Eco-Efficiency Marketing Study

Dalhousie University

Dalhousie University: Halifax, Nova Scotia
SUST & ENVS 3502
Campus as a Living Laboratory

Final Report
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1.0 Executive Summary

Eco- Efficiency refers to the creation of greater goods and services while simultaneously reducing environmental resource use and degradation (Eco-Efficiency Centre, 2011). The Eco-Efficiency Marketing project answers the following question: "What areas of eco-efficiency are in most need of improvement at the Faculties of Management and Engineering on Dalhousie campus, and what marketing tools can better promote eco-efficiency among staff and students within these faculties?". In doing so, the Eco-Efficiency Marketing Project lends itself to the overall goals of greening the campus that are presented in the Dalhousie Sustainability Plan (Dalhousie University, 2010).

An extensive literature review suggested that successful marketing incorporates community-based social marketing and active learning techniques. These techniques include: making marketing engaging and relevant to audiences through the use of specific, tangible information and interactive components. Our survey of eco-efficiency knowledge at the faculties of management and engineering demonstrated that while most respondents are committed to the ideology of sustainability, there is limited practical knowledge of and commitment to engaging in eco-efficient behaviour on campus. In particular, understandings of waste management were limited among students and staff at both faculties, posing a significant barrier to the adoption of eco-efficient behaviour.

The Eco-Efficiency Marketing Project addresses perceived barriers identified in our survey results by incorporating them into a Lunch N Learn Powerpoint presentation. This presentation can be used to promote eco-efficiency on Dalhousie campus, in the manner that our literature review suggests will most effectively encourage positive behavioural change. Recommendations for further action include better signage, financial incentives and interactive education in regards to eco efficient behaviours at Dalhousie. Further research is necessary to determine the perceived barriers to eco-efficiency on a campus-wide level, and in developing a faculty-specific survey to better understand this demographic's perceptions of eco-efficiency.

2.0 Introduction

The term 'eco-efficiency' was first defined by the World Business Council for Sustainable Development (WBCSD) in 1992. Combining both ecological and economic sectors, eco-efficiency refers to the greater creation of goods and services while using fewer resources, thus reducing waste and environmental degradation. Specifically, eco-efficiency aims to improve energy efficiency, waste management, water conservation and use of hazardous chemicals. In simple terms, it means doing more for less.

As Dalhousie progresses toward a greener future, eco-efficiency will undoubtedly play a significant role. The Eco-Efficiency Centre is interested in reaching out to students and staff at Dalhousie to educate them and develop 'stewards for change'. In order to assist the Eco-

efficiency Centre in its mandate, our team was asked to develop marketing materials to present to students and staff at Dalhousie, specifically the Faculty of Engineering and the Faculty of Management. In doing so, we hope to increase awareness of eco-efficient behavioural choices at Dalhousie University. The following report will provide an overview of our study on marketing eco-efficiency on campus, and provide recommendations based on our findings.

2.1 Project Definition

Research Question

"What areas of eco-efficiency are in most need of improvement at the Faculties of Management and Engineering on Dalhousie campus, and what marketing tools can better promote eco-efficiency among staff and students within these faculties?"

Purpose

The purpose of the Eco-Efficiency Marketing Project is to gauge current awareness of eco-efficiency within the faculties of Engineering and Management. Based on information gathered, we will develop effective marketing tools designed to address the gaps between eco-efficient knowledge and behaviour. Our long-term objective is to change the attitudes and behaviours of staff and students at Dalhousie in order to improve energy efficiency, water conservation, and waste management on campus. In working towards this objective, our study will contribute to the overarching goals of Dalhousie's long-term sustainability plan (Dalhousie University, 2010).

2.2 Goals and Objectives

Goal 1

To determine the extent of eco-efficient behaviour, beliefs and knowledge of available resources within the faculties of management and engineering.

Objectives

- Using a survey, collect data on the eco-efficient behaviour, beliefs, and knowledge of available resources at the faculties of management and engineering
- In analyzing the survey, identify gaps in awareness where future eco-efficiency outreach should be focused
- In analyzing the survey, determine the perceived barriers that that challenge the implementation of more eco-efficient practices on Dalhousie campus

Goal 2

To develop marketing tools, which can be used in the future to effectively raise awareness about promote eco-efficiency on Dalhousie campus

Objectives

- To provide information on the components of eco-efficiency and the ways in which students and staff in the Management and Engineering Departments can reduce energy, water, and waste.
- To provide information on the initiatives and resources available at the Office of Sustainability and the Eco-Efficiency Centre.
- Develop a Powerpoint presentation that incorporates social-marketing and active learning theories to effectively address gaps in eco-efficient knowledge and practice at Dalhousie.

3.0 Background

3.1 Eco-Efficiency at Dalhousie

There are two principle institutions that address eco-efficiency at Dalhousie University – the Eco-efficiency Centre and the Dalhousie Office of Sustainability. The Eco-Efficiency Marketing Project makes use of the marketing strategies offered by the Eco-Efficiency Centre, in addition to studies conducted by the Office of Sustainability. In combining these two campus-based resource hubs, we hope to generate the most effective eco-efficiency outreach possible.

The Eco-efficiency Centre was established in 1998 with assistance from Nova Scotia Power (Eco-Efficiency Centre, 2011). The Centre helps small and medium-sized businesses improve their eco-efficiency; reducing costs and becoming more economically efficient while simultaneously putting less stress on the environment. Of particular influence on this project were the Eco-Efficiency Centre's best management practice (BMP) fact sheets, which detail the ecological and economic benefits of improving eco-efficiency, and how it can be attained through specific efforts.

As opposed to engaging in off-campus outreach, the Dalhousie Office of Sustainability develops policies and programs that further on campus efforts in sustainability. The Office, "focuses on supporting solutions that create positive social, ecological and economic change in university operations" (Dalhousie University, 2011). One of the most comprehensive policies put forth by the Office of Sustainability is the Dalhousie University Sustainability Plan (2010). Inspired in part by the government of Nova Scotia's *Environmental Goals and Sustainability Prosperity Act* (EGSPA), the plan provides "strategic directions for achieving sustainability outcomes in campus operations" (Dalhousie University, 2010). The plan advocates for further integration, planning, efficiency, continual improvement and innovation at Dalhousie, thus improving ecological health benefits and economic success. The plan recommends addressing

social behaviour through social learning programs, specialized training, workshops, websites, student employment, and marketing campaigns. As the Eco-Efficiency Marketing Project focuses on creating an outreach tool with sustainability in mind, the Dalhousie Sustainability Plan plays a critical role in our research.

It is important to note that the Office of Sustainability already engages in campus-based sustainability outreach. One example of such outreach is the Campus *Green Guide*, a booklet detailing many simple ways to live a more eco-friendly life (Campus Green Guide, 2010). The guide was useful to our project, as it provided simple methods individuals can take to reduce their impact on the environment.

3.2 Marketing Techniques

The Eco-Efficiency Marketing Study aims to create alternative marketing tools to supplement already existing resources. Through the use of specific, efficient marketing strategies, this will broaden outreach.

Social Marketing Theories

Community-based social marketing "merges knowledge from psychology with expertise from social marketing" (Mohr, 2000, p. 546), and is designed to connect with audiences. Developing a community-based social marketing program involves uncovering the perceived barriers blocking desired behaviours, and designing marketing programs that address these barriers (Mohr, 2000). This theory determines the ultimate need to develop a survey that identifies which areas of eco-efficiency are least practiced at Dalhousie. Furthermore, the survey should uncover what barriers prevent people from adopting these behaviours. With this information, we can tailor our marketing tools to help people overcome these barriers to eco-efficiency.

Nedra Weinreich further explains the concept of social marketing as the "use of commercial marketing principles and techniques to promote the adoption of a behaviour that will improve the health or well-being of a target audience or of society as a whole" (Weinreich, 2011, p. 10). She provides three types of social marketing techniques:

- *Enabling* - enable the desired behaviour by making it easier than the alternatives
- *Motivating* - motivate the behaviour using education, incentives, and attitude change
- *Constraining* - make alternatives to the desired behaviour more difficult or impossible

(Weinreich, 2011, p. 99)

The Eco-Efficiency Marketing Project uses enabling and motivating marketing techniques to help individuals overcome the perceived barriers to eco-efficient behaviour.

In *Designing and Marketing Consumer Energy Conservation Policies and Programs: Implications from a Decade of Research,* Ritchie and McDougall connect social marketing to environmental initiatives. They analyze the effectiveness of energy conservation programs over a ten-year period, and provide recommendations for social marketing programs based on this information. Findings include:

- conservation programs which motivate people by means of nationalistic or altruistic goals will have either no or minimal impact.
- conservation programs which use information to outline the financial benefits of specific conservation activities will be of interest to consumers, (whether people will be motivated to act will depend on the perceived benefits they feel they will derive).
- conservation programs must be tailored to specific regional areas, particularly if the conservation program has a an information component.
- consumers must be provided with the specific information that tells them the financial benefits of each conservation action and in what sequence these actions should be taken

(Ritchie & McDougall, 1985, p. 16)

The Eco-Efficiency Marketing Project will build on these findings by creating social marketing that utilizes specific information, expresses impacts in financial terms, and gives specific, individual target actions. In doing so, we hope to effectively communicate eco-efficiency information, and motivate individuals to take action to improve eco-efficiency at Dalhousie (See Appendix A).

Active Learning

A primary goal of the Eco-Efficiency Marketing Project is to develop a more engaging marketing tool that can be used to promote eco-efficiency on campus. In *Student Engagement Techniques; Handbook for College Faculty*, Elizabeth Barkley (2010) explains that learning is a dynamic process that consists of "making sense and meaning out of new information by connecting it to what is already known" (Barkley, 2010, p. 8). She describes passive learning as listening to a lecture, watching a film, or reading, and active learning as "doing what we think, and thinking about what we are doing" (Barkley, 2010, p. 8). Barkley suggests that in order for students to fully understand an idea, they need to be both informed and engaged in a variety of performances that make active use of ideas.

Thus, to be effective, the Eco-Efficiency Marketing project must develop a tool that allows audiences to actively engage in the information being presented. To do so, we will create a captivating presentation on the subject of eco-efficiency. Barkley (2010) tells us that audiences best remember information shared at the beginning of presentation, followed by information divulged at the end. Furthermore, there is a downtime in the middle where the information is least retained (Appendix B). In order to incorporate Barkley's theories, our presentation involves interactive components (i.e. quiz activities), and ensures key information is allotted to the beginning and end of the presentation.

3.3 Case Studies from Other Campuses

The final area of background research was an investigation of sustainable and eco-efficient practices at extremely 'green' campuses. This allowed us to learn from the successes of our peers and build off of the marketing work they have begun already. There are many examples of powerful sustainability campaigns on university campuses. In this section we explore the sustainable marketing strategies of Yale University and Harvard University. These institutions were chosen because they both carry ratings of A- or higher on the *College Sustainability Report Card (Sustainable Endowments Institute),* which ranks 322 North American post-secondary institutions on their sustainable practices (SEI, 2010). As such, they are considered examples of highly successful sustainability marketing. Dalhousie received a 'B' in the College Sustainability Report Card (SEI, 2010), indicating some opportunities for improvement.

Yale University received an 'A' on the College Sustainability report card (SEI, 2010). The Yale Office of Sustainability's strategy encompasses policy and governance, operations, campus engagement, academic integration, and strategic partnerships. Yale aims to reduce its GHG emissions to 10% below 1990 levels by 2020 (a 43% reduction from 2005). The success of Yale's marketing campaigns can be seen in the '7% reduction in campus emissions despite a 5.5% increase in the main campus size' (Yale, 2011). In order to encourage both staff and students to behave more sustainably, Yale has employed many slogans. These slogans are catchy and clear in their meaning. For example, the slogan 'Turn Me Off, Baby' has been used on both posters and stickers to encourage shutting down computers to save energy (Fig. 1 in Appendix C). Yale has also taken steps to ensure that the audience can understand how much energy they are using. A good example of this is a poster addressing the Kilowatt hour, explaining that it is equivalent to the number of calories in a hamburger and French fries (Fig. 2 in Appendix C). Lastly, Yale has also developed, with the help of students, a comic series to encourage sustainable behaviours among students (Fig. 3 in Appendix C). The information is presented in a manner that is funny, educational, and visually appealing. Many of these strategies can be applied to the Dalhousie Eco-Efficiency Marketing Study.

Harvard University received a College Sustainability Report card grade of 'A-' (SEI, 2010). Like Yale, Harvard has adopted sustainability practices that are built upon reducing greenhouse gas emissions (to 30% below 2006 by 2016). Marketing that targets faculty and students is vital to the overall success of Harvard's GHG reduction goal. (Harvard, 2011). Harvard's marketing strategies can serve as a model to our eco-efficiency project in three areas – the use of relevant facts, faculty specific programming, and continuous outreach methods. Harvard uses information that is specific to its own campus to ensure that sustainability concerns are relevant to the target audience. This is best displayed in a 'Did You Know' section on the Harvard Sustainability web page. For example, 'Did you know that every day, students, faculty, and staff recover enough recyclables from Harvard Yard to fill 326 trash bags? (Harvard, 2011). Harvard also has excellent faculty outreach, such as the 'Green Office Certification'. Steps to greening offices at Harvard include: 'Microwaves, coffee makers, and

other small appliances are unplugged at night or are programmed to shut off through a timer' (Harvard, 2011). The last point that Harvard stressed is that sustainability outreach must be ongoing to be effective (Penny Slight, personal communication, March 16, 2011). To this end, Harvard has developed a Green Tip of The Month that helps in this process. For example, December was the Holiday Shutdown Challenge, which saved $30 000 and 43.4 Metric Tonnes of GHG emissions in 2010 (Harvard, 2011).

Many of the strategies employed by these successful universities, 'catchy' outreach, specific and relevant data, audience-specific incentives, have been incorporated into our marketing outreach and final recommendations to increase this project's capacity to improve eco-efficiency at Dalhousie.

4.0 Methods

The following section outlines the survey component of the Eco-Efficiency Marketing Project. The purpose of developing the survey is to identify the barriers to eco-efficiency that must be addressed and overcome.

Surveys were collected from students on March 17, 2011 from 10 am to 2 pm in the alumni lounge on Sexton Campus. Engineering faculty surveys were distributed by office administrators, and then picked up later in the day. Surveys were collected from students in the atrium of the Kenneth C. Rowe building from 11 am to 3 pm on March 16, 2011. In order to reach faculty, surveys were distributed to administrative assistants in the faculty of management on March 24, 2011 at 10 am and collected on Monday, April 4 at 11:30 am. All sample groups were given identical surveys, which were distributed in a haphazard, non-probablistic manner in both locations. Baked cookies were provided to students and faculty as an incentive to participate. At each location, 80 surveys were available for students to fill out and 20 surveys for staff and faculty. The respondent numbers were as follows: 78 students on Sexton campus, 17 Engineering faculty, 65 students at the Rowe building, and 8 Management faculty. Engineers and management personnel were targeted due to their close ties to the Eco-Efficiency Centre, and their perception by our client as being some of the least environmentally proactive faculties at Dalhousie.

The survey asked questions pertaining to eco-efficiency knowledge, beliefs, and behaviours. Both qualitative and quantitative information was gathered. At the direction of our client, all aspects of eco-efficiency were focused on, except for hazardous waste. The survey can be found in Appendix D; the questions can be understood as follows:

- Questions 1-3 determine the knowledge of eco-efficiency resources available at Dalhousie. They ask to what extent respondents are familiar with the Dalhousie Office of Sustainability, the Eco-Efficiency Centre, and the Green Guide. The participants are given three options – (a) I have not heard of them, I don't know what they do, (b) I have heard of them, but am not familiar with what they do, (c) I have

heard of them, and am familiar with what they do.

- Questions 4-9 explore the extent of eco-efficient behaviour relating to energy efficiency, water conservation, and waste generation. They ask the commitment respondents have to turning out lights, shutting off computers, climbing the stairs, bringing re-usable beverage containers and using re-usable textbooks. This section includes a section where respondents are asked to provide suggestions as to how to ensure greater participation in the aforementioned activities. Participants were given six possible answers – (a) Never, (b) Rarely, (c) Occasionally, (d) Sometimes, (e) Most of the time, and (f) Every time.
- Questions 10 and 11 are quiz-style questions, asking which materials can be recycled and composted in the Halifax Regional Municipality. These questions are important as they demonstrate whether respondents have the knowledge necessary to commit to *proper* waste reduction, regardless of whether or not they support it. See Appendix D for quiz questions.
- Questions 12-15 ask respondents about their personal beliefs in relation to eco-efficiency on campus: how they view the efficiency of waste management on campus, what types of eco-efficient programmes they would support Dalhousie implement, and to what extent environmental issues weigh in on their everyday decision making.
- Finally, the survey provides an opportunity for respondents to comment on how they believe eco-efficient behaviours at Dalhousie can be best achieved.

The results of the survey were analyzed through a variety of methods. Initial survey calculations were formulated through percentage calculations according to the number of respondents who gave each possible response. For example, 13 management students out of 65 said they climbed the stairs almost every time, a total of 20%. Following the calculation of these percentages, we used Microsoft Excel to create bar graphs of responses to each question according to their demographic (management student, management faculty, engineering student or engineering faculty). Bar graphs were plotted with percentages on the y-axis, and demographic on the x-axis, with each possible answer represented with a separate colour (see Appendix E). The results that followed from this analysis provided the foundation for the development of our Powerpoint presentation. Given the time restraints on our project, we felt that our survey was an appropriate and relatively effective means of helping us identify the key barriers to eco-efficiency.

Time was a significant limitation in regards to the depth of our research. Ideally we would have spent significantly more time developing and implementing our survey. This would have given us the opportunity to further clarify our questions and collect a greater number of responses. In relation to this, another limitation was that we had no control over who filled out our surveys (both in regards to time and our haphazard, non-probablistic survey technique). Our results may not be fully representational of the engineering and management faculties, given the small proportion of respondents in relation to the total population. Another limitation was our own knowledge and values; despite our best efforts, the survey reflected the beliefs of its makers – that all people should be environmental stewards, and

should understand and care about the natural environment. Despite these limitations, as our survey was designed to gauge people's *general* perspectives on eco-efficiency, we believe our methods are valid for the purpose they served and our results are accurate enough to identify overarching barriers to eco efficiency.

We delimited the scope of our study by restricting surveys to Sexton campus and the Kenneth C. Rowe building. This was both due to the request of our client, and our limited time frame to sample every faculty on campus. Further delimitations are evident in the type of feedback we acquired from respondents. For example, we did not consider gender, ethnicity, or age. Although these may have given interesting findings, we again lacked the time and capacity to properly collect and analyze such data.

5.0 Results

The results of our survey produced various findings, all of which were valuable in the development of marketing materials. The survey asked fifteen questions pertaining to three areas of eco-efficiency – waste management, water conservation and energy efficiency, though there was a focus on waste management. Results were tallied as percentages and can be found in the attached Appendix E. The following results reflect the most frequently answered responses for each question, which can be found in Appendix D.

The findings from question 1-3 show that faculty members had a better knowledge of the Office of Sustainability than students. In contrast, both faculty members and students weren't familiar with the Eco-Efficiency Centre, with management faculty members having the highest familiarity at 37.5%. Finally, results showed that close to half of all participants had never heard of the Green Guide.

Question 4-9 of the survey revealed complexities within a few areas, making certain results unrepresentative. Question four yielded "most of the time" for all participants, with exception of management staff. Many students commented that they were unsure whether they have permission to turn off lights in classrooms. Results from question five showed students take the stairs "most of the time", while staff take the stairs "every time". Questions six and seven both yielded unrepresentative results, as participants commented on the lack of a "not applicable" option. Question eight asked whether participants use reusable water bottles on campus. Most participants, in both faculties, answered "every time". The final question in this section also yielded unrepresentative results, as we didn't take into account that some students, and most faculty members don't buy textbooks.

Question ten asked participants to identify the listed item that could not be recycled in the Halifax Regional Municipality (HRM). Results varied, though most management faculty members and engineering students answered correctly with "number five plastics". Engineering faculty members and management staff guessed "aluminum foil" over "number five plastics". Similarly, question eleven asked participants to identify the listed item that could

not be composted in the HRM. Faculty members answered correctly with "biodegradable plastic bags", though results yielded mixed answers from students, most of which were incorrect. Frequent answers to the question, apart from "biodegradable plastic bags", were "cereal boxes" and "meat, bones and fat".

Question twelve yielded mixed results among engineering and management faculties. Both engineering students and faculty members found recycling and composting on campus to be "extremely convenient – I do it without thinking", while management found it to be "available", "somewhat convenient", and "extremely convenient". Question thirteen yielded unrepresentative results, therefore making the data unusable. We wished for participants to check all answers that applied, though many only checked one, as a lack of wording was evidently misleading. The final question of the survey, "Does environmental sustainability play a significant role in your everyday decision making?" yielded mixed results between students and faculty members. Faculty members answered "every once in awhile I think about it", while students answered "most of the time".

These survey results became a played a key role in identifying the barriers to eco-efficient behaviour at Dalhousie University. Using these findings, we will design a Powerpoint presentation for the purpose of increasing eco-efficiency awareness.

6.0 Deliverables

The completion of our literature review and survey analysis has led to the development of a Lunch N' Learn Powerpoint Presentation that the Eco-Efficiency Centre and the Office of Sustainability can use to promote eco-efficient behavior on campus. The presentation employs both active learning and community-based social marketing theories in its interactive and engaging layout and its use of specific, tangible, campus-focused information. Further, we acknowledge the barriers to eco efficiency that were identified in the survey analysis. It is our belief that the Lunch N' Learn presentation will be a valuable supplement to current eco-efficiency outreach tools already available at Dalhousie (See Appendix F).

7.0 Discussion

Upon beginning our study, we asked ourselves "What areas of eco-efficiency are in most need of improvement at the Faculties of Management and Engineering on Dalhousie campus, and what marketing tools can better promote eco-efficiency among staff and students within these faculties?". Such a significant research question has required extensive research and data collection. Through the compilation and analyzation of this research we have created a comprehensive marketing strategy that aims to eliminate the barriers that inhibit eco-efficiency.

Our literature review focused on multiple areas of study – effective marketing techniques, relevant internal Dalhousie information, government resources, and case studies. Research in these areas revealed valuable marketing techniques, in particular community-based social marketing. The underlying aspects of community-based social marketing compliment our study remarkably, while additionally offering valuable information that we were able to apply to our surveying and presentation design. Weinrich (2011) explains the theory of social marketing as the use of commercial marketing principles and techniques to promote the adoption of a behavior that will improve the health or wellbeing of a target audience or of society as a whole. In contrast, customary marketing is traditionally based on personal preference and belief (Weinreich, 2011, p. 10). As our study focuses on the broader concept of greening the campus, while promoting the wellbeing of the university population and environment, community-based social marketing became our focus. With this information in mind, we created a survey for the purpose of gauging a base knowledge of our target groups.

The survey focused on determining current knowledge and behaviour pertaining to three primary areas of eco-efficiency, and the existing barriers to eco-efficient behaviour. The survey results yielded interesting resolutions, specifically in regards to waste management. Our results showed three primary findings:

1) Participants claimed to practice eco-efficient behaviour, especially in areas of energy efficiency and water conservation.
2) Participants showed a serious lack of knowledge in the areas of Dalhousie resource centres (Office of Sustainability and Eco-Efficiency Centre), and proper waste management techniques.
3) Participants showed concern for sustainability in their everyday lives, with students especially claiming that it plays a significant role in decision-making.

These results hold great significance, and illustrate a key barrier to future eco-efficient behaviour on campus. While students and staff maintain a high regard for sustainability in their everyday lives, there is a serious knowledge gap occurring between this ideal and actualized eco-efficient practices. The Eco-Efficiency Marketing Project regards three primary areas – energy efficiency, water conservation and waste management. Based on our survey results, the largest knowledge gap occurs in the area of waste management – as participants, especially students, showed great confusion over which items are recyclable or compostable in the HRM. While resources exist to assist with mitigating such confusion on campus, such as the Green Guide or existing signage, they are evidently inadequate and must be reconsidered. Based on these deductions, we are building a marketing tool that best suits the nature of our target population and their needs – this being an environmentally concerned demographic with inadequate knowledge and/or resources to overcoming barriers to eco-efficiency.

Bringing together the information explored through our literature review, in addition to the survey results, we inferred that the creation of a lunch and learn presentation would be most adequate for stimulating learning and creating awareness. As previously mentioned, a

key concept of active learning is the stimulation of learning at the beginning and end of a presentation (Barkley, 2010). With this in mind, the design of our 'lunch n learn' presentation encompasses attention grabbers throughout, with key information outlined toward the beginning and close of the presentation. Furthermore, the presentation draws upon Ritchie & McDougall's (1985) findings on social marketing techniques. We've incorporated four of their concepts into our presentation in order to best engage students and staff: interactive, informative, personal and advocating elements. The incorporation of elements that are personal, specific and informative, allows participants to engage and better understand the depth of the presentation (Ritche & McDougall, 1985). In order to achieve this, we are using financial figures and facts that are specific to Dalhousie University. Furthermore, the implementation of an interactive element, such as a quiz, gives participants an alternative setting for learning that is both fun and exciting. Finally, the recommendations include basic techniques that participants can take away from the presentation in order to improve their eco-efficient behaviour. These quick facts, we recommend as a way in which to broaden the scope of eco-efficient marketing on campus.

8.0 Conclusion and Recommendations

As we have seen, the Eco-Efficiency Marketing Project can play an integral role in promoting a greener Dalhousie through eco-efficiency. Our project has addressed the following question, "What areas of eco-efficiency are in most need of improvement at the Faculties of Management and Engineering on Dalhousie campus, and what marketing tools can better promote eco-efficiency among staff and students within these faculties?". In order to answer our question we utilized a variety of research sources, both qualitative and quantitative in nature. Through this combination of literature and the conducted survey, we have determined the best possible method to market eco-efficiency on campus. Findings have revealed the necessity to address perceived barriers to eco-efficiency on campus within an active learning framework. We give the following recommendation for further research and action:

8.1 Recommendations for Action

Given the results of our survey, we recommend Dalhousie University take the following actions to enhance eco-efficient behaviour and awareness on campus:

- Increase signage in key areas to remind individuals that stairs are nearby, to bring their mug, to turn off lights in classrooms, and how to separate their waste. In addition,
    - Use 'quick facts' to change behaviour in key areas on campus. For example, indicate the number of trees needed to produce a single paper towel right beside the dispenser.

    - Post signs indicating relevant waste items (i.e. coffee cups beside coffee shops) *above* sorting bins so that the information is in the line of site of individuals wanting to dispose of items
- Incorporate our Lunch N' Learn presentation into the Green Week agenda and other educational programs.
- Require that vendors on campus who serve hot beverages offer a larger monetary discount for those who bring a mug. Our survey results indicate that twenty-five cents would be a reasonable incentive to encourage a larger proportion of the Dalhousie community to lug their mug.
- Incorporate a waste separation challenge into orientation week activities ensure those students who are not familiar with Halifax waste separation protocols learn early on what is expected.
- Replace all stand alone garbage bins found outside of classrooms with the four stream waste stations. In addition to this we ask that all garbage cans be removed from classrooms and instead post signs directing students to the nearest four stream waste station.

8.2 Recommendations for Further Research

This project reveals several potential future research areas. Possibilities include:

- A more extensive analysis of the populations studied, especially regarding the views of faculty members towards eco efficiency. More innovative techniques are recommended as a means to secure higher faculty feedback.
- Address the delimitations of our survey and failures within survey techniques, and sample those populations on campus we chose not to focus on. It would be of great interest to compare the views of those faculties perceived as being 'greener' to the eco-efficiency perspectives within management and engineering. These responses could provoke the development of another marketing tool that addresses different gaps in eco-efficiency knowledge.

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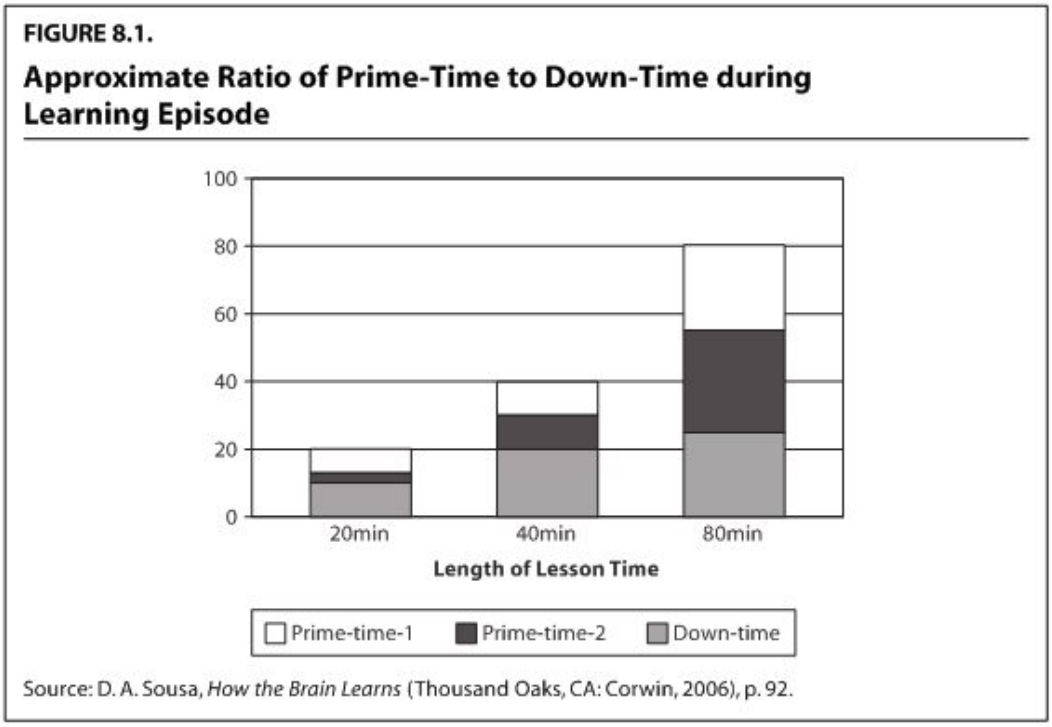
10.0 Appendices

Appendix A – Table of Community-Based Social Marketing Strategies and Behaviours

Community-based Social Marketing Behaviors and Barriers	
Behavior Classification	Barriers
curtailment (or continuous) *behaviors* involve reducing energy consumption by modifying present living patterns.	curtailment barriers ~ habit and inertia may be difficult to overcome, ~ the time and effort may be considered too great, ~ lack of knowledge of effective curtailment behaviors, ~ poor reinforcement because no apparent or large energy savings accrue from these behaviors
maintenance behaviors (operating efficiency, intermittent) involve reducing energy consumption by ensuring that energy using equipment is in good working order.	maintenance barriers ~ forgetting to perform behaviors because they are infrequent or periodic, ~ lack of technical knowledge or skill of how to perform activity, ~ monetary cost may be perceived as too high relative to perceived economic benefits;
efficiency (or investment, one-time) *behaviors* involve reducing energy consumption through structural changes in the home or travel environment. (Ritchie & McDougall, 1985, p. 18)	efficiency barriers ~ the monetary investment may be too high (i.e., consumer does not have the funds available), ' ~ lack of knowledge as to what should be done or who can be trusted to do it, ~ lack of knowledge of economic benefits and how much energy (money) could be saved, unwilling to spend the time to collect the information. (Ritchie & McDougall, 1985, p. 19)

Behaviors and Barriers to social marketing programs; Ritchie & McDougall,1985

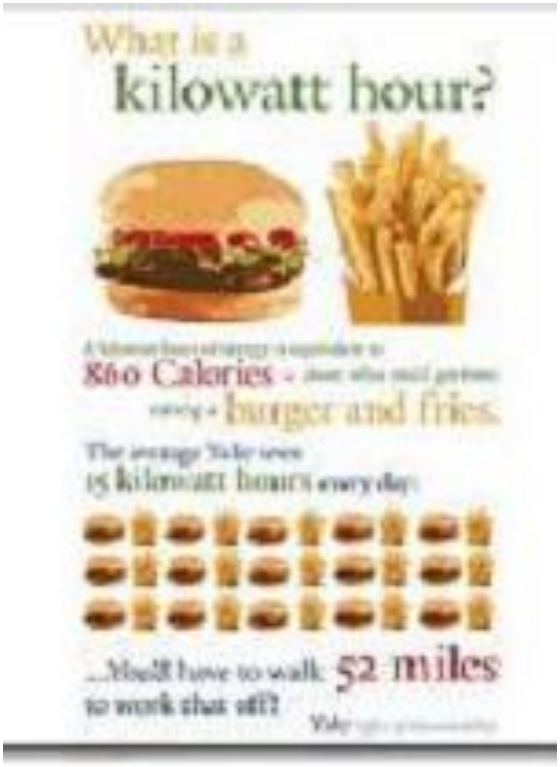
Appendix B – Graph showing ratio of prime-time to down time during learning episode



Active learning and down time; Barkley, 2010.

Appendix C – Marketing Strategies at Yale University

Fig. 1: Clever slogans: poster and sticker, Yale sustainability marketing (Yale, 2011).



Comprehensible data: poster explaining Kilowatt hours . 1 Kilowatt hour = 860 calories= hamburger and French fries. Average Yalie uses 15 Kilowatt hours each day; it would take 52 miles to walk off that many calories (Yale, 2011). ◊Fig. 2

Reaching Students: Dan the Green Dog, an ecological comic strip (Yale, 2011).◊Fig. 3

Appendix D – Eco-Efficiency Survey

DALHOUSIE UNIVERSITY
office.sustainability.dal.ca

A Short Survey: Environmental Sustainability on Campus

DALHOUSIE UNIVERSITY
ECO-EFFICIENCY CENTRE

Thank you for taking the time to complete this quick survey. The information provided will be used in the analysis of current student, staff and faculty commitment to green initiatives and general perceptions of environmental sustainability on campus. . Sustainability has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (United Nations, 1987)

	I have not heard of them, I don't know what they do	I have heard of them, but am not familiar with what they do	I have heard of them, and am familiar with what they do
1) Have you heard of Dalhousie's Office of Sustainability?	☐	☐	☐
2) Have you heard of the Dalhousie Eco-Efficiency Centre?	☐	☐	☐

3) Have you heard of the Dalhousie Green Guide? Yes ☐ No ☐

	Never	Rarely	Occasionally	Sometimes	Most of the Time	Every Time
4) Do you turn off the lights when leaving a classroom or office on campus?	☐	☐	☐	☐	☐	☐
5) How often do you climb the stairs, rather than taking the elevator?	☐	☐	☐	☐	☐	☐
6) Do you turn off your computer after use?	☐	☐	☐	☐	☐	☐
7) Do you bring a re-usable mug when buying hot beverages on campus?	☐	☐	☐	☐	☐	☐
8) Do you bring a re-usable water bottle to school?	☐	☐	☐	☐	☐	☐
9) Do you purchase or sell used textbooks?	☐	☐	☐	☐	☐	☐

If you answered sometimes, or never, to any of the above questions, why? Are there incentives that would encourage you to do otherwise?:

10) Which of the following CANNOT be recycled in the HRM?

- ☐ a. Tetra Juice Packs
- ☐ b. #2 Plastics
- ☐ c. Corrugated Cardboard
- ☐ d. Aluminum Foil
- ☐ e. #5 Plastics
- ☐ f. All of the above

Page 1 – 2

11) Which of the following CANNOT be put in the organics bin in the HRM?

- ☐ a. Cereal Boxes
- ☐ b. Sawdust
- ☐ c. Biodegradable Plastic Bags
- ☐ d. Meat Bones and Fat
- ☐ e. Coffee Filters (used)

12) Do you find that recycling and composting on campus is...

- ☐ a. Extremely convenient – I do it without thinking
- ☐ b. Somewhat Convenient – It is easily accessible, but I don't always know what to recycle
- ☐ c. Available – I have noticed it and use it when it is close by
- ☐ d. Somewhat Available – It is difficult to find, I use it occasionally
- ☐ e. Inconvenient – I have to hunt to find composting/recycling, and therefore rarely do either
- ☐ f. Not Available – There is no composting or recycling in my area of campus

13) I Support...

- ☐ a. Initiatives at Dalhousie to reduce energy, water, chemical and material use wherever possible
- ☐ b. Retrofit initiatives to upgrade lighting, toilets, computers etc. on campus
- ☐ c. Our campus going idle free
- ☐ d. Posting of more signs to tell people to turn off lights in classrooms, study rooms etc.

14) Does environmental sustainability play a significant role in your everyday decision-making?

- ☐ a. Yes, it plays a very significant role in my decision-making
- ☐ b. Most of the time it plays a role in my decision-making
- ☐ c. Every once in awhile I think about it and use it in making decisions
- ☐ d. I usually don't think about it, but sometimes I incorporate it into decisions
- ☐ e. I rarely think about it, it usually doesn't play a role
- ☐ f. I never think about it, it doesn't play a role in my daily decisions

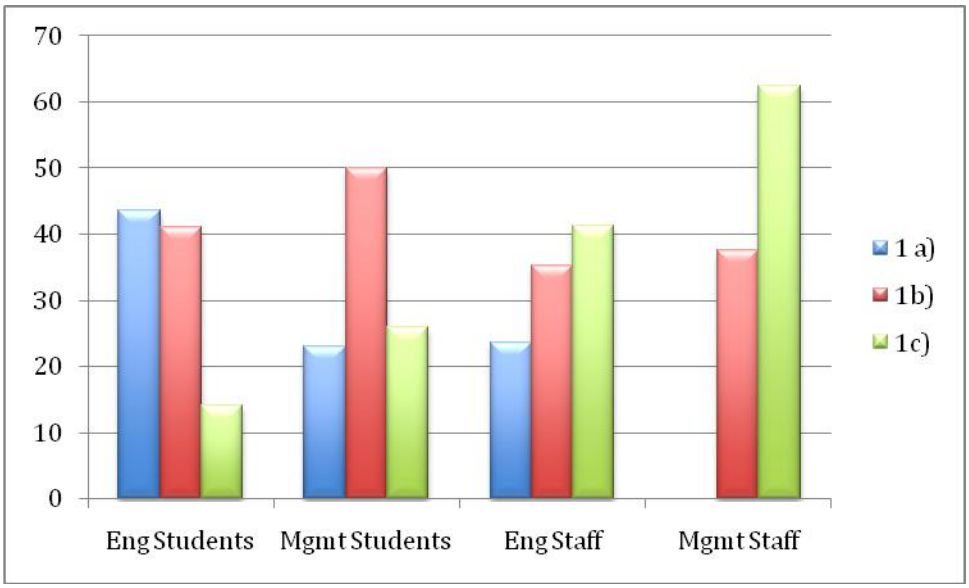
Comments:

Thank You!

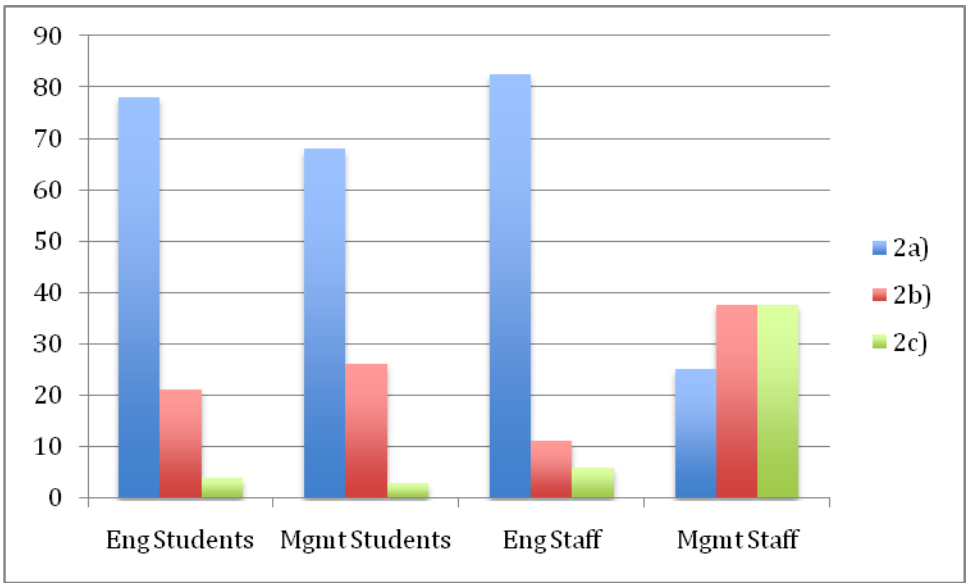
Appendix E – Survey Analysis

The following survey was conducted on March 16th, 17th and 24th. The survey was random and targeted students and faculty members from the Faculties of Management and Engineering. We managed to survey 65 Management students, 8 Management faculty, 78 Engineering students and 17 Engineering faculty – a total of 178 participants. The following represents the results gathered from each select target group.

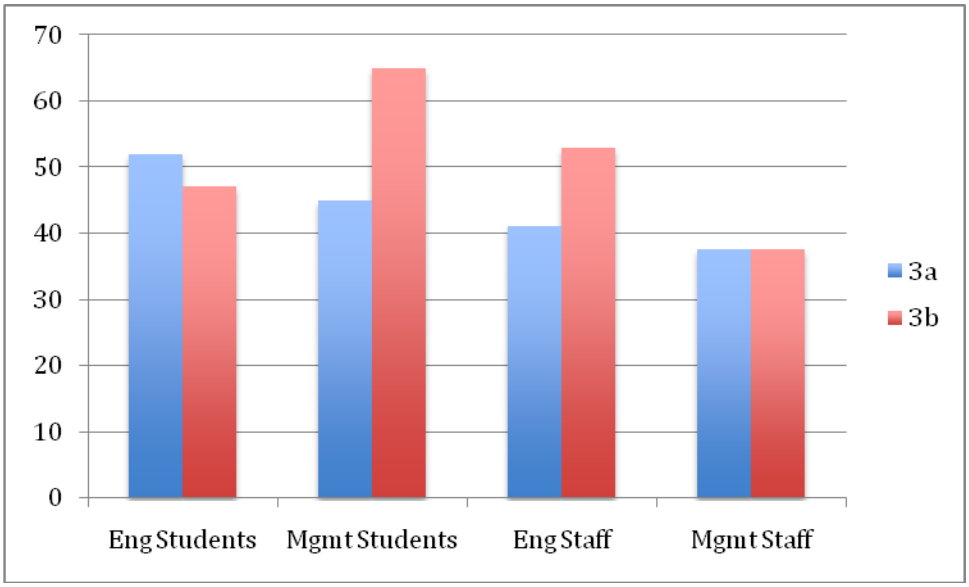
1) Have you heard of Dalhousie's Office of Sustainability?
    a. I have not heard of them, I don't know what they do
    b. I have heard of them, but am not familiar with what they do
    c. I have heard of them, and am familiar with what they do



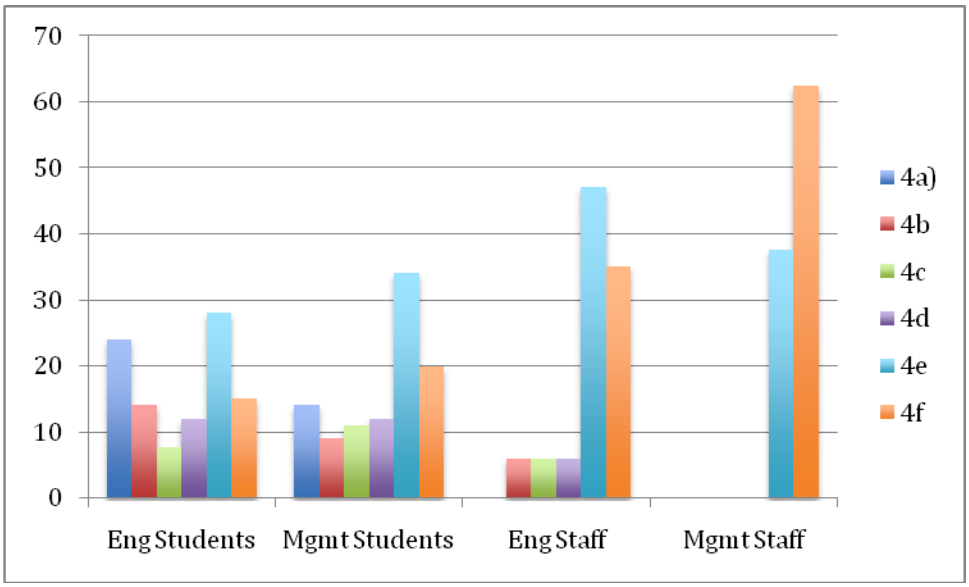
2) Have you heard of the Dalhousie Eco-Efficiency Centre?
    a. I have not heard of them, I don't know what they do
    b. I have heard of them, but am not familiar with what they do
    c. I have heard of them, and am familiar with what they do



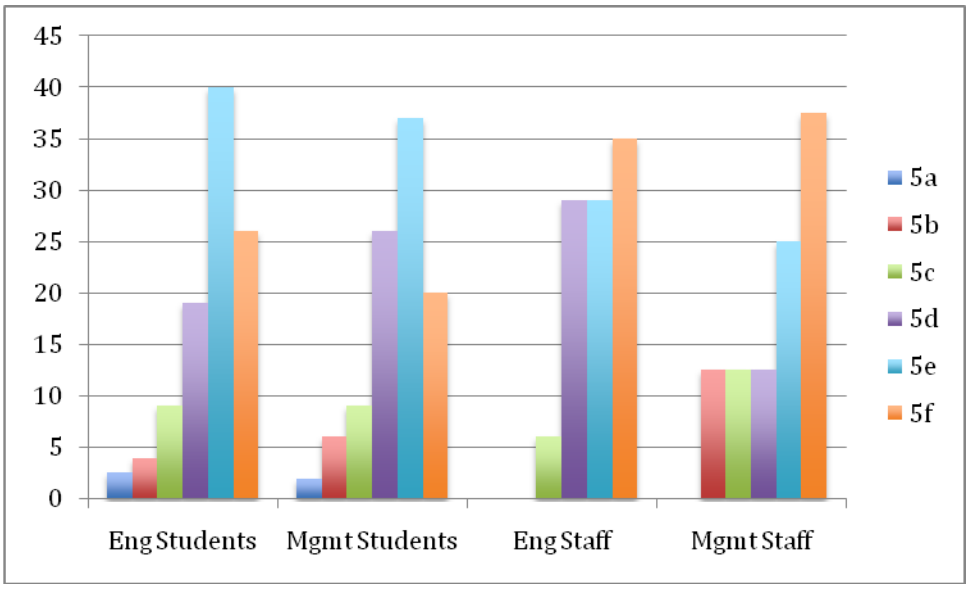
3) Have you heard of the Dalhousie Green Guide?
   a. Yes
   b. No



4) Do you turn off the lights when leaving a classroom or office on campus?
   a. Never
   b. Rarely
   c. Occasionally
   d. Sometimes
   e. Most of the time
   f. Every time



5) How often do you climb the stairs, rather than taking the elevator?
   a. Never
   b. Rarely
   c. Occasionally
   d. Sometimes
   e. Most of the time
   f. Every time



6) Do you turn off your computer after use?
   a. Never
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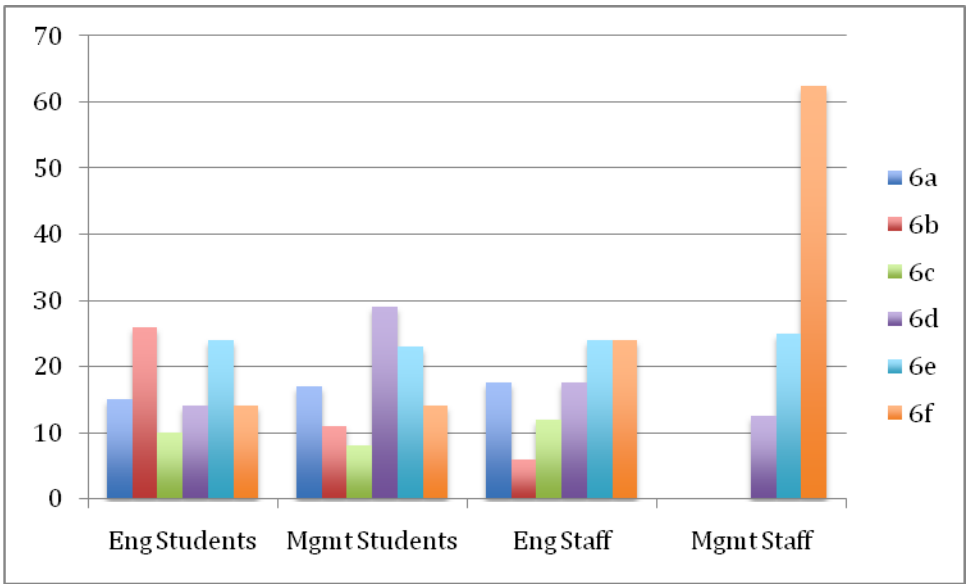

7) Do you bring a re-usable mug when buying hot beverages on campus?
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   d. Sometimes
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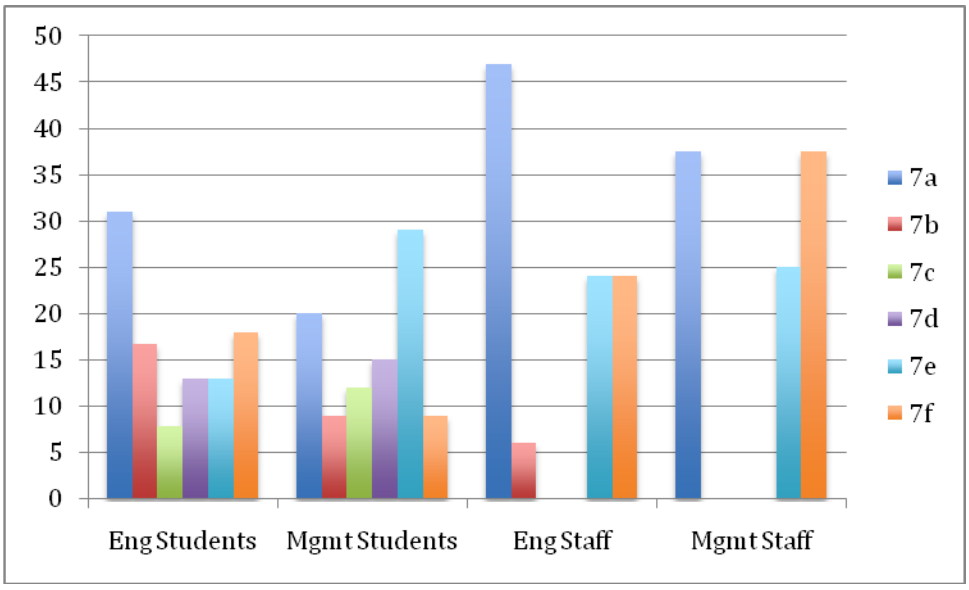

8) Do you bring a re-usable water bottle to school?
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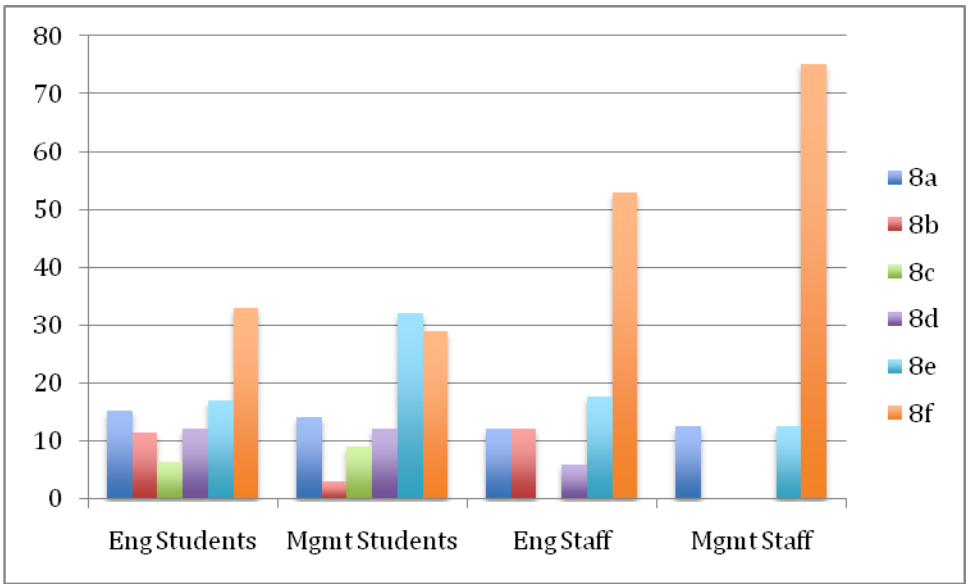

9) Do you purchase or sell used textbooks?
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   e. Most of the time
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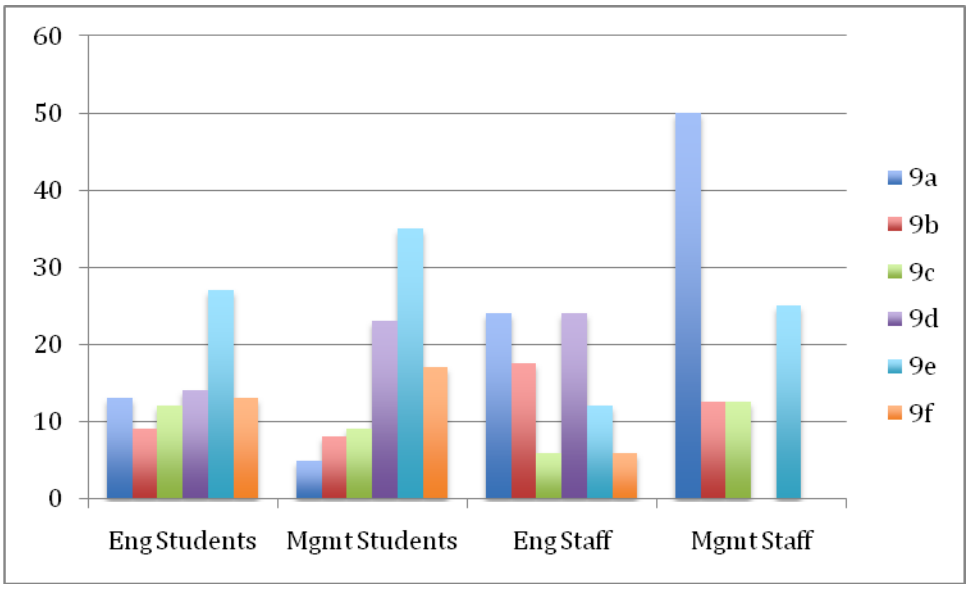

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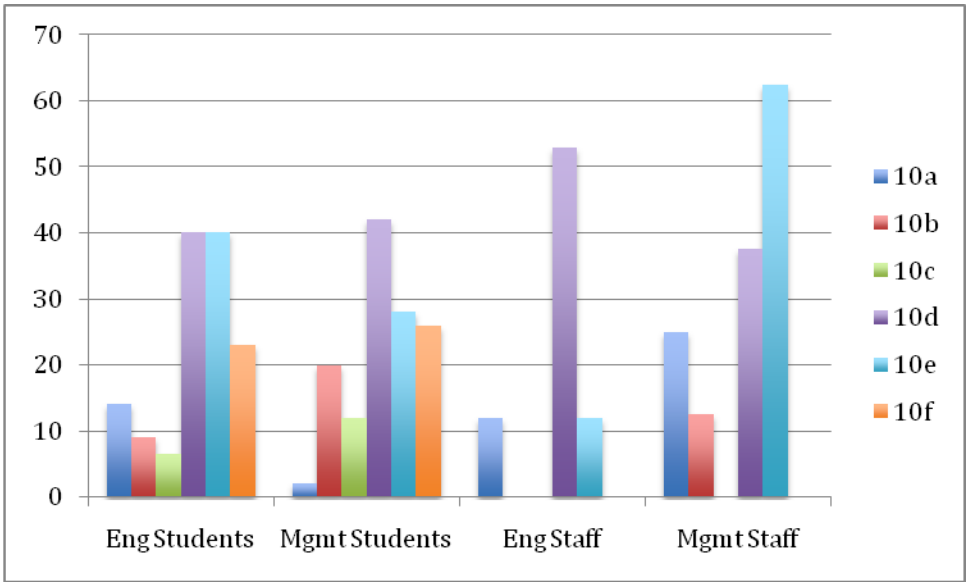

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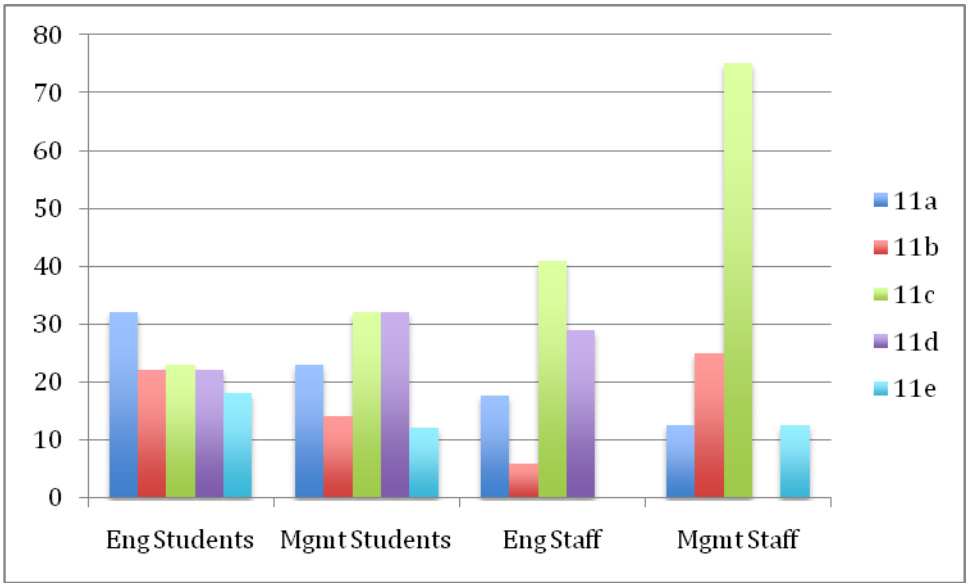

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c. Available – I have noticed it and use it when it is close by
d. Somewhat Available – It is difficult to find, I use it occasionally
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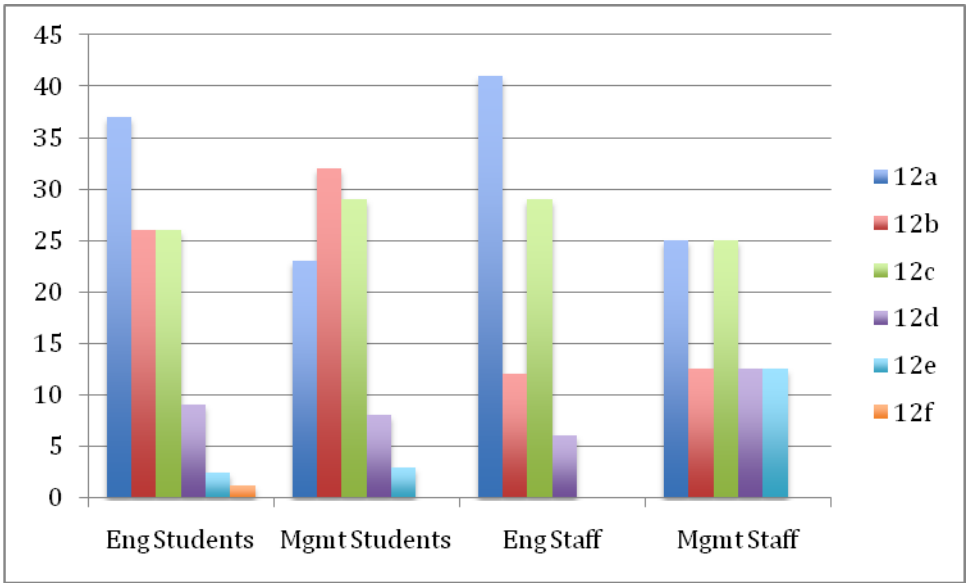
f. Not Available – There is no composting or recycling in my area of campus



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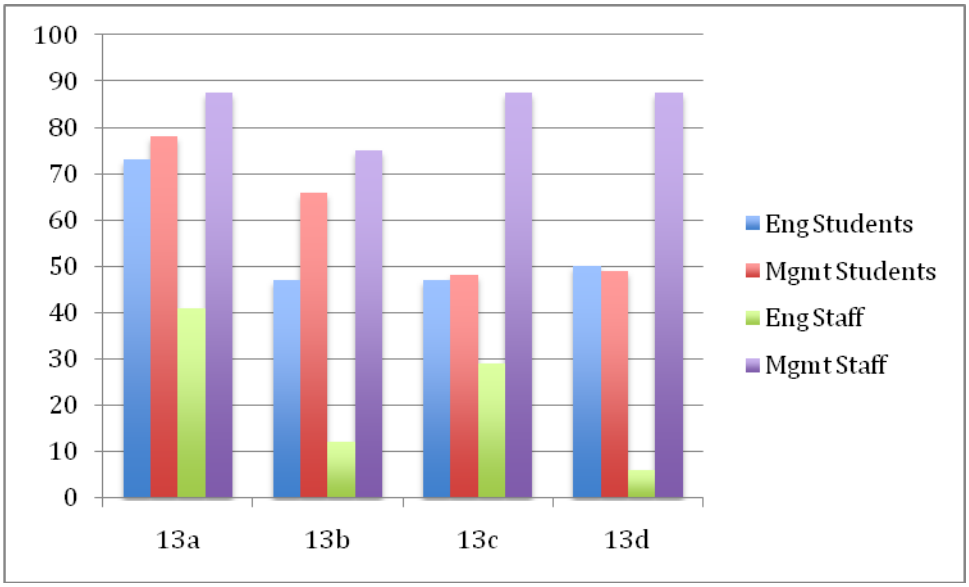

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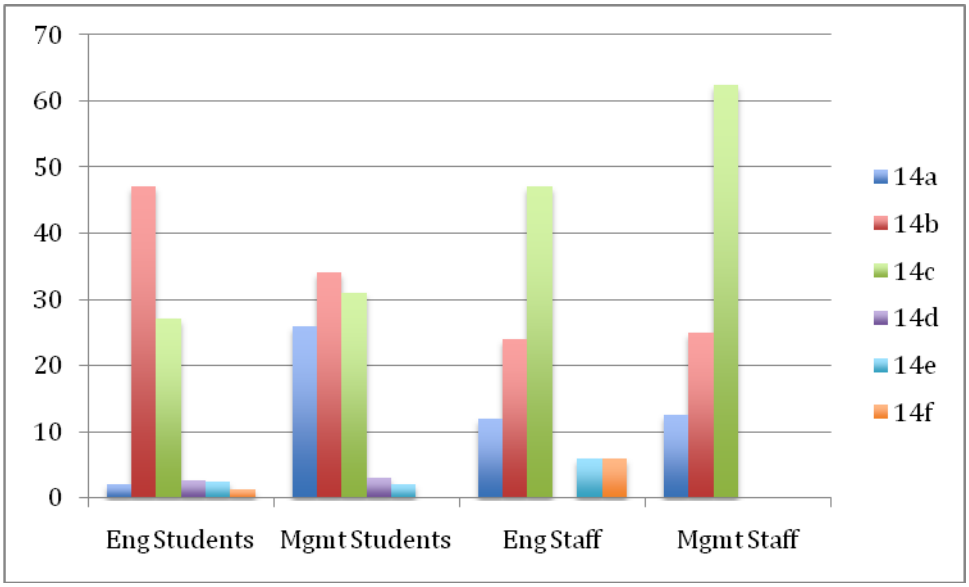
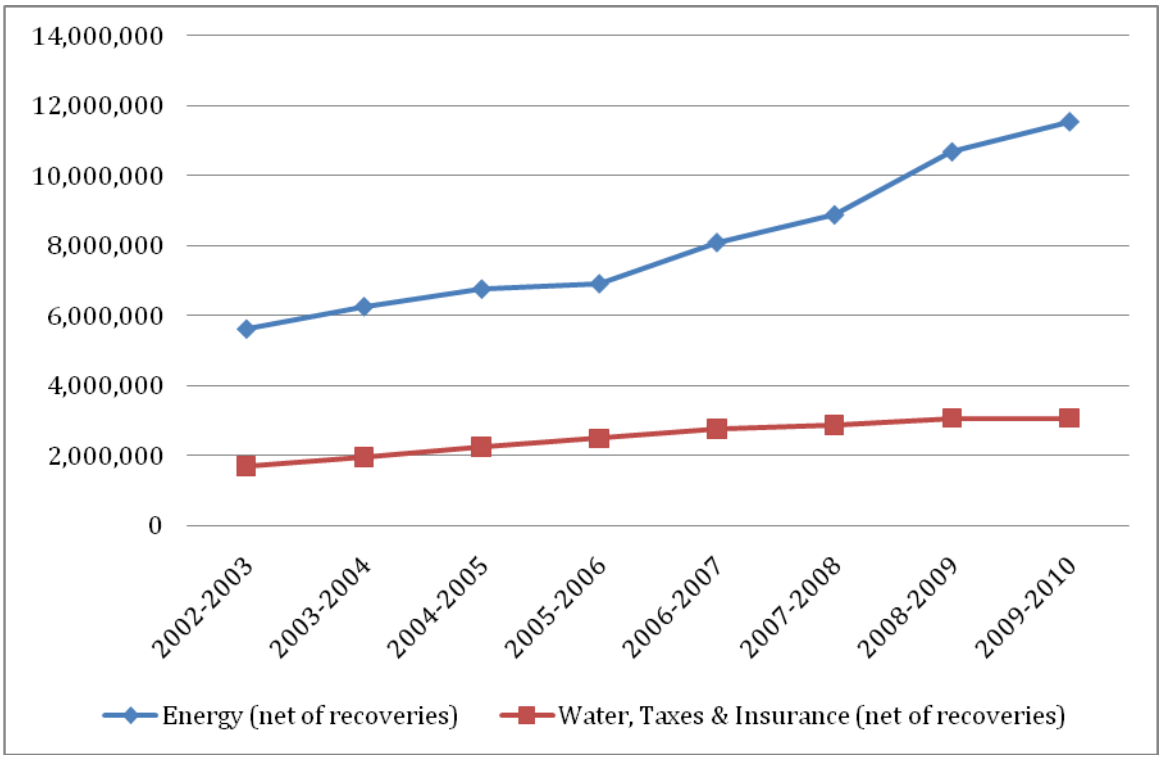
c. Every once in awhile I think about it and use it in making decisions
d. I usually don't think about it, but sometimes I incorporate it into decisions
e. I rarely think about it, it usually doesn't play a role
f. I never think about it, it doesn't play a role in my daily decisions


70
60
50
40
30
20
10
0
Eng Students
Mgmt Students
Eng Staff
Mgmt Staff
14a
14b
14c
14d
14e
14f

Appendix F – Operational Costs to Dalhousie University for Energy and Water Use

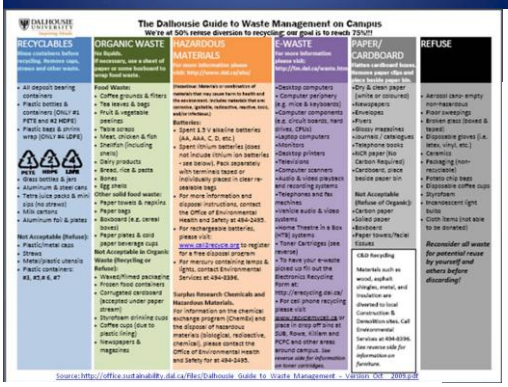
YEAR	Energy	Water
2000	$4,799,000.00	$1,094,000.00
2001	$5,546,000.00	$1,429,000.00
2002	$5,315,000.00	$1,607,000.00
2003	$6,464,000.00	$1,754,000.00
2004	$6,364,000.00	$1,986,000.00
2005	$6,772,000.00	$2,252,000.00
2006	$7,881,000.00	$2,550,000.00
2007	$8,402,000.00	$2,793,000.00
2008	$9,733,000.00	$2,956,000.00
2009	$9,813,000.00	$2,991,000.00

Operational Costs to Dalhousie University from 2000-2009 (Dalhousie University, 2010)

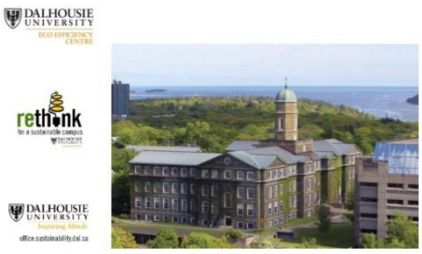


Trends in increased consumption from 2002-2009 (Dalhousie University, 2010).

Appendix F: Example Slides from the Eco-Efficiency Lunch N Learn



Greening the campus through eco-efficiency.



Interactive: Are you quiz worthy?

Recommendations: What can you do?

The Lunch N' learn Presentation is informative and interactive. Environmental information and eco-efficiency definitions start the session, and personal actions to reduce environmental impact. Engaging quizzes are featured throughout. Factual information and recommendations are Dalhousie specific. Barriers identified in our survey are addressed.