Voluntary Carbon Offsets:

A Way Forward for the Sustainability Movement at Dalhousie?

A Greening the Campus Movement Project, Final Report

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Abstract

With the establishment of the Dalhousie Office of Sustainability in 2007, Dalhousie University confirmed its commitment to sustainably operating the university. In less than two years of operation the office has already identified access to capital for investments as being the main factor limiting its ability to pursue its mandate, particularly when it comes to investing in greenhouse gas emission reducing projects. The establishment of a voluntary carbon offset fund capable of receiving capital from individuals looking to offset personal greenhouse gas emissions has the possibility of providing such capital for said investments. Through the distribution of a survey, this study looked to gauge the willingness of the greater Dalhousie community to participate in such a carbon offset fund, while at the same time investigated how such a program would be structured and administered. It was found that there was considerable willingness in the greater Dalhousie community to participate in such a program. It was also found that respondents to the survey wanted to be involved with the administration of a fund, and that such a program would have to be transparently administered and structured to encourage participation. It is recommended that further research be carried out investigating the feasibility of a Dalhousie administered carbon offset program. Given the potential such a program has for progressing the sustainability movement at Dalhousie University, it is felt that relevant persons at Dalhousie should pursue this idea with zeal and vigour.

Introduction

Background to Carbon Offset Trusts

Carbon offset programs are a way for individuals, corporations or groups to offset personal greenhouse gas (GHG) emissions through the purchase of 'carbon offsets'. These carbon offsets are purchased on the basis of some price per unit of GHG produced. Commonly personal contributions are based on the resulting GHG emissions from some activity – energy use, air travel, etc. – while prices can vary. Funds collected are thence used to fund activities that either directly sequester GHGs' from the atmosphere – such as tree planting – or result in avoided GHG emissions – such as energy efficiency retrofits or investment in clean forms of energy. In the following section one such carbon offset trust programs – the Colorado Carbon Fund – will be explored.

Colorado Carbon Fund

Voluntary carbon offset trusts are not an original idea. One of the better known voluntary carbon offset trusts is that run by the state of Colorado. Known as the 'Colorado Carbon Fund', this program has advanced the concept of a voluntary carbon trust in North America when it was introduced by the government. The program allows consumers (both private and corporate) to off-set their personal carbon emissions by providing verifiable carbon credits to those who donate to the fund (Anonymous, 2008, p.113). The program offers rewards for the most generous

contributors, such as license plates proclaiming that the vehicle has attained carbon neutrality (ibid).

The Colorado Carbon Fund was established to help the state government to invest in local carbon emission offsetting projects. These projects that the fund has invested in have ranged from those promoting renewable sources of energy to energy efficiency projects. The state of Colorado sees the fund as a tool to help them achieve their goal of a 20% reduction of GHG emissions by 2020 (Anonymous, 2008).

Carbon Calculators

Through the use of 'carbon calculators' the proponents of the voluntary carbon offset trusts such as the Colorado Carbon Fund have made personal calculations of carbon emissions by customers a straightforward process. Carbon calculators, which allow consumers to estimate carbon emissions of common activities such as energy use or air travel, have become a common feature of carbon offset websites in recent years. For example, Carbon Catalogue – a directory of carbon offset providers worldwide - has made a comprehensive list of online carbon companies consisting of 102 companies, twelve of which are operated in Canada (none of which are located east of Montreal, PQ) (Carbon Catalogue, 2009). The price for a tonne of carbon ranges from $12.60 to $39.90 in Canadian funds (Ibid). Three of the twelve Canadian companies come from not-for-profit organizations, whereas the other nine are from for-profit companies. Carbon

calculators imbedded in each company's website are essential for the easy quantification of one's personal carbon emissions.

Carbon Offsets and Dalhousie University

While no known university administered carbon off-set programs exist, support for such programs was found at the University level. In 2008 the American College and University Presidents Climate Commitment (ACUPCC) described 'high-quality offsets' as the following;

> "Emissions reductions should be: real and tangible; transparent; measurable; permanent; verified; synchronous; registered; and retired. [...] Projects should also have other social and environmental co-benefits in addition to reducing emissions and add value to the education, research and service missions of higher education." (Paragraph 7) (Treehugger 2008)

Off-sets offered as part of Dalhousie University's efforts to reduce on-campus emissions and promote educational research and development projects that relate to reducing GHG emissions would qualify as 'high-quality offsets' under this ACUPCC definition.

Arguably, universities are the ideal institution to offer carbon offsets. Not only are universities, like most large institutions, able to invest in carbon reducing retrofits and the purchase of carbon neutral energy technologies, but investments could be made into the research and development of new technologies that use energy or sequester GHG more efficiently. For example, if investments from such a carbon offset fund were made into the research and development of a

new type of photovoltaic cell at Dalhousie that was able to capture more energy from photons than traditional photovoltaic's, the potential GHG emission savings would be much greater (on a per dollar invested basis) than would the emission savings be from an activity like planting trees. As such, it is felt that universities are ideally situated to achieve substantial GHG reductions as a result of investments derived from a carbon offset program.

The tentative success of the Colorado Carbon Fund and recent statements from groups such as the ACUPCC suggest that the time could be right for a similar program operated in Atlantic Canada. Following an extensive investigation, no similar provincial programs were found that were offered at this time in Nova Scotia, nor were programs offered local to the Atlantic Provinces that would look to reduce GHG emissions locally. Therefore, Dalhousie could be the first institution in Atlantic Canada to offer verifiable carbon offsets, which brings with it the benefits of being the first provider of local carbon off-sets in a market of roughly 2.3 million people (Wikipedia 2009).

Currently Dalhousie University offers different ways to donate money to the university. For example, the Dalhousie Alumni and Friends web page offers several areas of interest for pledging money. By pledging through Dalhousie's alumni website, alumni have the opportunity to donate to different disciplines and even to different scholarship funds. However, these options for targeted donations seem to be directed only at different faculty. A carbon off-set purchase option could easily be included within the existing online framework for online transactions and give benefactors the option to purchase and participate in carbon emission off-setting projects.

Given the recent increase in environmental awareness in the general public, conditions seem favourable to offer such a program.

Project Definition

This research project is designed to assess the willingness of the greater Dalhousie University community – students, alumni, staff, faculty, Nova Scotians and others - to voluntarily contribute financially to a carbon off-set trust to fund GHG reducing projects on the Dalhousie University campus. A voluntary carbon trust would allow those willing to offset their personal carbon emissions due to activities such as air travel, electricity use, home heating, etc. while at the same time contributing to Dalhousie University. The ultimate goal of the project is to collect data that indicate whether or not Dalhousie University should further investigate establishing the financial infrastructure to support this type of program in perpetuity. As well, this project will give context for future research into a possible carbon emission offsetting program at Dalhousie with respect to how the framework of a successful carbon offset program could be administered and structured.

Research Question

The question that guides this research is:

What is the level of interest and willingness in the greater Dalhousie community for a Dalhousie-based carbon offset trust fund?

Scope

The Dalhousie Office of Sustainability has many projects that are ready to be initiated, but financial constraints limit the number of projects that it can undertake. This research project will indicate if members of the greater Dalhousie community are willing to purchase voluntary carbon off-sets, funding a trust administered by Dalhousie that could help fund the activities of the Office of Sustainability. This research will provide insight to the level of interest amongst the greater Dalhousie community for a voluntary carbon offsets program. Significant levels of interest could lead to Dalhousie initiating further research into establishing a carbon offset trust fund.

This project is restricted to members of the greater Dalhousie University community. Here, the greater Dalhousie community is defined as students, alumni, staff, faculty, Nova Scotians and other possible contributors to such a carbon offset program. Further, the opinions of these members will be solicited between March and April of 2009. As the project is limited to one semester, we felt that the time of the researchers would be best spent researching the willingness of only this community to purchase voluntary carbon off-sets from Dalhousie. It is felt that this group will be the most likely to purchase carbon off-sets from Dalhousie as they have a connection with the university, be it through direct (student, alumni, staff, etc.) or indirect involvement (members of the general public living in the Atlantic region). Our research will consider the effect of several parameters on the willingness of benefactors to purchase off-sets,

including tax incentives and physical objects recognizing one's carbon offset purchases. As mentioned above, Dalhousie could be the first local institution to offer verifiable carbon offsets in Atlantic Canada, which represents a substantial market appears to be underexploited. As such, Dalhousie could be a regional leader in the emergent field of voluntary carbon offsets.

Catalytic Validity

This research has the potential to empower the participants as the findings can be used to help encourage the development of a carbon offset program at Dalhousie University. Such a program could catalyze the offsetting of carbon emissions at the community level, leading to lower GHG emissions locally.

There are two groups that were expected to be more likely to participate in such a carbon offset program. The first group were those whom are financially secure but are not prepared to make substantial lifestyle changes in their attempt to reach or approach carbon neutrality. The second group would be those whom have made lifestyle changes, or have always led lives resulting in low GHG emissions, but are obstructed by societal structures to reduce their footprint further. These two groups were expected to be more likely to use carbon offsets as an economical way to offset activities resulting in GHG emissions, such as air travel.

This study will serve, not only to measure the support for a voluntary carbon offset program at Dalhousie, but will also give hints as to what a successful program would look like. While the majority of questions in the survey (see Appendix B) measure support for and willingness to

participate in a carbon offset program, questions 13, 15, 16 and 17 all allude to what respondents feel would encourage them to participate in such a program. These questions, along with those measuring program support, will help guide possible future research into the development of a voluntary carbon offset program at Dalhousie.

Methods

The tool used for this research was an *a priori*, exploratory survey. The survey was methodically structured to gain insight into three areas of concern; (i) the respondents' previous knowledge of carbon offset programs, (ii) the willingness of said respondents to participate in a Dalhousie based carbon offset program, and (iii) information about what components – such as tax incentives, informative website, etc. – would increase respondents' likelihood to participate. To develop a meaningful and insightful array of questions for the survey, two investigative techniques were employed. First an interview was conducted with Rochelle Owens, Director of the Office of Sustainability at Dalhousie University, to gain general information about the role a fund of this sort would have at Dalhousie. Second, an extensive literature review provided general insight into which practices and techniques are used by established carbon offset programs to encourage participation and efficacy of the respective programs. Following is a brief description of these two investigative techniques.

The interview was an informal meeting with Dalhousie's Office of Sustainability director, Rochelle Owens. Asking questions in a haphazard way made this meeting effective because it

increased familiarity with Dalhousie-specific issues and perspectives. While many existing carbon offset programs use contributed funds for energy conservation and carbon sequestration and storage, the resources and technical capabilities at Dalhousie University means that revenues generated from such a program could be split between funding research into sustainable enterprises and to reduce Dalhousie's GHG emissions.

Completed preliminary research provided insight into the theory behind carbon offsets and the methods employed by organizations successful in maximizing contributions from an environmentally conscious population. This enabled identification of questions that needed answering before further exploration of the implementation of an offset program at Dalhousie. Questions included categorical and single response type questions, and ratings scales. Using the *Opinio* research tool, the survey was distributed through email and social networking sites. This was an effective delivery method, and over one hundred seventy people completed a survey. The *Opinio* research tool was helpful in distributing the survey, and also for processing data and creating effective graphical representations. Major findings are displayed on a poster on view for public observation.

Survey Structure and Deployment

The sampling frame consisted of the greater Dalhousie community and, to a lesser extent, other members of relevant social networking sites.

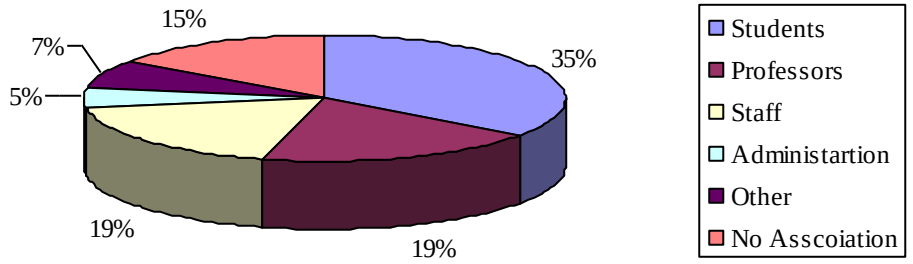
From one perspective the sample population represents a homogeneous group, as a disproportionate number of individuals are of similar race, class and educational level. However, within this group there exists a heterogeneous mixture of individuals who are from a variety of backgrounds, both as students and professions. Additionally, collecting data from this population was appropriate in that the research was seeking to understand the willingness of this particular group of individuals to contribute to Dalhousie for a specific purpose. Furthermore, this probabilistic, stratified, random sample of the greater Dalhousie community should demonstrate reliable results on the parameters of the survey questions. Additionally, and to a much lesser degree, respondents from outside the direct Dalhousie community added to the results through non-probabilistic snowball sampling.

Results

Participants

The survey was completed by 170 individuals with various associations to and statuses at Dalhousie University and some with no association to Dalhousie. Students represent the largest percentage of respondents, followed by professors and then staff. The composition of the associations to the Dalhousie of those who participated in the survey is summarized in **Figure 1** (below). Nearly 80% of the respondents were attending or employed by Dalhousie University as professors, instructors, staff, or administration at the time he or she completed the survey. Of

those who selected other for their status at Dalhousie, respondents specified themselves as alumni, instructors, or parents of students.



<u>Figure 1:</u> The composition of the survey respondents by status at or association to Dalhousie University.

Students of Dalhousie accounted for over one third of the total respondents. Of these students, just over one half is in his or her fourth year of study. Another quarter of the student respondents are in his or her third year of study, while the rest are split between second year students and graduate students. Over nine tenths of the student respondents are in an undergraduate program. There were no first year students who responded to the survey. **Figure 2** (below) displays the composition of students by year of study.

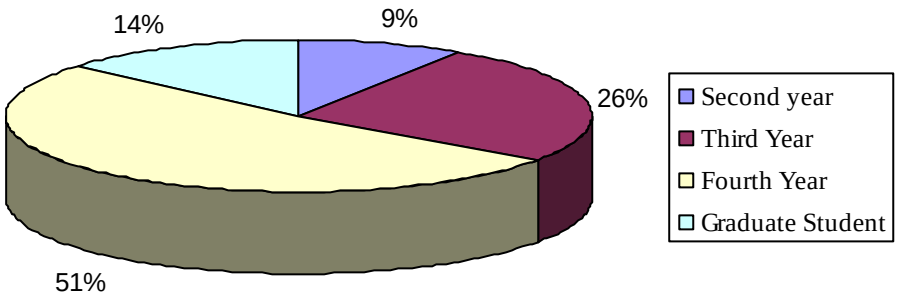
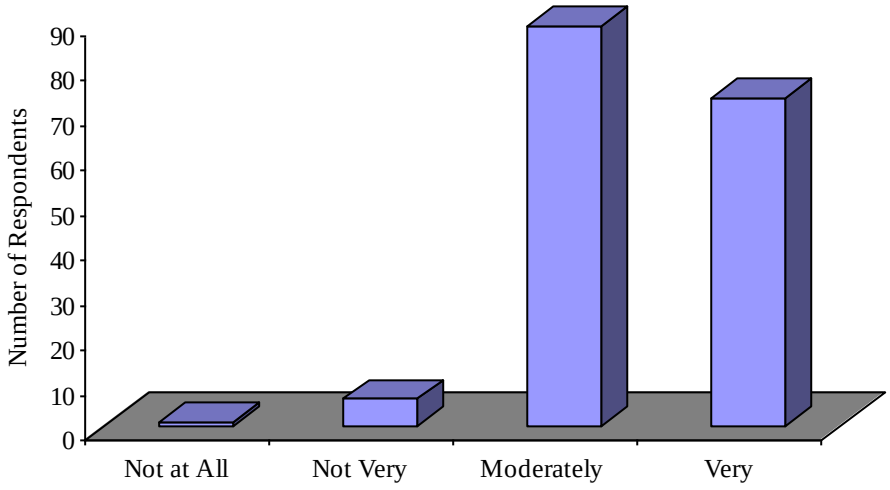


Figure 2: The composition of student respondents by year of study at Dalhousie University.

Environmental Awareness

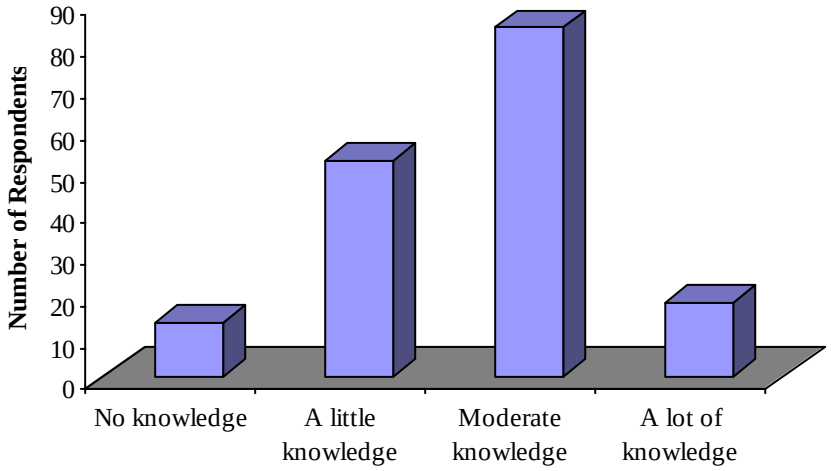
The respondents' answers tended greatly towards environmental awareness. Out of 169 individuals who responded about their own environmental awareness, only 7 were less than moderately aware. The greatest number of respondents could best describe themselves, from the given options, as moderately aware, while the number of people who claimed to be very aware was a close second. The degree to which people consider themselves environmentally aware is summarized in **Figure 3 (**Following page). Student respondents turned out to be 18% more likely to considerer themselves very environmentally aware than all other groups. The few who responded that they were not very or not at all environmentally aware were spread out proportionately among the rest of the groups.



<u>Figure 3:</u> The number of respondents for various degrees to which respondents consider themselves to be environmentally aware.

When it comes to carbon credits, the sample was less aware compared to how aware they were overall about environmental issues. The most popular response was the individuals were knew a moderate amount about them, followed by those who had heard a little bit about carbon credits. The results show that professors have the highest percentage of who say that they know a lot about carbon credits at 25%. This represents over 44% of the total number of respondents who claim to know a lot about carbon credits. Compared to students, which just over 10% of which responded that they know a lot about carbon credits, professors are much more likely to be knowledgeable about carbon credits. **Figure 4** (following page) shows the amount of knowledge respondents claim to have about carbon credits.

Our results show that almost three out of four of our respondents have never visited a website to learn more about carbon offsets. This suggests they must be hearing about carbon credits from other mediums, such as television, radio and word of mouth. Our results are that 39% of participants have already calculated their own carbon footprint, which shows a significant interest in one's own impact from respondents.

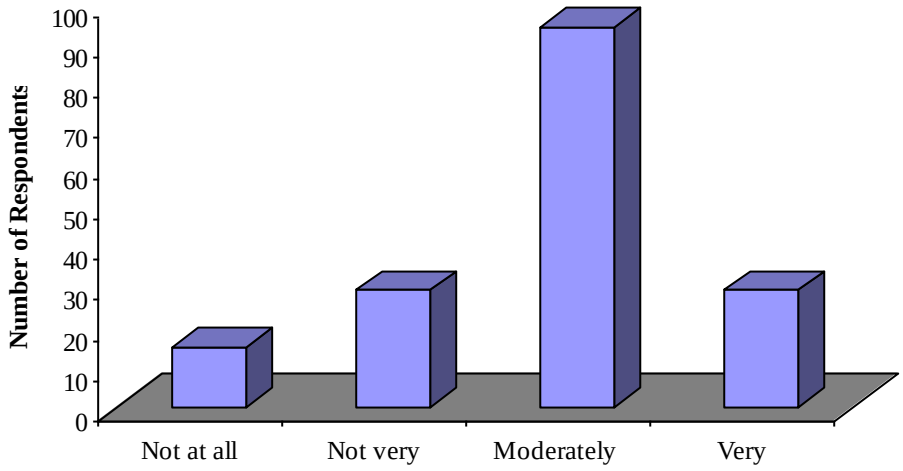


<u>Figure 4:</u> The number of respondents for various levels of knowledge respondents possess about carbon credits.

Interest in Carbon Offsets vs. Level of Concern for Climate Change

Figure 5 and **Figure 6** represent people's willingness to purchase carbon offsets if they were easily purchasable and the degree to which people are concerned about climate change. There are not an overwhelming number of respondents who would be very willing to buy convenient carbon offsets given the concern that individuals report over climate change. About 62% of the

individuals in the survey consider themselves extremely concerned about climate change, but only 17% would be very willing to buy carbon offsets. This suggests that people do not view carbon offsets as a viable part of the solution to climate change. At just over 60%, students showed an average level of concern for climate change with respect to the other respondents. Students did, however, show an above average willingness to buy offsets at around 22%.



<u>Figure 5</u>: The number of respondents for various degrees of willingness to purchase carbon offsets if they were made easy to purchase.

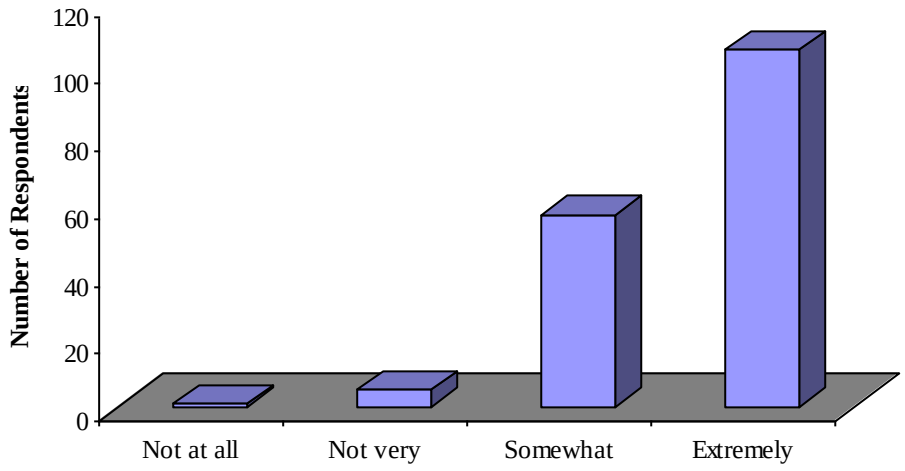


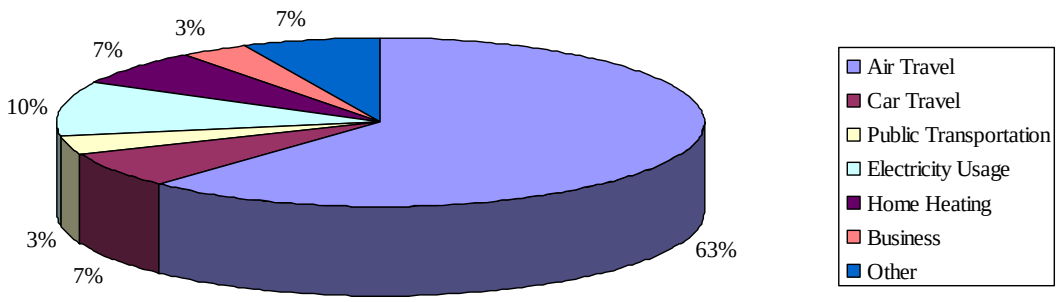
Figure 6: The number of respondents for various levels of concern over climate change.

Purchasing Carbon Offsets

We have shown that there is an interest in carbon credits with our survey group, and that 39% have actually gone through the calculations to estimate their footprint; however, just 11% of the surveyed individuals have purchased carbon credits prior to answering the survey. The inconsistency here may suggest that there is a market within the Dalhousie community for verifiable carbon offsets.

If we look at the carbon-emitting practices for which people are purchasing carbon offsets, the resounding leader is air travel, at six times more prevalent than any other practice, totalling 63%.

Figure 7 (below) illustrates the percentages of the practices for which people are buying carbon offsets. Virtually all of these purchases were made online through an assortment of websites.



<u>Figure 7</u>: The composition of the various carbon emitting practices for which individuals are purchasing carbon offsets.

Carbon Offset Program Website

Purchasing carbon offsets online is a reliable, convenient way for most people to make their offset purchases. There were 143 respondents with some association to or status at Dalhousie University and 109 asserted that their willingness to purchase carbon would increase with the creation of a Dalhousie-community-exclusive website to aid in the participation of a carbon offset program. **Figure 8** (below) is a representation of the features that the respondents desire for such a website.

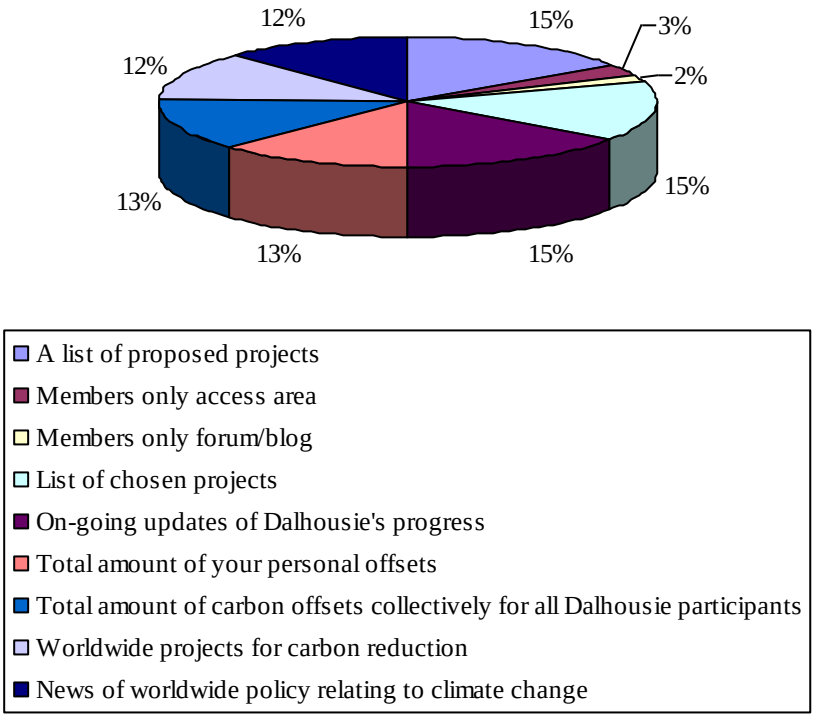
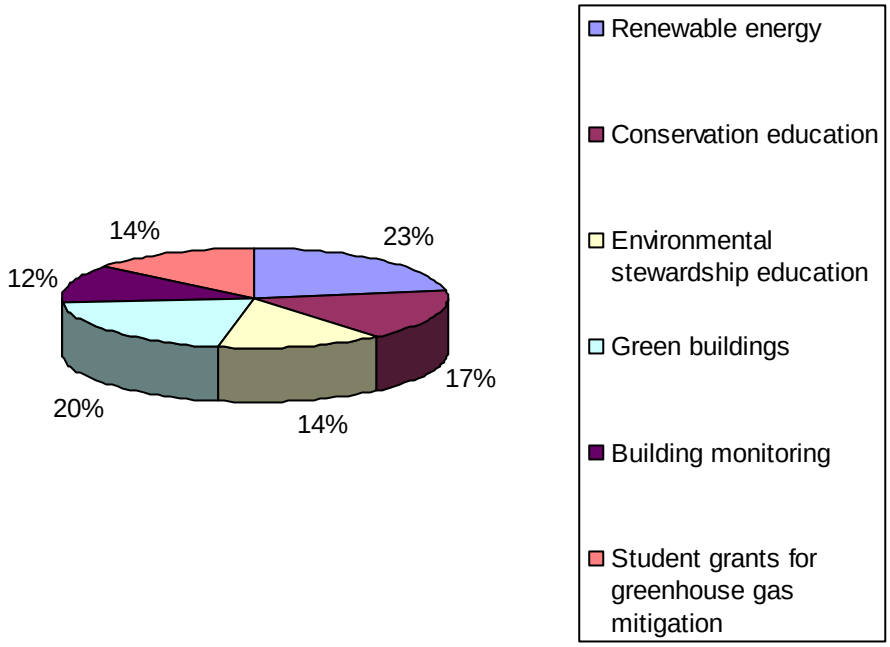


Figure 8: The percentages of the preference for possible features on a carbon offset website for the Dalhousie community.

The overwhelming consensus is that everything on the list is wanted on the web site except for areas accessible only to members and members' only forum/blog area. The rest of the features all received much interest, with proposed projects at Dalhousie, chosen progress at Dalhousie, and progress in undertaken projects at Dalhousie holding a slight edge over the other responses. The results show that, in general, people are more interested in seeing local occurrences than global ones.

The respondents were fairly diversified when selecting which projects they would most like to see as a means of reducing carbon. The results are displayed in **Figure 9**. Respondents could choose as many projects from the given list as they wanted and nearly every participant (89%) chose the addition of renewable forms of energy, such as solar or geothermal, to the campus. Every category, save real time energy monitoring (49%) had support from over half of the respondents; Green buildings and conservation education were the next two most popular choices for campus projects. Education in Environmental stewardship and a grant program for students to research greenhouse gas mitigations ranked lower on the list of support.



<u>Figure 9</u>: The proportions of the total number of respondents who would support the listed projects for funding under a Dalhousie University carbon offset program.

Incentives for Participation in a Carbon Offset Program

Apart from a comprehensive carbon offset website, we researched several other factors that may influence the members of the Dalhousie community to participate in a carbon offset program. Nearly 80% of the surveyed individuals would be more inclined to participate if there was a stipulation that they could claim the amount, or some portion thereof, as tax deductible. Over 81% of the respondents said they would like a personal record of their offset purchases at the end of each year. We also researched the use of physical incentives, using the example of a license plate declaring that the vehicle is carbon neutral. This would be awarded to anyone who purchased enough carbon offsets to mitigate the carbon released from their personal vehicle. The results, in terms of how influenced one might be by such an incentive, were split quite evenly among not at all, not very, and moderately. Not very was the most common choice among

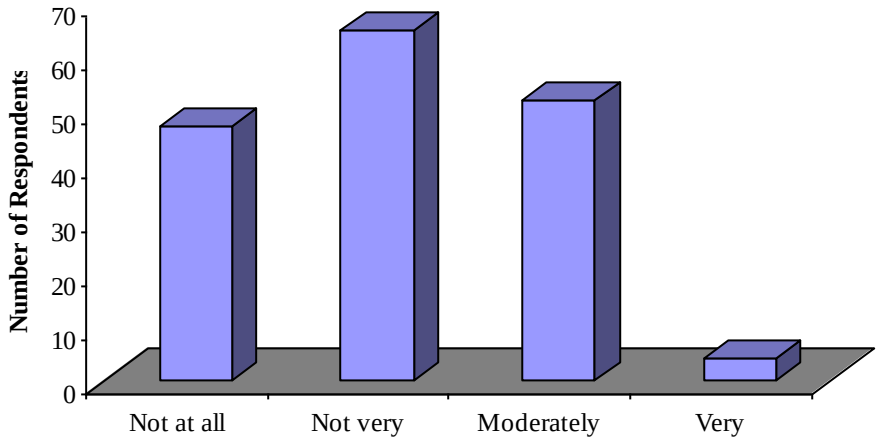


Figure 10: The degree to which respondents would be influenced by physical incentives for a carbon offset program at Dalhousie University.

participants. Very few people stated that they would be very influenced by such physical incentives. **Figure 10** summarizes the results for the influence of physical incentives, such as a carbon neutral license plate.

Discussion

Participants

There were no first-year Dalhousie students who responded to our survey (See figure 2). This can be accounted for partially because our purposive sampling was geared towards students in higher level courses. However, since the survey was open to first-year students, it could be that they are generally less interested in responding to surveys of this sort. First-year students are perhaps less likely to have done their own social science research, and therefore may not identify with researchers as much as other students, alumni and those employed by Dalhousie. Students, in general, represent a substantial portion of the Dalhousie community and thus represent a relatively large percentage of the respondents. Overall, the breakdown of the respondents was approximately what was expected.

Environmental Awareness

The level of environmental awareness among the respondents was very high (see Figure 3). There are several factors here that may account for this statistic. The surveyed group is assumed to represents a highly educated sector of society for the most part. This group is consequently more likely to be informed about both local and international environmental issues. Environmental issues are at the forefront of many recent scholarly articles, but also in the general media. Another factor is that there is significant campaigning for environmental related movements and initiates on the Dalhousie University campus. Presumably a high proportion of the respondents spend hours a day on campus and have been influenced by presentations, posters, and canvassers. We expect, however, that our sample population is slightly more environmentally aware than the total Dalhousie that community population. The reason for this is that we were intentionally sampling those who we felt were environmentally aware, such that they would be the targeted market for a carbon offset program at Dalhousie. There was also an unintentional sampling factor, in that many contacts were developed via environmental classes, programs, and events.

Students turned out to be the most environmentally aware group of respondents, and were 18% more likely to consider themselves very environmentally aware than the rest of the respondents (see Appendix A, question 3). This could be explained by the fact that students are exposed to more environmental awareness campaigns on campus than are the general public. Some examples include “One Million Acts of Green” and “Green Week” promoted by the Dalhousie Student Union and Office of Sustainability. Environmental student societies also increase student exposure to environmental issues. Examples of these societies are SustainDal and the Dalhousie

Chapter of the Nova Scotia Nature Trust. These societies and events are marketed for students, and therefore don't usually involve spending money along the path of reducing carbon emissions. As mentioned above, it is also likely that a disproportionate number of the respondents were studying environmentally science or a related topic.

The results showed that professors were generally the most informed about carbon offsets. This suggests that the researchers for carbon markets that exist already recognize that the older demographic of educated individuals are more likely to purchase carbon emissions because they have the financial means to do so. Carbon offset marketers are probably already aiming their campaign at this demographic. One way, which is common in our society, to sell carbon offsets is by offering voluntary offsets to individuals when they are paying for plane tickets. Plane tickets are generally purchased by an older, more financially stable demographic. Of the people who were very informed about carbon offsets, just over 10% of them were students (see Appendix A, question 4). This is very low given that they represent about 35% of the population of the research (see Figure 1). Presumably only a few students have had opportunities to purchase offsets, which could be a result of lack of financial means.

Interest in Carbon Credits vs. Level of Concern for Climate Change

We found that the concern for climate change exceeded the willingness to buy easily-purchased carbon offsets. The concern for climate change among the participants was significant. Just 3.5% of the group did not describe themselves as at least somewhat concerned by climate change (see figure 6). An astounding 62% (see figure 6) of respondents classified themselves as extremely

concerned. However, given the chance to purchase carbon offsets with no hassle, just 17% would be very willing and 56% would be moderately willing (See figure 5). This suggests that the participants either do not view carbon offsets as a worthwhile endeavour to reduce carbon emissions or they do not feel they are in a position to pay for carbon offsets. For those who do not feel they can wisely spend money on carbon offsets, it likely that the concern for climate change is superseded by lack of sufficient disposable income or a lack of confidence that offsets purchased will lead to actual reduction of GHG emissions. Many students do not have the funds to pay for carbon offsets. However, the students comprised 45% of number of respondents who were very willing to buy carbon offsets (see Appendix A, question 5). Students accounted for just 33% of the population that claimed to be extremely concerned over climate change (see Appendix A, question 6). This varies from what was expected. Students have reason to be the most concerned for climate change in that it is projected to be more significant for their own lifetime, given that students are generally young relative to other respondent groups. However, it appears that older demographics are at least equally concerned, probably because they are in a position to worry about their offspring and future generations more than themselves. Students are perhaps more willing to buy carbon offsets because they see significant income increases in the coming years and have not considered the other costs. Though much of the greatest willingness to purchase offsets is from students, nearly three-quarters of the sample population was at least moderately willing to purchase carbon credits.

Over 73% (see Figure 5) of the participants were at least moderately willing to purchase carbon offsets from Dalhousie if it were easy, however, only 11% (see Appendix A, question 9) had

actually purchased carbon offsets prior to taking the survey. This suggests that there is a market for supplying carbon offsets to the Dalhousie community. Of the 11% who had purchased carbon offsets, about 90% had done so for air travel (see Appendix A, question 10). Only a very select few purchased carbon credits to offset daily activities such as car travel, electricity usage, and home heating. One obstacle may be to convince people that day-to-day uses of GHG emitting energy production will accumulate emissions in the atmosphere more than sporadic plane trips. Carbon offset providers thus far have taken advantage of the high cost of airfare that minimizes the comparative price of the offset, to convince people to buy carbon offsets. However, the most untapped market for the Dalhousie community would be to sell to individuals who wish to mitigate the effect of activities like home heating and personal vehicle use. The results suggest that there is a moderate interest among participants to purchase these offsets if the program were to be established.

Carbon Footprints

Our results showed that 39% of the respondents had calculated and estimate of their carbon footprint (see Appendix A, question 8). This can be done relatively quickly on websites of offset providers and other web-based sources. However, only 27% (see Appendix A, question 7) took it as far as investigating carbon offsets at the website of a provider, and only 11% (see Appendix A, question 9) followed through to purchase carbon offsets. This means that out of all the people who were interested enough to calculate their carbon footprint, just over a quarter had purchased offsets. One of the reasons people are not following through with the purchase of carbon offsets could be due to a hesitation based on purchasing offsets from non-local providers. While the

results shown in Appendix A do not specifically support this theory, if future research were to find this to be true, it would strengthen the case for a regional carbon offset program located in Atlantic Canada.

Carbon Offset Program Website

The respondents reported an interest for a website to accompany the carbon offset program with 71% claiming that it would increase their likelihood of participating in the carbon offset program (see Appendix A, question 12). Every proposed feature – a list of funded projects, worldwide projects for carbon reduction, total amount of one's personal offsets, etc.- that would be in the public domain received at least 60% support (see Appendix A, question 13). The features that were most highly preferred were those that dealt directly with Dalhousie: a list of proposed projects, a list of chosen projects, ongoing updates for Dalhousie, and the sum of all the offsets purchased by individual members (see Appendix A, question 13). This suggests that people want to verify the carbon reductions that account for the carbon offsets they have purchased. There was some interest in world-wide carbon issues, however overall interest was less than local carbon related issues. This supports the theory that carbon offset customers hesitate when purchasing non-local offsets. It is likely that customers will take more pride in their offsets if they can actively engage in or see the efforts being made to offset emissions as a result of their purchases. This could potentially have a snowball effect encouraging more people to buy carbon credits.

Incentives for Carbon Offset Purchases

An overwhelming 79% of the sampled individuals would be more inclined to buy carbon offsets if they were tax deductible (See Appendix A, question 14). This was expected, as charitable donations that are tax deductible are generally more popular to benefactors. Of the remaining 21% who were not more inclined, less than 10% of them had been extremely willing in the first place, and about half were not at all or not very willing to purchase offsets (see Appendix A, questions 14 and 5). About 84% of the respondents who claimed to be moderately willing to purchase carbon offsets if it was easy were also in favour of a tax incentive (see Appendix A, questions 14 and 5). This is a positive sign for willingness, because it is those who are moderately interested in carbon offsets that are being targeted by incentives as the most likely to purchase them if they are made more attractive.

81% of participants were in favour of receiving an annual statement of their total carbon offset purchases (see Appendix A, question 15). Excluding those who were not at all willing to buy carbon credits in the first place this percentage increases to 84% (see Appendix A, questions 15 and 5). This interest indicates that respondents are interested in their own footprint and to know by how much they are offsetting it, and as such an annual statement of carbon offset purchases should be included in a carbon offset program. Features that allowed participants to be involved in the administration of the program with respect to things like project selection were received favourably by respondents.

Physical incentives, such as license plates displaying that the vehicle is carbon neutral had little potential to encourage people to participate. Just over 2% were very interested in such incentives,

while two thirds were either not very or not at all interested (see Appendix A, question 16). This may have been an awkward question for many of the participants to answer. Perhaps they view their reasons for wanting a cleaner Earth as altruistic, or at least not for the associated social 'bragging rights'. The desire to be consistent with their reasons for wanting to reduce emissions would lead them to say they are not interested in these incentives. While these type of incentives could serve as free advertising for a carbon offset program, it is probably not worthwhile to provide these items free of charge as these items would represent a cost without encouraging more participants. Further investigation should be undertaken to see if people would pay for such physical incentives on an optional basis, as the potential for free advertising could be significant.

Carbon Reducing Projects

When asked which on-campus projects participants would like to see funded, the most popular choices were those projects most closely linked to GHG emission reduction projects: investment in solar energy and green buildings with LEED certification with 23% and 20% of the total choices respectively (see Appendix A, question 17). Investing in education was not a top priority for nearly as many individuals. This could reflect how the public sees which actions will most significantly reduce GHG emissions.

Investments in conservation and environmental stewardship education programs and the funding of student grant programs to research GHG emission mitigation were not as favoured by respondents as were the above proposed projects. However there was moderate support for said

investments – 17%, 14% and 14% respectively. This could reflect the attitudes of respondents who consider these projects to be less likely to result in real GHG emission reductions, as the GHG emission reductions resulting from these projects is difficult to quantify, or it could be a result of question 17 (Appendix A) being poorly worded.

Investing in real-time campus building monitoring was the least popular option, with only 12% of respondents supporting this option (see Appendix A, question 17). The idea of real-time campus building monitoring is an abstract and ambiguous idea, and this question could also be more clearly worded.

Following analysis of the data in question 17 Appendix A, it became clear that some of the question and possible responses were not clearly worded. Future research should look at the issue of support of particular projects. However, the responses to this data give some basis for understanding what projects would be most popular and receive the most support by participants.

Conclusion

The results show that the greater Dalhousie community is generally very environmentally aware and concerned about the effects of climate change. The respondents that have purchased personal carbon offsets are mostly professors, and because it appears students and professors are similarly concerned with the environment, those most likely to support the proposed carbon offset fund will be professors. Where the survey has indicated that environmental concern is not related to occupation, there are no grounds to assume alumni would be less concerned and therefore less

willing to participate in offsetting their personal carbon emissions. Under the assumption that Dalhousie alumni are equally aware and concerned with climate change, we can assume that their known ability and willingness to make charitable donations to Dalhousie could result in a considerable amount of money being generated should a carbon offset program be implemented.

Respondents have indicated that several rather simple measures could be used to greatly increase their willingness to purchase carbon offsets. Our survey results indicated that people prefer more transparency regarding how their donated money is spent; that they would prefer to fund locally beneficial projects as opposed to the broad, research-based alternatives; and that making their offset purchases tax-deductible would greatly increase their willingness to buy offsets. Further research should be conducted to gauge exactly what projects would be most likely to generate the most revenue, and whether or not having the purchases tax deductible is a possibility.

This research provides grounds for further study as it shows the greater Dalhousie community is environmentally aware and recognizes the benefits of making offsetting personal carbon emissions. The money generated would be used to increase sustainability initiatives at Dalhousie, and to fund research that could create exportable information, methods and technology to increase the sustainability of society as a whole. The largest contributors to such a fund would likely be alumni, and therefore a survey confirming or refuting their willingness to partake may provide the incentive needed to implement a carbon offset program at Dalhousie.

Literature Cited

Anonymous. (May 19, 2008). Colorado Governor's Energy Office; The Climate Trust selected to implement Colorado's innovative voluntary carbon fund. *Energy Business Journal*, 113. Retrieved from ProQuest database.

Carbon Catalogue. (2009). *Find a carbon offset provider*. Retrieved February 17, 2009 from www.carboncatalogue.org

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offset-protocol-american-college-university-presidents-climate-commitment.php on April 4th, 2009.

Appendix A

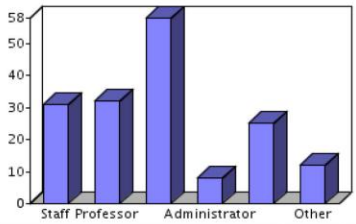
[print]

Summary report

Lists all the questions in the survey and displays summary information for each question. Text input is not included.

Report date:	Tuesday, April 14, 2009 1:28 PM, ADT
Start date:	Friday, March 6, 2009 11:22 PM, ADT
Stop date:	Wednesday, March 25, 2009 12:22 AM, ADT
Completed responses:	170
Number of invitees:	249
Invitees that responded:	49
Response rate:	19%

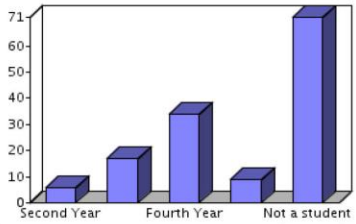
1. Please indicate your status at Dalhousie:



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Staff	31	18.67%	31	18.67%	31
2. Professor	32	19.28%	63	37.95%	95
3. Student	58	34.94%	121	72.89%	269
4. Administrator	8	4.82%	129	77.71%	301
5. No association	25	15.06%	154	92.77%	426
6. Other	12	7.23%	166	100.0%	498
Total	166	100%	166	100%	498

Median: 3.0 Minimum value: 1
Total responses: 166 Maximum value: 6

2. If your are a student, what year are you? (If you are not a student please check, not a student)

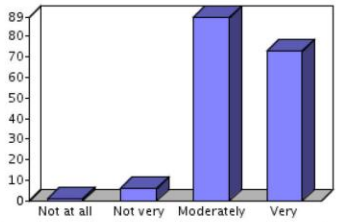


Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
2. Second Year	6	4.38%	6	4.38%	12
3. Third Year	17	12.41%	23	16.79%	63
4. Fourth Year	34	24.82%	57	41.61%	199
5. Graduate Student	9	6.57%	66	48.18%	244

6. Not a student	71	51.82%	137	100.0%	670
Total	137	100%	137	100%	670

Median: 6.0 Minimum value: 2
Total responses: 137 Maximum value: 6

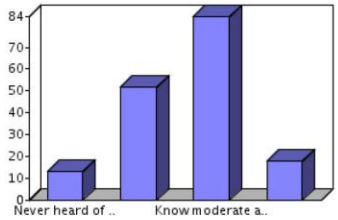
3. At what level do you consider yourself environmentally aware?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Not at all	1	0.59%	1	0.59%	1
2. Not very	6	3.55%	7	4.14%	13
3. Moderately	89	52.66%	96	56.8%	280
4. Very	73	43.2%	169	100.0%	572
Total	169	100%	169	100%	572

Median: 3.0 Minimum value: 1
Total responses: 169 Maximum value: 4

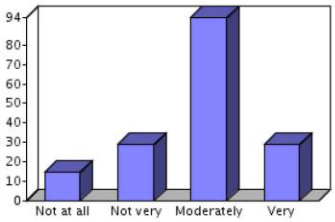
4. What is your knowledge of carbon offsets?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Never heard of them	13	7.78%	13	7.78%	13
2. Have heard a little bit about them	52	31.14%	65	38.92%	117
3. Know moderate amount of information	84	50.3%	149	89.22%	369
4. Know a lot about them	18	10.78%	167	100.0%	441
Total	167	100%	167	100%	441

Median: 3.0 Minimum value: 1
Total responses: 167 Maximum value: 4

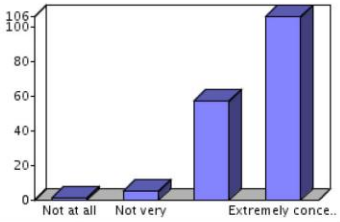
5. If carbon offsets were easy to purchase, how willing would you be to buy them?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Not at all	15	8.98%	15	8.98%	15
2. Not very	29	17.37%	44	26.35%	73
3. Moderately	94	56.29%	138	82.63%	355
4. Very	29	17.37%	167	100.0%	471
Total	167	100%	167	100%	471

Median: 3.0 Minimum value: 1
Total responses: 167 Maximum value: 4

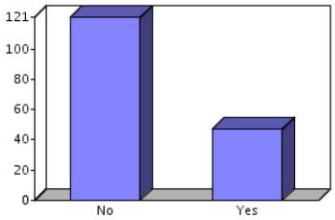
6. At what level does climate change concern you?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Not at all	1	0.59%	1	0.59%	1
2. Not very	5	2.96%	6	3.55%	11
3. Somewhat concerned	57	33.73%	63	37.28%	182
4. Extremely concerned	106	62.72%	169	100.0%	606
Total	169	100%	169	100%	606

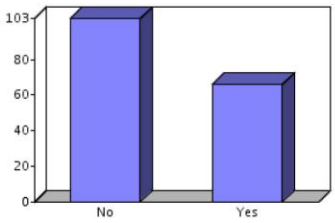
Median: 4.0 Minimum value: 1
Total responses: 169 Maximum value: 4

7. Have you ever visited a carbon offset web site (such as carbonzero.com)?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. No	121	72.02%	121	72.02%	121
2. Yes	47	27.98%	168	100.0%	215
Total	168	100%	168	100%	215

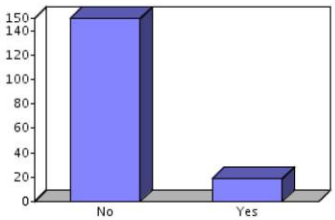
8. A carbon offset calculator calculates carbon emissions for different uses, such as air travel. Have you ever used a web-based carbon offset calculator?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. No	103	60.95%	103	60.95%	103
2. Yes	66	39.05%	169	100.0%	235
Total	169	100%	169	100%	235

Median: 1.0 Minimum value: 1
Total responses: 169 Maximum value: 2

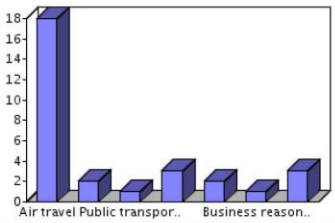
9. Have you ever bought carbon offsets before?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. No	150	88.76%	150	88.76%	150
2. Yes	19	11.24%	169	100.0%	188
Total	169	100%	169	100%	188

Median: 1.0 Minimum value: 1
Total responses: 169 Maximum value: 2

10. If so, for what?

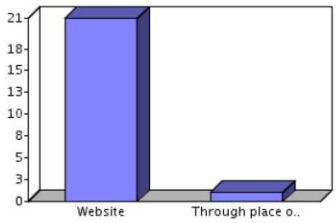


Option	Count	Percent	Cum. count	Cum.	Cum. sum

				percent	
1. Air travel	18	60.0%	18	60.0%	18
2. Car travel	2	6.67%	20	66.67%	22
3. Public transportation	1	3.33%	21	70.0%	25
4. Electricity usage	3	10.0%	24	80.0%	37
5. Home heating	2	6.67%	26	86.67%	47
6. Business reasons	1	3.33%	27	90.0%	53
7. Other	3	10.0%	30	100.0%	74
Total	30	100%	30	100%	74

Median: 1.0 Minimum value: 1
Total responses: 22 Maximum value: 7

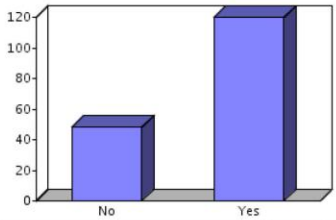
11. If so, where?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Website	21	95.45%	21	95.45%	21
2. Through place of employment	1	4.55%	22	100.0%	23
Total	22	100%	22	100%	23

Median: 1.0 Minimum value: 1
Total responses: 21 Maximum value: 2

12. Would an informative website designed exclusively for carbon offset participants at Dalhousie increase your willingness to participate in a carbon offset program?

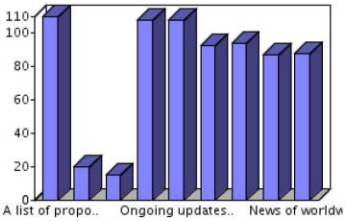


Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. No	48	28.57%	48	28.57%	48
2. Yes	120	71.43%	168	100.0%	288
Total	168	100%	168	100%	288

Median: 2.0 Minimum value: 1
Total responses: 168 Maximum value: 2

13. If so, which of the following would you like to see on the website (check off all that

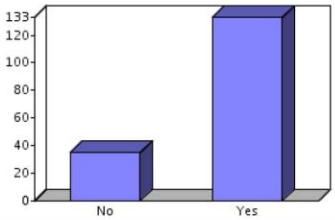
apply)?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. A list of proposed projects	110	15.21%	110	15.21%	110
2. Members only log-in access to certain areas	20	2.77%	130	17.98%	150
3. A members only forum/blog	15	2.07%	145	20.06%	195
4. A list of chosen projects	108	14.94%	253	34.99%	627
5. Ongoing updates of work in progress at Dalhousie	108	14.94%	361	49.93%	1167
6. Total amount of your personal offsets	93	12.86%	454	62.79%	1725
7. Total amount of carbon credits collectively for all Dalhousie participants	94	13.0%	548	75.8%	2383
8. Worldwide projects for carbon reduction	87	12.03%	635	87.83%	3079
9. News of worldwide policy pertaining to climate change	88	12.17%	723	100.0%	3871
Total	723	100%	723	100%	3871

Median: 6.0 Minimum value: 1
Total responses: 126 Maximum value: 9

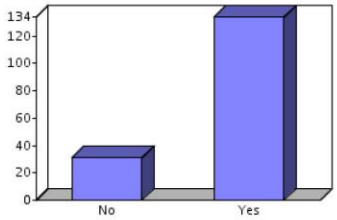
14. Would you be more inclined to participate in this program if it were tax deductible?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. No	35	20.83%	35	20.83%	35
2. Yes	133	79.17%	168	100.0%	301
Total	168	100%	168	100%	301

Median: 2.0 Minimum value: 1
Total responses: 168 Maximum value: 2

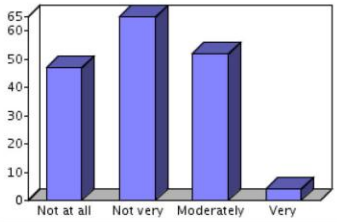
15. If you purchased carbon offsets through Dalhousie, would you like to receive an annual statement of your total offsets?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. No	31	18.79%	31	18.79%	31
2. Yes	134	81.21%	165	100.0%	299
Total	165	100%	165	100%	299

Median: 2.0 Minimum value: 1
Total responses: 165 Maximum value: 2

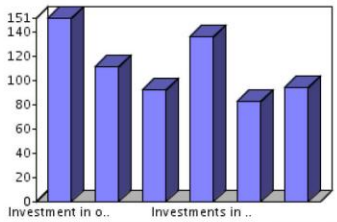
16. At what level would incentives or rewards such as license plates displaying "carbon neutral vehicle" influence your decision to participate?



Option	Count	Percent	Cum. count	Cum. percent	Cum. sum
1. Not at all	47	27.98%	47	27.98%	47
2. Not very	65	38.69%	112	66.67%	177
3. Moderately	52	30.95%	164	97.62%	333
4. Very	4	2.38%	168	100.0%	349
Total	168	100%	168	100%	349

Median: 2.0 Minimum value: 1
Total responses: 168 Maximum value: 4

17. Which types of projects would you like to see supported (check all that apply)?



Option	Count	Percent	Cum. count	Cum.	Cum. sum

				percent	
1. Investment in on-campus renewable energy installations (i.e.: solar or geothermal)	151	22.64%	151	22.64%	151
2. Investments in conservation education?	111	16.64%	262	39.28%	373
3. Investment in environmental stewardship education?	92	13.79%	354	53.07%	649
4. Investments in green buildings (LEED type certification)?	136	20.39%	490	73.46%	1193
5. Investment in a real-time building monitoring on campus?	83	12.44%	573	85.91%	1608
6. Establishment of a student summer grant program to research greenhouse gas mitigation	94	14.09%	667	100.0%	2172
Total	667	100%	667	100%	2172

Median: 3.0 Minimum value: 1
Total responses: 164 Maximum value: 6

Appendix B

survey https://surveys.dal.ca/opinio/s;jsessionid=C191FD20DB5F045AB5...

Carbon Offset Survey

This survey is voluntary and you may stop at any time.

This survey is designed to collect data on the willingness and interest of the Dalhousie community in the participation of a carbon offset trust. A carbon offset trust is a program that allows participants to purchase carbon offsets to help mitigate the emissions generated by travel and energy use such as electricity and home heating. The proceeds are then used for carbon reducing projects.

1. Please indicate your status at Dalhousie:
   - Staff
   - Professor
   - Student
   - Administrator
   - No association
   - Other

2. If your are a student, what year are you? (If you are not a student please check, not a student)
   - First Year
   - Second Year
   - Third Year
   - Fourth Year
   - Graduate Student
   - Not a student

3. At what level do you consider yourself environmentally aware?
   - Not at all
   - Not very
   - Moderately
   - Very

4. What is your knowledge of carbon offsets?
   - Never heard of them
   - Have heard a little bit about them
   - Know moderate amount of information
   - Know a lot about them

A carbon offset is the act of mitigating one's carbon emissions, by purchasing carbon-sequestering activities such as tree planting, renewable energy, and energy conservation.

5. If carbon offsets were easy to purchase, how willing would you be to buy them?
   - Not at all
   - Not very
   - Moderately
   - Very

6. At what level does climate change concern you?

1 of 3 3/25/2009 10:49 AM

- Not at all
- Not very
- Somewhat concerned
- Extremely concerned

7. Have you ever visited a carbon offset web site (such as carbonzero.com)?
   - No
   - Yes

8. A carbon offset calculator calculates carbon emissions for different uses, such as air travel. Have you ever used a web-based carbon offset calculator?
   - No
   - Yes

9. Have you ever bought carbon offsets before?
   - No
   - Yes

10. If so, for what?
    - ☐ Air travel
    - ☐ Car travel
    - ☐ Public transportation
    - ☐ Electricity usage
    - ☐ Home heating
    - ☐ Business reasons
    - ☐ Other

11. If so, where?
    - ☐ Website
    - ☐ Through place of employment
    - ☐ Through a carbon broker

12. Would an informative website designed exclusively for carbon offset participants at Dalhousie increase your willingness to participate in a carbon offset program?
    - No
    - Yes

13. If so, which of the following would you like to see on the website (check off all that apply)?
    - ☐ A list of proposed projects
    - ☐ Members only log-in access to certain areas
    - ☐ A members only forum/blog
    - ☐ A list of chosen projects
    - ☐ Ongoing updates of work in progress at Dalhousie
    - ☐ Total amount of your personal offsets
    - ☐ Total amount of carbon credits collectively for all Dalhousie participants
    - ☐ Worldwide projects for carbon reduction

- ☐ News of worldwide policy pertaining to climate change

14. Would you be more inclined to participate in this program if it were tax deductible?
    - ○ No
    - ○ Yes

15. If you purchased carbon offsets through Dalhousie, would you like to receive an annual statement of your total offsets?
    - ○ No
    - ○ Yes

16. At what level would incentives or rewards such as license plates displaying "carbon neutral vehicle" influence your decision to participate?
    - ○ Not at all
    - ○ Not very
    - ○ Moderately
    - ○ Very

17. Which types of projects would you like to see supported (check all that apply)?
    - ☐ Investment in on-campus renewable energy installations (i.e.: solar or geothermal)
    - ☐ Investments in conservation education?
    - ☐ Investment in environmental stewardship education?
    - ☐ Investments in green buildings (LEED type certification)?
    - ☐ Investment in a real-time building monitoring on campus?
    - ☐ Establishment of a student summer grant program to research greenhouse gas mitigation

Thank you for taking the time to complete our survey

Finish

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