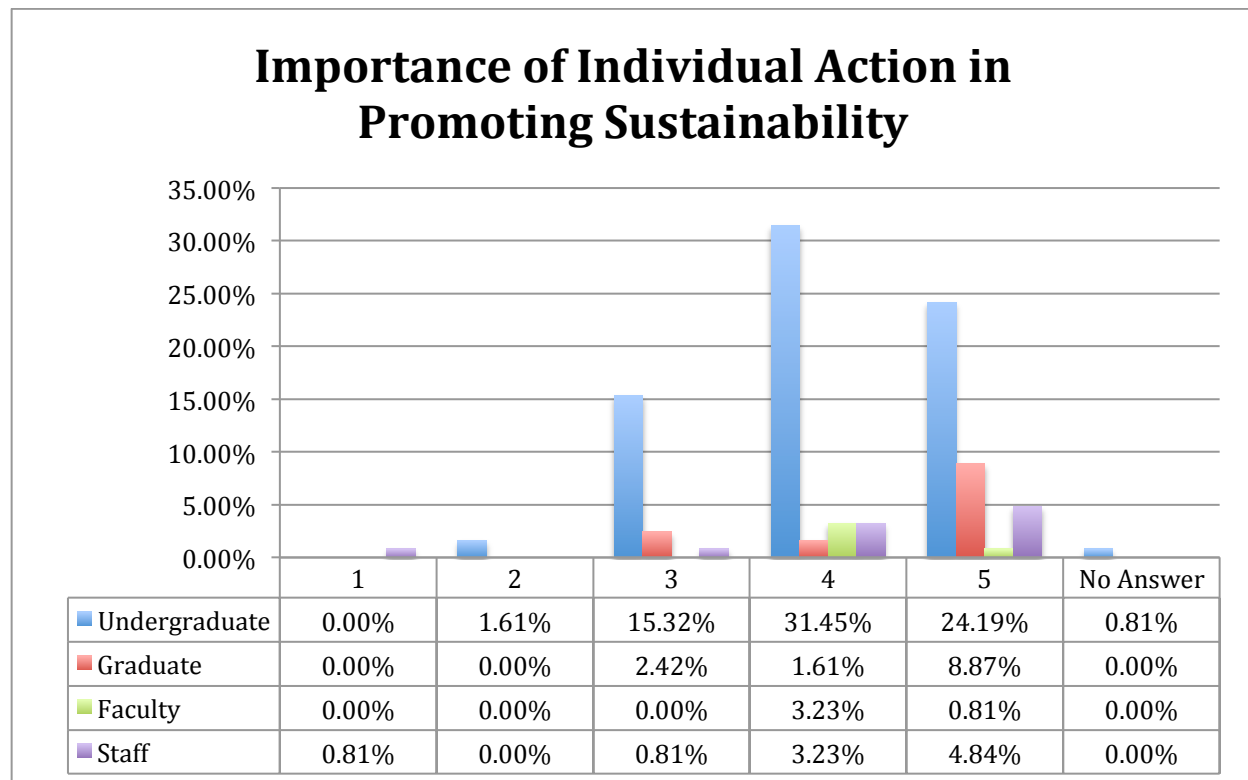


Figure 3.1

(Question 4) Importance of individual action in promoting sustainability, on a scale of 1 (no importance) to 5 (high importance), broken down according to occupation.

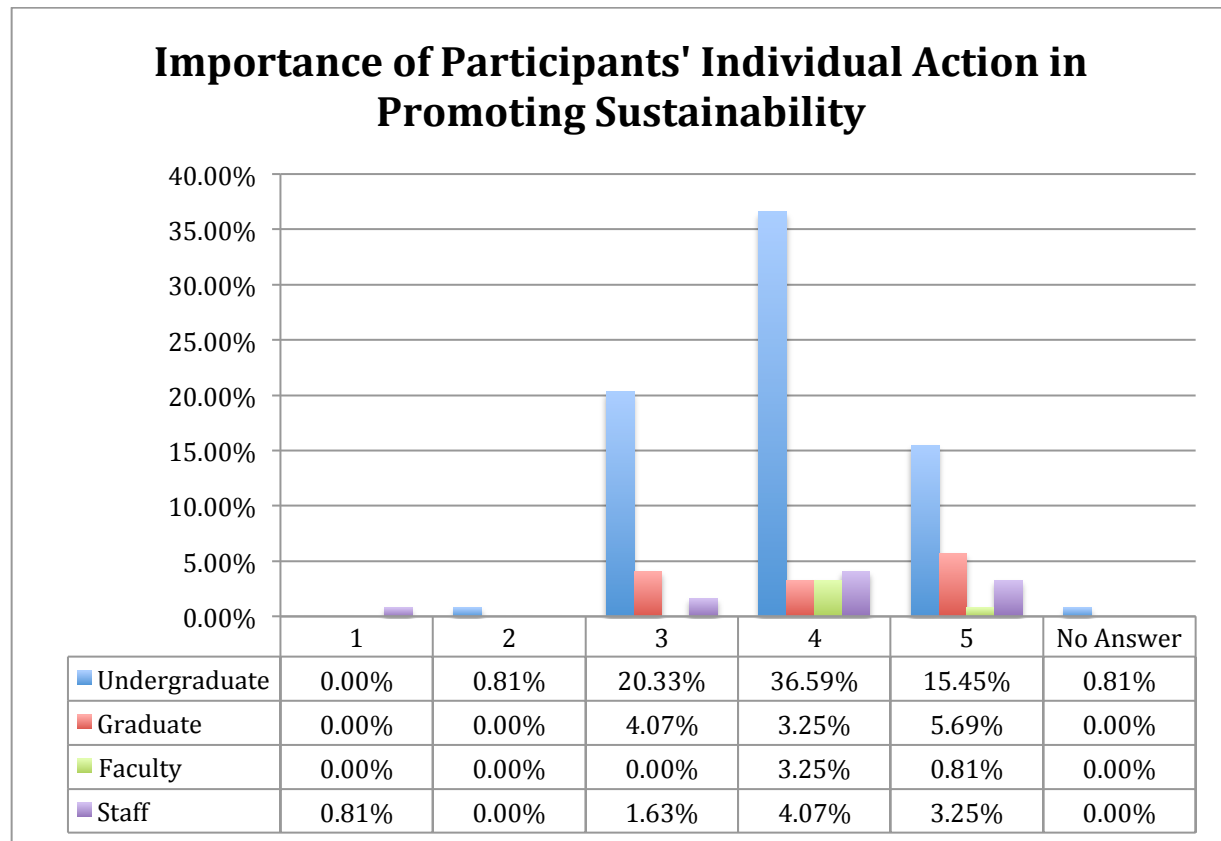


Figure 3.2

(Question 4) Importance of survey respondents in promoting sustainability through their own actions, on a scale of 1 (no importance) to 5 (high importance), broken down according to occupation.

The question of individual action regarding sustainability yielded very interesting results. We expected that respondents would believe individual action to be important. Our expectations were generally supported, as seen in Figure 3.1; however, the perception of individual importance was significantly downplayed once personal action was called into question (See Figure 3.2). This suggests that a proportion of the community believe individual action is important, whereas personal actions are not. The implication of this is that calls for action based on environmental arguments alone may not be enough; some may agree that individual contributions are needed, but refuse to take personal action under the premise that their own actions are unimportant or ineffective.

Section 4: Accessibility of information

Relevant question:

- Question 7: *On a scale of 1 (not accessible at all) to 5 (extremely accessible), how accessible is information on energy efficiency developments at Mac Campus?*

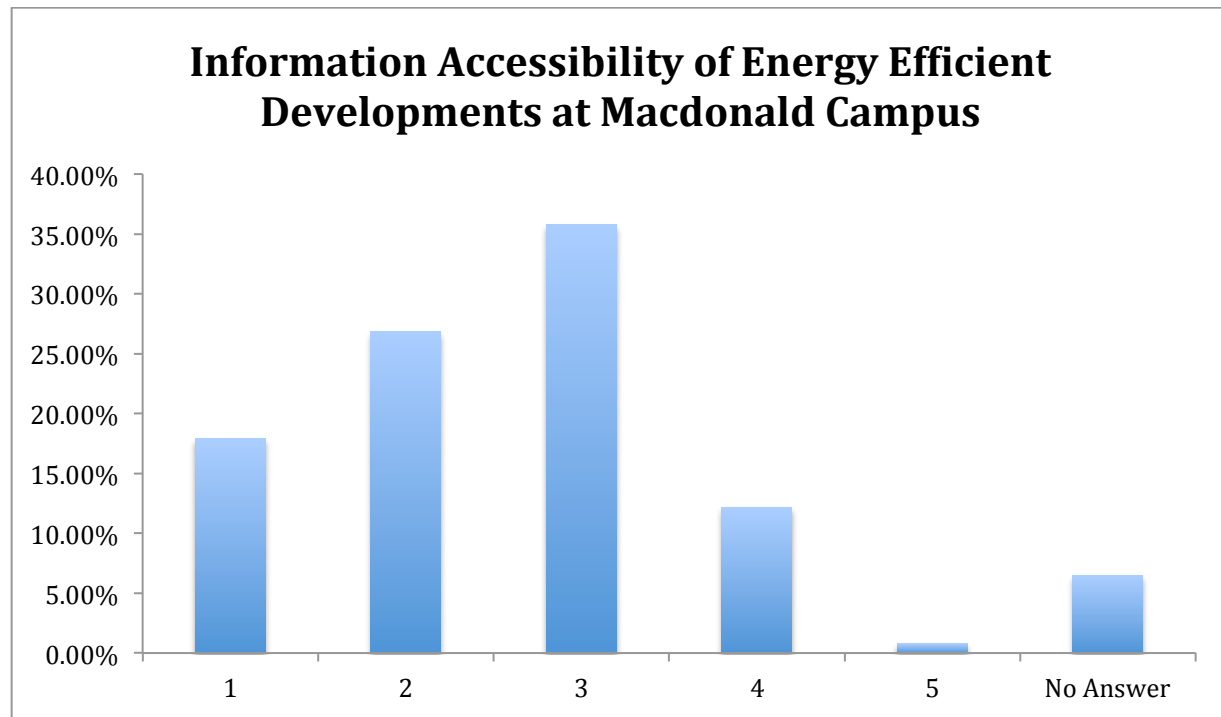


Figure 4.1

(Question 7) Information accessibility on energy efficiency developments at Macdonald campus, on a scale of 1 (not accessible at all) to 5 (extremely accessible). The results represent a cumulative answer from all occupations.

Responses indicated that most people at the Macdonald campus do not know about energy efficiency developments on campus (See Figure 4.1). This was reflected during our discussions with various individuals; the majority of people were unfamiliar with initiatives, including the Macdonald Energy Project and the McGill Energy Dashboard. This lack of information accessibility can prove problematic in establishing a culture of sustainability, since it may hinder individual action. Individuals willing to contribute to environmental movements on campus may find themselves in a state of inaction, simply because they do not know what options and initiatives are available. These results suggest that the general lack of awareness about environmental initiatives is a significant hindrance to environmental action within the campus.

Section 5: Macdonald Campus vs. Home

Relevant question:

- Question 8: *Relative to your behavior at home, are you more or less conscious about your energy use when on Mac Campus?*

Table 5.1

(Question 8) Breakdown of relative energy consciousness, according to occupation. The scale is from 1 (less conscious) to 5 (more conscious).

More conscious or less conscious about energy use						No Answer
	1	2	3	4	5	
Undergraduate	1.63%	8.94%	41.46%	19.51%	1.63%	--
Graduate	--	2.44%	4.07%	1.63%	4.07%	0.81%
Faculty	--	1.63%	2.44%	--	--	--
Staff	0.81%	1.63%	5.69%	--	--	1.63%
TOTAL	2.44%	14.63%	53.66%	21.14%	5.69%	2.44%

The majority of people surveyed showed that they are not more conscious about energy use at the Macdonald Campus than they are at home (See Table 5.1). Combined with results shown in Figure 2.3, which indicated that people at the Macdonald campus are conscious about their energy use, this would then imply that community members apply their studies to their daily lives at home. This finding is quite important, as it further compounds the necessity to establish a culture of sustainability in campus as it may carry on throughout the student's life.

Section 6: Green Activities

Relevant question:

- Question 9: *Please list any green activities at the Macdonald Campus dealing with student life that you are familiar with, and indicate how often you take part in the activity on a scale of 1 to 5.*

Table 6.1

(Question 9) The table depicts listed actions and initiatives on campus that were considered to be “green.” It also indicates the proportion of total respondents that participate in the action/initiative at a particular frequency, 1 (Never participate) to 5 (Frequently participate).

List of Green Activities and How Often They Are Used						
	0	1	2	3	4	5
Compost	0.71%	5.00%	0.71%	19.29%	12.86%	6.43%
Recycling	0.00%	0.00%	0.00%	3.57%	10.71%	10.71%
Farm	0.00%	0.00%	0.00%	1.43%	0.00%	0.71%
Compost (Link Cafe)	0.00%	0.00%	0.00%	0.00%	0.71%	0.00%
MSEG	0.00%	0.00%	1.43%	0.00%	0.00%	2.86%
Food Box	0.00%	0.00%	0.00%	0.00%	0.71%	0.00%
Transportation (Shuttle & Free Bike)	0.71%	0.00%	0.00%	0.71%	1.43%	2.14%
Bring Your Own Plate	0.00%	0.00%	0.71%	0.00%	0.00%	0.00%
Happy Belly	0.00%	0.00%	1.43%	2.14%	0.71%	0.71%
CERES	0.00%	0.00%	0.00%	2.14%	0.00%	0.71%
Out of the Garden	0.00%	0.00%	0.00%	0.71%	0.71%	2.14%
Use Stairs	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%
Turn Off Lights	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%
Hug Your Mug	0.00%	0.00%	0.00%	0.71%	0.71%	0.00%
Eco Rez	0.00%	0.00%	0.00%	0.71%	0.00%	0.00%
Mac Market	0.00%	0.00%	0.00%	0.71%	0.71%	0.00%

Table 6.1 gives us a table showing all the activities people at the campus consider to be environmentally friendly. The most common activities cited were composting and recycling. While these results may initially seem encouraging, it should be noted that most people selected the value 3 for composting, meaning that they don't compost all the time. This is in accord with results from Gorilla Composting during a waste audit, where estimates indicated that up to 48% of all material in garbage bags were compostable (CERES, 2011). This suggests that, if done properly, initiatives designed to increase awareness and enforce proper sorting behavior could have pronounced effects.

Question 9 also casts light on a perception issue- that people believe the most prominent "green" actions they can engage in on campus to be composting and recycling. Unfortunately, these behaviors alone, while important, do not fully encompass the range of environmental initiatives that are available- and needed- on campus. Recycling- and to a lesser extent, composting- are considered by many to be customary in this day and age. Hence, if Macdonald Campus community members are to uphold their reputation of being environmentally friendly, there is a need for greater participation in environmental initiatives that go above and beyond the standard.

Section 7: Information Event

Relevant question:

- Question 10: *If an information session about green initiatives available at the Macdonald campus was hosted during your orientation session, how likely would you have been to attend?*

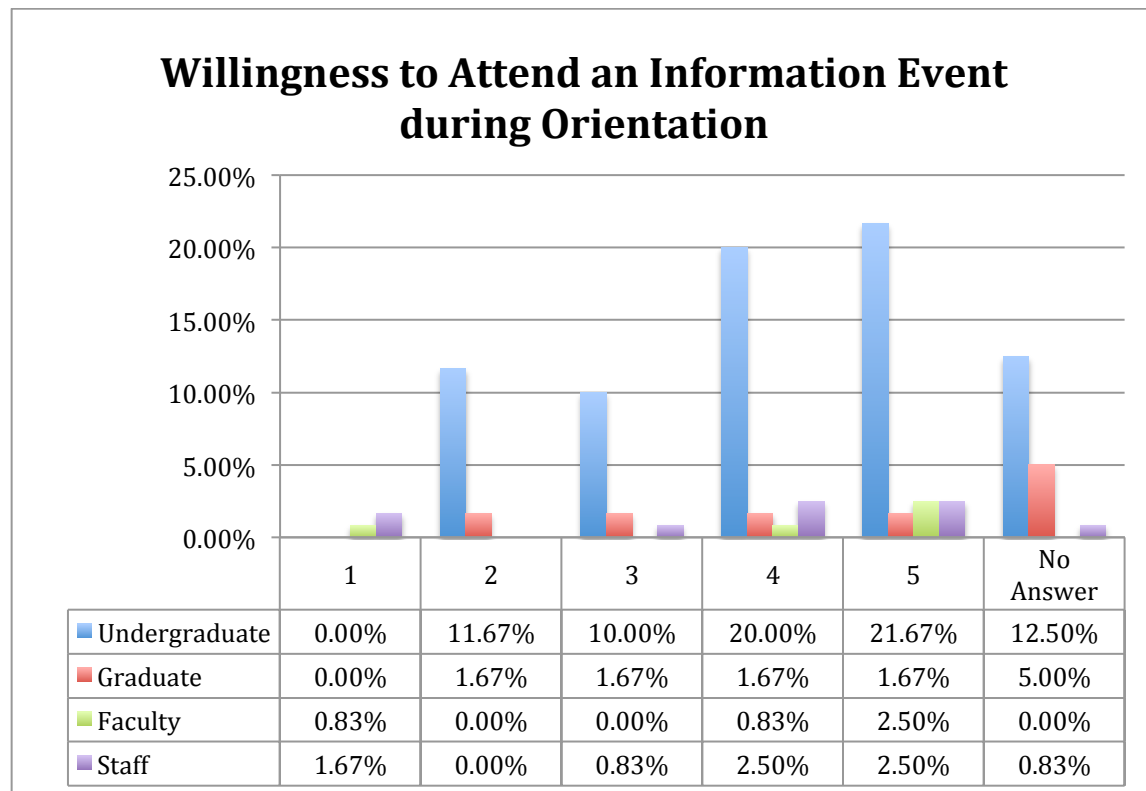


Figure 7.1

(Question 10) Willingness to attend an informational event during Orientation, on a scale of 1 (not accessible at all) to 5 (extremely accessible).

This question was designed to see if students would attend an information event discussing current and future green initiatives on campus. The results in Figure 7.1 indicated considerable interest in the event. Interestingly enough, the majority of faculty and staff answered “very likely” or “definitely” for attendance. This shows us the staff and faculty want to learn more about what the campus has to offer. However, based on the wording of the question, the degree of their desired involvement is unclear; some faculty members may be content with a participatory role, while others, with their expertise on environmental issues, may wish to become more involved. Overall, the message to be taken from this question is that, while informational events during orientation would be well received, students should not be the sole target- it is important to get faculty and staff members involved as well.

Solutions and Initiatives

Apart from commenting on energy use at Macdonald Campus, one of the primary aims of this report was also to provide ways of influencing social behavior to decrease energy use. Based on an ENVR 401 project conducted in Fall, 2011, this task is attainable given the use of proper methods, albeit quite difficult to achieve. It should be noted that the project listed “education,” “competition,” and “incentives/decentives” as the most effective ways of changing behavior (M. Fabian, 2011). If these findings are to be taken as true, efforts to change social behavior should focus on these methods for maximum effect.

To fix this problem, McGill needs to make its energy developments, such as the McGill Energy Plan, more apparent to the student body. Despite the release of the Governors’ report and plans regarding this topic (Governors, 2010), efforts towards increasing information accessibility remain insufficient, as evidenced by results from Section 4. Suggestions to improve accessibility, such as advertising the existing energy dashboard, would likely have significant impacts on the area, and will be discussed in further detail later on.

Proper education is the first step to influencing social behavior. By informing the Macdonald community about sustainability initiatives, we would be able to help dispel any misconceptions about the campus’ current environmental state (see Figure 2.2). Contrary to the students’ popular belief, awareness and involvement in composting and recycling alone (see Table 6.1) does not mean the campus is energy efficient. As discussed earlier, the faculty views energy efficiency differently due to their experience and knowledge about the inner workings of the campus; however, through education, the students can easily be brought up to their level. The following are proposals to make the students more aware of energy use on campus:

One Day A Month Awareness Event

We propose the hosting of a monthly awareness event regarding a particular energy or environmental topic pertinent to the campus. While student environmental groups on campus would naturally be entitled to manage and take part in the event, faculty and staff members would also be strongly encouraged to assume roles of responsibility. Given the general conducive nature of the faculty to environmental issues, these events would provide them another way to communicate with the campus and promote a topic they would like to see the student body address. That said, student groups would still be encouraged to host these events; collaborations between student groups and faculty members would certainly result in mutual gains. This initiative has already been put in motion, with eight events being planned for the 2012-2013 school year. If done well and favorably received, this may get the ball rolling for the 2014-2015 school year, even potentially becoming integrated in campus culture as a tradition. Brief descriptions of the events being planned are as follows:

- An exhibition of lights would be set in the MS (Macdonald-Stewart building) Foyer, using a predetermined amount on energy that would be put on display. This will help provide a

visualization of energy use on campus, and can potentially reflect the energy used in at least one building on campus.

- To bring awareness to water consumption, a shower will be displayed in the foyer, along with relevant figures on daily water use. Numerous options for the figures can be used, such as national averages from government databases or estimates from Macdonald campus' pipelines.
- To help combat bottled water use on campus, a figure made of plastic water bottles will be constructed; this figure will holding a single refillable water bottle to represent the amount of plastic that could be saved.
- Regarding the misplacement of plastic into garbage bins, instead of recycling bins, (gorilla composting waste audit), a display will be designed to show the volume of mishandled plastic.
- A flash mob event will be planned to highlight the water bottle refill stations available to students. CERES in co-ordination with CENEM hosted this event for the 2011-2012 year.
- To illustrate energy use, AA batteries will be used to show energy use of iPods, cell phones, computers and dryers. As each battery represents a certain amount of energy, estimates of appliance energy use will be represented using the equivalent number of batteries.
- Another event will focus on presenting proportion of energy delivered to the campus from various energy sources. This is also to illuminate the fact that the campus has yet to reach its mandate of using 90% of renewable energy, and is currently sitting around 30% instead (R. Proulx, 2012).
- The final event planned will be a map of the campus, warped so that each building's is representative to its energy use- i.e. The Macdonald-Stewart building will be the largest building on the map (R. Proulx, 2012).

Advertise McGill's Energy Dashboard

McGill has recently installed a comprehensive system of energy monitoring, known as the McGill's Energy Dashboard. This system allows anyone to view the energy consumption of most of McGill's buildings, including most buildings on the Macdonald Campus (Pulse-Energy, 2012). Unfortunately, due to the lack of awareness on campus, we believe that it is not being used to its full potential. To help raise awareness about it, we recommend that the TV in the MS Foyer display information from the service regarding buildings on campus. Considering the Macdonald community's relative energy consumption consciousness (see Figure 2.3), it is expected that such informational programs should be well received. Actions to implement this initiative are currently already underway; it will most likely be ready for the 2012-2013 school year.

Green Tips, an agenda section

The agenda given to students will include a Green Tips section. This will include general advice for reusing materials and reducing energy consumption, as well as a listing of green activities and programs currently available on campus.

While research has shown that initiatives involving face-to-face contact are generally more effective, this section of the agenda is important because it will serve as a supplement, or reminder, of the information provided during the Orientation Event (discussed below). Discussions with the Macdonald Campus Student Society to implement this initiative have been a success- we hope to see this in action in the near future.

Orientation Event

Generally speaking, students applying to study at the Macdonald Campus are applying to the “agricultural and environmental campus” of McGill; hence, it should only be natural that they are informed about environmental issues on campus. This event will focus on presenting the environmental side of the campus, consisting of a short presentation showing the courses, initiatives, and environmental groups an environment student may be interested in taking part. For example, to improve energy awareness, there will be a section consisting of a breakdown of Macdonald campus’ energy sources, along with a discussion about students’ individual perceptions and how they can reduce their individual energy consumption. Due to the introductory nature of orientation events, however, it may be preferable to include a broad range of topics in the presentation and discussion, rather than focusing on energy use alone. Initiatives such as B.Y.O.M. (Bring Your Own Mug) have largely been overlooked by incoming students, due in part to the lack of promotion. This event, which is currently in the planning stages, will hopefully provide the advertising and awareness that these initiatives so desperately need.

Competitions

One of the most effective way to effect change is through competition (M. Fabian, 2011). Hence, we propose two competitions to be brought to the campus. In addition to the residence competition, there can be an inter- and intra-university competition. Through groups like CENEM (Coalition Environnementale des Étudiants de Montréal) and tools like the McGill Energy Dashboard, McGill can face off against other Montreal universities for a predetermined amount of time. This can be accomplished by having each university select comparable buildings for the competition, and then competing to determine the greatest proportional drop in energy consumption. In a similar fashion, this idea can be applied within McGill’s own boundaries by having the Macdonald Campus challenge the Downtown Campus. The second proposed competition is a simple obstacle course, placed in this upcoming year’s frosh activities. The course would involve engaging activities that raise environmental awareness, such as having students racing to sort waste into the proper bins. The obstacle course suggestion is in the process of being implemented.

Incentives and Decentives

As stated earlier, the ENVR 401 report headed by M. Fabian in 2011 suggested incentives and decentives as a very effective way of changing behaviour. One proposal, then, was to have residences give students a cap for energy use; if a room's energy consumption went above the cap, the occupants would be billed that amount in their next rent payment. The problem with this, however, is that Laird Hall and EcoResidence do not have the proper energy metres in place to charge an individual room (Laird Hall) or apartment (EcoResidence). The 2011-2012 school year has seen an increase in energy meters installed for the energy dashboard; unfortunately, none were included in either residence. Furthermore, the spatial distribution of energy within individual buildings is still unknown. Without this ability to measure individual energy use and determine whether residents have gone over the energy cap or not, it would be difficult to properly distribute incentives or decentives. Hence, as supported by interviews with the Laird Hall Housing Office, an incentive/decentive approach is unlikely to work until energy-recording equipment of high resolution is placed on campus.

Getting Involved

These solutions, particularly the One Day a Month Awareness events, would not achieve maximum efficacy without input from the McGill Faculty and Staff. If you wish to help by hosting some of these activities or giving helpful advice, please contact the MCSS Environmental Advisor at env.adv.mcsc@gmail.com. Any further ideas, or suggestions for initiatives would be most appreciated.

What we learned (Technical)

From this project, we have learned a great deal about energy use and implementing sustainability on campus. This research project illuminated the status quo on Macdonald campus' energy use: while certain aspects- such as community interest- are to be commended, awareness of energy consumption and campus initiatives are generally not up to the standards of what one would expect from an environmentally conscious community. This is clearly seen in the survey results. For example, in section 2, students showed a proclivity to characterize the campus as being environmentally friendly; however, this view was not shared by the faculty and staff, who are more acquainted with the workings of the campus and hence more aware of its sheer energy consumption. This observation is further supported by results from section 4 and 6; community members generally felt that there was limited accessibility of information to sustainability initiatives, and were consequently unable to list the multitude of initiatives present on campus. Many written responses bolstered our findings, explicitly stating that they were unaware of the happenings and green events going on in campus. Simply put, the lack of awareness is arguably the greatest hurdle to developing a culture of sustainability on campus, and should be a primary leverage point to enact behavioral change.

This said, there are many reasons to be optimistic about sustainability initiatives on campus. On the contrary, there exists a multitude of projects that are underway across the campus. Clubs, such as Gorilla Composting and CERES (Comité Étudiant pour une Responsabilité Environnementale et Sociale), are reaching out to students, seeking to integrate sustainability into their everyday lives. As evidenced by the existence of the McGill Energy Dashboard and the Macdonald Campus Energy Project, members of the administration are diligently working to establish energy-efficient infrastructure that is crucial for a culture of sustainability to thrive. Furthermore, as shown through findings in section 7, the community appears to be quite receptive to environmental initiatives, and has indicated a willingness to learn and adapt to sustainability initiatives if given the information and opportunity. Apathy and inaction do not seem to be the main problem; rather, survey results suggest (as discussed in Section 2 and 4) that communication and awareness is the element most in need. As our proposed solutions have yet to be carried out, their efficacy at improving environmental awareness is ultimately unknown. Nonetheless, based on our findings, it is reasonable to conclude that initiatives designed to enhance the accessibility of information are likely to have substantial impact on energy use on campus. What Macdonald campus needs most, then, are seeds of communication to help the garden of sustainability grow.

What we learned (Personal)

Having gone through the entire research process, lessons were learned that extend beyond the theme of the project itself. One of the most important messages we took from the project was the importance of personal contact. This theme pervaded throughout the entire project, be it through interviews, surveys, or even the research itself. During our meetings with various personnel throughout campus, we were blown away by others, not just through their willingness to help us, but also through the degree of detail in the information they were able to provide. Years of experience, shared by people such as Lilith Wyatt and Denis Mondou, were invaluable to our investigation and could not be replaced by any amount of books. Similar sentiments could be found in the research; findings stressed that personal contact and face-to-face time was essential in disseminating information and effecting change in social behavior. Indeed, we experienced this fact while distributing surveys and collecting information. When dealing with faculty and staff members without prior contact, people were much more receptive to phone calls and drop-in meetings than anonymous emails. Once people are approached personally, they are quite willing to help and provide their feedback. The kindness of strangers, combined with the efficacy of personal contact, is an outstanding lesson each of us will take with us in our future endeavors.

Taking on a slight “meta” twist, another key lesson learned through this process was about the process itself. More specifically, we were exposed to the nuances in research design that can ultimately determine a research project’s failure or success. Survey design is the predominant example of this. Contrary to popular belief, surveys require a considerable amount of effort to truly be informative. Intricacies of the English language, coupled with the unpredictability of human individuality, mean that surveys can easily be misinterpreted by respondents, rendering conclusions and findings moot. Hence, the relevance of a survey depends not only on the respondent’s willingness to provide accurate information, but also the researcher’s ability in survey design as well. Complications with surveys can also arise during data collection. When handing out surveys, we quickly discovered that a certain degree of “aggressiveness” was required; while the majority of people are very willing to fill out surveys, it is ultimately the surveyor’s responsibility to take the initiative and ask for others’ feedback. Searching for target respondents and providing respectful (but incessant) reminders may also be required on occasion, especially when dealing with occupied individuals like professors or graduate students. Tips like these will be remembered for future reference, and will likely assist us in the years to come.

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APPENDIX 1

Questionnaire on Energy Use at Mac Campus

-Filling out and returning the survey is implicit consent-

1. **Occupation:** Undergraduate Student Graduate Student Faculty Staff

2. How often do you do the following on Mac Campus?

	NA	Never	Rarely	Sometimes	Usually	Always
Close fume covers when not in use	0	1	2	3	4	5
Keep windows closed during winter	0	1	2	3	4	5
Sort waste into proper recycling bins	0	1	2	3	4	5

3. On a scale of 1 (strongly disagree) to 5 (strongly agree), how do you feel about the following statements relating to how environmental Mac Campus is?

Mac Campus is an energy-efficient place.	1	2	3	4	5
People at Mac Campus are conscious about their energy use.	1	2	3	4	5

Please state your reason for giving the above ratings:

4. On a scale of 1 (not important at all) to 5 (extremely important), how do you feel about the following statements relating to sustainability?

How important is individual action in promoting sustainability (as opposed to institutional action)?	1	2	3	4	5
How important do you believe your actions are in promoting sustainability?	1	2	3	4	5

5. Have you been at Mac Campus over the past 3 years? Yes No

If yes, please answer the following question:

Over the past 3 years, has the degree of energy/environmental consciousness at Mac campus increased, decreased, or stayed the same? Please explain.

6. On Mac Campus, are there any areas of energy use in particular need of improvement?**7. On a scale of 1 (not accessible at all) to 5 (extremely accessible), how accessible is information on energy efficiency developments at Mac Campus?**

1 2 3 4 5

8. Relative to your behavior at home, are you more or less conscious about your energy use when on Mac Campus?

Less Conscious Somewhat less No Difference Somewhat more More Conscious
1 2 3 4 5

9. Please list any green activities at Mac Campus dealing with student life that you are familiar with, and indicate how often you take part in the activity on a scale of 1 to 5.

	Not Applicable	No impact at all	Barely any impact	Some impact	Quite a bit of impact	A lot of impact
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5
_____	0	1	2	3	4	5

10. If an information session about green initiatives available at Mac was hosted during your orientation session, how likely would you have been to attend?

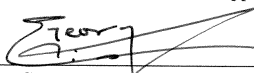
Not Not likely Barely Somewhat Likely Very
Applicable at all likely likely likely
0 1 2 3 4 5

**Research Ethics Board**

Faculty of Agricultural and Environmental Sciences

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www.mcgill.ca/macdonald/research/compliance/human/**Certificate of Ethical Acceptability
Research Involving Humans****REB File #:** 977-0212**Project Title:** *Independent Study on Changing Student Behaviour to Increase Energy Sustainability and Efficiency at the Macdonald Campus of McGill University***Principal Investigator:** Peter Tikasz
Co-Investigators: Andrew Wu
Jaaved Singh**Department:** School of Environment**Status:** Undergraduate Students**Supervisor:** Georges McCourt, Faculty Lecturer**Funding Agency and Title:** N/A

This project was reviewed and approved by

Expedited Review ✓
Full Review

Elias Georges, Interim Chair
REB, Faculty of Agricultural and Environmental Sciences**Approval Period:** March 14, 2012 to March 13, 2013

This project was reviewed and approved in accordance with the requirements of the McGill University Policy on the Ethical Conduct of Research Involving Human Subjects and with the Tri-Council Policy Statement: Ethical Conduct For Research Involving Humans

*All research involving human subjects requires review on an annual basis. A Request for Renewal form should be submitted at least one month before the above expiry date.

*If a project has been completed or terminated and ethics approval is no longer required, a Final Report form must be submitted.

*Should any modification or other unanticipated development occur before the next required review, the REB must be informed and any modification can't be initiated until approval is received.