

Moving UBC Food Outlets Beyond Climate Neutral

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Group 30

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Abstract

With the increase in global energy use there has been a subsequent increase in greenhouse gas (GHG) emissions, a major contributor to global warming. Food systems, such as that of the University of British Columbia, provide opportunities for GHG reductions and to move beyond climate neutral. This study utilised secondary research in the form of a literature review and primary research in the form of qualitative interviews with key stakeholders. Key findings include the low supply of local food, the need for waste and energy reduction and the need for policies to assist UBC food outlets to move beyond climate neutral.

1. Introduction

Over the past one hundred years the human population has seen exponential growth and a subsequent increase in global energy use. Energy use is projected to increase further as developing countries pursue industrialization, resulting in greenhouse gas (GHG) emissions increasing to an atmospheric concentration that is 30% higher than at the beginning of the twentieth century (Rees, AGSC 450 Lecture, February 27th, 2008; IPCC, 2007). It has been determined that GHG emissions are a major contributor to global warming which continues to have devastating effects upon our planet (Rees, AGSC 450 Lecture, February 27th, 2008). Impacts of global warming are varied and include: melting of polar ice caps and the subsequent rising of sea levels, changing agricultural patterns, major health epidemics, destruction of rainforests and other ecosystems, and biodiversity loss. It is predicted that the negative effects of increasing GHG emissions will continue, as global temperatures this century are estimated to rise by 2 - 4.5 degrees Celsius (Rees, AGSC 450 Lecture, February 27th, 2008). According to the Intergovernmental Panel on Climate Change (IPCC), 2015 is the last year in which “the world can afford a net rise in greenhouse gas emissions, after which ‘very sharp reductions’ are required” (IPCC Chairman, Sept 2007).

This report addresses these urgent global climate concerns in the context of the University of British Columbia (UBC): specifically, how UBC can reduce its impact on climate change and move ‘beyond climate neutral.’ Written as a component of the UBC Food System Project (UBCFSP), this report is part of an ongoing collaboration involving the Faculty of Land and Food Systems and number of key partners from the campus community. The focus of this paper is on the UBC food system’s contributions to GHG emissions and subsequent areas for reductions. However, understanding the linkages between climate change and food poses a difficult challenge due to the complex nature of the global food system (Ferris, 2008). Our goal

with this paper is to share the research required to make linkages between aspects of the food system that are involved in GHG emissions, and in doing so assist UBC Food Services (UBCFs), AMS Food and Beverage Department (AMSFBD), UBC Waste Management (UBCWM), UBC Sustainability Office (UBCSO), and future AGSC 450 researchers by developing relevant targets and strategies to help food outlets at UBC reduce their impact on climate change.

2. Problem Definition

It has become widely accepted that something urgently needs to be done to reduce our emissions; catastrophic impacts of global warming are increasingly capturing the attention of scientists and policy makers around the world (Bill Rees, AGSC 450 Lecture, February 26, 2008). In light of this, the Government of British Columbia recently adopted a progressive carbon reduction plan in the passing of Bill 44: GHG Reduction Targets Act. The target is for the public sector, which includes universities, schools, and other public institutions, is to be carbon neutral by 2010 (Penner, 2007). Climate neutral refers to the production of no net GHG emissions. To become carbon neutral, these institutions must pursue actions to minimize GHG emissions and net remaining emissions to zero by buying carbon offsets. Carbon offsets are tradable financial instruments which represent a reduction in carbon emissions resulting from the research, technology, and efforts of another organization. Carbon offsets in B.C. will be available at \$25 per tonne of GHG emissions in 2010, and this price is projected to increase in the future (Ferris, Personal Communication, February 27th, 2008). Therefore, from a financial standpoint, it is in the best interest of UBC to reduce their carbon emissions to the lowest level possible. This will support reduction processes to be developed and utilized, reducing the number of required offsets to be purchased in the future.

Food systems provide many opportunities for GHG emission reductions. Agricultural production, transportation, storage, preparation of food, and waste production are all arenas for implementation of mitigation practices. The contribution of agriculture to emissions continues to increase on a global and national scale; in 2005, the agricultural sector contributed the equivalent of 7.2 percent to the overall national increase of emissions (Environment Canada, 2008). This is a result of intensive agricultural practices such as “fertilizer overuse, land clearing, soil degradation, and intensive animal farming” (Greenpeace, 2008). While agriculture is an important component of UBC’s food-related emissions, it poses a challenge as the associated emissions result from our practices but yet we do not directly control the emissions source (Ferris & Best, 2007). In contrast, other emissions sources of the food system over which we do have direct control are those associated with waste disposal and heating/electricity use. At UBC, heat and electricity account for approximately 73% of total CO₂ and equivalent emissions (Ferris & Best, 2007). Emissions related to food sources and production of food on can also be directly addressed through altering distribution and purchasing patterns. These actions to reduce the impact on climate change can act as a model for other universities, industries, and organizations. For these reasons, we are addressing the question: how can UBC food outlets help move UBC toward its goal of beyond climate neutral?

UBC is already considered a leader of Canadian institutions in the climate change mitigation movement. Extending from this, we support the UBC's and the Climate Action Partnership's (CAP) goal of a 'beyond climate-neutral' university. Going beyond climate neutrality "emphasizes the capacity of educational institutions...to contribute to the solutions of climate change, as well as mitigate their own impact on the climate" (Ferris & Best, 2007, p.14). UBC needs to focus its efforts and resources to move to climate neutral and beyond, and this requires that all aspects of the campus food system are addressed. Although UBC was

Canada's first university to implement a sustainable development policy as well as to open a Sustainability Office, there are many universities whose sustainability outlook goes beyond that of UBC (UBC Sustainability Office, 2008). To date, 507 American higher-education institutions have signed The American University and College Presidents Climate Commitment which outlines a plan for carbon neutrality (ACUPCC, 2008). Many of these institutions are focusing on increasing energy efficiency; for example, the 10-campus University of California system passed a policy to meet 20% of its electricity needs from renewable sources by 2017, to ensure that 10% of its energy comes from locally generated clean energy sources by 2014, and to get a 10% reduction in energy consumption by 2014 (Climate Action Partnership Steering Committee, 2007). Other BC universities are also striving to go beyond climate neutrality through local food procurement. For example, Simon Fraser University (SFU), has recently developed the "Local Food Project" which aims to bring more local food to the SFU Burnaby campus, and raise awareness of the benefits of local food as part of their goal to establish SFU as a model sustainable institution (Sustainable SFU, 2008).

3. Vision Statement & Group Value Assumption

Our group's reflection on the overarching goal and vision statement for a sustainable food system here at UBC was created through discussions about our values and ideals. We are an ecologically aware group, and all agree with the need for minimizing environmental impact. As well, we wanted to look at the vision in the most realistic way possible, incorporating our ideals and vision within a real world setting. We agreed with all of the principles of the original UBCFSP vision statement; however, we felt that some of the principles should be altered slightly to reach the ideal and sustainable UBC food system we all strive for. The following is the UBCFSP vision statement with our climate neutral-specific adjustments in italics:

1. Food is locally grown, produced and processed *as much as possible*, and policy is involved in *ensuring this*.

Through our research we found that not all of the food served on campus can be locally grown if businesses are to be socially and economically sustainable. It would be impractical to say that it 'all' could be, as this would contradict the third statement, which refers to ethnically diverse, affordable, and nutritionally adequate foods. However, as much as possible should be purchased and policy should be in place with specific targets and requirements for what can and should be procured locally.

2. Waste must be recycled or composted locally, *with proper provisions and policy provided to do so*.

To achieve this goal, there needs to be increased awareness about composting and recycling on campus. In addition, food purchasing needs to be guided in such a way that minimal waste is generated from packaging. Again, there needs to be a concrete policy to ensure this.

3. Food is ethnically diverse, affordable, safe and nutritious.

4. Providers and educators promote awareness among consumers about cultivation, processing, ingredients and nutrition *with designated responsibility, and accountability*

This statement needs the additional designation of who these 'providers' and 'educators' are going to be. Responsibility and accountability need to be assigned to ensure messages and knowledge are proliferated appropriately, and policy also needs to come into play here to allow for larger, mainstream changes and education.

5. Food brings people together and enhances community

6. Is produced by socially, ecologically conscious producers, *with a shift towards a more sustainable 'organic' agricultural process, who maintain high moral standards.*

For this statement, we feel that ecologically conscious producer's need to be defined and standardized. Ethical and moral standards for animal husbandry need to be included.

7. Providers and growers pay and receive fair prices.

4. Methodology

Our initial methodology included a literature review to expand our knowledge of climate change, carbon footprints, and associated GHG emissions. We then split up the components of food service operations according to major emission categories to further research solutions and options for each of the sectors (energy/building, food, and waste). Included in this additional research was an examination of what other universities and food service providers were doing in these areas to reduce their carbon footprint.

For qualitative data collection we used a Community-Based Action Research (CBAR) approach: engaging community members and stakeholders in the research process and ensuring that their views were incorporated into the proposed GHG reduction targets and recommendations for UBC food outlets (Rojas, AGSC 450 Lecture, January 20th, 2008). In order to provide us with a comprehensive picture of the food system at UBC, our class had several lecturers from key informants who were involved in various sectors of the food system here at UBC. Further, after we had completed our background research, we sent follow up e-mails to

key players from various sectors of the UBC Food System community and conducted interviews with these stakeholders.

As part of our research we participated in the UBC roundtable discussion on food. The roundtable took place on March 12, 2008 and was facilitated by Dr. Alejandro Rojas from the Faculty of Land and Food Systems, and Liz Ferris from the UBCSO. Eight groups of four to six people, consisting of faculty, staff, stakeholders, and students, were designated to individual tables to discuss questions relating to carbon neutrality of the UBC food system. Common themes were identified throughout the discussion, which informed the development of our targets and recommendations. Each table had a note-taker to capture ideas which were then made available to all students through the course software and to the wider public on the internet through Wikipedia.

5. Research Findings and Discussion

5.1 UBC Food System Background and Key Stakeholders

The UBC food system needs to potentially supply food for 43,579 students and 12,648 staff and faculty at UBC (UBC Public Affairs, 2008). Currently, the majority of food on campus is prepared and sold by UBC food outlets: UBCFS serve approximately 10 to 12 thousand meals per day (Ferris, 2008), and AMSFBD serves approximately 3 thousand (Toogood, Personal Communication, April 2, 2008). These meals require facilities within which to be prepared, energy with which to be transformed, and variety of packaging with which to be served. These numbers reflect the impact UBC food outlets have on energy and building requirements, food procurement, and waste creation at UBC.

Stakeholders we spoke to came from a variety of sectors of the food system at UBC, and provided background into our understanding of the food outlets role in climate change at UBC. Andrew Parr, manager from UBCFS was our key informer regarding the organization's mandate and the issues they face in becoming climate neutral. Recently, UBCFS has moved environmental impact and sustainability issues to the front line of their core philosophy (Parr, Personal Communication, April 2, 2008). AMSFBD outlets are managed by Nancy Toogood, with whom we spoke. These outlets are located solely within the Student Union Building on UBC campus. The AMSFBD has initiatives to incorporate more sustainable and climate neutral practices in their food outlets. Considering the role that the food system plays in waste production, we felt it was vital to gather a greater background into waste disposal at UBC. We had an interview with Nick Gallant, an outreach coordinator with UBCWM, to learn more about their programs. They provide both waste management services and waste reduction education to the UBC campus community through the coordination of recycling, composting and litter reduction initiatives. They also house an in-vessel composting system within their department, which allows for increased diversion of UBC's compostable material from landfills, increasing UBC's composting capacity, and keeping composted waste on campus to be reused for landscaping.

Considering the role that the food system plays in waste production, we felt it was vital to gather a greater background into waste disposal at UBC. Currently, UBCWM provides both waste management services and waste reduction education to the UBC campus community through the coordination of recycling, composting, and litter reduction initiatives. They also house an in-vessel composting system within their department, which allows for increased diversion of UBC's compostable material from landfills, increasing UBC's composting capacity,

and keeping composted waste on campus to be reused for landscaping (Gallant, Personal Communication, April 2nd, 2008).

5.2 Climate Action Partnership Food Roundtable Discussion

From the Climate Action Partnership (CAP) roundtable discussion on food, it was agreed that UBC needs to become a leader in food system sustainability to help move the campus beyond climate neutral. More emphasis needs to be placed upon support for current initiatives such as composting, local food procurement, and food systems sustainability research.

Participants believed that consumer behaviour patterns towards our food system need to change. To address this, strategies discussed included raising public awareness, finding ways to increase the availability and demand for sustainably produced seasonal local food, and promoting lifestyle changes that promote sustainability. In efforts to reduce the carbon footprint of the food system, some types of foods were identified as having lower impacts on the environment. These include fresh produce, foods that do not need require refrigerated transport or storage, and foods that have less waste associated with their consumption. Beef production was identified as having a larger impact as it has high energy inputs and produces methane gas.

The need for proactive policy and administration development were also emphasized. Some recommendations generated from this topic include: campus-wide policies for food service outlets and franchises (including local food procurement policy), mandatory custodial staff training to collect compost from all buildings, and strict policies pertaining to saving energy and practicing energy efficiency in core UBC buildings.

5.3 UBC Food Outlets

We chose to divide our research into the three main sectors of food outlet operations that result in GHG emission: food procurement and choice, waste production and disposal, and energy use. Our discussion in these sections focused on topics and issues where UBC can currently exercise control.

5.3.1 Food

Food production and transportation are closely associated with high GHG emission levels. The use of fossil fuels in the production of food, including fertilizer use and intensive agricultural practices contribute greatly to the GHG emissions associated with the food system (Carlsson-Kanyama, 1998). Compounding this, a vast majority of the food consumed on campus has traveled long distances in GHG intensive trucks, planes and ships (Ferris & Best, 2007). In addition, there are currently no purchasing policies to ensure that the agricultural production of this food is sustainable or low in GHG emissions. Several recent studies support that there are potential energy savings and reductions in GHG emissions from a more locally-based diet, by reporting significant carbon dioxide emission reductions from procuring locally grown food when contrasted with globally sourced foods (Bentley and Barker, 2007). As well, purchasing from locally based producers increases the UBC food systems connection to the BC food system and its farmers. Developing relationships with these local farmers, and increasingly providing support to those who practice sustainable and climate friendly farming methods, will help to decrease our entire local food system's carbon emissions.

As part of their strategy to move beyond climate neutral, the University of Victoria came up with the following statement about the importance of a local food economy: “Supporting local food production will increase food security and nutritional content, lower carbon dioxide

emissions, support local farmers, diversify our local economy, and build healthy communities” (Common Energy, 2007, p.40). Another example of a BC university striving to move beyond climate neutral though food is Simon Fraser University (SFU). They recently developed the "Local Food Project" which aims to bring more local food to the SFU Burnaby campus while raising awareness of the benefits of local food consumption (Sustainable SFU, 2008).

At UBC, local food procurement is currently one of the prioritized issues for UBCFS. They purchase 100% of their eggs and poultry locally, and are working with some of their distributors to ensure they deliver only local apples on a year round basis (Parr, Personal Communication, April 2nd, 2008). UBC is unique in the fact that food production occurs within our campus grounds at the UBC Farm, and therefore, truly local products have the capacity to be sourced to UBC food outlets. Currently, the farm provides some produce to campus food outlets including Sage Bistro, Pie R Squared, and Bernoulli’s Bagels. However, most of the food produced by the farm is sold at their seasonal weekly farmers market, therefore very little of the produce grown is routed to supply the UBC food system (Toogood, AGSC 450 Lecture, February 27th, 2008).

It is important that food outlets meet consumer needs and achieve their financial goals while still staying true to the mandate of UBC and a civilly responsible policy (Parr, AGSC 450 Lecture, February 27th, 2008; Golob, AGSC 450 Lecture, February 27th, 2008). Keeping this in mind, challenges and barriers to increasing the local food procurement for UBC food outlets were identified. Firstly, UBC’s busiest times do not align with regional crop seasons.

Seasonality affects purchasing and menu planning, and would limit choices here at UBC if menus were designed to be both seasonal and local. Secondly, food sourced from local or sustainably grown markets tend to be more expensive, which reduces the profit margin on menu items. Also, local food often does not get processed prior to delivery, which requires that

employees spend more time preparing food, increasing the financial burden of increased local food. Lastly, large quantities must be obtained to reach food outlet demands. Currently, there is a lack of co-ordination to match supply and demand for locally grown produce. The large scale distributors that are able to supply the quantity of food UBC requires are often not locally nor sustainably focused.

5.3.2 Waste

Food prepared for human consumption needs to be safely harvested, processed, shipped, distributed, stored, cooked, and served; to achieve this, various packaging materials are a necessary component. Packaging increases the ease of shipping and serving and ensures safety, which is of utmost importance for any food service operation. However, excess packaging and food will turn into waste. Currently UBC's garbage is collected and shipped out to the Cache Creek Landfill which is over 1200 km away. The transport of our waste has been estimated to release approximately one kilogram of carbon dioxide into the atmosphere with every tonne of waste that is shipped (Naus, 2007). Further, waste disposed of in a landfill will continue to release methane, a potent GHG (Gallant, Personal Communication, April 2nd, 2008). Waste emission levels, although shown to be small compared with other emission culprits at UBC, can be easily reduced and will help reduce the speed of landfill filling and subsequent loss of habitat. Waste reduction is a movement everyone at UBC can be involved in, and is essential for achieving carbon neutrality.

UBCWCM has several waste reduction initiatives currently under way. Within their waste disposal program, UBCWCM owns and operates an in-vessel composting facility, allowing an on-site closed loop system that processes food and landscape waste into a rich compost material (Gallant, Personal Communication, April 2nd, 2008). At peak capacity, the facility can process five

tonnes of food waste daily and produce compost in two weeks. This system exceeds the capabilities of traditional composting, as it can process pre- and post-consumer food wastes, including meat, grain and dairy as well as paper towels, cups and plates (UBC This Week, May 18, 2006). In its first two years of operation, 97.5 tonnes of campus waste was diverted from local landfills (UBCW, 2008). However, no studies have yet been conducted on the role of the in-vessel composter in terms of GHG reductions.

A lot of waste can simply be avoided by ecologically minded purchasing (Gallant, Personal Communication, April 2, 2008). There are several ways to reduce waste in a food service outlet by using re-usable products, including: using take-out/food distribution containers made from recycled materials, or materials that are biodegradable, and using reusable linens and cloths wherever possible. In order to reduce waste the AMS is now providing compostable containers made from sugar cane and other renewable resources that are decomposable (Toogood, Personal Communication, April 2, 2008). However, even providing compostable containers is associated with GHG emissions as the containers are produced in Hong Kong and shipped to Canada by boat (Toogood, Personal Communication, April 2, 2008). The AMSFBD's recycling program has been expanded to incorporate more post-consumer waste through the presence of composting and recycling bin placement in conjunction with garbage containers, as well as explanations of what should be disposed of in each receptacle. However, garbage cans still greatly outnumber composting containers, despite the fact that 70% of the universities waste stream is compostable within the in-vessel composter (UBCW, 2007)

Waste that is produced can be minimized by creating green policies and culture within the work place and expressing these goals to food service clientele. Within AMSFBD, 100% of all pre-consumer food waste is currently composted, reflecting a comprehensive composting program (Toogood, AGSC 450 Lecture, February 27th, 2008). Currently, there are no UBFCFS

policies in place that specifically address waste practices. However, UBCFS does try to communicate green/sustainability initiatives through an annual meeting and by helping employees make a connection between what they do and the impact on the environment. Unfortunately, language barriers are often present which limits the effectiveness of this initiative (Yip, Personal Communication, March 5, 2008).

5.3.3 Energy

Energy use and buildings are the largest generators of GHG emissions. Approximately 73% of UBC's total annual carbon emissions are attributed to heat and electricity (Ferris & Best, 2007). Significant reductions in emissions have already been made at UBC through changes in energy usage and changes to buildings such as the Ecotrek retrofit of 277 core buildings (achieving 24% CO₂ emissions reduction per square metre since 2000 and savings of more than 2.6 million annually) (Ecotrek, 2008). However, overall at UBC more dramatic improvements can and need to be made in order to achieve and go beyond carbon neutrality.

Significant energy reductions are associated with use of alternative fuel sources used to heat and cool buildings. For example, the Oregon Institute of Technology (OIT) has demonstrated geothermal energy's long term reliability by using it as its heating and cooling energy source since 1964 (Oregon Institute of Technology, 2007). Focusing UBC's efforts on developing strategies to use alternative energy such as geothermal, would reduce UBC's emissions and UBC's movement beyond climate neutrality. John Meech, the Director of The Centre for Environmental Research in Minerals, Metals, and Materials at UBC states that high-temperature geothermal resources under B.C. have potential to supply 30 percent of our power needs with clean energy within the next 15 years (Meech, 2008). UBC is currently partnering

with a greenhouse operation in Chilliwack to build a demonstration plant to heat the greenhouse with geothermal energy and remove the current natural-gas boilers.

Energy reductions can also be implemented at the food outlet level. Currently, AMS buys all appliances second hand; many of them exceed 10 or 15 years of previous use and are less efficient models than those available on the market today (Toogood, Personal Communication, April 2nd, 2008). This is a result of financial barriers that food outlets face, as price is the primary factor that is considered in appliance purchasing for both AMSFBD and UBCFS, and energy efficient appliances are often more costly (Toogood, Personal Communication, April 2nd, 2008; Parr, Personal Communication, April 2nd, 2008). Franchised UBCFS outlets are restricted by franchise polices and must purchase brands selected by their head offices, therefore, this poses a barrier to UBCFS if they were to attempt to upgrade appliances (Parr, Personal Communication, April 2nd, 2008). In addition, building design significantly contributes to energy inefficiency. Many of the high traffic and high profit food outlets on campus are located in the Student Union Building, which is an old building with poor energy efficiency (Toogood, Personal Communication, April 2nd, 2008).

5.4 Targets and the Ideal Food System

The following targets we created have been developed from our background research. We suggest that they act as goals or possible policy directions we think that members of the UBC food system community should attain to build an 'ideal' and 'climate neutral' food system.

Food Targets:

1. *Increase the amount of local food purchased and served by the UBC food outlets.*

Ideally the majority of menu items available on campus would be made from locally grown produce. In order to service this demand there should be a dedicated distributor and menus should be adjusted seasonally to reflect product availability.

2. Increase food production on campus and design a local food processing center.

A substantial barrier to local purchasing has been the lack of value-added preparation in the form of peeling or slicing which takes up valuable time and labour funding (Golob, AGSC 450 Lecture, February 27th, 2008). A food processing centre would begin by performing this function for food outlets and could potentially expand into wholesale processing.

3. Decrease the number of franchise food service outlets on campus that do not adhere to sustainable and climate neutral practices.

Franchises, though high in customer demand and lucrative in profit, make it difficult for UBCFS to reach sustainability goals due to differences in corporate objectives and cultures (Parr, Personal Communication, March 5th, 2008). The franchises are not able to be as sustainable and ecologically minded as the non-franchise outlets (Parr, Personal Communication, March 5th, 2008). We recommend that the number of franchises that don't measure up to sustainable and low GHG practices be removed from the UBCFS line-up.

Waste Targets:

1. 90% of food system waste stream able to be composted or recycled by 2015.

Improved and increased sustainable purchasing can help to decrease potential waste created. As well, being able to compost almost all packaging available on campus helps to increase compliance for composting, if that message is clearly outlined to food outlet patrons.

2. Create a campus wide social marketing program to promote recycling and composting at UBC.

It is not just food service employees that play a role in waste disposal: students, staff and guests must all be made aware of the role they can play in reducing waste and promoting composting.

3. Improve receptacle and manpower availability to deal with increased recycling and composting materials.

The availability of disposal options other than garbage plays a large role in whether or not the alternative methods are chosen. Currently few such options exist and doing 'the right thing' becomes onerous. With enough awareness and options we hope that not exercising these options will become an act that is scorned.

Energy Targets:

1. Increased energy efficiency of all appliances in food service outlets.

By increasing energy efficiency of appliances, energy use and the associated GHG emissions will be reduced. Steps should be taken to ensure that all new appliances that are purchased should be at the highest standards for energy efficiency.

2. As new buildings are built the most sustainable building practices and building designs should be followed.

To date, the LEED standard is generally recognized as the best standard. New buildings at UBC should strive to achieve the highest possible LEED rating.

3. Include electricity meters that are independent of the rest of the building.

Currently, UBCFS and AMSFBD are distinct entities from the buildings they are housed in; in effect, they are not responsible for energy efficient practices. Through the introduction of electricity meters, such as smart meters (an initiative which is currently

being promoted by BC hydro), each food outlet could regulate their energy usage and promote energy minimization with their employees.

6. Recommendations

Combining our targets with the findings collected from key stakeholders regarding UBC food outlets' current states and themes from the CAP roundtable, we developed the following set of recommendations. Expectedly, there is no one all-encompassing solution; consequently, it is important that emissions be addressed at all levels to achieve an overall reduction target. We divided the recommendations into three categories: top down, bottom up, and recommendations for future AGSC 450 students. Top down recommendations pertain to those who have control over the direction of the entire campus as a whole, whereas bottom up recommendations are aimed at those who have control over specific aspects of UBC and UBC's food system.

6.1 Top Down: UBC Administration

We propose development of campus-wide sustainability policy that goes above and beyond the UBC Sustainability Strategy and provincial regulations pertaining to climate neutrality in order to establish UBC as a global leader of sustainable food systems. Development of this policy needs to include collaboration between the multiple sectors and key players involved in the UBC food system, including: policy makers and administration, UBCWM, UBCFS, AMSFBD, and the UBCSO. The sustainability policy should encompass building standards, energy efficiency, food procurement, and waste management. Some examples of policies that would bring UBC food systems towards the above targets are policies that:

- promote sustainable campus development by building all new developments and renovating existing projects according to the highest LEED certification standards
- promote an increase of institutional capacity thorough regulation and monitoring of campus GHG emissions
- provide specific targets for current food service sustainability initiatives such as composting and local food procurement, and provide support and incentives for meeting those targets
- establish purchasing standards for food service outlet appliances
- establish research initiatives that will fill existing knowledge gaps surrounding the GHG emissions of food producing agriculture and industry in order to assert UBC's leadership in sustainability

6.2 Bottom Up: UBC Food System Key Stakeholders

6.2.1 Collaborative Meetings - UBC Sustainability Office, UBC Waste Management, UBC Food Services, AMS Food and Beverage Department

We propose that monthly or bi-monthly meetings be established that bring together key players and stakeholders in the UBC food systems. These meetings should be hosted by the UBCSO and involve the AMSFBD, UBCFS, UBCWM, and any other relevant parties. These meetings would be to address and discuss sustainability issues, collaborations, and improvements within their respective organizations, as well as to establish targets that will bring the UBC food system beyond climate neutral.

From the conversations we had with key food system participants at UBC, it was discerned that there needs to be increased and ongoing communication and collaboration

between the key players. Previously, monthly 'Waste Free Committee' meetings were chaired by UBCWM that involved AMSFBD, UBCFS and UBCWM; however, these ended when funding was cut to UBCWM and no one was available to chair or organize the meetings (Gallant, Personal Communication, April 2nd, 2008). We feel that the UBCSO should delegate a staff member to chair these meetings in order to ensure continued collaboration. The foci of the meetings should be development of sustainability initiatives and direct multi-stakeholder communication to promote proactive change towards a beyond climate neutral UBC.

6.2.2 Composting Audit - UBC Waste Management, SEEDS, UBC LFS

We propose that UBCWM, through a potential student project with SEEDS, determine how much material is currently being composted in the in-vessel composter, how many potential carbon emissions are being diverted through this process, and the maximum capacity of the composter. This will help maximize and promote composting opportunities in the future and quantify subsequent reductions of GHG emissions that may occur through improved waste management.

6.2.3 Processing Facility - Campus Planning, UBC LFS

In order to enhance local food availability for the large scale buyers at UBC we propose the design and construction of a processing/preservation facility at UBC or in the Fraser Valley that will supply UBC. Locally-grown foods would be preserved and processed during their harvest seasons and be made available for UBC's food service outlets to purchase throughout the school year. Facility maintenance and operation could be incorporated into the curriculum of certain courses, such as Food Science, in order to enhance learning, develop innovative research opportunities, and provide hands on experience to students. The

combination of local food sourcing and energy-efficient operations within this facility would project UBC ahead in moving beyond climate neutrality and aid in the establishment of UBC as a world leader in sustainability initiatives.

6.2.4 Increase post-consumer composting - UBCFS, AMSFBD, UBCWM

We feel that it is essential to increase post-consumer composting at UBC, as compostable waste is processed on site at UBC, whereas non-compostable waste is shipped to landfills at Cache Creek. Fostering a social climate where composting and other sustainability initiatives are common place will also help move the student body towards greater compliance and involvement in sustainability based initiatives. In order to minimize the negative impacts of non-composted waste on the climate, we propose:

a) Point of purchase and point of decision promotion of composting

Employee policies should be created which would include proper waste management promotion when customers purchase their food, in particular when food is served on compostable plates and containers. As well, appropriate signage should be located at crucial 'point of decision' locations in order to ensure that consumers know what is compostable and what is not. A task force, who pointed out the locations of composting containers, and promoted their use during the first week of each semester may increase education and compliance.

b) Increase availability of composting receptacles

To increase post-consumer composting, the availability of receptacles must be improved. Locations should include high traffic areas around UBC such as the SUB and the Henry Angus Building.

6.2.5 Refine pre-consumer composting - UBCFS, AMSFBD, UBCWM

While pre-consumer composting has been successful in terms of volume, the compost bins are commonly contaminated with items such as large metal spoons, grease grates, and large soup bones (Gallant, Personal Communication, April 2nd, 2008). This type of contamination causes mechanical difficulties with the in-vessel composter. Visually contaminated compost bins are discarded due to potential harm to the in-vessel (Gallant, Personal Communication, April 2nd, 2008). We recommend that UBCFS and AMSFBD include a mandatory tour of the in-vessel as part of their orientation to improve employee awareness of the problems caused with contamination. As well, the number of contaminated bins coming from each food outlet should be tracked in order to identify problem outlets. Currently, there is no cross talk between UBCWM and UBCFS or AMSFBD about the contamination levels of pre-consumer compost (Gallant, Personal Communication, April 2nd, 2008). Improvement in these areas will greatly enhance the efficiency of this process.

6.3 AGSC 450 2009

For next year's AGSC 450 teams we propose a feasibility analysis of implementing the following items:

6.3.1 The Processing Facility and Composting Audit

We feel that for these two recommendations to move ahead, further research needs to be completed to look into the complex requirements these two recommendations entail.

6.3.2 Online Local Food Distribution System

In order to increase local food purchasing with large scale buyers such as UBC, the development of an online local food distribution system following the model of the Kansas River Valley Project (KRVP) is recommended. On the KRVP website, farmers and ranchers simply post descriptions of their products, quantities available, dates available, privately-set prices, and pictures. Large-scale buyers can log onto the distribution system, review the items and production practices listed by the producers, and place orders online. In addition, buyers are able to post “wanted products,” which allows farmers and ranchers an opportunity to match market demands. The product exchange involves producers delivering the products and collecting payments (Kansas River Valley Foods, 2007). AGSC 450 students next year could assess the feasibility of the development of such a website or the expansion of an existing, similar website such as BC Farm Fresh, allowing large scale institutions to purchase locally while also maintaining large demands (Kansas River Valley Foods, 2007; BC Farm Fresh, 2008).

6.3.3 Local food market at UBC

UBC's food provision is not exclusive UBCFS and AMSFBD, retail grocers are also present that provide a plethora of goods for the UBC community, including grocers in the UBC village, UBC Farm and the Save-on-Foods which is under development at South Campus. Despite this, there is a current lack of year-round supply of local foods to students, faculty and staff. For this reason, we propose that the AGSC 450 class next year conduct a feasibility analysis of the opening of a local food store at UBC.

7. Conclusion

Increasing global energy use and the subsequent increase in GHG emissions are major contributors to global warming. As a large public institution which feeds numerous students,

staff and faculty members, the University of British Columbia's food system has the opportunity to reduce GHG emissions and to move beyond climate neutral. Broadly, our three recommendations, top-down, bottom up and for AGSC 450 2009, will move UBC towards achieving its goal to move beyond climate neutral. If UBC, a university which trumpets itself as 'Canada's leader in campus sustainability', does not take the recommended actions to move beyond climate neutral what example does this serve to the people of British Columbia, Canada and the world?

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