
SSMU
2008 Sustainability Assessment
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First Edition, October 2008

Principal Writing Duties by Chapter

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Book Design

Designed by Trevor Chow-Fraser

Typeset in Baskerville.

Assisted by Century Gothic, **Futura**, *Optima,* and Zapfino.

This paper copy produced by the following printer:

ideally, using sustainable materials and processes

SSMU Sustainability Assessment 2008

authored by

Trevor Chow-Fraser and Derina Man

Introduction

Introduction

How does this guide work?

Welcome to the first SSMU Sustainability Assessment. The assessment establishes a qualitative, and wherever reasonable, quantitative baseline for evaluating the SSMU's progress toward social and environmental sustainability. We also provide background information on the issues facing the SSMU. We hope decision-makers and activists will find this resource educational and helpful when considering potential solutions in the future.

This report provides a window onto the history and current state of sustainability efforts in the SSMU and with student groups involved with the SSMU. While the issues and information covered within these pages will be valuable to any organisation, our research is focused uniquely on the SSMU's operations and activities. This is only the latest step—but a crucial step—in helping move the SSMU toward a sustainable future.

How to Successfully Implement Changes

When considering how to reduce the environmental impact of the SSMU's operations and activities, it is best to start with the Three Rs: Reduce, Reuse, and Recycle.

The Three Rs

Please remember that the Three Rs are a hierarchy. Reducing waste is the best thing that we can do to mitigate our impact. Ensuring that those things we do use can be used again and again will also help. Finally, if we must only use something once, then let it at least be recyclable.

Recycling is the lowest priority because recycling is a risky business. It can be resource intensive, and a lot of things can go wrong between your green bin and the recycling plant. Because of contamination, much of what we hope is recycled actually goes to a landfill. Paper and aluminium recycling are actually profitable businesses, but like all materials, even these lose some integrity when recycled (meaning it becomes a lower grade product). For instance, fine printer paper might be recycled into newsprint.

It is much safer to think creatively about strategies that will eliminate an impact entirely. Where this is not possible, consider investing in durable and flexible options that can be used repeatedly for years.

What does sustainability really mean?

We do not want to suggest that sustainability is all about austerity. We live in a consumption economy, a system that requires continual human and resource exploitation. This a system bound for eventual failure, but we believe that a more just and enduring way of life is possible. Sustainability is not about a return to nature, only a return to balance. Sustainability values creativity, community, diversity of living things and ideas and methods.

So this is not a report about cancelling everything the SSMU does. The SSMU has important activities and operations, many of which are high impact. The SSMU has high consumption events, sends people travelling around the country, provides heating and power to hundreds of organisations and offices, and feeds thousands in its cafeterias and cafés; these activities must continue.

However, sustainability must be considered in every decision. The organisers of these activities must acknowledge the social and environmental impacts that they will create. Only then can the SSMU make responsible decisions. It could be that other values will outweigh environmental considerations. At times, we will decide that having fun is more important than saving so much waste. That's okay—so long as we can keep the SSMU accountable to its overarching environmental commitments.

Our goal is to force the SSMU to think about deep change. As Max Silverman puts it, SSMU Executives operate on a model of liberal

environmentalism: they think about ways to mitigate their impacts, rather than find creative ways to eliminate an impact or change what they are doing altogether. This liberal model trains organisers to ignore the possibility of deep change. Worse, it makes mere inconvenience seem like the greatest sacrifice that students can make.

In fact, real change would be anything but inconvenient. Real change is activating; it requires people to be creative, to be engaged. It can be a good thing. According to Kay Turner, "Sometimes radical change is really what needs to happen for an organization to realise its direction." Afterall, society is counting on the University to break new ground, to lead experiments, to reveal the future today.

Thus far, McGill University has not broken new ground on sustainability. It needs to show some leadership. And as Marcelle Kosman argues, leadership begins by showing a good example. As part of the University, the SSMU must now meet its responsibility to society. In so doing, we will raise the bar on campus sustainability, challenging the rest of McGill to join us.

Lessons from History

The story of environmentalism at McGill is already one rife with student activism. Even the McGill Reporter acknowledges, McGill's Environmental Policy "was approved by Senate in spring 2001, largely in response to student requests for increased environmental friendliness."[1] Although, 'request' seems an overly polite term. In fact, the Environment Policy provided a focus for student mobilisation for half a decade. Students were involved behind the scenes, sitting on administrative bodies and conducting research, as well as organising publicity campaigns. Its early successes and failures surrounding the Policy have shaped the direction of McGill's student environmentalism. Ultimately, they have created a movement with strong organisation and self-reliance, and well positioned to effect change across the University.

Student Representation The extent to which students were crucial to the Environment Policy's success is revealed by the institutionalisation of student involvement in the Policy's aftermath. The principal body responsible for preparing the Environmental Policy had parity of membership between students, staff and faculty. This meant four students (one from each student society, plus the School of Environment) had voting power in establishing the foundation for McGill's environmental administration. When this group became the Senate Subcommittee on the Environment, students retained parity, with three permanent representatives.[2]

Student Pressure At key points in the Policy's path toward implementation, professorial and staff allies relied on student pressure to push things forward.[3] Afterward, students turned their attention to independent projects (notably Gorilla Composting and the Sustainable McGill Project). In those years, efforts within the administration came to a virtual standstill. There was a lack of coordination between students, and administrative actors, as well as a lack of research into the campus environment. Only a few years later, with the return of student interest into administrative matters, is McGill once again conducting research, building the Office of Sustainability, working on a Sustainability Policy, and seriously investigating solutions.

Student Catalysts Though the process began in Senate, students seemed to fare best through quasi-official or ad hoc channels. Perhaps this helps explain why neither the Environment Officer, nor the SCE managed to make noticeable headway pushing environmental concerns to the forefront of campus priorities.[4] Students simply seem to have been the best enablers of change. They have found and engaged key staff working in Facilities and on the Grounds. They have mustered the ideas and influence of powerful academics. Students were also hired on Work Study to complete McGill's first and only Environmental Review.

The most influential research projects since have been independently undertaken by students. Students are already building institutions addressing the need for sustainable food, waste management and transportation on our campus (The Plate Club, Organic Campus, Midnight Kitchen, Gorilla Composting, SSMU Bike Collective, Campus Crops).

Student Leaders Students have either the privilege or the opportunity of sitting on the vanguard of environmental change at McGill. Why not harness that power for ourselves? We believe that students can accomplish more working through the SSMU. Controlling an entire building, students have the freedom to experiment with changes both moderate and radical. We believe that student environmentalists can help the SSMU transform into a towering example of sustainability. We will set the bar for the rest of the University.

History of Student Environmentalism

Recently at McGill

This history is guided by the goal of showing the students' side to environmentalism at McGill, because it is less likely to be told in the University's official history. Furthermore, we really do believe that students are the driving force behind environmentalism at McGill, and that our efforts are best spent working on student-coordinated initiatives. You might not agree with us, but we feel that history speaks otherwise.

Even before McGill had made any sort of commitment, student activists were pushing for McGill to do the basics, such as paper recycling. The first recycling programme on campus was actually joint-operated by the SSMU, QPIRG McGill, and McGill.[5] These student-initiated pilot projects from the late 1980s led directly to the full spectrum system we see today.

McGill had first made commitments to the environment by signing the 1990 Talloires Declaration and the 1991 Halifax Declaration. These agreements incorporated sustainable development values into a framework tailored for educational institutions. By decade's end, the University had consolidated its classes into the School of Environment, but had little else to show beyond an unreleased, draft Green Plan from 1996.

Environment Policy

When the process of rectification finally began, students were leading the charge. In April 1999, the SSMU's Vice President (University Affairs) brought a motion to Senate pushing for an Environment Policy. McGill's Vice Principal (Finance and Administration) sent the matter to committee, where it waited almost a year to be addressed. Then, in February 2000, an Environmental Policy Workgroup was struck under the aegis of the Senate Committee on Physical Development (SCPD). This Workgroup later evolved to become the Subcommittee on the Environment (SCE). Both bodies had an equal membership of staff, academics and students.

With speed reflective of a great motivating energy, the Working Group brought forward its proposal in November 2000. Not only did the proposal include a policy, but it added a set of guiding principles, a dozen recommendations, and suggested implementations.[6]

At the end of the following semester, in April 2001, Senate adopted the Policy statement approved by McGill's VP Administration and Finance. The rest of the proposal was left out. The following year, Greening McGill led a campaign to have the full policy proposal implemented.[7] The campaign's pinnacle came in February 2002, when students held “a rally and 4-day camp-out” in front of James Admin (McGill Tribune). In September 2002 the VP Admin & Finance conceded a little more of the proposal. The Senate thus ratified the policy statement's accompanying principles.

Following the Policy's adoption, the working group had been reformed as the SCE. That summer 2001, students were hired by the SCE's vice-chair to undertake McGill's Environmental Review.[8] This document was to guide McGill's implementation of the Environment Policy. The writers called it a 'snapshot' assessment, rather than a full audit, and it omitted recommendations. While the research was conducted over the summer of 2001, the final report was not presented to / by the SCE until October 2002.

In summer 2001, the University had also made plans to hire an Environment Officer. This position was not filled until almost two years later, in February 2003.[9] The Environmental Officer position was seen be many as a key step toward implementing the Policy. A full-time staff person could devote her full attention to much of the research and coordination that students currently were doing in their spare time. The final decision was marked by controversy. The hiring committee had one staff, one student and one academic representative. But for some reason, the student representative was not present at the meeting when the Environment Officer was selected.[10] The students were favouring a different candidate, Melissa Garcia Lamarca, who fortunately went on to act as Concordia's first Sustainability Coordinator.

Breaking New Ground

Thus closed the era of the Environment Policy. Students who had been key to its implementation were somewhat alienated from the product. They turned their sights toward the institutions that they themselves might build.

The proposed Policy had included a recommendation directed at students. Recommendation 11 encouraged student associations and societies to form an "inter-body council for the Environment" and to "create permanent environmental positions." At some point, students followed through with the creation of the MSEC (McGill Students Environmental Council). The SSMU and SUS both have Environment Commissioners, which seems likely to be the result of this recommendation as well.

Around the time of the Officer's hiring, students received joint-host duties (with Concordia) for the September 2003 Sustainable Campuses National Conference. This was a great honour, a chance to showcase our efforts, and an opportunity for McGill students to learn from environmentalists nation-wide. This conference also launched the CSAF,[11] Sustainable Campuses' official tool for measuring progress on campus sustainability.

This led to the birth of the Sustainable McGill Project in 2004. Between its inception and the end of 2005, students were recruited into completing the CSAF's ecosystems assessment. In the spring and summer of 2005, students kicked off Gorilla Composting, an effort to institute campus-wide pickup of organic food waste. Working with Grounds and Vehicles Services, and a generous class of 2005-06 gift, they provided service to all downtown cafeterias, some residences, and a public drop-off behind the MSE. Still other students launched the McGill Urban Community Sustainment project, linking student research to the world beyond McGill. Greening McGill also managed to have the Board of Governors pass the Paper Policy, which gave students the right to print double-sided, and mandated all departments to use double-sided recycled paper. All of these projects put students in contact, not with senior administrators and senators, but with on-the-ground staff and working academics. These relationships proved to be very rich and empowering, for all involved.

Throughout this time, Sustainable Concordia cast a palpable shadow across McGill's environmental community. They had completed their first sustainability assessment in 2003, hired a Sustainability Coordinator in 2004, received a student levy in Winter 2005 and by 2006 their recycling services included a staff position and limited composting. Sustainable Concordia was from the very beginning driven by students, and many of those same

students had been hired by the University to coordinate environmental services and planning. Whether Concordia presented a model worthy of emulation or not, their example was certainly inspiring to students here at McGill.

Taking Charge

Many students looked at McGill's stalled progress, and then looked at the amazing work that McGill students were doing without the Administration's support or funding. While McGill argued that it was pursuing a different path than Concordia, students no longer wanted to wait around to find out if it would work or not.

Building off of their own successes between 2004 and 2006, student environmentalists came together once again to coordinate on a political front. Implementing nation-wide lessons learned at the Sustainable Campuses National Conference, students decided to make their Union work for them. In Winter 2006, a coalition of student groups successfully brought forward a new Sustainability Policy for the SSMU. It passed unanimously at the second regular General Assembly. This was followed up by a referendum question, asking students to contribute into a Green Fund. The student body agreed, and over the next three years students would contribute 1.25 $ per semester, creating an annual pool of roughly 40,000$.[12]

At the same time, the Sustainable McGill Project turned its attention toward reforming the McGill administration. Through a series of consultations with academics, staff, students and senior administrators, SMP brought forward a proposal for a Sustainability Research Centre. This Centre would allow students to work directly with staff on projects that ameliorate campus sustainability. Students would earn credit from collaborating professors; professors would put their expertise to work on their own campus; and staff would find creative solutions to the environmental problems they've been dealing with in isolation.

Throughout this period of renewed institutionalisation, environmentalists benefited from a confluence of forces that permanently inked sustainability into the University's agenda. The harbinger of this change came with Youth Action Montreal (also known as Gorezuki for its keynote speakers, Al Gore and David Suzuki). By then, An Inconvenient Truth, the Kyoto Accord, Stéphane Dion and the Montreal Kyoto conference,[13] Montreal's Plan Durable, Quebec's Sustainable Development Act, and a host of other forces meant that McGill could no longer pretend it was doing enough for the environment.

With the Green Fee in place, the SSMU became a welcome home for student environmental initiatives. The Midnight Kitchen had long been a SSMU Service with its own kitchen, but it received its own fee levy in 2007, allowing it to hire Coordinators and diversify its ingredients. The Organic Campus became a SSMU Service in 2006, and is now enjoying great traffic with a home outside the Shatner University Centre, and in the second floor Organic Corner. In 2007-08, they were joined by the SSMU Bike Collective, a volunteer bike repair shop given a prime location near Gerts. The Plate Club (2008 New Club of the Year) has an office near the cafeteria, and received crucial support establishing their lunchtime dish service. Gorilla Composting, while independent of the SSMU, received significant funding toward purchasing an industrial bioreactor for the downtown campus.

The Green Fee also made it possible for the SSMU to hire student researchers. One worked on greening Frosh, one on governance, another on green events planning. And finally, in summer 2008, we were hired to write the SSMU's first ever Sustainability Assessment!

How should this document be used?

This Sustainability Assessment is the first of what we hope will be an annual undertaking. We expect that students going through this document will find points in need of revision. Much of our

knowledge about the SSMU's relationship with McGill is tentative. The relationship is so un-transparent that we have been forced to rely on personal experience, research and memory. We were also limited in time and expertise. We have made some conclusions about the Shatner University Centre's operations that may simply be wrong.

There are also sectors that we were not able to complete. We did our utmost to thoroughly cover the core considerations: Food, Energy, Paper, Events, Waste Management. There is still much work to be done on Transportation issues, Space use, Air & Water quality, and more.

Finally, the annual assessments should document, celebrate and criticise the progress that the SSMU will make on sustainability. In this report, we have set a kind of baseline. Though work has been underway for years, the SSMU can now be held accountable to the standard of documented history. We hope that this will be the first step in transcribing a great change for the better.

Methodology

We set out to do this assessment, relying not on an established framework, but our own common sense and years working in McGill's environmental movement.

The Assessment needs to updated annually

- parts that are found to be erroneous, or off the mark, should be revised.
- parts that are lacking should be filled out
- progress should be documented, celebrated, criticised

The only standardised assessment tool with any currency around here seems to be the CSAF. We decided that the CSAF was too broad and inapplicable for assessing a student union. We also found its methodology to be a little counter-productive. Looking at Sustainable Concordia's 2006 assessment, we were very impressed by their analysis. We liked how they framed any progress with background information and documented the steps they took to ascertain information or bring about change. Yet when we took a look at the completed CSAF indicators, there was very little relation between their discussion and the data. We therefore decided that we would dispense with the crude data of indicators, and instead concentrate on the qualitative analysis.

We limited our investigation strictly to the concerns of the SSMU. We began by interviewing the outgoing Executive, one at a time, taking between 45 to 75 minutes. We did this in order to build a profile of each portfolio. This gave us a better understanding of where change is possible, and who would be responsible for it. The executives also had some great ideas, which we gladly picked up on. We were also interested to know how different executives conceive of environmentalism and sustainability. Over the years, we hope to see a growing insight into sustainability among our elected leaders. The interview and supplemental information were condensed into

Basic Steps

- Interview outgoing executives
- Investigate and catalogue on-the-ground situation
- Follow-up with relevant contacts
- Compile background research
- Write to be educational as well as prescriptive

Executive Profiles. Following a simple template, these profiles should be updated annually.[14]

We next conducted an investigation of the Shatner University Centre, including the SSMU Office. We catalogued the electrical appliances we found, the lighting situation, and made note of other resource impacts. If necessary, we spoke with members of the offices and businesses to inquire about use patterns. We did more in-depth interviews with the food vendors, inquiring about their suppliers and their clientele.

We followed up on our findings with additional research. We attempted to contact suppliers and key staff at McGill. We looked at the SSMU's purchasing information for the past year. We would have liked to follow up with more people, but unfortunately ran out of time.[15]

Writing the final report, we compiled background research to help contextualise issues. We tried to create a report which would also serve as a guidebook to anyone interested in greening the SSMU. Thus, we provide much more than just recommendations for action. We equip readers with the knowledge and understanding to perhaps choose a new path forward.

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[1] Desjardins, Sylvain-Jacques. "The Greening of McGill." McGill Reporter. January 16, 2003. 35.8. http://www.mcgill.ca/reporter/35/08/green/

[2] This was was changed in 2007, in a controversial but not fully debated increase to the staff membership.

[3] Personal correspondance with Wayne Wood.

[4] What has McGill been doing, in the meanwhile? There has been some progress. Energy generation and distribution has been improving over the past decade, entirely under the self-direction of power plant staff. The recycling programme has also made baby steps toward full implementation, under higher administrative direction.

The problem is that McGill's Environment Officer and the SCE do not seem to have the time to get things done themselves. They continue to rely on unpaid students to do the work that McGill has hired staff to do! Students have become alienated from this process. Moreover, they are more interested in their own projects, and thus McGill's own projects have slowed down.

[5] Kisilenko, Karine, and How-Sen Chong, Johanna Hume. Environmental Review. Subcomittee on the Environment. October 2002. http://www.mcgill.ca/rethink/policies/reports/

[6] The proposal is now available online at http://www.mcgill.ca/rethink/policies/policy/history/working/

[7] Sierra Club. "Outreach: The Sierra Youth Coalition and the Sustainable Campuses Project" The Declaration. Volume 6, Number 1: December 2002 http://www.ulsf.org/pub_declaration_parvol61.htm

[8] See Kisilenko, et.al above.

[9] We infer this from the January 2003 article in the McGill Reporter (see note 1) which notes that the future hiring of an Environmental Officer would increase McGill's potential to take action. The February 2003 SCE minutes show that Kathleen Ng was then Environment Officer.

However, the SCE minutes for November 2004 confusingly note that the Environmental Officer position had already been renewed twice. This implies that the Environmental Officer was hired in February 2002.

[10] Personal correspondence with that very student representative, Spencer Mann.

[11] Pronounced ‘see-saph’; stands for Campus Sustainability Assessment Framework.

[12] The original coalition now hoped the SSMU would hire a Sustainability Coordinator. But matters were now in the SSMU's hands, and they chose to move more slowly, instead stipending students for targetted research and coordination work.

[13] More accurately named the UNFCCC COP-MOP.

[14] We also interviewed some of the incoming Executives. However, most of them were too inexperienced to offer much insight. The notable exception is the VP Internal, who was already well underway organising Frosh. We actually benefited mutually by maintaining communication with her throughout the summer.

In any case, the outgoing executives were much more entertaining. As Kay Turner puts it, they had nothing to lose! The interviews were as honest as it gets with politicians—and very rewarding.

[15] Now that more of a framework has been established, we encourage next year's assessors to start contacting people earlier. It can take quite a while to track some people down, even for a phone interview.

Executive Profiles

Name
Portfolio

Description: What is the executive's job, practically speaking.

Portfolio Integration with Sustainability: How has the executive integrated sustainability into its portfolio.

Addressing Sustainability: What concrete measures has the executive taken to address sustainability.

Critical Remarks: Do they really get sustainability?

In Summary: *Try to do justice to the executive.*

Adrian Angus

University Affairs

Description: The UA sets the SSMU's policy on McGill's policy; leads Senate caucus; and manages the SSMU's response to campus issues.

Portfolio Integration: The UA's duties are determined by student movement and pressure on campus. The UA must pick up responsibility for these issues, or give the portfolio to a willing senator. "Out of thirteen student senators, at least one of them will care about the environment." In any case, given the current climate, "it would have to be a pretty untrained, and lacklustre, and lazy UA to let the environment go."

Addressing Sustainability: Adrian used his official capacity to advocate to the McGill Administration and to Senate. "Greening McGill and the other groups can only do so much." He believes that his access to decision-makers means only Senate caucus can get McGill to green up its act. Adrian also worked with Senator Lynne Champoux-Williams to reform the place of sustainability in the governance structure. Although they thought about it all year, no solution was found. Adrian nevertheless felt that the current situation is so dysfunctional, that the SSMU "should just concentrate on individual projects" outside the governance structure.

Lynne was the Senator in charge of sustainability. Though she only joined halfway through the year, she made significant progress paving the way for digital coursepacks at McGill. The only thing left now is for McGill professors to give up paper coursepacks. As part of this, Lynne worked heavily with McGill's IT people, and her work will have impacts down the road in terms of opening up education with technology.

Adrian was very concerned with documenting his term, thus ensuring a smooth turnover to the next UA. He is generally unimpressed with the level of self-documenting at the SSMU, saying that this year they "improved to a poor level of record keeping." In fact, Senate caucus was not minuted at all. But, under Adrian's initiative, Council and Executive meetings were audio recorded. Adrian also circulated memos after each important meeting, adding his personal knowledge, history and context. Finally, and for the first time ever, his executive has prepared a transition report to the incoming executive.

Of course, these are all internal record-keeping measures. But Adrian maintains that his detailed Council reports provide the best window into his portfolio. Because of the limited popular interest in SSMU Council, Adrian also ensured public accessibility by reporting regularly and openly with the McGill Daily.

Remarks: Adrian doesn't seem to be aware of the different environmental student groups—instead, he assigns every initiative he knows to Greening McGill. Adrian is very comfortable working within the collegial system, which is "hierarchical, but with consultation" at the community level. He neither dismisses, nor advocates for democratisation of McGill's governance and operations.

Adrian's office uses large amounts of paper. Unfortunately, this is largely because McGill Senate does not allow laptops in its meeting room. Senators are sent both paper and electronic versions of all documents. Senators may opt-out of receiving the paper version, though, Adrian prefers the tactility, durability and easy reference of paper.

In Summary *In general, Adrian has done much to open up his office, ensure good record keeping and transition to the next UA. He has managed sustainability into his portfolio in a responsible and effective manner. He has not been an active friend to environmental students, nor has he set out environmental goals for himself. But he has not let down the environmental community when events required the UA to take the initiative. He had the good fortune of having a remarkable student senator take on his environmental responsibilities.*

Jake Itzkowitz

President

Description: Jake was the official spokesperson for the society, and was responsible for SSMU Council and the General Assemblies, among other roles.

Portfolio Integration: As the environment is a Presidential Affair, Jake regularly attended Environment Committee meetings. He worked closely with the Environment Commissioners, providing required support toward several projects.

Addressing Sustainability: Jake singled out the provision of reusable dishes in the SSMU Cafeteria as his primary sustainability goal. He was very lucky to have hired my co-author as Environment Commissioner, who has gone great lengths to order dishes and install a commercial-grade dishwasher.

He also played a supporting role in putting sustainability on McGill's agenda. The Joint Senate–Board of Governors meeting on sustainability proved especially fruitful, and Jake helped with our Sustainable Campuses Conference, a rallying point for student environmentalists this year.

Jake sat on SSMU Council the year before becoming President. That year, they tried to have paperless council meetings, by emailing documents beforehand, encouraging councillors to bring their laptops, and by projecting the relevant documents for all to see. Jake considered this experiment a failure, for a number of reasons, and his council was not paperless. They did, however, print all documents doublesided.

Jake notes that his portfolio involves constant meetings, all of which create paper trails. Promoting the General Assembly also required 6000 flyers, 1000 posters and 10,000 newspaper ads. He is also indirectly responsible for SSMU Accounting, which still relies entirely on paper. Jake would like to see Accounting purchase new software that would allow them to give up paper. He also suggests that tablet PCs or cheap laptops could solve the Executive's dependence on paper meetings.

Jake admits that he should have given more guidance to the Environment Commissioners, perhaps setting goals for them to accomplish. He also found the Environment Committee to be a bit unruly, and he would have liked it to be more functional. Other challenges that Jake feels held back sustainability under his watch include institutional resistance, and waiting for McGill to make infrastructural changes. The cost of change was also a factor, but greatly mitigated by the Green Fee.

Critical Remarks: Jake's conception of sustainability is very pragmatic, focusing on lessening the impact of the SSMU's staff, paper use, and building. People need to realise that "what's cost efficient is often what's also sustainable." At the same time, Jake recognises that campus environmentalists are pushing a deeper idea of sustainability along social, economic and ecological lines. "It's a balance" he says of his implementation. "What I would consider an appropriate level of corporate sustainability is probably different from what [this author] would think. But I really think we can do better."

In Summary *In a year when the President was criticized for not accomplishing much, Jake's oversaw significant gains in sustainability. He may not have had a direct hand in charting the changes, and he could not always be counted on to follow through on his promises of support. It is a shame that Jake did not take a more active hand in minimizing his portfolio's impact. Notably, he could have done much to reduce paper consumption, in his own meetings, at SSMU Council, and with the GAs. Despite these failing, Jake provided consistent support and sustainability remained his favourite priority throughout the year.*

Imad Barake

Finance & Operations

Description: The FOPS is responsible for keeping the SSMU on budget, and for overseeing its operations, including Gerts, Haven Books, and the Daycare.

Portfolio Integration: For Imad, sustainability principally meant "reducing how much paper we use in this office, because I think it's obscene." His number one priority was to reduce the Finance Committee's paper use, which he knew from prior experience could be quite high.

He also aimed to "spearhead projects in the building that would make our operations a model to the University. We are making an effort" he emphasised. Finally, he got the Financial Ethics Research Committee (FERC) functioning, and oversaw their investigations.

Addressing Sustainability: "You can move pretty much everything from that office online." Imad made great progress digitizing various functions, and foresees his entire office moving online. He encouraged clubs to submit their year-end audit forms online; clubs had to scan their receipts, but they made the change. Unfortunately, Imad failed to prevent the clubs auditor from printing it all out anyway, defeating the whole exercise. Balance sheets will be kept online, and sent regularly to clubs. Application forms can all be completed online. The Finance Coordinator is charged with summarizing the applications, to minimize the paper handled by committee members. Whenever possible, Finance Committee used a projector instead of paper, but the SSMU does not have its own projector.

Haven Books' consignment system is online, but Imad cannot claim responsibility for that—the system was bought along with the store.

With the former FOPS, David Sunstrum, Imad finished the Ethical Business Policy (EBP). Unlike the older Ethical Purchasing Policy, the EBP covers all of the Society's financial transactions. Both regulations included specific details regarding environmental harm.

Imad chaired the FERC, which holds the SSMU accountable to the EBP. He mostly took notes, encouraged debate, and kept his hands clean. FERC investigated oil investments, American Apparel, the mining industry, and recommended that gender issues be better reflected in the EBP. FERC also researched waste management, energy consumption, and local purchasing to help evaluate the Room 103 tenders.

Critical Remarks: Imad's term was marked by two major space allocations in the Shatner University Centre. In both cases, Imad voted against allocating space toward students interested in building-up sustainable services such as Organic Campus, the Bike Collective and the Midnight Kitchen. The winning councillors favoured the security of rental fees, and gave the space to commercial vendors.

Imad shied away from taking personal responsibility over the FOPS portfolio—to an extent that some would consider a fault. Asked how he deals with the tension between fiscal responsibility and sustainability, he claimed that it would be inappropriate for him to navigate such controversial waters alone. Imad organised five committees, four more than were functional the year prior. "It's a pain," he said, but the consultative process "makes what you do that much more relevant." Imad conceives of committee work as a collaborative, consensus-building approach to decision making. He argues that this process will help bring about a cultural shift toward sustainability. The changes needed to make FOPS sustainable are very achievable, "realistic goals"; only cultural inertia holds back progress.

In Summary Despite initially equating sustainability with paper saving, Imad's understanding of the FOPS' place in sustainable decision-making is spot-on. He tried to bring together a range of opinions and actors, covering a broad knowledge base and including experts when needed. This might have to do with Imad's reluctance to make decisions. Nevertheless, while he spent most of his time running from operation to operation, and ploughing through budgets, he worked harder than past FOPSes to ensure that sustainability research was underway. He was not as friendly to student environmental initiatives as we would have liked. But I guess that's just too bad…

Kay Turner

Internal

Description: The Internal oversees the SSMU's events planning, notably Frosh and Snow AP, as well as Four Floors and Faculty Olympics. The Internal facilitates community building and social life for students.

Portfolio Integration: Kay continued to green the SSMU Frosh and Snow AP, her year's only major events. Throughout the rest of the year, she supported a broad diversity of events on campus. The SSMU's IT situation was in shambles upon entering office, and it did not much improve over Kay's term. Lacking a proper website limited the SSMU's accessibility and transparency, and prevented a paperless office initiative.

Addressing Sustainability: Previous environmental efforts have focused on SSMU's events, more than any other portfolio. Still, she characterises the two major events as "very high consumption." Kay responded by hiring a Green Frosh Coordinator (GFC) and implementing many experimental measures. She concedes that failures of communication and coordination stymied progress: "Frosh did not work out as well as I had hoped, environmentally." But she learned well from the problems revealed at Frosh, and did much to green Snow AP. Her lessons have further helped her successor organise the greenest frosh yet.

For instance, she resolved the question of how to integrate environmental responsibility into the organising team. She feels that the GFC position was created out of an unhealthy divide between "the event planning people and the environmental lefties." Kay realised that green event planning requires organisers who are event planners first, but integrate sustainability into their thinking at all times. With this in mind, she wrote environmental responsibility into her coordinators' job descriptions, with great success.

Kay pursued two strategies for increasing participant diversity at her events: organising "a broader range of events, and changing existing events so that a broader group of people feel comfortable there." She did not depart too far from the party mould. But she supported a wide range of groups in their own community building efforts, from the Sustainable Campuses Conference to Mob McGill and SSPN.

Critical Remarks: Kay was dismayed that her events did not undergo the deep changes necessary to become truly sustainable. At the same time, she seemed unwilling to take those bold steps herself.

Though she was reluctant to force inconvenient changes at Frosh, she successfully instituted cup-washing at Snow AP, a doubtlessly thankless task that she managed to get her volunteers to take-on. She has mulled about forcing further change, for example by not supplying any plastic cups and requiring participants to bring their own mug.

Looking back on her term, Kay becomes more radical in expression. She calls her efforts minimal steps, and believes things are still "not very good." She recommends rethinking Snow AP from scratch. There is no way to reconcile an oil heated tent in January with sustainability. She believes that the SSMU, as part of a university, should be pushing society ten years into the future. "We should be leading the charge and making sacrifices. We shouldn't be afraid to take risks, shouldn't be afraid to really shake things up."

In Summary Kay's Frosh was not the greenest, but it wasn't for lack of trying. The lessons she learned were invaluable, and the solutions successfully implemented at Snow AP and Frosh 2008. Kay's vision of a healthy community fostered an increase in the diversity of students involved in campus life. Despite these modest victories, Kay is now advocating for a radical rethinking of her events, and an end to incremental change. A strong leader, Kay could have coordinated the sorts of deep change she realises her portfolio requires. Though now in the President's role, we hope that she will not lose her resolve to fundamentally redirect the SSMU.

Max Silverman

External

Description: The External sets SSMU's policy on government and community issues. The External meets with student unions and student federations, mobilises students in support of the External's campaigns, and conducts research and media campaigns. Though responsible for community issues, students at McGill have no real interest in bringing their student union to bear on off-campus issues.

Portfolio Integration: As an environmental activist, Max admits, "in no way did I live up to my own ideals." The pressure of working inside the union forced him into a liberal position: "trying to reduce your impact, as opposed to trying to avoid an impact."

Max's largest impact was in paper use, stemming from inter-union meetings and mobilisation efforts. Fortunately, Max found a congruence between reducing paper use and finding better ways to reach students. Max's team would not leaflet willy-nilly, preferring to engage students in talk; and they used street theatre and publicity stunts to get attention. Max hopes to use television ads, and the LCD televisions McGill recently installed across campus, to more authoritatively connect with students.

Under his watch, Max characterised the SSMU's relationship with campus activism as the most effective it's ever been. Off campus, the SSMU has signed on to several important sustainability initiatives as well.

Addressing Sustainability: Max contracted the SSMU to Katasoho, a local printer that uses vegetable inks and recuperated paper. All of his promotional material is also printed doublesided, and in both official languages. Max is also saving paper by receiving all new newspaper subscriptions in digital format. Since he gets all the major provincial daily newspapers, the savings will soon add up.

Over his two years, the SSMU joined the Sierra Youth Coalition, signed on to Montreal's Plan Durable, and sponsored tickets for McGill students at Youth Action Montreal with Al Gore and David Suzuki. The latter conference, at which Max was supposed to speak, kicked off the campaign for the Generations Pact (matching government money for all student green funds). He also pushed the Canadian Federation of Students to address its paper use and reliance on cheap airfares, despite feeling it was a lost cause.

For his own part, Max travelled primarily to Ottawa and Quebec City. If accompanied by two or more people, he would rent a car. Only if alone or with his attaché would he take the bus. Max suggests the External could travel by bus more often, but that scheduling and time constraints would make it onerous.

Critical Remarks: Max explains his personal understanding of sustainability comes from ecology. He believes that all things are interconnected. "You can't do anything without it having an effect, so make sure it has the most positive effect." This is very different from the liberal approach, which promotes penance for sins (carbon credits) instead of advocating virtue. "It's not tit for tat, did something bad so do something good to make up for it."

But Max admits he could not make his personal philosophy work at SSMU. True sustainability at SSMU "will require years of mindshift." It's a matter of "slowly but surely ingraining it into the culture, that SSMU can't have a negative environmental impact." Only then will sustainability stop being one concern out of many, and start being a natural part of all decision-making.

In Summary *Max might not have lived up to his own ideals, but we feel he succeeded by applying them in important ways—signing SSMU onto the greenest printer in town, hooking McGill students up with David Suzuki, bringing activism to SSMU—all the while campaigning for accessible education. Max concedes that he has "one of the better portfolios, actually" and we agree. If only he had taken notes...*

Marcelle Kosman

Clubs & Services

Description: The C&S oversees the financial and organisational wellbeing of over 200 clubs, 15 services, and 3 publications. She also manages the SSMU's relationship with all Independent Student Groups, Faculty Associations, and McGill Student Services. Finally, she is also co-Building Manager of the Shatner University Centre.

Portfolio Integration: C&S is considered the hardest of all the SSMU's portfolios. The clubs and services are so numerous and autonomous, and the building so large and dynamic, that the C&S is constantly in reactive mode. As co-Building Manager, the C&S's vision sometimes runs up against that of more conservative staff, holding back deep changes to the infrastructure and operations.

Marcelle recognised that the clubs' events, as well as her own semi-annual Activities Night, have large impacts. She rates the Shatner University Centre's sustainability at 4 / 10 because of the water, power, food, and material waste. She realised that much of this waste comes down to personnel practices, but she was uncomfortable forcing change on the Porters and vendors. She focused instead on students, particularly clubs and services executives, and fostered new services and spaces for sustainability.

Addressing Sustainability: Marcelle crafted a communication strategy for reaching clubs and services, since their connection to SSMU is tenuous at best. She empowered clubs to address sustainability, through education, access to the Green Fund, and networking the waste reduction services. She also facilitated a sustainability audit of the club offices by students in MGCR 360. She emphasized that sustainability often means cost-saving, and that organisational sustainability is good for clubs too. "It saves the club money, which is great, and at the same time fulfils out commitment to sustainability." She encouraged collaboration on events, resources, and work, developing a stronger, more dynamic body of clubs and services.

Marcelle followed through on an election promise to establish the SSMU Bike Collective. She supported The Plate Club with resources, space and a spirited defence against McGill Health & Safety's attempt to shut it down. She saw Organic Campus move outside to enjoy its best season yet. She also reformed the yearbook's publication process, with an eye to preventing hundreds of pages wasted on advertising in every book.

Marcelle believes that space in the Shatner University Centre should "go to students first." She led the fight to have rooms 108 and 103 made available to student initiatives, such as the Midnight Kitchen, Organic Campus or the Bike Collective. "There are a lot more creative ways that we can put sustainability into practice than just having limitations in contracts." Unfortunately, she was not able to sway Council in her favour, and the SSMU must now settle for limitations in contracts.

Critical Remarks: Marcelle argues that the SSMU must demonstrate leadership on sustainability, by creating visible change to building and its operations. While she fought hard for green services, she did not plan any of the major renovations she suggests would demonstrate the SSMU's leadership. As the executive responsible for clubs & services, it is understandable that she concentrated her efforts on students. But she had important responsibilities as Building Manager too. Overburdened, and held back by internal politics, it is nevertheless unfortunate that Marcelle was unable to give sustainability more prominence in the Centre's physical management.

In Summary *"There are things that I tried, that didn't work, but that doesn't mean they shouldn't be tried again, and again." Marcelle might have accomplished more working directly with the Porters and vendors, but her heart is with the students. Marcelle sees great potential for clubs and services to lead the charge on greening SSMU. "In my experience, if the clubs know what's going on [with sustainability] most of them get pretty excited!" She has made great strides strengthening the SSMU's relationship to clubs and services, and her vision may soon come to fruition.*


food

Food

Introduction

With the global urban population surpassing 50% by the end of 2008,[1] there has been a growing disconnect between many individuals and food production. The importance of food, the difficulties facing our farming systems as well as the impact of agribusiness can be overlooked when our only connection with our food is in the packaged form in our supermarkets. Only with recent concern over increasing food prices around the world has the importance of food taken centre stage once again. Food is a necessity for our own survival but also plays a greater role in the ecological balance of the planet. As a large institution, it is imperative that we understand the issues and take a critical look at our practices and policies related to all aspects of our food. The type of food production, distribution, consumption and disposal into which we invest in has profound environmental and social impacts that we cannot ignore. Making conscientious decisions in this realm can help us address some of major global issues that we currently face.

What is Organic?

Organic agriculture, as defined by the Canadian Organic Growers[2]

"Organic is an agricultural method. It is based on agricultural management practices that

- Create ecosystems capable of ensuring sustained productivity
- Control weeds and pests through a diversity of interdependent forms
- Recycle plant and animal wastes
- Use crop selection and rotation
- Manage water

With this method:

- Soil fertility is maintained and improved by a system that maximizes soil activity
- Plants and animals are provided with essential nutrients
- Soil resources are conserved
- Insects and diseases are controlled by:
  - encouraging a balanced host--predator relationship
  - increasing beneficial insect populations
  - using biological and crop controls
  - mechanical elimination of pests or damaged plant parts.

For Crops:

- No chemical pesticides nor weed killers

  instead use mechanical or biological techniques […]
- No synthetic fertiliser nor sewage sludge

  instead reinforce the soil by using proven agriculture methods
- No seed originating from GMOs (genetically modified organisms)

  instead use only original seeds

For animal breeding:

- Neither antibiotics nor growth hormones

  instead use alternative therapeutic techniques such as homeopathy

- No animal wastes or slaughter by-products in food diets

  instead use feed that is cultivated according to organic standards and without GMOs

- No overpopulation of animals in closed building

  instead provide decent living conditions with adequate moving space, sunlight and fresh air

For processed food products:

- No chemical dyes, artificial flavours nor synthetic additives including sulphates, nitrates
- Preserving the original taste
- No preservatives
- No irradiation
- No synthetic fungicides or preservatives in packaging or storage materials"

Organics

Organics are one of the fastest growing agricultural sectors in Canada with a growth of 20% each year.[3] Organic products are often considered to be healthier and "better" but the extent of the environmental and social benefits gained from organic farming is often poorly understood. The modern system of industrialized farming requires incredible amounts of synthetic inputs and relies heavily on petroleum resources. Food and Water Watch, a non-profit organisation, has reported that approximately 20.8 litres of fossil fuels are used per farm acre. In 2005, it was reported that 625 teragrams of carbon dioxide equivalent (or 141 million cars driving for a year) was released by U.S. agricultural production. These figures help illustrate how damaging large-scale farming has become and how unsustainable the current food production system is.[4]

The use of biologically-based regenerative practices (organic farming) has the capability to help shift our food systems away from a dependence on oil by eliminating the use of synthetic fertilizers. Organic farming relies on the use of complementary biological systems (ex. crop rotation) to renew resources. This type of practice results in better soil management system; soil erosion and structure degradation is prevented. Globally, soil holds more than twice the carbon of terrestrial vegetation.[5] Studies done by groups such as the Rodale Institute have suggested that organic practices can alter the carbon storage of land and build soil "humic" substances; this results in potential agricultural carbon sequestration as well as improved water management by soils. This can result in a better performance during periods of unpredictable precipitation. If organic agriculture was practised on the 3.5 billion tillable acres that currently exist, 40% of current CO2 emissions could be sequestered in the soil and vegetation.[4]

The elimination of fertilizers, pesticides, and antibiotics from farming practices results in an elimination of these inputs into waterways. Industrial farms release large amounts of synthetic nitrogen and phosphorus into waterways; these elements throw off the natural equilibrium in water systems that can have major impacts. A local example is the blue-green algae problem in many lakes in Quebec; the overload of phosphates from fields into waterways has resulted in an overwhelming proliferation of the cyanobacteria.[6] Manure run-off from intensive livestock operations leeches antibiotics as well as drug-resistant bacteria into rivers, lakes and streams. Transmission of resistant pathogens to humans via avenues such as contaminated water has been implicated in contributing to human antimicrobial resistance.[7] Antibiotic resistance can have serious health implications for populations; as a

result, the Canadian Medical Association has called for Canada to ban subtherapeutic antibiotic use for promoting growth.[8]

NOTE: Industrial farming accounts for 70% of all antibiotics used in North America.[9]

Organic Output

Contrary to popular belief, studies have shown comparable yields between organic and conventional soybean and corn farming. During years of drought, organic regenerative systems yielded about 30% more corn than in conventional systems. Water was better maintained and managed in the organic plots as a result of the higher quality soil system.[4]

The most notable difference between organic and non-organic produce for most consumers is likely not the environmental impact but the cost. Non-organic foods are consistently sold at a lower price than their organic counterparts; this factor is significant in a time where food prices have been on the rise. It is important to consider that the price in the grocery store of non-organics does not account for externalities such as the cost of cleaning industrial farm pollution.[10] These costs can be significant; Chesapeake Bay, the largest estuary in the U.S., has spent millions of dollars to reduce nutrient loss into the waterway. Despite this investment, 300 million pounds of nitrogen still enters the bay annually.[11]

Local Food

Until the middle of the twentieth century, the majority of the population ate foods from the surrounding regions. With developments in areas such as food processing technology, food now comes from all over the world. The impact of such international trade on both the environment and on local producers must be considered in any sustainability assessment. "Food miles", or the distance that a food item travels between where it is grown or raised to where it is consumed, is a significant issue that needs to be addressed. A study done by the Region of Waterloo Public Health found that the average commonly eaten food item travelled 4,497 km before reaching the consumer; this accounts for 51,709 tonnes of greenhouse gases (GHG) emissions. The study compared these imported foods with their locally available counterparts and found that 49,485 tonnes of GHG emissions (equivalent to taking 16,191 cars off the road) could be reduced. These findings are not exceptional; European studies found that many countries were importing the same item that they were exporting (FoodShare Toronto). Reducing redundant trade between nations has the potential to help mitigate the effects of global warming.

It is difficult to create a formula for making the least harmful choice with foods. Food miles, while important, are not the definitive factor. For an accurate assessment of the impact of food, the process in which something is grown or how it is transported also require consideration. For example, Canadian tomatoes do not travel as far as foreign tomatoes; however, the 18,000 imported Caribbean and Mexican migrant workers required for the majority of the harvest should be accounted for (FoodShare Toronto).

Why Vegetarianism for the Environment?

Vegetarianism is an umbrella term for a range of diets. Many vegetarians are ovo-lacto, meaning they do not consume meat but will consume eggs and milk. Other types of vegetarians may include fish or even anything that is not red meat. A vegan diet is one that is absent of any animal products (no meat, fish, dairy or eggs) and may not contain honey or refined sugar.

Many individuals follow a vegetarian, vegan or low-meat diet for environmental reasons. Farming animals is a highly consumptive operation that requires water, land, fuel and grains. The table below gives average fossil fuel energy input to protein output ratios.[12]

Animal Protein	Number of fossil fuel kcal to produce 1 protein kcal
Beef	54
Lamb	50
Pork	17
Chicken	4
Eggs	26
Milk	14

54 kcal of energy derived from petroleum is needed to produce 1 kcal of energy from beef while grains on average require an input of 3.3 kcal of energy to produce the same. Moving towards a more plant-based diet will reduce the amount of resources that need be dedicated to food production. Reducing the number of livestock will also result in a reduction of grains needed for animal feed; this grain could be used to alleviate the global inequities in food distribution.

Meat is a matter of equity as well. Since 1950, the world's most affluent countries (top 20%) have doubled their meat consumption while the dietary patterns of the poorest remain the same.[13]

Sustainable Food Services

Among the SSMU's clubs and services, some of the most successful are sustainable food organisations. The Organic Campus, formerly known as the Organic Food Coop has been around since 2001. The Midnight Kitchen is only one to two years fresher. And while Campus Crops is a relative youngster, there have been students gardening on campus for years.

Organic Campus

Organic Campus [14] (OC) is a non-profit student organisation dedicated to bringing low-cost, local, and organic fruits and vegetables to the community. This service enables individuals to make more sustainable lifestyle choices by making organic food available and lowering the economic barriers. OC is supplied by True Farm Ecostere, a small farm about an hour outside of Montreal run by the Wassihun family. Individuals can sign up every Tuesday to get fresh produce delivered to campus the following week.

OC's baskets can accommodate two to four people. They deliver 20-30 baskets per week in the summer and winter months, and can surpass 100 per week during the peak fall season. OC has more than doubled their numbers in the past year, suggesting a growing interest in sustainable produce within the community. A major contributing factor to OC's success is their increased visibility. Establishing the Organic Corner in the second floor cafeteria, and distributing outdoors, in front of the Shatner University Centre has increased OC's presence on campus. Good visibility and access during the warm months has also been a major factor in their continued financial success.

Some future possibilities that have been discussed include creating a storefront that would be able to provide produce on a daily basis.

Readily available produce, and regular hours would make responsible food purchasing convenient for the average consumer. This type of expansion would require paid positions; volunteer power alone would not be enough for operations. SSMU has been very supportive of OC's efforts, and should maintain that support on OC's next big step.

A first step towards this goal could be to install an electrical outlet behind the Organic Corner to allow them to keep a refrigerator. Considering the extensive renovations for the vendors, we should be able to do the minimum to ensure an already successful student service can expand.

NOTE: Organic Campus occasionally sources from Fruits & Légumes Gaétan Bono (95 Rue Du Marché-Central, Montreal, QC, 514-381-1387). They have a significant collection of organic fruits and vegetables and a good selection of local produce.

Campus Crops

Campus Crops[15] (CC), founded in 2007, is a volunteer-run group whose aim is to provide students with gardening spaces, experience and knowledge. They work to promote urban agriculture and support other gardening initiatives. They have obtained garden space from McGill from spring–fall of 2008 and are optimistic about doing so again the following year. They have been operational through the summer and have been able to provide fresh, local produce to their volunteers. Their future plans include a partnership with Midnight Kitchen to promote sustainable eating on campus, working with McGill groundskeeping to incorporate more edible plants into the existing green space, and supporting individuals with urban agriculture projects for academic credit.

SSMU can play a vital role in promoting urban agriculture by providing support and resources to CC and other interested individuals. Campus Crops faces a challenge common amongst many student groups—it lacks a physical home. They require space outside of the garden to store their equipment and to organise their work. CC has been housed in the School of Environment and with the McGill Undergraduate Geography Society (MUGS), but the arrangements are temporary.

Although SSMU has limited space to offer, it could viably provide space for CC's needs. The Shatner University Centre's sub-basement, inappropriate for the needs of most groups, is perfectly suited to CC's storage needs. Most of the work done by CC or individuals working on urban agriculture projects will tend to occur in the spring and summer. Many of the offices in the Centre are unused during the summer months when groups are largely inactive; these spaces could be used by CC in their most active period.

Education and integration of urban agriculture are the other pillars of CC. They hope to work with McGill to provide academic credit to students participating in their exploration of sustainable food alternatives and the transformation to an edible campus. These are two crucial factors in making SSMU and McGill more ecologically-friendly—both the population and the physical space need to be transformed.

SSMU can play a role by acting as a link and advocate for student groups with McGill. The McGill institution is large and can be difficult to navigate for those less familiar. SSMU's familiarity with the administration can facilitate the goals of groups with sustainability as a focus.

Midnight Kitchen

The Midnight Kitchen[16] (MK) is a non-profit, volunteer-run collective dedicated to providing affordable, healthy food to as many people as possible. MK works towards social and environmental justice by providing a working alternative to the current market-based systems of food collection and distribution.

MK aims to be as socially, economically and environmentally sustainable as possible. They try to be inclusive by choosing to cook vegan food only. This choice is appropriate since a vegan diet consumes at a low trophic level. MK collects from the Marché Jean Talon produce that would otherwise be thrown away, thus reducing waste. The collective purchases only dry bulk goods as it will not spoil and is more economically sound.

MK controls and operates out of the Shatner University Centre's third floor kitchen. As a SSMU Service, they serve daily, lunch-time meals to around 300 people. They also have a semi-independent catering service, that charges at cost for meals. This allows the MK to support progressive organisations and events.

Moving Forward

Many student initiatives are already underway with regards to sustainable foods on campus. SSMU can be most effective, not by starting new initiatives, but providing support and resources to flourishing groups. Enabling groups to expand, supporting their initiatives and promoting knowledge amongst the members of SSMU can help SSMU move forward towards a more sustainable future.

SSMU has taken some positive steps in supporting local agriculture by being part of the coordinating effort for the Farmers' Market in September 2008. Ideally, SSMU would continue to act as a leader by making sustainable agriculture an option for members of SSMU on and off campus. In addition to providing support for existing local foods initiatives such as Organic Campus and Campus Crops, SSMU could facilitate efforts towards developing a decentralised urban agriculture collective (similar in process to the development of the bike collective).

The development of the collective should be a collaboration between interested stakeholders and should remain non-hierarchical. That said it would likely require significant participation and support from Campus Crops. The collective would require space and time for people to gather, work on initiatives as well as share knowledge. A large portion of the participation would occur off-campus; the office-space demand of such a collective may be small enough for SSMU to accommodate. The initial monetary investment required for such a collective could be obtained from the Green Fee.

Best Practices: My Farm in San Francisco

My Farm[17] is a decentralised urban farm that was started in San Francisco, California. The group grows vegetables in backyard gardens throughout the city using organic farming practices. They aim to create a secure and sustainable food system by increasing local food production. Individuals with different interests and resources can get involved in different ways; people can provide garden space, work in your garden or receive a CSA (Community Supported Agriculture) style box.

Review of all Food Recommendations

The SSMU should collaborate with Organic Campus to create a fully functional storefront in the Shatner University Centre.

The SSMU should continue to provide the Midnight Kitchen with robust support, and control over the Centre's kitchen.

The SSMU should provide equipment storage space to Campus Crops, and help their students receive academic credit for research into urban agriculture.

The SSMU should consider supporting the growth of a decentralised, urban agriculture collective similar to My Farm SF.

Conventional Food: The Shatner Cafeterias

The Shatner Cafeteria houses three vendors: Tiki Ming, Cultures and Franx Supreme. The vendors are all franchisees of chain restaurants owned by the MTY group. MTY's structure determines these restaurants' layout, branding, pricing, food offerings and suppliers. However, the vendors retain some flexibility with regards to their operations.

With regards to food sourcing, MTY's list of suggestions is used to varying degrees by the vendors. Products such as condiments, burgers, vegetable oil, seem more likely to come from MTY's in-house supplier. The vendors are much more likely to independently purchase produce and breads from other sources, such as Costco, Marché Centrale or local grocers.

When interviewed, the vendors expressed that freshness and quality of the food they serve was of great importance to them. Tiki Ming receives produce deliveries on a daily basis in an attempt to get the freshest vegetables while the franchisee from Cultures personally shops for food from different distributors. Yao Jing of Cultures expressed particular concern with regards to the healthiness of the options for students and staff.

Another growing concern for vendors is the rising cost of food. All of the vendors expressed a desire to keep prices low, to remain competitive in the student market. But they are all facing drastically increased supply costs.[18] The cost of produce plays a significant role in the purchasing practices; buying the cheapest available helps reduce the financial strain on vendors. The cheapest produce available is rarely organic and not necessarily local (foreign suppliers guaranteeing large shipments are preferred by supermarkets over more variable, local farms). A recent report claims that less than 15% of Costco's produce comes from Quebec, with the majority being shipped from Ontario or the United States.[19]

Facilitating Local Organic Purchases

With these considerations in mind, SSMU and the vendors in the building can coordinate to help achieve both environmental and economical goals. Large purchases are often accompanied by discounts; a more efficient ordering system could be developed to increase efficiency and reduce costs. If the vendors within the building consolidated their orders and purchased in bulk, the number of deliveries could be greatly reduced and organic and local foods would be more affordable to all vendors. SSMU could facilitate communication between the vendors and act as a leader within the building. Despite operating in close proximity, the vendors are unlikely to take the extra steps to coordinate their ordering schedules, without a mediator involved.

Sharing knowledge between students, vendors and SSMU is vital in a sustainable system; many individuals and groups have resources and knowledge that can help SSMU achieve environmental objectives. In the past, the vendors have worked successfully with groups such as the Plate Club. A partnership with the Organic Campus could be promising, and would support an established, local and sustainable supplier. OC has also acquired many resources and connections beyond True Farm Ecostere, that could prove useful.

In partnership with McGill, SSMU could also explore the option of large-scale urban agriculture on campus (downtown or at Macdonald campus). Aside from space on the grounds, McGill now has its first green roof (although it is not currently used for crops). Many ingredients used in the cafeteria are grown in the Montreal region. A partnership with the vendors could allow for campus-grown foods to be incorporated into our meals. Vendors could purchase seasonal produce from campus agricultural projects, and that revenue would fund the maintenance of these gardens.

Recommend: Facilitate Sustainable Purchases in Shatner Cafeteria

The SSMU must put labour and potentially other resources toward ensuring local, organic produce is purchased by the Food Vendors.

This could take the form of facilitating mass purchases, or of streamlining procurement from student initiatives, including on-campus urban agriculture.

Best Practices: The Acadia Community Sustainable Farm and Dining Hall

In June 2008, students from Acadia University and the Wolfville community banned together to start an organic vegetable garden on a 1,400-square-metre plot on a main street owned by the university.[20] There were four paid farm positions this season as a result of a grant. The project was started to help increase awareness of food sources and to enable students and the university to make more responsible choices. Hillary Barter, one of the coordinators, said that the garden helped create a dialogue, that "by bringing this food to student's plates, it gets people talking about how food can be produced organically and close to where it is eaten." Alongside the garden, public meetings and workshops with local farmers and agricultural experts have been held to share knowledge on how to develop sustainable agricultural systems.

The produce from the garden is sold to the Acadia dining hall and chef Mike McKinnon works with the foods that are in season. The dining hall pays the garden as they would with any farm.

Tiki Ming

Tiki Ming is a Chinese-themed restaurant serving a variety of hot meals. The franchise is owned by Li Huiwan. Tiki Ming has a large menu including vegetable and tofu dishes, such as soups, fried noodles and fried rice. Vegetarian dishes comprise close to 20% of the menu, although they are good quality vegetarian dishes. Currently, meat dishes outsell vegetarian dishes at a rate of approximately two to one, but there has been a trend of increasing vegetarian sales. All dishes are cooked in vegetable oil.

Franx Supreme

Franx Supreme,[21] owned by James Su, serves "French Canadian Cuisine". They specialise in hotdogs, poutine and French fries but also serve other items. Franx Supreme has a vegetarian menu consisting of sandwiches, paninis, Yves veggie dogs and burgers, and pasta. Items such as veggie dogs and burgers menu are not widely known to students, since they are not listed on the menu. Vegetarian dishes comprise over 40% of the menu, although as a breakfast and fries joint, not all dishes are full meals. Franx Supreme sells an average of 10-15 vegetarian plates a day, predominantly paninis and linguini. The poutine is supposed to use a vegetable gravy, and all fried dishes use vegetable oil.

Cultures

Cultures, run by Yao Jing, offers a variety of sandwiches, salads and hot meals. A wealth of vegetarian options are available as well as more difficult to find items such as soymilk and organic tea. All salads (including the dressings), two thirds of the breakfast option, and most à la carte items are vegetarian. Most combo meals include six options, only one of which is vegetarian. Cultures has reported that approximately 50% of sales are vegetarian, the highest in the cafeteria. Yao estimates that close to 20% of the produce she purchases herself is organic, a choice she makes for health reasons.

Liquid Nutrition

Liquid Nutrition could not respond in time for this report. Their website does not detail any environmental policies. Their menu contains some organic ingredients, such as soy milk and 1% milk.

Café Supreme

Café Supreme could not respond in time for this report. Although it gives no specific mention of the environment or sustainability, their website contains a section on social responsibility which states: "We believe being a good corporate citizen requires building successful partnerships with our customers, suppliers and communities and is critical to establishing a trusted brand and responsible reputation."[22]

Best Practices: SSMU Daycare

The SSMU Daycare offers 32 spots to members of the McGill community. They care for children between the ages of 18 months and 5 years and are partially subsidised by the government. They have made great efforts in reducing their impact in a number of ways.

The local company Services Alimentaires Félix (SAF) caters for SSMU daycare. The catering service works with the daycare and the parents to provide healthy, balanced, homemade-style meals that accommodate all the dietary diversity of the children. Services Alimentaires Félix purchases much of the fresh produce locally. A Quebec farmer provides their potatoes, tomatoes, apples, peppers, carrots, cucumbers, broccoli and other seasonal produce when it is available. The balance of the produce is purchased from local markets with 30% being organic.

Of the 32 children using the daycare, 3 were vegetarians last semester. The daycare habitually orders more vegetarian meals than the number of designated vegetarians and redistributes the meals so the each child is receiving more fruits and vegetables. The meat that is served by SAF is purchased from a Montreal butcher; the chicken breasts come from Quebec while the beef is from Alberta. The milk served in the daycare is from Naturel Dairy located in Lachine. Leftovers at the daycare are often sent home with parents (who bring their own containers) or brought over to SSMU for redistribution. Any food scraps were composted with Gorilla Compost; any parents brought compost from home to add to the pile.

The SSMU daycare integrates sustainability into their daily operations at many levels. The children are taught about composting, recycling, plants and water conservation and practice these things every day. There are regular trips to green spaces such as the rooftop garden, the backyard, and Beaver Lake as well trips to culture events such as Jazz Fest. As seen by many on campus, most travelling is walking (on a rope) with the occasional bus or metro ride.

The art supplies consist of recuperated paper from the library, donations from parents and from community groups. Newsletters, menus and notices are all sent out by e-mail to reduce the paper waste for parents. Clothing is also recycled through a daycare exchange; parents can swap clothes for themselves and their children.

The policy of the daycare changed when Amy became the daycare manager; students may continue to use the daycare for their children after they graduate. This was changed in an effort to offer more continuity for the child so they do not need to adjust to a new setting in their last year.

In June of 2008, the daycare changed their cleaning companies. Their new cleaning services use only environmentally friendly cleaning agents.

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[3] http://www.cog.ca/orgquickfacts.htm

[4] http://www.foodandwaterwatch.org/food/factoryfarms/dairy-and-meat-factories/climate-change/greenhouse-gas-industrial-agriculture

[5] Rodale Institute Paper.

[6] http://www.cbc.ca/canada/montreal/story/2006/10/18/blue-green-algae-government.html

[7] McGeer, A. J. "Agricultural antibiotics and resistance in human pathogens: Villain or scapegoat?"

[8] Sierra Club of Canada. "ILO Fact Sheet". http://www.sierraclub.ca/national/programs/health-environment/food-agriculture/ilo-consumer-issues.shtml Accessed July 21, 2008

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[11] Chesapeake Bay Foundation. http://www.cbf.org/site/PageServer?pagename=resources_facts_water_pollution

[12] Segelken, Roger. Cornell Science News. http://www.news.cornell.edu/releases/aug97/livestock.hrs.html Accessed August 19, 2008

[13] See Horrigan, above.

[14] Organic Campus: http://organiccampus.blogspot.com Accessed August 19, 2008.
Personal Correspondence with Josiane Lafleur.

[15] Personal Correspondence with Catyee Lush.

[16] The Midnight Kitchen: http://themidnightkitchen.blogspot.com. Accessed August 10, 2008
Personal Correspondence with Sarah Eidelman

[17] My Farm: http://www.myfarmsf.com Accessed August 17, 2008

[18] Lee from Tiki-Ming recently told us that the price of a single portion of chicken had doubled, while as we all know, wheat and rice prices of doubled or tripled over the past year.

[19] JCG. “Flash actualité: Costco.” *24 Heures*. 20 October, 2008.

[20] Pickrem, Paul. “Acadia students on mission to help peers eat, go green.” The Chronicle Herald Nova Scotia. August 28, 2008. http://www.thechronicleherald.ca/NovaScotia/1075574.html Accessed: Sept. 10, 2008

Additional information from a CBC Radio 1 interview from Wed. Sept. 10, 2008

[21] http://www.mtygroup.com/en/our-brands/banners/franx-supreme.aspx Accessed on August 22, 2008

[22] http://www.cafesupreme.ca/en/social_responsibility.html

Events

Events

Impact And Opportunity

Events are resource intensive, time sensitive, and collective. For this combination of reasons, events tend to be extremely wasteful. We are not talking only about the SSMU's centrally organised events, of which there are only a handful every year. The VP Clubs & Services also identified events as her portfolio's most wasteful activity. Considering that clubs and services book the Shatner University Centre solid, every weekend and weeknight of the year, the magnitude of our events' environmental impact becomes clear.

The VP Clubs & Services and the VP Internal helped us to build an impact profile for the SSMU's events:

- Lots of different materials goes into a party-type event, such as room and table decorations. A few clubs' offices that we had the privilege of checking out were filled to the brim with streamers, banners, candles, tablecloths, paint, and more.
- Almost every club also had their own supply of disposable tableware, including styrofoam and paper plates, plastic cutlery, plastic wine glasses and beer cups, and paper napkins.
- The food served at events can range from excellent to poor. Many cultural clubs order from a local restaurant of their national cuisine, and it is delivered in bulk and served as a real meal. Other clubs buy the most affordable cheese and fruit platters from Provigo and serve it with white flour baguettes. Few events settle for real junk food, such as chips and cheetos. Rarely do events serve organic food, let alone local organic.
- Drinks at events are often alcoholic. If alcohol is served in the Shatner University Centre, it must be ordered by the SSMU. This allows us to know exactly what is served at these events. All beer must come from Boreale or McAuslan breweries. All wine comes from the SAQ, and is limited to choices from Vincor Canada, a subsidiary of the world's largest wine corporation. Of course, we have seen events with different (potentially local) wines served, but this isn't really *supposed* to happen.
- Other beverages include pop, juice, tea, coffee and bottled water. Many clubs' offices contained bottled water, and only one club had a supply of fair-trade organic tea or coffee—it thus seems unlikely that many events would thus serve fair-trade organic products. Generally speaking, the most affordable pop and juice products are served.
- Clean-up is an issue along two dimensions. When an event goes late into the night, and is potentially combined with alcohol consumption, it becomes less likely that leftover materials and food will be properly recycled or composted. Often, everything just winds up in the garbage. In the Shatner University Centre, the Porters use environmentally-friendly cleaning products. But elsewhere, many people are not aware of the harmful impacts—both on the environment and on human health—of traditional cleaning products.
- Some events include t-shirt or other apparel purchases, for volunteers and only rarely for participants as well. Such clothing is often purchased from a generic supplier such as Gildan. These clothes are as affordable as possible, and never sweatshop-free or using organic fibres. In recent years, some events have purchased more ethical clothing from American Apparel, Montreal's own Blank, and a few other manufacturers.
- Event promotion at McGill generally consists of postering and perhaps leafleting with photocopied handouts or postcards. Postcards are very common for commercial-style fundraiser events off-campus. Anyone who has passed through the Milton Gates surely knows this, and also sees that many of these postcards are immediately discarded on the ground. Some promoters even seem to purposefully spread their flyers around, to grab attention.

Optimism!

The VP Internal and VP Clubs & Services were upset at the amount of waste generated by events at McGill. At the same time, they were both optimistic about the prospects for change. Already, they agree that much progress has been made, some instigated from within the SSMU Office, and some due to general environmental consciousness. Moreover, the VP C&S intimated that clubs are very eager to lower their environmental impact, if only they know what their options are and they receive the proper help.

After a few years of experimentation and halting progress, the SSMU Executive has expressed an enthusiasm for taking bigger risks. Change does not happen overnight, and we too feel that now is the time to capitalise on our pioneering environmental initiatives of the past few years.

the Main Events

The SSMU organises several large, annual events. Below, we provide a retrospective analysis of Snow AP and SSMU Frosh over the past year.

Snow AP 2008

Progress was made at Snow AP 2008. Under the planning of the VP Internal and with some consultation with the SSMU Environment Committee, the following initiatives were undertaken:

- **Bottled Water** instead of individual bottles of water, the SSMU provided a water cooler. Although individual plastic bottles would be recycled, it is better to rely on the larger, reusable water cooler bottles.
- **Reusable Mugs** the SSMU purchased a supply of Snow AP reusable mugs. Patrons could purchase a mug instead of paying cover, and could continue to enter for free all week long.
- **Plastic Cups** all cups were provided by Boreale, and manufactured of Number 5 plastic. This means that they are recyclable in Montreal. Snow AP staff collected cups, washed them, and had them recycled.
- **Green HR** when the VP Internal was hiring staff for Snow AP, she changed the interview process to include environmental management qualifications. This ensures that environmentalism is not left up to a single staff, but is made a priority for all Coordinators.

What's Next?

- **Bottled Water** instead of water cooler bottles from Labrador Springs, the SSMU should look into refillable bottles. This would allow us to use tap water, which is proven to be as safe as bottled water, and is free.
- **Reusable Mugs** much thinking went into figuring out the proper price incentive to encourage patrons to purchase and use their Snow AP mug. In the end, organisers settled for waiving the cover charge. We hope that that future Snow AP organisers will figure out a stronger incentive.

  On the other hand, we would prefer for Snow AP to do away with plastic cups altogether, and to only provide reusable mugs. With a dishwasher in the Shatner University Centre, patrons would not have to purchase their own mug, and organisers will not be unduly burdened with washing and sanitizing the mugs.
- **Energy** in 2007 and 2006, Montreal experienced relatively mild winters—so mild that there was not even snow on some Snow AP

nights! This meant a great deal of energy was saved, that otherwise would have been put toward heating the Snow AP tent.

2008 saw a return to our normally frigid Montreal winter. Once again, the Snow AP tent was heated by an oil-consuming electric generator. For the VP Internal, this was unavoidable, but also completely problematic. She recommends, and we agree, that the concept of Snow AP needs to be rethought from the ground up.

Frosh 2007

It was the SSMU's first big push at sustainable event-planning. But we were not so successful that time around. Here's what went right and what went wrong:

- **Green HR** the SSMU Executive used the new Green Fund to hire a Green Frosh Coordinator. According to the VP Internal, it was a great idea but because of "failures of communication and coordination" the GFC was not effective. According to the GFC himself, he was not so much a part of the coordination team, as someone who bugged the real coordinators from time to time. And since the GFC stipend was not a full time job, the person hired was unable to stay in Montreal all summer long.

  The important lesson here is that an environmental job position needs to be tightly knit into the organising team. It is not enough to have an environmental consultant, as the GFC was treated / treated himself. This is a lesson applicable to all events, not only Frosh.

- **Dishes** frosh participants traditionally receive frisbees in their loot bags. It has often been suggested that these frisbees could be used as plates, saving the impact of paper or styrofoam plates. Frisbees could be reused if washing stations were made available on site, and frisbees could be kept for later sporting fun.

  When attempted at Frosh 07 we found that, unfortunately, far too many participants would throw the frisbee in the garbage afterward. Far from a consequence of poor planning, the GFC suggests that this is the natural consequence of an unconventional dish choice combined with alcohol and thousands of people.

- **Mugs & Cups** all participants were provided with a reusable Frosh mug, as is tradition. In that year, the beer tent also provided beer in cups, for people who had lost their mug. By the end of day two, a significant proportion of drinks were being provided in cups, rather than mugs. It seems that there was not a strong enough incentive for people to keep track of their mug. Unfortunately, this meant many good mugs were essentially wasted.

  The plastic cups provided were in fact recyclable. Organisers placed large blue recycling bins across the field, along with black bagged garbage bins. Unfortunately, participants did not distinguish between the two types of bin. Thus, the garbage contained large amounts of plastic cups, and the blue bins were contaminated with large amounts of food waste. It is highly unlikely that the cups were clean enough for recycling.

- **Apparel** t-shirts were provided by a women's workers cooperative in Guatemala, a connection made possible by the SSMU's temporary membership in the Canadian Federation of Students. Though perhaps not made from organic fibres, we consider these t-shirts to be from a great supplier.

- **Frosh Bags** for the first time in a few years, participants received large cotton laundry bags to hold their swag and welcome

materials. This is important because a laundry bag continues to be useful after the event is finished.

Frosh 2008

"It's getting better every year!" That's according to the new VP Internal. This Frosh was organised at the same time as we were researching and writing this assessment. We therefore have greater insight and feedback as to the sustainability of this event. Here's what we've found:

- **Green HR** this year, there was no Green Frosh Coordinator. Instead of a GFC, the new VP Internal relied on a student researcher, who had been hired by the Green Fund to create a green purchasing guide. She also relied on her colleague, the new VP University Affairs, who is a former coordinator for the Sustainable McGill Project. Finally, the VP Internal was in some consultative contact with the writers of this assessment.
- **Food** the new VP Internal identified food provision as her biggest sustainability challenge at Frosh. In some respects, she overcame this challenge. Food was provided by a local restaurant. They came on-site both days to serve the food directly out of large, recyclable / reusable aluminium containers. Their operation was streamlined and seemed to have a minimum of waste.

  In terms of the actual food served, however, the VP Internal has no idea how much of it was local, and if any was organic. The meal was centred around a meat dish, but there was a healthy vegetarian option available each day. [fn. The vegetarian option was a falafel sandwich, while the meat option was fried chicken. The chicken was clearly part of the rest of the platter, while the falafel sandwich was a bit incongruous.]
- **Bottled water** as at Snow AP 2008, water was provided in water coolers. Between 10 and 15 cooler bottles from Labrador Springs were consumed. We did see some individual water bottles at the beer tent, along with other beverages like soda pop. Perhaps these were purchased as back up.
- **Mugs & Cups** this year saw a return to the larger reusable mugs that this author enjoyed five years ago during his own Frosh. They hold roughly two beer bottles, but it is their larger size that makes them more useful for non-alcoholic beverages as well. In other words, they are more versatile mugs, and more likely to see continued use at home, once the event is over.

  Once again, organisers provided beer in plastic cups for participants who had lost their mugs. Due to better organising and communication, fewer plastic cups were required this year. We do not know how many were used, but there are 10,000 cups leftover in storage—suggesting that a considerable number of cups were saved.

  Those cups that were used were washed and recycled. To eliminate contamination, no recycling bins were placed on the field. Instead, participants were asked to leave their cups (and other garbage) on the ground. Certain Frosh staff were responsible for making periodic tours of the field, collecting and sorting waste into recycling bins and trash cans.

  So while it may have looked chaotic, this year's waste was actually the best managed of any orientation event on campus. The new VP Internal corresponded with McGill's Grounds & Vehicles Services to let them know that the situation was in fact under control. G&VS staff were quite happy with the system, and later remarked that SSMU Frosh's recycling was more successful (in terms of uncontaminated recycling collected) than even Discover McGill—

which was organised in conjunction with the McGill Sustainability Office staff.

We commend the new VP Internal for this gutsy tactic. We understand that she was applying her learned experience from previous events, and in novel fashion found the best solution. We recommend that the SSMU continue with such bold innovation.

- **Dishware** the new VP Internal had hoped to purchase a fleet of SSMU plates, that could be reused at all of the SSMU's events, beginning with Frosh 08. The organisers tracked down the supplier to Concordia's R4 and McGill's The Plate Club. It is a local supplier, especially supportive of such student initiatives.

  Maintaining such a fleet of plates would require the use of a commercial-grade dishwasher in the Shatner University Centre. While an appropriate dishwasher was researched and chosen (by my co-author) it was not installed in time for Frosh. The organisers therefore used paper plates.

- **Apparel** t-shirts were purchased from All Style Apparel, and were manufactured of organic cotton. The VP Internal with Jonathan Glencross had researched a number of more sustainable suppliers, but did not have enough time to order from them. Their hard work will go toward selecting a better apparel supplier for next year's Frosh.

- **Printing** the Frosh pamphlets, which are mailed to every first year student, were printed by Katasoho. This local printer uses vegetable-based inks and prints on recuperated paper. They have done many, many jobs for the SSMU over the last two years. However, the SSMU Executive was not entirely confident that they could meet such a large order in time for the mail-outs to be sent. Fortunately, the VP Internal took a risk and Katasoho did pull through in time.

- **Frosh bags** the new VP Internal tried to limit the amount of waste contained in the Frosh bags. She asked the Creative Marketing Coordinator not to include paper products such as simple advertisements. She preferred paper products only if they were informational, such as safer sex guides or guides to Montreal. She also sought branded items that have a practical purpose, such as bottle openers and carabiners.

  The new VP Internal expressed some dissatisfaction with the way grab bags turned out. She felt that a lack of communication between herself and the CMC led to too much paper products in the frosh bags, and some broken promises by sponsors who had committed to contribute more practical objects.

- **Training** McGill's First Year Office gives training to all orientation leaders, including leaders for Discover McGill, Faculty Frosh, SSMU Frosh and Rad Frosh. They cover topics including safe drinking practices and harassment. There is no training regarding the leaders' roles in environmentalism.

  The SSMU gives some additional training after the FYO is finished with leaders. During this training, the VP Internal discusses issues particular to SSMU Frosh, including the SSMU's waste management plan, and other environmental issues. The new VP Internal felt that this training was as good as could be, considering that leaders had already sat through six hours of being talked to.

- **Sexual Misconduct** the SSMU maintains a Zero Tolerance policy on sexual advances and/or sex between leaders or organisers and frosh participants. All leaders sign contracts to that effect. The consequence of breaking their contract is immediate dismissal and loss of the frosh bracelet (the leader's entrance to Frosh events and access to drinks).

Both the new VP Internal and the new VP University Affairs reported having to take disciplinary action while attending to this year's Frosh. The VP Internal also confirmed that several reports were given to her by participants who were uncomfortable with leaders making sexual advances or engaging in other improper behaviour. She notes that participants generally do not want to come forward to make formal complaints. We imagine that such a process would be a rotten way to start University and that participants would rather move on with their exciting new life at McGill.

- **Communication** the Frosh 2008 website included a section explaining the environmental initiatives that the organisers hoped to undertake. The new VP Internal hoped that this would get students excited about sustainability, as well as facilitate smooth operations by informing participants beforehand.

What's next?

- **Green HR** based on this year's experience, the new VP Internal was optimistic that a GFC will be unnecessary in the future. With student-researchers hired by the Green Fund in the office, colleagues running for office based on their environmental record, and now with McGill's Sustainability Officer (Dennis Fortune) offering help, plus a Green Events Guide, she feels that a willing VP Internal will have no trouble finding the right resources.

  She may be correct. But we should point out that last year was hardly different—the VP Internal had a colleague elected on sustainability platform, several prominent student environmentalists working in the office, and the will to get things greened. Given the difficulty that student organisations normally have with continuity, the GFC position could be a way to safeguard environmental improvements at Frosh.

  We recommend that the SSMU Executive hire a GFC in years when the VP Internal is not particularly concerned about minimizing Frosh's environmental impact. We leave it up to them to decide whether a GFC is required every year.

- **Sexual Misconduct** confirmed reports of sexual misconduct by Frosh leaders reveals the serious problem with the contract leaders must sign. The only consequence—losing ones bracelet—is fairly harmless. The contract is even more toothless on the last night of Frosh. Moreover, the contract does not address the fact that the power relationship between leader and participant can extend for weeks beyond Frosh itself.

  The most significant consequences for students at McGill come from the Green Book, also known as the Handbook on Students Rights and Responsibilities. The Green Book can be used to censure students for both academic and non-academic offences. However, the Green Book does not seem like a viable avenue—McGill wants nothing to do with Frosh, and the SSMU does not want McGill involved in Frosh either.

  The new VP Internal agreed that this problem must be discussed within the SSMU and that a viable solution needs to be institutionalised. She suggested that Management Frosh provides an interesting solution. They have a class of participants called 'Amigos,' older students who want to enjoy the Frosh experience all over again. Amigos are grouped together, minimizing their contact with first years. The VP Internal also thinks that they sign contracts forbidding sexual contact with first years. In theory, the Amigo system weeds out people who would make poor Frosh leaders, by allowing them a way to just plain party and stay out of trouble.

- **Communication** the SSMU received some complaints from passersby who saw that participants were throwing all of their garbage on the ground. The VP Internal was able to explain the waste management strategy in person. But have some sort of street-level printed communication would serve the longterm viability of this waste management strategy, by preventing a backlash at the community and administrative level.
- **Timeline** finally, to ensure that the most sustainable apparel, food and other products are purchased, and that resources are minimized from the outset, Frosh planning needs to begin earlier. With the SSMU Executive's terms now starting in June, it is even more important for the incoming VP Internal to start planning before her term begins—as early as late March. The outgoing VP Internal will have to plan some aspects of the next Frosh, perhaps ordering t-shirts and bags herself.

Policy & Regulation

While the SSMU could obviously improve its impact by simply purchasing greener products, there are also key policy and regulatory measures that must be implemented. Some of these measures will make the campus more vibrant, diverse and thus socially sustainable. Other measures will enable the SSMU to more aggressively and effectively pull off sustainable events.

Preparedness Few events are successful without ample preparation. Pulling off sustainable events are no different—preparation is everything. The steps required to ensure materials are recycled, that waste is minimized, that posters are printed on reused paper, are really quite minimal. But in the rush to get an event of the ground, these minimal steps are easily forgotten.

The SSMU should encourage sustainable event planning by institutionalising sustainability preparedness into the funding process. In its first year, requests were made to the Green Fund independently of requests to the Campus Life Fund. But the same people (Finance Committee) would handle both requests at the same time. By merging the Green Fund and the Campus Life Fund application into one, all event organisers will have the opportunity to consider the environmental impact of their events—and the chance to receive funding to minimize their impacts.

Preparedness also applies to the VP Internal. She must be prepared to take risks—smart ones—that if successful will push the SSMU forward. Afterall, we don't elect pack animals; we elect intelligent, capable people that we entrust to make smart, forward thinking decisions. The VP Internal agrees, arguing that it is in fact the role of the universities to demonstrate the future to society.

Since sustainability requires more preparation, the incoming VP Internal should be willing to begin planning Frosh before her term begins. The outgoing VP Internal will also need to make some decisions on behalf of her successor. This process will be aided by instituting sustainability reporting into the VP Internal's job. This can be as simple as having the VP Internal report to Council on the sustainability of her major events. Reflection will help clarify what needs to be improved the next year, and documentation will help the whole organisation learn from the VP Internal's experience.

Regulation It might surprise even the SSMU Executives, but there are in fact SSMU regulations concerning sustainability, and specifically dealing with events. First of all, the Constitution holds the SSMU to "demonstrating leadership in matters of human rights, social justice and environmental protection" (VII). The Financial Ethics Research Committee (FERC) can be petitioned by any member of the society to investigate the ethics of any corporation with which the SSMU does business.[1] Finally, and most concretely, the by-laws include articles regulating events in the Shatner University Centre (By-law III Article 2).

These bylaws are important because they hold all organisers—not only the SSMU and its clubs and services—to manage the waste at events by recycling and reusing materials. It also establishes a chain of reporting to ensure that organisers are held accountable for a lack of proper waste management. Unfortunately, these particular by-laws are unimplemented and unenforced. It just goes to show that good policy means nothing if our officials and staff are not interested in following through.

Revising By-law III Article 2 – Events

We recommend that the listed articles be clarified with the following non-substantive revisions (original in *italics*):

2.3 Event organisers must properly manage their waste at events; organisers must separate garbage from recyclables, reuse as many materials as possible, and reduce their overall resource use.

2.3 Event organizers must pick up and place in garbage bags all items such as cups, cans and bottles, etc... Event organizers must also make an attempt to recycle and reuse as many materials as possible.

2.7 Any violations of these regulations shall be reported by the building porters, and/or security personnel and/or any member of the society to the Vice President (Clubs & Services).

2.7 Any violations of these regulations shall be reported by the building porter and/or security personnel to the General Manager.

2.5 Organisers that fail to abide by the regulations contained in this section may be penalised at the discretion of the Vice President (Clubs & Services) and/or Executive Committee.

2.5 Groups that fail to abide by the regulations contained in this section may be penalized according to the Society's fee and Penalty schedule.

These revisions emphasize the principles of reduce, reuse, and recycle in proper waste management. These revisions also increase the chance that the regulations will be implemented, by increasing the participation and responsibility of the VP Clubs & Services. We feel that the VP C&S, being a fellow student, and the official liaison with clubs and services, is best positioned to facilitate better waste management with errant event organisers.

Community Building As discussed in the Community chapter, sustainability encompasses the need for diversity, participation, and social justice. The events that take place on campus bring to life the priorities and values of McGill students. It is thus important that the SSMU organise events in such a way that it fosters a vibrant, diverse community.

Looking at SSMU Frosh, Snow AP, OAP, Four Floors, etc. one might conclude that McGill students only prioritize drinking beer and partying. For our part, we argue that students attending such events are actually simply interested in having fun with friends, meeting new people, and transforming their campus into a place of lived memories. With these values in mind, the VP Internal should consider the best ways to re-orient the SSMU's events portfolio toward realising these values and priorities. We might find that beer drinking parties (which are fine) become one activity among a broader range promoted by the SSMU.[2]

The VP Internal is in general agreement with us. She believes that the new VP Internal should not alter events like Four Floors and Snow AP, since they have an established identity and base of loyal participants. She would rather see additional events developed. She points to last year's Comedy Night as an example of a new event that reached a broad, but nonetheless untapped population on campus. She is also enthusiastic about conference-style or lecture events convened around issues important to students. The VP External

points to his involvement in the Al Gore & David Suzuki talk of 2007 as an example of such an event.

The VP Internal might not have enough time to organise these new events herself. But as the VP Clubs & Services asserts, the SSMU facilitates dozens of events *every week*, hosted by an the incredible range of cultural and political groups that compose the clubs and services. With an eye to making this sector's sustainability, the VP C&S has taken steps to foster more vibrant, exciting events that will attract larger audiences. She has encouraged clubs with similar interests to share resources, and to collaborate on events. For instance, she encouraged the Friends of Thailand, Burma Solidarity Collective, and Singapore and Malaysian students to throw joint events, as they all focus on South East Asian cultures. From a policy side, she has also prevented clubs with too similar interest from forming on campus. She has encouraged prospective groups to instead integrate with existing clubs, with the goal of building singular, dynamic interest groups.

Safe Space Issues related to sexual misconduct at Frosh are discussed fully in the Frosh 2008 review. While most events are not as volatile as Frosh, it is important that organisers always consider the potential for participants to be made uncomfortable in an oppressive manner. We are not only concerned with sexual assault or other violence. Gender, sexuality, race, ethnicity, religion, political affiliation and many other qualities can all be used to silence or discount people.

It is important for event organisers to establish boundaries on acceptable behaviour when they think that their event—be it a drinking party or a political rally—is going to encourage transgressive behaviour. It is not enough for organisers to provide passive guidance, waiting until after someone is hurt to inform someone they have overstepped the line. It is more constructive and trust-building to discuss such boundaries beforehand.

Many of the SSMU's services could help organisers to build safe space. The Sexual Assault Centre of the McGill Students' Society (SACOMSS), the McGill Anti-Racist Coalition (MARC), Queer McGill, and the Union for Gender Empowerment (UGE) are all appropriate organisations to turn toward.

Green HR Historically, it has been volunteers who take the initiative for recycling, composting and finding green products when organising events. Simply put, someone helping cleanup might decide to go around with a separate bag collecting plastic water bottles. Even the SSMU's most successful services are 99% staffed by volunteers. Unpaid Greening McGill members purchased reusable dishes and to sit outside the cafeteria for hours a week, so that students can save on styrofoam over lunch. All of McGill's environmental initiatives, from Gorilla Composting to Organic Campus, have thrived on the dedication of those for whom satisfaction is the only remuneration.

These passionate volunteers have brought sustainability to the forefront of the University's agenda. Unfortunately, McGill's Office of Sustainability, like the Environment Officer before, seems intent on continuing to rely on student volunteers for much of the work that lies ahead. But as the writers of this report can attest, students are no longer content to work for nothing.

Happily, the SSMU has been using the Green Fund to hire student researchers and green coordinators. This allows student environmentalists to work harder, knowing that they do not have a night shift at the Couche Tarde to work instead. At the same time, some environmental duties have been incorporated into previously existing job descriptions. This highlights two tensions in the category of Green HR.

The first is the gap (real or perceived) between party planners and environmentalists. While many people from environmental circles are interested in seeing the impact of Frosh and Snow AP reduced, few have stepped forward to help coordinate either event. Meanwhile,

the party planners would like to reduce their impact, but do not have the resources to do so independently. Yet never the twain has met.

The first Green Frosh Coordinator was hired into a position that was clearly meant for an environmentalist. But the GFC was remarkably ineffective because he remained an outsider, more consultant than coordinator. What proved effective was giving the normal coordinators responsibility for greening frosh. With a little help from some environmentally-minded colleagues, they devised a recycling system that suited themselves and worked well. But they also hired a researcher to find sustainable alternatives to common frosh products.

It thus seems that events will be most sustainable when organisers are "coordinators first, environmentalists second."[3] This allows solutions to arise indigenously, with sustainability efforts in sync with all other logistics. Environmentalists can still be paid to do good work, such as researching solutions and products. But if they want to try their hand at coordinating green initiatives, they must be prepared to take responsibility for the entire event, as part of the organising team.

The second tension that arises from institutionalising green jobs has to do with everyone's personal responsibility to the environment. If we hire people to clean up your event, to wash your reusable dishes, to sort your compost and recycle your waste, what happens to personal responsibility? Is it also unfair to leave these messy, tedious jobs to McGill and SSMU porters, since this will eventually be the result of shifting environmental responsibility to paid workers?

Currently, we argue that it is not actually possible to leave waste management up to personal responsibility. We do not have the proper infrastructure in place to facilitate people acting on personal responsibility. For instance, in most campus venues, garbage cans outnumber recycling bins by several magnitudes. If we want people to recycle then there must be a recycling bin wherever there is a garbage can. At the same time, it is unreasonable to expect intoxicated participants to take care waste management.

2000 drunken frosh participants are simply too euphoric to effectively meet the SSMU's responsibility to the environment. The level of environmentally literacy in contemporary society is also not high enough. Though this could eventually be remedied through popular education, we firmly believe that there will always be some need for paid staff to manage event waste, cleanup and other impacts.

Snow AP: Heating the Outdoors

Snow AP is an annual, multi-day celebration, held at the beginning of Winter semester in a tent on lower field. It is one of the last remnants of McGill Winter Carnival, a lost, frozen wonderland of debauchery unthinkable today.

In Snow AP's current configuration, its ecological footprint is similarly unthinkable. The problem is heating a tent located in Montreal in January—3967 litres of heating oil (comprised of hexadecane, a 16 carbon molecule) were burned at Snow AP 2008, solely for keeping the tent outdoors warm. With organisers ensuring the tent is as insulated as possible, heat still bleeds out of the roof and the walls.

Based on two different carbon emission calculators, we estimate that Snow AP 2008 contributed ***10 metric tonnes of CO2 emissions*** for heating alone.[4]

To put this into perspective, a small car could circumnavigate the earth almost twice before exceeding Snow AP's CO2 emissions.[5]

Snow AP: Heating Up the Debate

This author has said it before: Snow AP is kind of like organising a little Exxon Valdez on the McGill front field. Sure, partying in a tent

in the middle of winter, at the centre of our beloved campus—it's pretty cool! But the cost is tremendous.

But you don't need to hear that from us. Instead, we would like to quote verbatim these insightful comments from the 2007-08 VP Internal, Kay Turner.

"I think you need to look at things both moving in the direction that we are going in now, and the way we've been doing things in the past, and how we can improve the current system. As well as [give some] prescription, like maybe we should just scrap the whole thing and come up with something else."

[We accuse her of inciting revolution. She laughs.]

"Well, Not Frosh. But I just don't know what to do with Snow AP. Because the environmentalist in me dies a little bit. It's just like—why do we have to use so much oil? We've looked at other ways of heating it, but it's just prohibitively expensive, to the point of being impossible.

"Generally when we've looked at it, we've looked at everything as is, just trying to improve things as they are, as opposed to stepping out of the box and asking what else can we do. But people love Snow AP! So what do you do?"

We fully support her recommendation that the incoming Executive step outside the box, and rethink Snow AP. We will not suggest specific solutions—that's the Executive's job—but we do hope that they dream up a creative, exciting new welcome back party—a party that even Kay's environmental lefties can love.

Greening Logistics

Social sustainability and good organisation are important. But when it comes down to it, the SSMU's environmental impact will only be lessened by reducing and improving resource use. We provide the information below as a history and a guide to event planning practices over the past few years.

This information will also be supplemented by Jonathan Glencross' report on Green Events Planning, 2008.

Reusable Dishes

Mugs The first waste reduction initiative at a SSMU event was to give SSMU Frosh participants reusable mugs that they were to keep for all three days, eliminating the need for tens of thousands of plastic cups. This initiative has spread to the Faculty Frosh and now Snow AP. It is considered very successful.

This original Frosh mug project was born at a time when student environmentalism and McGill's SCE worked more closely and productively. In fact, the Environmental Health & Safety Office subsidized the mug purchase (SCE 19 Sept 2003). The Frosh Coordinators followed a "No Mug, No Beer" policy and only 200 plastic cups were used. Frosh leaders were encouraged to lead by example, and students were equipped with carabiners so as not to lose their mugs. The SSMU also purchased a portable washing station so that students could go home with clean mugs. This wash station seems to have since disappeared—but the need for a washing station has only grown. Some six years later, the SSMU is now investing in a dishwasher, which will allow for all sorts of dishware to be quickly cleaned and sanitized.

One reason that Frosh Mugs work so well is that participants pay a flat fee for the whole event. This makes it easy to organise and fund a fundamental shift in the service (from cups to mugs). Most other events at McGill do not use a flat fee to create a large fund of money. Instead, participants at Snow AP, club nights, faculty taverns, etc. simply pay for each drink they purchase. This makes getting reusable mugs into participants hands more complicated. There is far less

financial incentive, and from an environmental standpoint, there is less certainty that participants will not waste their reusable mug.

For such events, organisers must either provide their own reusable mugs (as in Gerts Pub, or most bars), or encourage participants to bring their own reusable mugs. The population of mug-friendly event organisers has waxed and waned over the years. Years ago, the Open Air Pub (OAP) encouraged students to bring their mugs or Frosh Mugs with monetary incentives. More recently, students have been pushing unsuccessfully for such incentives to be re-implemented.

Greening McGill sought to address this situation by establishing The Plate Club. They provide dishware, including reusable plastic cups, to event organisers without charge. While their cups could be used for beer or wine, their services have not caught on with the largest event organisers. They recently purchased reusable wine glasses, which should help them to build a larger clientele.

For her part, the new VP Internal has expressed interest in filling the need for reusable beer mugs. She suggested that the SSMU could purchase a large supply of mugs to be reused at all SSMU events other than Frosh. We recommend that these mugs be placed under the stewardship of The Plate Club, to increase their use and to give The Plate Club the full jurisdiction over reusable dishes on campus.

Plates The Plate Club also provides plates. They are commercial-grade, white melamine dishes, supplied by Mistral Dinnerware of Boucherville, Quebec (mistral-ultra.com). They also supply dishes to Concordia's R4 programme, and to l'Université de Montréal.

The Plate Club requires borrowers to return dishes in a clean state. They provide dish detergent, sponges and towels to help get the job done. This requirement, though reasonable, is a stumbling block for potential borrowers. Now that the Shatner University Centre is equipped with a commercial-grade dishwasher, the Plate Club has the opportunity to increase its rentals. The SSMU has also purchased 500 extra plates for use in the cafeteria and at SSMU events. The dishwasher will allow such plates to be used at Snow AP, at events in Gerts, and at other times.

Sponsorship Because reusable dishes and mugs require a higher capital investment than disposable dishes and cups, the SSMU often talks about turning to sponsorship. We have no real problem with such an approach, but the SSMU must be careful not to run into contractual problems.

For instance, Gerts Pub uses glassware for draft beer. The staff claim that they are only supposed to poor Boreale beer into a Boreale glass, and St. Ambroise beer into a St. Ambroise glass. The same claim has been made regarding large events—that recyclable plastic Boreale cups could not be used at an event serving Molson, for instance. The VP Finance & Operations refutes such claims, claiming that nothing in the contracts with Boreale and St. Ambroise specifies that branded glasses must be used with their respective beers. They do request logo visibility, but this could be accomplished with banners or other ads. When McAuslan was questioned, they added that they would rather see their beer served in an environmentally friendly way, rather than served in branded, plastic cups. This needs to be sorted out conclusively if the SSMU is going to invest in reusable mugs for generic SSMU events.

Dishes have some overlapping concerns with mugs. To deter theft, it has been suggested that reusable dishes be stamped with some sort of unsavoury logo. This is a great opportunity for an unironic, unfashionable sponsor to step forward. When sponsorship is provided, reusable dishes are often prepared with a logo for the event being sponsored. This is done to Frosh mugs, and while sometimes pleasant to look at, it prevents leftover mugs from being used the next year, or at different events. To summarize, reusable dishes must not be dated and must be somewhat unfashionable.

Germaphobia Many people are unwilling to use reusable dishes because they have unwarranted fears regarding the spread of illness.

The fact that Plate Club dishes are hand-washed can upset some people. Using the dishwasher will help to address some of these fears. However, some public education is required to fully address germaphobia issues.

For instance, the use of environmentally friendly cleaning products seems inadequate to some people. In fact, chemical cleaning products are no more sanitary—they are simply cheaper to manufacture, since they likely use petrochemicals. Antibiotics present in some cleaning products are counter-productive, weeding out the weakest organisms bug fostering the growth superbugs.

Food

Sponsors If an event is large enough that the organisers cannot provide food without sponsorship, it is less likely that sustainable food options will be pursued. The problem, of course, is that providers large enough to fully sponsor likely rely on inexpensive, industrially produced food. Relying on sponsorship, organisers can provide a healthy meal (not junk food) but cannot quite provide healthy, local, organic meals.

At a bare minimum, any restaurant / caterer should be capable of providing vegan food in recyclable, non-individually wrapped portions. Unfortunately, as the new VP Internal reports, sponsors sometimes do not follow through on requests for vegan food and minimal waste. To gain more leverage over the way food is provided, organisers might consider purchasing their food. But this can be very expensive!

That said, Montreal is home to some wildly successful sustainable / vegetarian food providers: Aux Vivres, Crudessence, Bonnys, le Commensal, Faim du Monde, Robin des Bois, Chu Chai, Lola Rosa, Sala Rosa, and more! Based on personal experience, organisers should consider negotiating directly with a restaurant to cater their event. Restauranteurs that might not normally provide organic meals may be willing to prepare something special for a big event with good publicity. They can also work to prepare something at an affordable price point. And of course, the more personal touch creates culinary magic!

Diet As described in the Food chapter, meat is an exceptionally resource intensive food. Sustainable event planning precludes serving meat. But furthermore, it is best to serve vegan (no animal products whatsoever) since this is the most inclusive diet—very few people *need* to eat animal products; many more have choose to eat vegan, or have difficulties with lactose. A vegan diet is also compatible with many religious diets. Other things to watch for are common food allergies, such as peanut, pulse and some fruit allergies.

Many cultures emphasize the role of meat in their diets, which may seem like a stumbling block for SSMU's cultural clubs. But at the same time, all cultures have vegan options that might normally be overlooked. Striving to create a vegan menu can be a good opportunity to explore ones own culture.

Packaging With mega-stores like Loblaws and Costco, affordable food is no longer limited to bulk food. Instead, such stores sell cases of individually wrapped, factory prepared foods. This extra packaging has increased the impact of self-catered parties.

Purchasing from delis or smaller grocers, it is still possible to purchase foods in bulk. For instance, an organiser could purchase a large cheese wheel from a deli, and pick up several baguettes directly from a local bakery, and use almost no packaging.

Restaurant-prepared food can often use minimal packaging. Restaurants often deliver food in large, aluminium trays. These can be cleaned and reused, or cleaned and recycled. Caterers such as the Midnight Kitchen, and the Peoples' Potato use large, food-grade plastic bins which are always washed and reused. McGill's catering service uses non-recyclable plastic trays. These could be reused, but the plastic is fragile and often they wind up in the garbage.

Volume An event like SSMU Frosh, which serves 2000, is considerably more difficult to cater sustainably than a club night for 30 students. One way to address volume has been demonstrated by the Faculty Frosh's concept of the 'International Food Fair.' With enough coordinating organisers, the food fair concept brings together three or four different restaurants at the same time. Keeping individual food providers at a smaller scale allows them to concentrate on sustainability, whereas a single provider feeding 3 to 4 times more people would have difficulty reducing waste and using local, organic ingredients.

Venue

Organisers do not often consider the sustainability impact of different venue choices. Wheelchair accessibility is the primary consideration brought forward, although this is not a problem in large buildings such as the Shatner University Centre. Unfortunately, many of the smaller buildings on Peel and University are too old and restricted to accommodate an elevator.

We hope that organisers will also consider the environmental aspects of venue choice, such as the requirement for daylight vs. electric lighting, and energy use for heating and cooling.

In summertime, events taking place in the evening will make use of the still abundant sunlight, and will benefit from cooler temperatures as the day's heat dies off. The best way to enjoy these benefits is to plan summer events outdoors—there are several suitable locations on campus, where outdoor benches and relative quiet can make for a wonderful time. Even projectors can be used later in the evening, for video screenings or powerpoint presentations. The worst summertime venue is an indoor event at high noon—it really maximises the need for air conditioning.

In wintertime, the sunlight is gone in the late afternoon. Events taking place during the day can still make use of sunlight, but only if organisers choose a venue with windows. They do exist at McGill! In fact, the Lev Bukhman Council Room and the Clubs Lounge are sunlit, and frequently used for student events. The worst wintertime venue is outdoors—fortunately, only Snow AP seems determined to heat the outdoors by gas generator.

Promotions

Events can be promoted without relying too heavily on printed paper. Publicity stunts and street theatre are good, non-resource intensive ways to get attention. The VP External also expressed interest in announcing student events on the widescreen LCD televisions that have popped up all over campus recently.[6] For the most part, they show year-old news that "nobody care about." We echo the VP External's recommendation that the SSMU work to get more relevant, student announcements on these television screens.

For posters and leaflets, organisers should to minimize the impact of their paper and ink use. Posters can be easily printed on scrap paper, since the back will never be seen. Leaflets should be printed on 100% post-consumer recycled paper. For large events, such as those organised by the SSMU, promotional material can be printed by a sustainability-oriented printer. Katasoho, for instance, uses vegetable-based inks and prints on recuperated paper.

Green Events Service

As elaborated in the Waste Management chapter, we recommend that the SSMU establish a new Service to help event organisers plan and execute sustainable events. The Service would provide consultations and advice to event planners. It would also promote and facilitate provision of services from support organisations, such as The Plate Club, a new Green Clean Team, the Organic Campus and Midnight Kitchen, and McGill Safety Services.

The Service be an invaluable, and ground-breaking component in the plan for the SSMU's sustainable future.

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[1] The FERC is automatically required to investigate when the SSMU makes a transaction of 15,000$ or greater.

[2] Afterall, drunken fun isn't the only way, and maybe not be the most constructive way, to reclaim spaces on campus.

[3] It might not seem like it at first, but this is really only another way of saying "sustainability must be integrated holistically into the event planning process"—which sounds much more like conventional sustainability wisdom. We prefer Kay's addage.

[4] **Calculations: Earth Lab** (http://www.earthlab.com/carbon-calculator.html)

3967L = 1047.97 US gallons

1047.97 gallons(22.384 lbs CO2/gallon) = 23457.76 lbs CO2

23457.76 lbs CO2 / (2205lbs/metric tonne) = 10.64 metric tonnes CO2

Calculations: Carbon Trust (http://www.carbontrust.co.uk/resource/conversion_factors/default.htm)

3967L burning oil (2.518 kg CO2/L) = 9988.806 kg CO2

9988.806 kg / (1000 kg/metric tonne) = 9.989 metric tonnes CO2

[5] **Distance**: The earth is roughly 40,000 km in circumference. At the CO2 emissions calculated above, one could drive 55 to 70,000 km in small car like a Toyota Yaris, or 70 to 90,000 km in green car, like the 2009 Chevrolet Aveo.
http://www.autoobserver.com/2008/10/got-co2-they-definitely-do-at-the-paris-auto-show.html
and http://www.smmt.co.uk/co2/co2search.cfm

[6] For information about using the screeens, check out http://knowledgebase.mcgill.ca/article.asp?article=2360&p=4. Since the screens cost 9000$ each, we suspect that units might be interested in renting out advertising space to the SSMU (though as collegiate partners, we encourage them to rent the space *gratis)*.


Energy

Energy

Introduction

Energy-efficiency often seems to be synonymous with sustainability. That is certainly the approach that McGill's Office of Sustainability is taking. In that light, the SSMU has a great opportunity over the next few years, to work cooperatively with McGill to achieve significant energy savings.

The SSMU should also take this opportunity to push the idea of sustainability beyond the more comfortable confines that McGill uses. Energy saving must not be limited to considering our power bills. All products have lifetime energy costs, in the manufacturing and recycling / disposal stages, which must be considered as well. Moreover, cheap energy sources such as hydroelectricity have social and long-term environmental impacts that must also be considered.

The SSMU has the responsibility of setting a good example for McGill students, to engage our population of nineteen thousand undergraduates in the fight against a climate crisis. Canada is a high consumption society— per capita production of CO2 emissions is 17.2 kg, 55 percent higher than the average for all industrialised nations.[1] Fortunately, recent students have demonstrated that they want the SSMU to help turn things around.

This section will help us to understand the current situation, establishing the foundation for any forward-thinking energy improvements.

Why Save Energy?

As a general rule, we should not waste natural resources. With our exploded world population, and the upcoming depletion of cheap energy sources, it makes less sense now than ever before. The fewer resources are available, the more costly they will be for everyone. Of course, this is only clear when looking at the big picture, considering our actions as part of a larger whole.

Unfortunately, such a perspective is not always consonant with the reality faced by individual actors and organisations. For example, the SSMU occupies the Shatner University Centre and has a major hand in deciding how the space is used. But the buildings belong to McGill. The infrastructure is built by McGill. And McGill absorbs the power consumption into its own bill for the entire campus.

So the SSMU has no financial incentive to invest in power saving appliances and lighting. And McGill's power management is divorced from the interests of those who use the space. Ever wonder why the SSMU Office is too cold in the summer and winter alike? It is because those in the office have no choice over the matter, and McGill is wholly unresponsive to requests for improvement. It is not a situation conducive to smart power management, nor to cutting energy use.

But in case you were wondering, the SSMU *has* invested in energy-efficiency. Ethical choices are not always financially efficient choices, and we commend the SSMU for doing the right thing in the past.

The SSMU's experience with energy efficient appliances and lighting will help the SSMU adapt to a future when power-saving will be directly linked to financial incentive. In past years, McGill has shifted responsibility for residences and the athletics facilities from the central administration to nominally independent organisations. McGill Residences and McGill Athletics now have to pay McGill for the power they consume. Because they are also in control of their own facilities, they have the opportunity to lower their costs by improving the infrastructure and modifying use.

Unlike Residences and Athletics, the SSMU runs the risk of having to shoulder McGill's costs, without gaining greater control over its infrastructure. For instance, in past years McGill has forced the SSMU to maintain higher security at on-campus events. At the same

time, they are forcing the SSMU to use McGill's own security. So the SSMU incurs greater costs, while losing control over their own events.

The SSMU must ensure that McGill gives it the maximum possible control over energy use in the Shatner University Centre. This should happen even before McGill begins to load power bills onto SSMU's shoulders. Not only will it benefit the SSMU financially, but decentralising power controls on a site-basis is the best method for bringing down power across campus. McGill has committed to the Ministère de l'Éducation, du Loisir et du Sport (MELS) to cut its power consumption twelve percent by 2010. McGill must provide the SSMU with the ability to contribute meaningfully to this reduction.

Non-financial incentives

As noted above, financial benefit and ethical choice are not always consonant. The SSMU's past decision to invest in energy-efficiency shows its commitment to environmentalism for the environment's sake. In other words, the SSMU's actions acknowledge that there are serious problems with our power system, and with the worldwide inequality of power access. Reducing our energy intake shows that we wish to limit our participation in an electricity system we do not wholly believe is responsible or 'green.' This is an important example that we are setting for our future leaders—the students of McGill University—and the surrounding community (not to mention the rest of McGill).

Where does our power come from?

The Shatner University Centre's power comes from electricity and natural gas. Natural gas from Gaz Metropolitain is used in the second floor cafeteria, and each vendor pays directly for their own consumption. The other use of natural gas is for heating. McGill operates its own natural gas power plant in the Ferrier Building (behind the Arts Building), which heats the steam that is used throughout campus for heating.

All electricity use, including for the cafeterias and other rented spaces, comes from McGill at no charge. Hydro Quebec provides the University's electricity for general power needs.

All universities in Quebec have an arrangement with the Ministère de l'Éducation de Loisir et du Sport (MELS) which subsidizes their bill with Hydro Quebec. McGill's own energy efficiency efforts have been concentrated in the natural gas power plant, which is unsubsidized.

So just to recap: the SSMU doesn't pay for any of its power; McGill only pays for some of its power; and the provincial government picks up the final tab.

How much power?

Hydro Quebec meters the entire University as one client. So until very recently, we had no idea how much individual sectors of campus were consuming. In 1997 or 1998, McGill began installing meters on different buildings across both campuses (SCE 2003). If *finally* installed on the Shatner University Centre, these meters will establish the SSMU's actual consumption, and will reveal increases or decreases due to infrastructure or practical changes that the SSMU undertakes.

Until McGill reveals the actual consumption data, we will have to rely on the SSMU's Financial Statements. These list the dollar value of the electricity and heating consumed in the Shatner University Centre. Later financial statements are listed as estimates of fair-market value.[2]

Year	Rent	Notes
1996-97	$339,933	
1996-97	$339,933	

Year	Rent	Notes
1997-98	$372,396	
1998-99	$496,915	
1999-00	$577,716	*50,000$ disbursed by the SSMU*
2000-01	$727,161	*100,000$ disbursed by the SSMU (included already?)*
2001-02	$541,331	*100,000$ disbursed by the SSMU*
2002-03	???	*100,000$ was to have been disbursed by the SSMU*
2003-04	$520,526	*100,000$ was to have been disbursed by the SSMU*
2004-05	$567,000	*fair market value*
2005-06	$711,925	*fair market value*
2006-07	$607,397	*fair market value*
2007-08	???	

Without more background knowledge, it is difficult to know why the amounts oscillate by hundreds of thousands of dollars from year to year. But to give students a sense for the scale of these costs, consider that the SSMU's rent is only a little more than 100,000$ annually. Any agreement that asks the SSMU to pay for its power consumption will be a considerable burden to students.

A New Deal

For this reason, it is imperative that the SSMU and McGill reach an agreement that allows the SSMU to benefit financially from energy-efficiency initiatives, without punishing the SSMU with the full extent of our energy burden. Afterall, McGill owns the Shatner University Centre, and it is McGill that has not invested in improving the Centre's infrastructure.

A fair agreement could draw inspiration from that which McGill hopes to strike with the MELS. In its *Plan d'action en efficacité énergétique,* McGill argues, "les règles de financement du budget énergétique doivent être revues pour assurer la rentabilité économique des investissements universitaires dans les projects d'économie d'énergie. Dans la situation actuelle, l'Université investit ses resources propres dans ces projets et le Ministère réalise les économies générées." The SSMU is currently in the same position, except both the province and McGill benefit from its efforts.

In other words, we assume that McGill does not mean they want to start paying their entire power bill. Rather, McGill would like to do the right thing for the planet by investing in energy efficiency projects. McGill wants a deal that will allow the university to recoup its investment using the money saved by their energy efficiencies. If McGill can arrange such a deal, then surely the SSMU deserves a similar reward.

Moreover, after billing begins, McGill will be both landlord and power plant to the SSMU. McGill will then have *even less* incentive to improve the Centre's infrastructure than it currently does. Any agreement with the SSMU must therefore establish transparent reporting between McGill and the students. Public reporting must begin at a reasonable interval prior to the start of billing. This will reassure students that the SSMU is not being overcharged, and that energy-efficiency efforts are producing real savings.

Working with the Office of Sustainability and Facilities Management, the SSMU should go extra lengths to maintain a spirit of cooperation and good faith. Past experience has shown that direct student involvement with staff and low level administrators produces great results. Gorilla Composting's pilot project, for instance, succeeded largely because of the healthy, supportive relationship between Grounds & Vehicles Services and GC's student volunteers.

Given the McGill Administration's rocky relationship with the SSMU, we might find that it is most fruitful to concentrate efforts on

setting up collaborative projects between students and staff. This bottom-up approach will not preclude top-level agreements. Rather, support from staff directly engaged with students could help ensure a fair deal for the SSMU.

Even if McGill and the SSMU do not go forward with power billing, McGill should give the SSMU greater control over heating and cooling in the Shatner University Centre. This would allow for immediate energy savings, as temperatures inside the Centre sometimes deviate 4 to 10 degrees from the recommended ambient temperature (27°C in the summer and 21°C in the winter).

Hydro Quebec & Social Sustainability

'Wait a second! If McGill's power comes from Hydro Quebec, we have nothing to worry about. Hydro Quebec is the world's cleanest power producer... isn't it?'

Hydro Quebec is this province's national, public hydroelectricity producer and distributor. Hydro Quebec also operates a foreign arm, selling power to the US and developing partnerships in the Global South.

Hydro Quebec has made a public commitment to sustainable development, and produces annual Sustainable Development Reports to back up its claims. It focuses its commitment on the workplace, on community involvement, and its responsibilities to society. Its Environment Policy commits to "adopt a transparent approach by encouraging the participation of local communities in the environmental assessment of its activities, programs and projects;" although in french it is differently worded, as "faire preuve de transparence envers les communautés locales dans le cadre des évaluations environnementales de ses activités, de ses programmes et de ses projets." It also commits, in the Environment Policy and elsewhere, to only undertake projects with "favourable reception by local communities" (2005 SD Report, 6).

From an environmental standpoint, Hydro Quebec claims that 93% of its energy comes from renewable resources. Of the total provided, 92% is hydroelectricity (produced & purchased) and 1% is wind and biofuel (produced & purchased). Of the electricity produced by Hydro Quebec, 97% is hydroelectricity. The remainder is provided by a single nuclear facility, and a negligible amount is provided by decentralised fuel-burning plants.

So, is Hydro Quebec really as squeaky clean as it claims?

The James Bay Cree

Hydro Quebec was founded by the provincial government in the 1960s, kicking off la Révolution Tranquille. Nationalisation allowed electricity, now considered a basic necessity, to be provided as a public service. For the first time, rural areas were electrified, and all residents could gain power at reasonable rates (CUPE).

Despite such progressive origins, hydroelectric production in Northern Quebec developed within a colonial framework. Over the 1970s and 1980s, vast areas were appropriated from the James Bay Cree, rivers were dammed, and a homeland transformed into lake-sized reservoirs. When challenged, government lawyers argued that the Cree were so assimilated and dependent on the government for their way of life, that they deserved at most a small monetary settlement. There was no question of consulting, accommodating or incorporating Cree values and interests (Feit 3.2).

The Cree countered that they had historical title to the lands, and that the ecological impacts of dam-building did irrevocable damage to their society and culture. Cree culture is rooted in hunting.

Hydro Quebec's planned 700 km highway, three to four 960 km transmission line corridors, construction camps, towns, airports, mines and clearcuts would all contribute to the end of hunting in Cree territory. Once built, the dams would eliminate 50% of wetland habitat, and would prevent re-establishment of fish, fowl and small game populations. The government had also encouraged accelerated commercial logging and hunting in the condemned areas, and over-exploitation by southern Canadians had since spread throughout the James Bay region (3.2, 4.2).

In 1973, the lower court ruled in the Crees' favour, which compelled the province to negotiate the *James Bay and Northern Quebec Agreement*. While the agreement promised much, it has unfortunately not been successfully implemented. As Feit remarks, "the economic benefits of the project have been directed to southern urban centres, and even the benefits for non-Cree inhabitants of northern Quebec have been less than expected" (4.2). The governments of Canada and Quebec had neglected their obligations, and subverted responsibilities to the Cree, "in the interests of facilitating large-scale projects that primarily meet the interests of private and public corporations" (4.2).

Nevertheless, many point to the JBNQA as an historic reconciliation between Hydro Quebec and First Nations Peoples. Meanwhile, longterm social impacts stemming from the disruption of Cree hunting culture by dam-building include low-level mercury consumption, alcoholism and diabetes related to increased road access, and associated with unemployment and family disintegration.

Rupert River

Partly due to the failure of this first agreement to be implemented, the Cree fought in and out of court for a new agreement. Signed with the province in 2002, *La Paix Des Braves* agreement gave the Cree Nation new rights & responsibilities, significant funding and resource-sharing opportunities. It was also considered a successful referendum on the Cree Nation's acceptance of hydroelectrical development of the Rupert River.

Since then, Native and non-Native opposition to the Rupert River diversion has grown, but construction has continued apace. Critics argue that Hydro Quebec concealed wind-energy alternatives from the Environmental Impact Assessment, and that by receiving permission through an omnibus bill, the community has not had a genuine say. They also show that the project will not provide power to Quebec, but will be exported south to US markets (Helios). Hydro Quebec claims that the Rupert River diversion is a model of environmentally-friendly design, that will enable the Eastmain dam to reach full capacity.

International Development

Hydro Quebec's international arm has been criticised for participating in World Bank and IMF backed development projects. Such projects are often imposed on local governments, "forcing developing nations to sell off their public resources for a pittance" (CUPE) and handing foreign corporations (such as Hydro Quebec) big profits. Such profits are often squeezed out of workers' wages, or by rolling back working conditions.

Greenhouse Gas Emissions

Hydroelectricity is widely believed to be carbon-neutral. Unlike thermal power plants, no petroleum products are burned during electricity generation. But starting in the mid-1990s, this view has come under challenge, and a new scientific consensus is currently being formed.

The problem with hydroelectricity lies underwater: submerged, rotting vegetation. Dams produce vast lake-sized reservoirs, drowning verdant forests and muskeg. Water levels in the reservoirs fluctuate as power is generated, allowing soft, green vegetation to grow and drown in the floodplain. All of this anaerobically decomposing greenery produces methane (CH4).

CH4 is a potent greenhouse gas, twenty times more effective than CO2 (EPA). Methane bubbles to the surface in some dams, but for the most part if remains liquified. Yet Fearnside's studies show that dissolved gases vaporize instantly upon escaping through the dam's turbine and spillway. International research is now underway to quantify the impact of both pathways for CH4 emission.

The question now is not whether hydroelectricity is carbon neutral, but whether hydroelectricity has less impact than burning fossil fuels. Studies show a range of carbon emissions across different types of dams. Some dams produce more greenhouse gases than an equivalent oil-fired plant, while others produce far less. While research is on-going, it now seems likely that Hydro Quebec's vast, Northern reservoirs will likely emit greenhouse gases at a slow rate for a long time. This is because of the submerged peat moss, which has high soil carbon but slow decomposition, and a large surface area.

International Rivers provides an online listing of scientific publications examining the greenhouse gas emissions of dams.

Ecological Impacts

Flooding for reservoirs exacerbates natural processes that lead to methylmercury production. Mercury in this form rapidly accumulates in the food chain, concentrating in the bodies of fish, birds and small animals (EPA). Humans who hunt and fish in the wild are exposed to mercury for several generations (up to 30 years) after damming (HQ 2007). Adverse health effects from such exposure have not been conclusively documented, though as Rosenberg notes, the impact of mercury poisoning is hard to distinguish from other social changes ushered in by hydroelectric development. In animals, the effects are much clearer, and include growth and developmental changes (EPA).

Dams cause radical changes to the water quality upstream and downstream. In Quebec, water is stored up throughout the summer, and let out over the winter as demand fluctuates. This means a reversal of seasonal flow and water temperature downstream. It also means the desalination of the estuary as freshwater suddenly floods downstream. Rapidly fluctuating water levels create 'dead zones' along upstream and downstream shorelines. Riverbanks erode and wetlands are submerged and collapsed (Linton). These changes have profoundly disorienting effects on fish and wildlife populations, affecting reproductive and migratory patterns.

Conclusion

So, what's the verdict on Hydro Quebec? It has a historically poor relationship with the First Nations people who hold original title to land now underwater. Many claim that this relationship is now healthy, but really, they are still working things out. The dams have had unquestionably negative impacts on the Cree Nation, and Hydro Quebec participates in socially unjust hydroelectric projects across the globe. And scientists do not even know if hydroelectricity is better than fossil fuel burning plants!

All in all, we are sceptical when people suggest that Hydro Quebec provides clean, green energy to the entire province. The truth is we do not really know how green it is. As clients of Hydro Quebec, we still have a great responsibility to reduce our power consumption.

Reducing Our Energy Consumption

So where should the SSMU begin? Unfortunately, SSMU Executives haven't had a wealth of ideas about this. The SSMU *is* doing a lot of work on waste management, but because McGill maintains control over heating and cooling, energy has not been a priority.

Nevertheless, we do have some progress to note, and some suggestions from SSMU Executive.

Lighting in the Shatner University Centre is predominantly fluorescent, the most efficient sort of lighting currently available. The SSMU Office is also wired with motion sensors, minimizing power consumption afterhours.

The full story on Lighting is told in a separate chapter.

Computers in the Shatner University Centre are almost all second-hand, donated by departments at McGill. This is excellent for the environment, as IT equipment is very energy-intensive to manufacture. Extending the lifetime of McGill's IT equipment gives the SSMU many, many bonus points.

The full story on Computers and other IT is also told in a separate chapter.

Haven Books is a consignment bookstore, acquired by the SSMU in 2007. Its property is leased from an office tower on Aylmer, below Sherbrooke. For whatever reason, McGill students did not flock to Haven Books this past year. The VP Finance & Operations and President both expressed interest in finding a way to move their bookstore operation out of Haven Books. They hoped to establish a low-infrastructure system, such as online ordering combined with a weekly drop-off. The VP Finance & Operations in particular cited Haven Books' power costs as a reason to move out.

We will let the SSMU Executives mull this one over.

Snow AP is the SSMU's annual welcome-back party during the first week of January. Like its more popular sister, September's Open Air Pub, Snow AP is outdoors. But here in Montreal, outdoors in January really means indoors a heated tent.

In past years, Snow AP's heating bill has become controversial. With Montreal's harsh winter seemingly intractable, the VP Internal seems willing to concede that the SSMU cannot continue heating the tent with an oil heater. “Maybe it's time to rethink Snow AP.” We cannot agree more.

The full story on Snow AP is told in the Events chapter.

Heating and Cooling Systems

We have our own suggestions as to what should be targeted for energy efficiencies. Generally speaking, creating heat and removing heat are the most energy-intensive ways to use power. While the SSMU cannot currently affect building-wide heating and cooling, the Shatner University Centre does contain several heating and cooling systems: walk-in refrigerators and refrigerated vending machines.

Walk-in Refrigerators are installed in the sub-basement (five units, as far as we can tell) and in the third floor kitchen. The latter is used to store produce and grains for the Midnight Kitchen's daily lunch service and catering service. It is also sometimes used by other student groups, with the MK's permission. The sub-basement refrigerators each store store different things, from beer to compost & garbage to computer servers.

The average walk-in refrigerator (15 m^2) has an annual consumption of 16,200 kWh. A combination freezer-refrigerator uses twice that (NRCan). We do not know the size of the SSMU's refrigerators.

We are not confident that the sub-basement refrigerators are being put to efficient use. In fact, the SSMU closed down one of the refrigerators in SB05 last year, because it had been running empty.

The server-containing refrigerator is surely not being used efficiently. It is also possible that a refrigerator may be used only during large events, but runs empty the rest of the year. We leave it up to the Porters and the General Manager to decide whether their use of the remaining refrigerators is efficient, or if changes should be made to maximize their utility.

One of the Porters told us that the refrigerators were installed prior to any of them starting their jobs with the SSMU. This suggests that they are quite old refrigerators. In the residential market, energy efficient refrigerators have been developing rapidly for the past two decades. The cost of operating a residential refrigerator older than a decade is now more than the entire lifetime energy of purchasing and operating a new refrigerator. While walk-in refrigerators are different markets and technologies, we suspect that the SSMU's refrigerators could use some sprucing up.

According to Natural Resources Canada, there are three ways to improve a walk-in refrigerator's efficiency: by paying attention to parasitic loads, improving operating conditions, and investing in heat recovery.

- "Parasitic loads generate heat that must be removed by the compressor, thus adding to the cooling load and increasing the energy consumed. Parasitic loads come from heat sources inside the refrigeration room, for example, interior lights, fans, defrost systems and heaters that prevent surface condensation."
- "Operating conditions can be improved by refrigeration components that can lower the compressor load."
- "Heat recovery lowers overall energy use by recovering heat expelled by the refrigeration system and using it for domestic water heating and space heating." (NRCan)

NRCan suggests retrofitting the following measures, ranked by the magnitude of potential improvement:

- High efficiency refrigeration compressors — 5-10%
- High efficiency evaporator fan motors — 5-10%
- Naturally sub-cooling the liquid refrigerant — 5-9%
- Evaporative condensers — 3-9%
- Heat recovery to heat air or water — *does not improve the refrigerator itself, but reduces our heating costs elsewhere in the budget.*

Ozone Depleting Refrigerants

Another issue with refrigerators is the use of outdated, ozone-depleting refrigerants. McGill claims that its only remaining "high-capacity chillers" using CFC or HCFC refrigerants "are equipped with a recuperation system to minimize refrigerant loss to the atmosphere" (SCE 2002).

Since McGill's relationship to the Shatner University Centre is always indeterminate, we urge the SSMU to ascertain that its refrigerators are using ozone-friendly refrigerants. If not, appropriate recuperation systems must be in place.

We have to admit that we were unable to really get a handle on the SSMU's current walk-in refrigeration situation. We recommend that the SSMU conduct further research into this, to see how much the SSMU can reasonably expect to save.

Vending Machines are refrigerated if they are dispensing drinks, and the SSMU even operates a freezer machine containing popsicles and frozen dinners. These types of refrigerators are very different from the kind in your kitchen. Typical, older vending machines consume 3,500 kWh of electricity per year, compared to between 450 and 900 kWh for a residential refrigerator.

Refrigerated vending machines also create a lot of excess heat, which must be compensated for by air conditioning. This fact is usually invisible, but not so in the SSMU's Sadies Corner. That space has machines for frozen goods, refrigerated beverages, hot beverages, and snack food. They create so much heat that a large, wall-mounted air conditioner is required to fan them continually for half of the year.

New vending machines in Canada are required to meet the equivalent of Energy Star certification. These newer machines are 45% to 55% more efficient than the previous regulations stipulate. They must also be capable of entering a low-power sleep mode during extended inactivity. While not necessarily enabled, these machines are all capable of turning their lights off and letting beverages rise above 4.4°C while sleeping.

As far as we can tell, older machines are not required to meet the new, tougher standards. They can be upgraded, however, using a product called Vending Miser. The device implements all of the features that a new, Energy Star compliant machine would have. Remember, that means cutting a machine's power consumption in half! (Check out vendingmiserstore.com for details).

Vending machines are typically equipped with fluorescent lighting. In a front-plated machine, a colourful plastic cover is normally backlit by several 4" high-output fluorescent lamps. Though fluorescent is the most efficient lighting, lamps this size still require a good deal of power. And arguably, they don't really contribute much to our quality of life. We recommend permanently turning OFF these sorts of vending machine lights.

NOTE: Given that the Shatner University Centre is vacant all night long, the SSMU might consider putting their vending machines on timers. While this might seem like a cost-effective alternative to the Vending Miser, **it is a bad idea**. Shutting down a machine's compressor mid-cycle can be damaging.

If cost is an issue, we suggest that the SSMU instead negotiate with the vending machine distributor to have them bear the cost of upgrading our machines.

We were not able to ascertain the age and energy-efficiency of the SSMU's rented machines. We ask the SSMU to follow-up with Denis Chalifoux (Sadies Corner) and Coca-Cola (second floor cafeteria) to determine whether or not action is required.

Many of our machines are often more than half empty. It seems likely, therefore, that the SSMU could consolidate the products in some vending machines, allowing for a reduction in the number of operational vending machines.

Green Energy Initiatives

An Energy Audit If the SSMU can find some students to do a building energy audit, we recommend that they go for it. Otherwise, we understand that McGill's Facilities Management and the Office of Sustainability are interested in training students to undertake some sort of energy audit. This could also be an excellent opportunity.

According to the US Environmental Protection Agency, the average annual energy intensity for office buildings is 167 kWh per square meter.[3] An energy audit would allow us to locate the Shatner University Centre against the average, and determine whether energy-efficiency is the best place for us to concentrate our efforts.

The Green Building Coordinator (an Environment Commissioner perhaps) should be working under the VP Clubs & Services, the General Manager and Porters, and with McGill Facilities to further investigate the opportunities for improvements outlined in this report (and beyond). This will help the VP C&S to be more directly involved in building improvements and to uphold the students' sustainability investments.

The added help is especially important for managing energy-efficiency—more so than for waste management and events planning. Energy-efficiency is a big enough portfolio that a person could spent all year working on it: coordinating research on the building itself, digging up lifecycle energy reports, and coordinating between all the different stakeholders—contractors, vendors, McGill Facilities, McGill admin, SSMU Executives, student groups—that's a lot of interests to take care of!

The GBC's relationship with the VP C&S is crucial to ensuring that energy-efficiency projects are undertaken successfully. While the Building Manager portfolio is theoretically shared between the General Manager and the VP C&S—one hired staff and one elected official—the GM actually makes most of the decisions. To grow a sustainable student centre, the SSMU needs to make some controversial, potentially expensive decisions. Sustainability entails a genuine departure from the status quo. To ensure that such decisions are accountable to students, the VP C&S needs to increase his or her participation as Building Manager. The GBC will enable the VP C&S to stay informed and knowledgeable about necessary changes. The GBC would also keep student interest groups engaged with the process, by maintaining an accessible link to the VP C&S.

Offsetting Our Energy Consumption

Carbon Credits also known as carbon offsets, are issued for projects "that result in less carbon dioxide or other greenhouse gases in the atmosphere than would otherwise occur." Renewable energy projects, such as wind, solar, small hydro, geothermal and biomass power plants can issue carbon credits if they displace the use of fossil fuels. Other types of activities result in carbon offsetting, including "energy efficiency projects, methane capture from landfills or livestock, destruction of potent greenhouse gases such as halocarbons, and carbon sequestration projects (through reforestation, or agriculture) that absorb carbon dioxide from the atmosphere" (DSF).

The David Suzuki Foundation warns against investing in just any carbon offsetting projects. The market is largely unregulated, and many of the cheaper projects are of questionable environmental worth. Tree-planting for carbon sequestration is considered problematic, in part because they are impermanent and do nothing to address fossil fuel consumption. Halocarbon destruction projects are criticised because they actually create a "perverse incentive" to manufacture **more** of the now profitable ozone-depleting gas. The cost of such projects is low enough to flood the offset market, squeezing out genuinely sustainable projects.

According to the principle of offsetting, credits must also be issued by projects that could not otherwise happen without the extra investment from offset purchasers. This is known as the principle of additionality, and it ensures a net benefit for the climate.

Following the David Suzuki Foundation's wise advice, we recommend that the SSMU only consider carbon offsets that are certified as Gold Standard. Offsets with Gold Standard certification only support projects that produce additionality; prioritize renewable energy generation; do not include tree-planting; and are located in developing countries.

Carbon offsets are sold by various online vendors, a sample of which is included below. We recommend purchasing from Planet Air, a reputable, Montreal-based, offsetter for the Canadian market.

When should we purchase carbon credits?

The SSMU must establish which of the Society's activities should be offset by purchasing carbon credits. Should the general operations, including climate control, lighting, and IT be offset? If so, the SSMU could simply reserve a portion of the annual budget toward carbon credits.

Another option would be for the SSMU to offset its extra-ordinary expenses, such as travel. In 2006, two SSMU Executives took a cross Canada fact-finding tour of the different student unions. The VP External and his or her assistant also make frequent trips to Ottawa and Quebec City. Sometimes, they organise busloads of students who participate in demonstrations in the capital cities. The impact of these car, bus and train rides could be offset at a reasonable cost (see table below).

The VP Internal portfolio includes many large events, the considerable impacts of which could be offset—if we can accurately calculate their energy costs. Establishing these impacts would be the subject of several good research papers, if the SSMU can recruit interested students.

Snow AP would in fact be easy to calculate, since we know exactly how much oil is burned to heat the tent. While the option of not using a heated tent is discussed in the Events chapter, we would like to emphasize here that purchasing carbon offsets should not be used as an excuse for unsustainable practices.

Afterall, the goal behind offsets is that people will purchase them to cover the impact of unavoidable carbon expenses—for instance, the cost of travelling to see family, the cost of heating a home, etc. Given that we believe there is no good reason to hold Snow AP outdoors in the middle of winter, we do not consider carbon offsets for Snow AP to be a good investment.

Finally, the SSMU could institute carbon offsetting into the claims forms made by clubs, services, independent student groups, Executives and staff when they are requesting reimbursements, grants and pay orders. This would encourage people to consider the impact of their activities on the climate right where it hurts most thoughtfully—the pocketbook.

The SSMU could create a scale of set amounts to offset various activities, to simplify budgeting for organisers. Organisers could also get around the credit by demonstrating other environmentally friendly practices (such as using the Plate Club and ordering organic wine for their party, or printing their journal on recuperated paper with vegetable-based inks).

For inspiration, the SSMU should take a look at the PGSS Travel Policy. Passed this year, it sets guidelines for the purchase of Gold Standard carbon credits to cover travel impacts.

Carbon Emissions in Quebec

Because Hydro Quebec provides 92% of its supply from hydroelectricity, average carbon emissions from electricity consumption are vastly lower in Quebec. Various brokers offer online calculators, all of which use different baselines to calculate their prospective clients' costs. Planet Air offers calculations based on provincial averages, while Climate Friendly calculates based on the Canadian average. That means you can have radically different calculations depending on which website you visit.

How different? According to Planet Air, 100,000 kWh of electricity in Quebec produces **1 tonne** of CO2. Climate Friendly, based on the Canadian average, calculates the same consumption at **22.4 tonnes** of CO2.

That means the SSMU has a choice to make. Do we calculate our offset at Quebec rates, the most accurate, and vastly less expensive? Or do we calculate our offset based on the Canadian average, or the even higher global average? Given that almost half of McGill's students are not from Quebec, this could be the more responsible position. Leadership, the kind that McGill aspires to show on the world stage, is best exemplified by self-sacrifice and role-modelling. If students at McGill enjoy an extravagantly fun and resource-intensive school life, it should not be because we have the privilege of cheap energy. Let us at least earn our extravagance, by investing in the future of others above and beyond our nominal responsibility.

In any case, this is a debate we feel will be best reconciled in a public forum. We leave it to the SSMU to figure out the best path forward.

NOTE: The SSMU must remember two things: first, the Quebec factor is only for electricity provided by Hydro Quebec. Travel, heating, and generator power are all differently calculated.

Second, the SSMU can calculate the CO2 produced by an activity at any website. Most sites will output the CO2 tonnage produced by the activity. An offset to that tune can then be bought from any vendor.

Some Example Offsets

If the SSMU were to offset its IT related carbon emissions, it could base its purchase off of the calculations included in our Computers chapter. We calculated the weekly power consumption of computers, monitors and printers to be roughly 1,500 kWh, or 78,000 kWh per year. An equivalent Gold Standard offset would cost the following from various online brokers:

Tonnage	0.78 t	17.5 t	24.96 t
Jurisdiction	Quebec	Canada	Global
PlanetAir.ca	$30.62	$686.88	$979.68
Less.ca	$31.12	$698.25	$995.90
ClimateFriendly.com	$18.33	$320.20	$457.52
MyClimate.org	$37.57	$636.87	$898.95

For offsets unrelated to the SSMU's general operations, more specific calculations are necessary. Planet Air offers a highly refined calculator for automobile travel, based on the make and model of the vehicle used to travel. Some examples that might be pertinent to the SSMU include:

- Driving a 2007 Ford Focus to Toronto and back (540 km each way) would release almost 200 kg of CO2. This could be offset at Gold Standard for 7.46$.
- Driving an older mini-van (2000 Honda Odyssey) to Quebec City and back (270 km each way) would release almost 150 kg of CO2. This could be offset at Gold Standard for 5.50$.

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[1] The OECD average is 11.1 kg per capita.

[2] It could be that all of the numbers are actually estimates, but that the reporting procedure in earlier reports was different.

If market estimates, the cost to McGill for producing natural gas powered heating must be less than market value. We hope, therefore, that McGill would only charge the SSMU at wholesale cost.

[3] Metric derived from the original 79.8 kBTU per square foot.


Lighting

Lighting

Parts of this chapter draw heavily on the International Energy Agency's excellent book-length report *Light's Labour's Lost*, principally written and researched by Paul Waide and Satoshi Tanishima.

Why Lighting?

In the effort to reduce our energy footprint, the SSMU should start by addressing the impact of lighting the Shatner University Centre and the SSMU Office. It might surprise you, but lighting is quite likely the SSMU's greatest source of electricity consumption. As the International Energy Agency reports, lighting accounts for an average 34% of tertiary-sector electricity consumption. In fact, "indoor illumination of tertiary-sector buildings uses the largest proportion of lighting electrical energy, comprising as much as the residential and industrial sectors combined" (32).

Furthermore, lighting is a global concern—electric lighting consumes a fifth of global electricity production, and produces 1.9 gigatonnes of carbon dioxide emissions annually (25). The lowly light bulb might not seem to be as great a concern as SSMU's walk-in refrigerators or our hundreds of computers, but the SSMU has both the responsibility and the great opportunity to achieve progress rethinking our lighting.

What makes lighting such a great opportunity?

Great New Products Lighting installations are generally pretty inefficient: "in a typical lighting system only 30% of the lumens emitted by the lamp make a useful contribution to the lit environment experienced by the users of the lighting system" (40). This low efficiency means there is ample room for improvement. And we can do more than just purchase newer, greener lightbulbs. We can also invest in better luminaires (fixtures) that release more light, and in sensors to ensure lighting is saved when it is unnecessary.

Easy Practical Changes But it's not just a matter of purchasing new equipment. Significant efficiencies can be found by changing our practices instead. Not only do practical changes often cost less, but it is also best to avoid manufacturing products, even green products, if we can address the problem in different ways.

Collateral Benefits All types of lighting, even fluorescent, creates heat. In the summer, we pay to have this heat removed from our buildings via the air conditioning. According to a study in China, each Watt of lighting removed will avoid an additional 0.3-0.5 Watts of air-conditioning. And if Canadians believe that their air conditioning use pales in comparison to heating needs, think again!

Great Visibility At risk of making a terrible pun, lighting retrofits can be excellent, high visibility renovations that get students excited about seeing a sustainable campus, and thinking about where else we could improve things.

Measuring Our Impact

Does SSMU really dedicate 34% of its electricity use to lighting? Unfortunately, we have no idea how SSMU matches up to the average. As part of this report, we actually did estimate in absolute terms the amount of electricity the SSMU uses for lighting. But as explained in the Energy chapter, the SSMU's landlord (McGill University) does not provided information on individually metered buildings. Therefore, we have no idea what proportion of the total our data represents.

APPENDIX Our Lighting Spreadsheet

This spreadsheet is designed to help us measure the impact of our lighting. It records what lights are used where and for how long

each week. Some of these variables are estimated, and we hope that future research can refine these details. We also hope that the spreadsheet will help the SSMU to target areas for retrofitting and practical changes.

Our data comes from an on-the-ground survey of the lights in each room, combined with time estimates based on opening hours (incorporating some tinkering when real frequency of use is known).

The vast majority of SSMU's lamps are simple fluorescents. The SSMU uses both T8s and T12s in recessed luminaires under refractive plastic shielding. In some newer installations, however, we could see that higher efficiency T8s were installed behind higher quality troffers. There are hundreds of other lights, including halogen spotlights, classic incandescents, dozens of varieties of compact fluorescent, incandescent floodlights, and so on.

How Can We Change Our Lighting?

We need to get involved in thinking about lighting, and especially about upcoming renovations. The sooner we start planning, the fewer opportunities we will lose. In 2008 alone, two major food vendors will have been renovated, along with the SSMU Lounge, several rooms in the SSMU Office, and several clubs and services offices.

Renovations in the Shatner building happen more frequently than most students might think. The SSMU must foresee and anticipate these opportunities. It should create guidelines for the sorts of sustainability enhancements that students want to see, and make sure that McGill and other contractors have these guidelines at the earliest stages of planning.

Transparency will ensure that the SSMU's research is put to good use, and make up for short timeframes and conflicting interests.

Renovations such as those recently taken place in Liquid Nutrition need to be given careful consideration from all of the many parties involved—the vendor, the SSMU, McGill Facilities, the contractors, and interested students—to see what sort of efficiencies can be achieved, and to learn from the space itself.

RECOMMEND: Anticipate renovations ahead of time, and prepare sustainable lighting design guidelines and plans to give contractors and architects.

Room 1203: A Case Study

The transformation of room 1203 into cubicle space has revealed a few lighting opportunities. As part of the change, the closed door office opposite the cubicles has been turned into a meeting room. Like most of the SSMU's staff offices, this space gets beautiful, full sunlight shining in from the courtyard—so much that the fluorescent lights could be turned OFF most of the time.

The SSMU Office is relatively advanced, in that it has automatic lighting attached to motion sensors. This is great for eliminating lighting wasted on *empty* spaces. But because the SSMU Office gets so much sunlight, the SSMU should also install ambient lighting sensors. These would dim or close the overhead fluorescents when the sun is shining bright enough that extra lighting is unnecessary.

This is just one example of how products and practices can be changed in accordance with the actual, lived opportunities available to us, if we just consider what we see. As a further example, the renovations have revealed several potlights in the space identical to those in the SSMU Front Desk area. In both spaces, the potlights are not bright enough, nor are they well situated to add any useful light to the space. They should therefore be kept turned OFF, or

have the lamps removed. This is a simple solution to an unsustainable installation.

Liquid Nutrition: A Case Study

The Shatner University Centre's room 108 was recently leased to Liquid Nutrition, a smoothie retailer. This was the first major contract signed after the SSMU adopted its *Sustainability Policy* in the Winter 2007 General Assembly. SSMU Executives promised on numerous occasions that the Liquid Nutrition contract would include exciting and robust sustainability measures.

It is too soon to say exactly how this relationship will play out in practice. We would only like to point out here that the renovations have resulted a less efficient, less environmentally sound lighting design. Yet both the SSMU and Liquid Nutrition were bound on paper to promoting sustainability.

Unfortunately, commitments on paper will not always translate into practical understanding of the deep changes that sustainability entails. The SSMU is ultimately responsible for the bad renovations, and we hope that they will see that they must take a more direct approach to managing the renovations, and not rest after the contract is signed.

Summarizing the problems with Liquid Nutrition's lighting highlights many points within this chapter. Three of the four walls, plus the ceiling, are painted a matte, charcoal black. This severely limits the amount of ambient lighting in the space. One of the walls has two big windows, making room 102 one of the only spaces with access to daylight in the Shatner University Centre. Unfortunately, one of the windows is painted lime green, drastically reducing the amount and utility of the daylight entering the space. For this stark, dark room, the lighting designers chose incandescent floodlights & spotlights. There are also some bulbous, decorative lights which we can only hope are fluorescent, since they serve no functional purpose.

Liquid Nutrition's lighting is designed to focus all our attention on the food, harnessing high energy, high CRI, tightly focused lamps. We suggest that lighting designed for sustainability would look very different. At the same time, we hope that the SSMU will read this chapter and realise that modern, sustainable lighting can both flatter a product and save significant energy.

Too Many Different Lights!

In our research on the Shatner University Centre, we have seen that end-users and builders are often very different people, with different experiences of renovation space, and different needs and considerations at heart. The person who designs the space feels the pressure to choose fashionable, hip lighting that will wow! end-users above all else. In other words, aesthetic value is often considered ahead of environmental impact and utility. A quick chat with the SSMU Porters reveals that there are some ***50 different types*** of light bulbs used in the Shatner building. This vast diversity is the result of having different contractors and designers choosing whatever lighting was then fashionable at the time of a renovation.

There are several important consequences to this over-diversity, aside from the headache it causes our porters.

1. The SSMU cannot make bulk purchases of energy efficient lamps in order to bring down the price and mitigate the generally higher cost of the most efficient lamps.
2. The SSMU cannot reliably track the use of different light bulbs, either through inventory or through purchasing (the porters simply have hard enough jobs that they cannot be asked to do

this). A more limited set of lamps would make tracking a manageable task.

3. With dozens of different lamps spread throughout the building in a variety of different luminaires, the SSMU has limited opportunity to plan efficient, large-scale upgrades of either luminaires or lamps.

RECOMMEND: The SSMU should work with renovators to ensure that it keeps the range of lamps required in the Centre down to a manageable number.

Look Out For Overspecification

So those are the principle reasons that it is important for the SSMU to get involved in making lighting choices in our spaces. But once students are involved, what should we look out for?

It can always help to return to the Three Rs, beginning with the First R: Reduce. In lighting terms, 'reduce' translates into 'avoid overspecification.'

Reducing the amount of lighting we consume begins with a simple practice: we need to make sure we clean our lights. Not only does this help keep our buildings brighter, but as the IEA notes, the failure to have a maintenance plan often leads designers to overspecify the system to compensate for the light lost due to dirt accumulation (155). According to estimates by the IEA and others, a typical *enclosed* luminaire is so dirty after 18 months that it is 10–15% less illuminating. Naturally, the impact is compounded in dirtier, high traffic areas such as the SSMU First Floor or Gerts.[1]

RECOMMEND: The SSMU must keep a maintenance plan for our lighting. By informing renovators of the plan, the SSMU will ensure lighting is appropriately specified.

How Much Is Just Right? Luminance & Contrast

We can find further reductions are possible by thinking through the spaces we need to light. A good question to start with is: How much lighting is the right amount of lighting? Is it determined by what's comfortable? Or is it a little more scientific than that?

Visual acuity (a measure of the eye's ability to resolve detail) is generally what professionals use to measure lighting quality. You've probably had your visual acuity tested at the optometrist, when you were asked to read out the progressively tinier and tinier text on your doctor's eye chart.

Visual acuity relates to two factors: luminous contrast and luminance. As either contrast or luminance increase, visual acuity increases. Visual acuity is more sensitive to changes in contrast than to changes in luminance (76). But since the relationship of increase is non-linear, the benefit of increasing either factor will eventually plateau.

In practical terms these facts confirm that many offices are over-lit. While increasing illuminance helps visual acuity, there is a rather low threshold beyond which extra lighting is unnecessary. Many offices with broad overhead flood lighting have in fact created an environment too much lacking in *contrast*. "A scene that is exposed to a low but less regular illuminance may be easier to discriminate than one which is exposed to a high, uniform, diffuse illuminance because of the greater contrast in the luminance of differently illuminated surfaces. Research has found that excessive uniformity not only makes it difficult to see but also causes visual fatigue" (94).[2]

INCREASING CONTRAST IN THE OFFICE

In an office, more often than not, the object we are trying to see is a text. There are many measures that we can take to increase the contrast of our text to help us read more clearly. We should start by making good typographical choices for printed documents, and learning how to increase the contrast of text on our computer screens.

Proper typographical choices

- Always choose a good font, with serifs (the little ledges on the tops and bottoms of letters).

  For on-screen text, we suggest Georgia.

  For printed text, we suggest Baskerville and Times New Roman.

- Although it can save paper to print single-spaced at 10 pt. this tends to discriminate against readers with less than 20/20 vision. Unless you know your intended audience, choose at least 12 pt.

- Choose a bright white paper. The SSMU currently purchases a paper of 92 brightness, which is great.

Adjusting contrast on-screen

- The Windows control panels and Mac system preferences both have 'Accessibility Options' which include a high contrast mode, and options for dynamic zooming.

- Web Browsers, from Firefox to Safari, all have options for increasing the size of text on any website. This is generally accessed from the 'View' menu or using keyboard shortcuts. Firefox 3 has an especially good live zooming feature, since it zooms the entire web page, and not just the text.

- MS Word and other Office apps can change the level of Zoom in the 'View' menu. This does not change the actual size of the printed text, but makes it much easier to read while you type.

Comfortable Lighting Is Energy Efficient

In any case the level at which people are comfortable is not always the level at which we can maximize visual acuity. Studies cited by the IEA reveal that many office workers prefer the following:

- 200 lux of lighting when reading on a computer screen
- 300 lux when reading on printed paper.

These levels are far below the guidelines and lower than the expected level for maximum visual acuity.

The IESNA provides guidelines for North American lighting design. These guidelines are actually on the lower end of the international scale and so we would recommend them as ceilings.

Room	Class	Dining	Office	Lounge	Meeting
lux	540	108	324–432–540	108	324

IESNA Guidelines for Task Lighting Levels in lux (lumens per meter squared)

Task vs. Ambient Lighting

One of the nice things about the IESNA guidelines is that they usefully address the need for contrast—they include recommended ratios between the task lighting and ambient lighting. As the IEA lauds: "providing well-defined but flexible task lighting, having localised user control blended with lower-level ambient illumination away from the task area, is increasingly recognised as one of the key means of providing high-quality low-energy lighting. (78)" This approach facilitates end-users taking control of localised lighting, ensuring appropriate contrast when lighting is needed, and minimizing wasted light, especially in general traffic areas.

The amount of variability we can allow in the lighting will depend on the different spaces we are looking at. For instance, some research shows that people are comfortable with greater variability in day-lit areas, than in windowless rooms (82). In any case, the North American guidelines provide for a generous difference between ambient and task lighting, allowing for greater energy efficiencies. "IESNA recommends that ambient lighting should be about one-third of the level of task lighting, e.g. an implied minimum uniformity of 0.33 (ALG, 2003). [… However] for the field of view they propose that uniformity should not be less than 10:1 and only propose the maximum 3:1 ratio for areas close to the task area" (96).

RECOMMEND: The SSMU should purchase or borrow a light meter (50-100$), and do a walkthrough of the Shatner University Centre. The porters should remove lamps where spaces are found to be overlit. The building managers should plan for task lighting to be added where it is convenient & found to be necessary.

Control Freaks

A natural conclusion to the design described above is that users should be able to take greater control over the lighting in their workspaces. Because we are trying to use less lighting, it is more important that the remaining available lighting be optimised to the use of those in the space. Also, due to natural variation in visual acuity, as well as age-related deterioration, it is best to allow users to modulate the lighting in their task areas, either brighter or more dim.

Finding the right recipe will depend on the exact space we have in mind. But generally speaking, manual control over the task area could be combined with automatic control over the ambient lighting. This would provide the best balance between ensuring energy conservation and being flexible enough to meet individual needs.

Automatic controls prevent the delivery of light to spaces that are empty, or for which there is adequate daylight. **Manual controls**, such as easily accessible ON / OFF switches, could serve the same end. As the IEA notes, "research shows that simply providing users with the [manual] capacity to control lighting levels in the space they occupy can significantly lower lighting energy use."

The combination of both manual and automatic controls will typically deliver 20-35% savings on energy use (41), though some studies show that manual controls alone can save over 60% when available throughout the office (143).

Motion sensors are currently installed in the SSMU Office, which ensures that roughly half the lights are OFF during the night, and that offices within the SSMU Office are dark when unoccupied.

Motion sensors could be employed in many other parts of the building with great success. Clubs and services' offices all have manual switches, and sometimes lights are left ON all night by accident or neglect. All the hallways are fully lit, even in the most obscure and ill-travelled parts of the building, and at night all parts of the building are sparsely populated. A study detailed by the IEA shows that washrooms and meeting rooms have 50-60% savings potential due to their unpredictable use patterns, and low after hours usage. Based on those principles, spaces could be selected for a gradual introduction of automatic sensor controls.

NOTE: If motion sensors are combined with dimming ballasts, then there is no need to worry about completely darkened stairwells or hallways and the danger this could pose to people alone in such marginal areas. While the building is open, lights could merely be dimmed, and then only after hours would motion sensors be able to turn lights off completely.

RECOMMEND We suggest the SSMU start by installing motion sensors in some of the back rooms and hallways in the Basement and Sub-Basement. When it is convenient, clubs and services offices on the Fourth Floor could be retrofitted with automatic sensor and daylight controls.

Photosensors could be used to dim lights in areas that are well-lit by daylight. Granted, there are relatively few such spaces in the dark box we call the Shatner University Centre. Notably, though, the SSMU Office benefits from sunlight along the Courtyard's West side. This would be a good location to test photosensitive dimming controls. An added benefit to such a system is the ability to lower lighting levels as night falls. This is known as adaptive compensation, following the body's preference for lower light levels in the evening (144).

RECOMMEND We suggest that the SSMU test daylight sensors in the SSMU Office, in conjunction with dimming ballasts and automatic controls. When successful, these could be tried elsewhere.

Dimming controls are important for responding to individual comfort and available sunlight. However, fluorescent lamps can only be dimmed when installed with electronic ballasts. The price of these newer ballasts is not prohibitive, but they may not yet be installed in spaces not recently renovated.

Manual ON / Automatic OFF is a type of automatic control that the SSMU could consider for sunlit rooms. Currently, the SSMU Office uses Auto ON / Auto OFF sensors, which desensitizes many users to the fact that the space is in fact artificially lit. Because the switch functions traditionally (Manual ON + OFF) the user may choose not to operate the overhead lighting, if for instance, there is enough daylight.

DAYLIGHT

Buildings in modern Canada are not generally designed to harness daylight. Heading down to Montreal's Old Port, take a look at the design of those old, grey-stone apartments. You will see large, broad windows rising all the way up to a 14" ceiling. Contrast that with an office in Burnside or a carrel in McLennan. There you pretty much have to duck and squint just to see outside.

Many of the buildings on campus, including the Shatner University Centre, were built at a time when keeping heat from escaping was more important than letting daylight enter. We live, study and work in what the IEA calls "dark boxes where the largest, cleanest and highest-quality source of light – daylight – often cannot reach" (26). Fortunately, today's glass windows with modern glazings allow buildings to prioritize daylight while retaining climate control.

In fact, up to 70% of annual illumination needs can be met by daylight in a properly designed building. This compares to only 20 to 25 percent in a typical building (IEA factsheet). Photographers and laptop users all know that daylight is brighter than the brightest indoor lighting. Even in cloudy weather, the sun can provide 50,000 lux—a light 100 times brighter than that required for any office or study space.

Apart from saving on electric lighting, daylit buildings are more happier, healthier spaces. Many studies link daylight to better overall health, employee satisfaction, and higher productivity (42). Exposure to daylight is linked to higher test scores among children, and to higher sales in retail establishments (83). Certainly, the lack of daylight is a perennial complaint among students who use the Shatner University Centre for work or study. Gert's Pub's move into the dark basement has been accompanied by a drastic loss of

popularity, and many older students pine for the days when Gerts occupied the comfortable—sunny—first floor.

RECOMMEND Allowing more sun into the Shatner University Centre will only improve student life on campus, helping to fulfil the SSMU's mandate and increasing traffic to our student centre.

We recommend that the SSMU arrange for lighting design students from the School of Architecture to prepare plans for the Shatner University Centre. That way, we will be ready when the opportunity, of funding, arises.

We also recommend that the SSMU look to better harnessing the sunlight already available.

- The SSMU Office should have ambient light sensors installed, and attached to the existing automatic ON / OFF controls.
- Once tested and working, similar areas could be equipped with automatic daylight controls. We suggest starting with the MISN Lounge and Travel Cuts.
- Ensure that windows are not blocked, either by poorly placed walls, other furniture, or paint. Notably blockages include: paint on the Liquid Nutrition windows, poor architectural choices in the second floor cafeteria serving area, and bookcases in Travel Cuts.
- The Shatner University Centre has not one but two sunroofs. With sunroofs, it seems to us that more is not better. We suggest replacing the lowest sunroof with metal grating—which is actually already installed over several square meters on the West side. This would be part of a longer-term plan to channel more daylight down the central staircase, into the heart of our 'dark, concrete box'.

An Overview of Lighting Technologies

Automatic and manual controls will alter the normal patterns of wear and tear on our lamps. Some fluorescent lights cannot be turned off and on with frequencies greater than every 15 minutes, or every few hours. Choosing the wrong sort of lamp or fixture can end up costing us more in burned out lamps, even though we may use less electricity. The following section is a reference illuminating today's available lighting technologies. We hope to inform the SSMU about their appropriate uses and limitations, so that the SSMU can plan most productively with its renovators and contractors toward sustainable renovations.

With the market for 'green' products booming, our readers might be misled into thinking that this section is the meat of our lighting chapter. In fact, we would like to emphasize that facilitating changes in practices is the most important change that the SSMU could pursue. Changes to our organisational practices, and improvements in lighting controls, will best lead to reductions in energy and material resource use—remember, Reduce is the *first* R. The second R, for that matter, is Reuse. We will not use and reuse our available technology to its fullest extent, if we are constantly lusting after the newest, sexiest, greenest lighting.

Light Anatomy There are between 1 and 3 parts to any of the lights in our spaces. The lamp is what actually gives off light. The luminaire is what houses the lamp and directs the light in a useful manner. Fluorescent lamps also require a secondary mechanism called a ballast.

LAMPS

Incandescent lamps are the classic light bulb, the kind that lights up overhead when you've got a brilliant idea. They are also the least efficient of all the lamps available. The reason that you can so easily burn yourself touching an

Shatner Total

250-350 Incandescents

incandescent light bulb is that 90-95% of the energy that goes into the bulb is converted to heat. Only 5-10% serves the primary purpose of creating light (The Watt).

Incandescents can come in many shapes and sizes. In our buildings, we principally see two kinds of incandescent lamp: 100W general service lamps and 100W floodlight style lamps. The floodlights provide a broad, bright sheet of directed light. Floodlighting is used in Gerts, in the Cafeteria because the quality of the light is flattering to the foods and drinkers on display.

The reason that incandescent lighting flatters is that its CRI—Colour Rendering Index—measures 100. That means that it reflects colour as accurately as if it were sunlight. Every other type of lamp has a lower CRI, though not always to the extent that it is noticeable.

Incandescent lamps are also cheaper to purchase. This issue came up when speaking with the porters about Gerts, because they are responsible for purchasing replacement lamps. It is easier for them to justify purchasing the cheaper Incandescent lamps than to spend more on an efficient, longer-lasting lamp type.

RECOMMEND: It is important that the SSMU Building Managers empower the porters to purchase the more appropriate and energy efficient replacement lamp, rather than the less expensive option—generally incandescent.

Although incandescent lamps are somewhat demonized in the green press, they could have an important role for our current sustainability. Fluorescent lamps should not be operated for only short intervals, because they will burn out too quickly. Only incandescent and halogen lights can currently be used in situations where lighting is only needed for a few minutes at a time. For example, closets, refrigerators and seldom-used washrooms should probably use incandescent bulbs.

In the future, LEDs could take their place, but for now, incandescents are our best choice for momentary usage.

Settling the HVAC Offset Factor

Incandescent lighting is currently being phased out across the United States, in Ontario, and elsewhere. One of the defences waged on behalf of incandescent lighting has to do with the fact that incandescents produce so much heat. Ironic, no?

The heat produced by incandescent lamps is sufficient to help keep our buildings warm in the winter. Of course, it also heats buildings up in summer, and our Air Conditioners must then work extra hard to cool us down. In a Northern climate such as Quebec's, one might think that our need for winter heating outweighs our need for summer cooling. Therefore, we would not benefit from switching from incandescent lighting to a cooler technology such as Compact Fluorescent.

This isn't entirely true. The HVAC offset is an important factor, but not to the point of reversing energy savings. Chernoff writes, "on average, this HVAC offset negates 25% of the energy savings from switching to CFLs, but only 5% of the cost." This is because Air Conditioners run on electricity, the marginal cost of which is more than that for heating, which runs on natural gas.

Chernoff actually puts the HVAC Offset's cost at ±12¢ for every dollar saved on lighting energy. Larger buildings that are open year-round (ie. operating during the summer) are more likely to be on the positive side of this offset.

Conclusion? Incandescents are nowhere near valuable enough as a source of heat to warrant keeping them. The benefit of switching to

fluorescents is still far in excess, and with the right building, the difference does not even exist.

Fluorescent Lamps we heart you! Of the available indoor lamps, fluorescents are the most efficient, last the longest, and have a manageable environmental impact. There are, however, some important considerations—setting up a fluorescent light the wrong way can completely wipe out its environmental benefit. And they cannot do everything that an incandescent, unless installed with the appropriate ballast.

Shatner Total

Over 1300 Fluorescents
4' equiv.

Linear Fluorescents are currently marketed in three different categories: T5, T8 and T12. The number in the name refers to the tube's diameter in eighths of an inch.

T5 Fluorescent is a relatively new technology, and are currently the best performing fluorescent lamps available.

- They are the most efficient, producing 104 lumens per Watt.

lm/W	standard W	initial output	lifetime
104	28W	2900 lm	20,000 hours

- T5s use more efficient phosphors (triphosphors) which means they have better Colour Rendering (higher CRI).
- T5s are more reliable, losing only 5% of their light output over a 20,000 hour lifetime.
- Because it is thinner, the T5 allows more light to escape the luminaire. This can be useful for creating more directed lighting. T5s can be used in tighter luminaires as well, since its efficiency actually increases at the higher operational temperature, unlike other fluorescents.
- Furthermore, the T5's smaller tube diameter means it bears a smaller impact on the environment—it uses less phosphors and mercury and can be shipped more efficiently.

The principal downside to T5s is that they cannot easily replace T8s or T12s, because they are not available in standard lengths. Manufactured to metric lengths, they come out slightly shorter. This means that most T5 installations are in new constructions or in large-scale renovations. Adaptors are available, though not yet widely so.

NOTE: There are already T4s on the market as well, often sold alongside T5 models. These could be worth investigating, though the more established T5 models might be more reliable.

T12 Fluorescent is the older technology, and suffers accordingly.

- They are still relatively efficient, clocking-in at 34 W for a standard 4' tube. T12 lamps can range up to 40W or so, however.
- They normally use less efficient phosphors (halophosphors) resulting in a lower CRI.
- They lose 20% of their light output over a lifetime.
- Because they are older, they tend to be installed with magnetic ballasts. These produce a flickering quality to the light. This effect can be annoying or even sickening, as it strains the eyes.

T8 Fluorescent comes in both high and low efficiency flavours. For this reason, we recommend prioritizing a switch to Super T8s over more costly T5 renovations.

- T8s efficiency clocks-in between 92-100 lumens per Watt. At the upper end, this approaches the efficiency of T5. Most T8s last for the standard 20,000 hours but some low mercury lamps can last up to 24,000 hours.

lm/W	standard W	initial output	lifetime
92–100	32W	2950-3200 lm	20,000–24,000 hours

- T8s can be found using either halophosphors or triphosphors. It is important, of course, that the SSMU select lamps with the more efficient triphosphors (the aforementioned "Super T8"). For even better Colour Rendering, the SSMU could also look for T8s with additional phosphors, reaching CRI in excess of 90. These lamps are, however, less efficient. They should only be prioritized for spaces where a high CRI is important, such as in Gerts or the Food Vendors' areas.
- T8s lose a little more than 10% of their light output over a lifetime, half as good as the T5, but twice better than the T12.

From T12 to T8

The SSMU purchases a good amount of T12 fluorescents. We do not know exactly where they are used, because we were not able to distinguish between T8s and T12s during our tour of the Centre. But in general, we encourage the SSMU not to use T12s when other fluorescents are available.

T12s can often be replaced by T8s without replacing the ballast or fixture. If this is the case, the SSMU should phase-in T8s as the T12s burn out. On the other hand, if removing our T12s requires installing new ballasts, then the SSMU should prioritize areas where high-quality lighting is more important, and leave areas like the parking garage for a time when the environmental cost of renovation can be mitigated more completely.

Compact Fluorescents' tubes are twisted around so that the lamp fits into spaces previously filled by standard incandescent bulbs. Many of the same considerations apply to compact fluorescents as to linear fluorescents.

Shatner Total

Over 400 Compact Fluorescents

CFLs are less efficient than Linear tubes, because the phosphors coated into the coils must be applied more thickly. Nevertheless, CFLs use between 20-25% the energy of an equivalent incandescent bulb. CFLs cost much more, but last on average 10,000 hours. One life-cycle assessment calculates that the greater energetic cost of manufacturing and recycling a Compact Fluorescent bulb is recouped after only 50 hours of use (The Watt).

Although we suspect that the recoup period is closer to 1 month (see Energy Pulse), a CFL that lasts its full life is undoubtedly much more efficient than an incandescent lamp. Replacing a single 75W incandescent lamp with a CFL can save 22$ a year in electricity alone, a savings of 68% (EnergyPulse).

CFL Ballasts CFLs in the residential market come with an integrated ballast, and are designed to fit standard light sockets. Earlier CFLs used magnetic ballasts, but almost all are now electronic. The SSMU could use these to replace many of its current incandescent bulbs.

CFLs in the commercial market are often ballastless. The ballasts are installed separately, since a single ballast can service a half dozen consecutive lamps (60,000 to 80,000 hours). These stand-alone ballasts are also higher quality, and have the potential to be wired into an automatic control system.

Most of the SSMU's CFLs are of this sort, and though they all look the same, we discovered that there are dozens of different fixtures installed. We do not know whether their ballasts are electronic or magnetic.

CFL Care Because CFLs use ballasts, they will burn out much faster if they are operated for too short an interval of time (as detailed below, in the Ballast section). CFLs are designed to replace general service incandescents, so they can take greater abuse than linear fluorescents. Still, Energy Star recommends at least 15 minutes of operation before turning the lamp OFF. This means CFLs should not be used in places like single-user washrooms, refrigerators, and closets, where they will only be ON for a few minutes at a time.

CFLs are also most effective and long-lived when installed with a proper luminaire. Recessed fixtures designed for incandescents trap heat produced by the CFL, leading to premature burn out. CFL appropriate luminaires allow greater air circulation, and actually reflect more light too.

PROPS: The SSMU should be commended for already using over 400 Compact Fluorescent lamps in the potlights found throughout the Shatner University Centre. High Five SSMU!

We have not ascertained whether they are in CFL appropriate luminaires, though we suspect that they are.

CFL Powerfactor CFL lamps generally have a low power factor. Appliances with low power factors require more current from the power plant than they use. In a sense, they are less efficient.

In the residential setting, this does not mean much for the consumer. But large commercial and industrial clients often pay fines to the power utility for having a low power factor. We have no idea whether or not McGill is in this situation, and whether or not this could have an impact on the fees the SSMU will pay to McGill.

If it does become an issue, the SSMU should consider purchasing CFLs with high power factors (a factor approaching 0.9).

Halogen lamps are actually a special breed of incandescent lighting. They are moderately more energy efficient than general service incandescents, but come nowhere close to fluorescent lighting. Furthermore, they last only 2000-3000 hours, while a CFL bulb lasts up to 10,000 hours. Halogens produce a good amount of heat, and have even been banned as fire hazards in some applications.

Shatner Total

Over 150 Halogens

Halogens are generally used to provide tightly focused spotlighting. This is useful in art galleries and cafés, among other spaces. It can also be very flattering, and so halogens are found in the Shatner building's cafés, lounges and bars, where people are paying close attention to each other. It might also be used to flatter the food, though in Shatner, we seem to use incandescent floodlights instead.

Halogens are quite fashionable in a late 90s sort of way. Unfortunately, the timing of our last major renovation means we have inherited a large number of halogen lamps. Fortunately, CFL design has advanced far enough that many halogen installations could be replaced by Compact Fluorescents. In the future, LEDs might do the trick as well.

The Rub Aye, the fact is that most of the halogen lamps installed in our spaces are not even very useful. For instance, we see halogens along the underside of the counters in the cafeteria. These are so useless that when we pointed out a few burnt out lights, cafeteria staff admitted that they didn't even know the installation existed!

We also see halogens in the SSMU Lounge, where they are installed in torchières on the wall. The goal of these installations is to provide a reflected, soft light. First of all, halogens are not very good for this effect. Secondly, the effect is so subdued as to be ornamental rather than functional. Since the SSMU Lounge is terribly underlit, we can only assume that the lights were *intended* to do more. All in all, it seems like a case of fashion over function. Fortunately, there are now CFLs small enough to do the a better job than halogen at a quarter of the energy cost.

BALLASTS

Electronic Ballasts can cost between 5$ and 50$, and dimming ballasts are no less than 30$. They last between 40,000 and 100,000 hours. Their efficiency ranges between 80 and 95 percent, translating into a drain of one to a dozen extra Watts (BC Hydro).

Ballasts and Lamp Failure

Fluorescent lamps last much longer than incandescents and use less energy to run. They are more complex to manufacture, however, and need to be recycled afterward. To ensure that a fluorescent lamp is really worth the extra inputs, it is crucial that the lamp serve its entire lifetime. If it burns-out prematurely, we are effectively wasting a whole lot of embodied energy—as much as if we had used an incandescent lamp all along, by some estimates.

The major problem is this: the shorter the time for which a ballasted lamp is normally ON, the more likely that the lamp will burn out (IEA 105). In other words, frequently turning a fluorescent light ON and OFF again will cut its life drastically short. Many Compact Fluorescents need to be ON for 10-15 minutes, while Linear Fluorescents might need to be ON for 3 hours at a time!

This will be a concern for us if we are putting fluorescent lights under greater Manual or Automatic Control. It is especially a problem in spaces such as washrooms and storerooms, where people are likely to switch OFF the light as they leave—we think that we are saving energy, but actually, we might be doing the very opposite!

Fortunately, Linear Fluorescents can be installed with Rapid-Start electronic ballasts, which will help mitigate this concern.

• **Rapid Start Ballasts** are the electronic ballast of choice for maximizing a fluorescent lamp's lifetime. They should be used for lamps that will be turned ON and OFF by automatic controls, or in locations where people are likely to switch lights frequently. Unfortunately, Rapid Start Ballasts suffer a bit in terms of efficiency. For this reason, they should be installed selectively.

• **Instant Start Ballasts** are the more efficient type of electronic ballast. However, they should not be used if lights are going to be turned ON for fewer than 3 Hours at a time.

NOTE: most lamps are designed to work with only one of these two types of ballast. Exceptionally, some Super T8s can operate in both Instant-Start and Rapid-Start ballasts (BC Hydro).

Magnetic Ballasts are not electronic, and so are often found in older installations, and especially with the less efficient T12 lamps. Magnetic ballasts operate at dramatically slower frequencies than electronic ballasts (60 Hz compared to 20,000 Hz), and so they can cause lamps to flicker. This flicker can strain the eyes and cause people to feel ill. Magnetic ballasts are also less efficient than electronic ballasts, consuming around 10% more energy (BC Hydro).

The only remaining place for magnetic ballasts is near radio-frequency sensitive equipment, such as in recording studios, with certain retail security systems (ex. book stores), and near extremely sensitive electronic equipment (ex. hospitals).

RECOMMEND: Canada's energy regulations effectively halted the manufacture of magnetic ballasts, ensuring that new renovations will use electronic ballasts. However, we recommend that the SSMU look into replacing current magnetic ballasts whenever possible, even if they do not plan to use the electronic ballasts' more advanced features.

Ballasts have Bells & Whistles

Electronic Ballasts have benefits beyond energy efficiency. Their microchips enable all sorts of sexy features too! What are we talking about? Well, for one thing, dimming controls!

Dimmable ballasts enable strategies such as automatic daylight dimming, and user-controlled task lighting—as discussed above. These ballasts can also automatically offset a lamp's natural lumen depreciation by overdriving the lamp as its life wears on. Finally, dimming can be used strategically to extend a lamp's life—instead of turning lights ON and OFF, risking early burn-out, lamps can initially be dimmed, perhaps turning OFF only if it is after-hours.

In the past, ballasts could not achieve a full range of dimming, instead dimming between 20% and 80%. A quick visit to Lutron, "the original dimmable ballast manufacturer," reveals that new dimming controls are available with higher resolutions. We can now dim from full strength down to 5 or 10 percent (and for real money, all the way down to 1/138th).

Luminaires

Outside of interrogation chambers (of which we discovered none) it is rare to see a bare, hanging light bulb. Instead, most lamps are installed inside luminaires, aka fixtures. Good luminaires distribute, diffuse and direct light in an efficient and glare-free fashion.

Selecting high quality and appropriate luminaires will be important for achieving our recommended lighting system—a design with low ambient lighting, controlled task lighting, and energy efficient lamps. Using inappropriate or low-quality luminaires will severely handicap our efforts.

For instance, if we replace an incandescent bulb with a CFL, but do not replace the luminaire, we might find that our space is now darker. A better, CFL appropriate luminaire would capture light emitted upward, reflect it around the bulb and down to where it can be useful—producing *10 times* the effective illumination as the incandescent luminaire.

In-ceiling luminaires for Linear Fluorescents (called 'troffers') are highly space efficient, and are the most common luminaires used by the SSMU. There are three grades of reflector installed in most troffer luminaires. The cheaper option, coated metal, harnesses from 60 to 80 percent of the lamp's light. A better option is anodized, polished aluminium, which harnesses at least 90 percent of the light. (And if SSMU wins the lottery, it might consider using silver film reflectors, which harness up to 96% of the emitted light). Choosing a luminaire with high reflectivity is a good way to insure our investment in energy efficient lamps.

NOTE: Recently, reflectors have been developed using material with a high reflectance and diffuse finish, harnessing up to 98 percent of the light and minimizing glare.

Of course, as reflectivity increases, so does the likelihood of glare. For this reason, troffers come with shielding. In most cases the SSMU uses semi-specular, clear plastic shielding. Some older plastics absorbed incredible amounts of light, but we feel that the SSMU's plastic shielding is okay. In the SSMU's more recently renovated spaces (the SSMU Office, the 4th Floor conference rooms), we find vertical baffling, which allows a pure light over the task area and diffuses light into the ambient zone.

Contrasting these new installations with older ones, reveals the other factors that luminaires affect. Aside from lumen efficacy, the luminaire also affects whether the emitted light is even or sharp, its harshness or softness, and the quality of colour rendering.

The hanging luminaire is another sort of fluorescent fixture, examples of which we can find in the McLennan–Redpath Libraries. These luminaires create a balance between light passing

directly downward onto the task plane, and light that passes upward, reflecting off of the ceiling to create a diffused, ambient glow. From what we have researched, such luminaires typically require high ceilings to function properly. However, with slimmer and slimmer linear fluorescents appearing, the SSMU might soon be able to install hanging luminaires in certain spaces. Due to the high quality of this light, we recommend looking at the Lev Bukhman Council Room, and any new conference / study spaces.

Solid State Lighting

LED lighting deserve a final note in this section. Light Emitting Diodes are the tiny lights we find on our stereos, computers and cellphones. High power versions are now frequently used in traffic lights, automobile headlights, concert lighting, and commercial signage. In the future, white light LEDs will be available for common household and commercial uses.

LED fanatics promise light so energy efficient that it is practically free. Plus, LEDs are non-toxic and supposedly recyclable too (446)! What the heck are we waiting for?

Well, this year Energy Star released a specification for solid state lighting (essentially LEDs). It provides for two categories of LED, the more ambitious of which "is intended to rival today's most efficient lighting systems using traditional light sources." These Category B guidelines are really intended as goals for the industry to strive toward. In the announcement, Energy Star states that it "believes a significant number of [LED] general illumination products will be able to achieve 70 lm/W luminaire efficacy within three years" of the guidelines coming into effect. This goal would put LEDs on par with today's highest performing fluorescent T8s within half a decade. The industry has stated its longer term goal of achieving 160 lm/W within a decade, which would be 50% more efficient than today's best linear fluorescents (434).

So it seems that LED will live up to the hype. But it will be three or four generations of students before we can see LEDs begin rivalling linear fluorescents as the mainstay of our general lighting needs.[3] Commercially available LEDs are already more efficient than incandescents and halogens, but LEDs remain far more expensive to purchase. For now, the SSMU should only expect to use LEDs for certain niche uses, notably signage, architectural accenting, and stage lighting.

What are appropriate uses for LED?

Architectural Lighting LEDs are extremely compact objects, producing a point light source, with strong directionality (442). They produce light in a broad range of temperatures, at a CRI as high as CFL, and can simulate 'natural' light without producing UV rays (444-45). LEDs are therefore very adept at producing architectural accents, and indoor environmental effects (ie. mood lighting).

While such applications may seem frivolous, energy-saving isn't everything in life. Our walk through the Shatner University Centre turned up dozens of purely aesthetic lighting installations, from lights under the cafeteria counters to those strange globe lights in Liquid Nutrition. Architectural lighting can help create a more functional, comfortable space for working, studying and living. We encourage the use of LEDs to make such improvements a little easier on the environment.

Signage While not yet commonly used, a majority of suppliers offer LED signage. Because LEDs are highly durable and long lived (443), their initially high cost will be recouped over their lifetime. Maintenance costs for outdoor or otherwise inaccessible signage are typically high, but can be avoided by using LEDs. Typical LEDs maintain peak performance for 50,000 hours, and only after 100,000 hours do manufacturers predict they will need to be replaced (442). LEDs also remain operational in cold temperatures, even down to –40°C (445), making them excellent for our Montreal weather.

Current trends in dynamic signage seem to be moving toward using LCD televisions. One only need walk through the Library, or even Tim Hortons to see examples. Signage using high-quality LEDs could be an interesting alternative to more resource intensive LCDs.

Stage Lighting shares many concerns with signage, so many of these benefits overlap. LED is an excellent technology because it can instantly turn OFF and ON. Unlike fluorescents, there is no warm up time, and the lifespan is not affected by rapid ON and OFF cycles. Fluorescents have been unable to take a strong role in stage lighting because of this shortcoming, and incandescents are the norm. For instance, Player's Theatre uses dozens of 750W incandescent behemoths to put on its shows in the Shatner University Centre.

LED stage lighting is produced using arrays of red, green and blue LEDs. A full spectrum of colours can therefore be produced by controlling the RGB output, just like a television or computer display. This means greater, more dynamic control without the need for gel screens. Plus, LEDs benefit from full linear dimming. And LEDs are also much cooler to the touch, which means a safer workplace for theatre participants.

RECOMMEND We recommend that the SSMU and Player's Theatre investigate having the theatre redesigned by an LED manufacturer as a demonstration space. With the exposure that comes from being one of McGill University's only theatre companies, the SSMU could promise a high profile renovation to the sponsor.

Exit Signage is a market dominated by LED lighting. Yet for some reason, the SSMU still uses incandescent bulbs. These 32W bulbs are operating, so they burn out every other month. Despite the small purchase cost of an incandescent bulb, our exit signs cost twice as much annually as an LED sign, because of the labour and purchases needed to constantly replace bulbs. Aside from saving the porters a major headache, LED exit signs are safer—they do not burn out, but fade out gradually. Conversely, incandescent exit signs burn out so frequently that they are not always functional in an emergency.

Instead of purchasing brand new LED exit signs, the SSMU could easily retrofit existing signs with LED kits on the market. LED exit signs use only 6W of electricity, and will save over 300$ in a ten year period, so they make sense in every way. As with any lighting technology, the SSMU must avoid cheap quality LEDs. More recent developments are producing brighter LEDs that maintain peak performance for longer. BCH recommends AlInGaP LEDs for red exit signs.

NOTE: LEDs are also great for closets, refrigerators, and for emergency lighting, because of their instant ON and OFF capability.

Moving Forward

Lighting may be the SSMU's greatest energy expenditure, but there are immense resources going toward developing low energy lighting. We now have access to both the products and the design expertise to make the SSMU's lighting the most sustainable on campus. Below, we detail just a few more issues that the SSMU must consider moving forward.

Landlord Issues

As explained in the Energy chapter, the SSMU's power bill is wrapped into the price for leasing the Shatner University Centre and the SSMU Office from McGill. Because of this, we do not know the exact size of the SSMU's power bill.

Our situation is an extreme version of the split-incentives relationship between landlord and tenant. Commonly in the tertiary sector, landlords maintain buildings while tenants pay all of the costs to use buildings. The landlord has no incentive to invest in energy efficient materials or capital products, if only to lower their tenant's energy bill (47). For the SSMU, McGill is both our power plant and

landlord—McGill has even less incentive to invest in our buildings' energy efficiency!

The SSMU must build an understanding with McGill that energy efficiencies in the Shatner University Centre will directly benefit both parties. The SSMU should emphasize McGill's commitments to the Quebec Sustainable Development Act, and the savings from lower power generation. At the same time, the SSMU should plan to make many upgrades independently. Because the most efficient lighting upgrades can last 20,000 hours or even 100,000 hours, the SSMU's short lease is a bit of a disincentive—some staff feel that it is too risky to invest in a building that we may lose within a few years. A stronger commitment from McGill, such as long-term lease, would empower the SSMU to independently undertake many important renovations.

Commercial Lighting

It is important that the SSMU secure commitment from its commercial tenants, the Food Vendors and Travel Cuts. We have seen that the Food Vendors especially like using lots of lighting that will flatter their products. Since the SSMU deals exclusively with chain restaurants, these spaces were likely designed by the franchise HQ using a set list of products common to all franchises. It is important that the SSMU negotiate in the initial contract to alter the design if it will make the space more energy efficient.

For instance, the SSMU should suggest high quality fluorescent lighting in place of halogen track lighting or incandescent floodlighting, the two current technologies of choice. Choosing fluorescents with extra high CRI will slightly reduce the energy efficiency, but will bring out the products' colours in a rich fashion, much like daylight does. In the future, high CRI LED lighting will be available as well.

The SSMU must also negotiate with Zoom Media to turn OFF the fluorescent backlighting on many of their larger ads. In fact, we might not even have a current obligation to keep the lights ON. This would allow us to simply flick a switch inside the ad, saving an annual 1,787 kWh for each large-sized ad.

Longterm Infrastructure Targets

- Eliminate inefficient lamps (T12, halophosphor T8s, halogens, incandescents). Try for minimum efficiency of 90 lm/W
- Eliminate high-loss ballasts (fluorescents) and transformers (halogens). Try for minimum 70% output ratios
- Ensure that lights are in appropriate and well designed luminaires
- Install appropriate lighting controls (whether manual or automatic) with motion sensors and daylight sensors when applicable
- Install task lighting where it is needed and lower the ambient illumination, rather than casting a bright, uniform illumination
- Plan bold renovations to harness the abundant daylight striking the Centre's South and West sides.

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[1] Just joking! Gerts doesn't get any traffic :(

[2] At the same time, we might consider our offices to be underlit, especially compared to retail spaces just down the hall. Retail spaces such as the Food Vendors in the Shatner University Centre generally require less visual acuity—cashiers and customers are not usually conducting detailed tasks or fine reading—but they are often twice as bright as many offices.

[3] Smaller LEDs are generally more efficient than larger ones (436), so it will be a few years after the industry hits its target that high power products will actually be able to replace linear fluorescents.


Computers & I.T.

Computers

Why Computers?

When people talk about making the University's operations more sustainable, they inevitably bring up using computer technologies to help make things more efficient. Indeed, Information Technology is responsible for many of the fancy climate and lighting controls available in the greenest of green buildings. IT helps us share our experience and insight into sustainability, as you might know first-hand if you are reading this as a downloaded PDF. IT reduces society's need for transportation and makes manufacturing and markets more efficient.

Nevertheless, computers are energy intensive inventions, from cradle to grave. Of course, anyone paying the power bills should be concerned with finding IT equipment that is more efficient to use. But as a student union focusing on sustainability, we must also concern ourselves with the environmental costs of manufacturing and disposing of our computers and other IT.

This section explains some of our computers' environmental impacts, and recommends steps to manage these impacts. We inventory the SSMU's current IT equipment and look into whether or not the SSMU should pursue alternative technologies.

Do We Need More Or Fewer Computers?

When interviewing the SSMU Executives and others, we were struck by the strong association in people's minds between *Sustainability* and *Paper*. Nearly everyone's top priorities focused on reducing paper waste (especially notable with the VP Finance and Operations, whose portfolio is actually pertinent to a much broader series of impacts). When asked for practical ways to reduce paper, many expressed regret that the SSMU had not done more to go digital. From administrative forms to advertising and outreach to minutes and agendas, everything must happen online!

So we asked ourselves: are computers really all that more efficient than paper? Are the environmental impacts less? Afterall, computers are laden with toxic substances and require constant electricity. Paper comes from a (theoretically) renewable resource, is ultra-portable, and doesn't need to be plugged-in.

For this assessment, we decided to leave aside trickier questions of toxicity and renewability, and simply investigate the energy efficiency of computers vs. paper. [1]

Paper vs. Digital Journals A study published by David Gard and Gregory Keoleian uses a life-cycle analysis to show academic libraries the costs and benefits of digital journals as compared to traditional, paper journals. This study cannot directly answer our question, but provides a useful comparison of key features.[2]

Gard & Keoleian's study shows that the infrastructure costs of both systems are high. On the one hand, it is costly to produce, transport and store paper documents. On the other hand, it takes constant power and maintenance to run servers and computers.

In the end, they found that the difference between the two systems comes down to the number of times an article is read. Paper is quite costly to manufacture, and they found that the initial impact of paper journals are in fact greater than the impact of digital journals. But a paper document can be read more than once, thousands of times—each time, with no new environmental impact. A digital document behaves differently. Every time it is read, computers are using power and the digital document's environmental impacts increase.

So, for documents that are read a few times, digital is best. For documents that are read over and over again, paper is better.

NOTE: The other benefit to digital documents is remote access. For the SSMU we do not consider this relevant, since most documents are only used in the office anyway.

We recommend that the SSMU use the following guidelines based on the above findings:

Recordkeeping On the whole, digitization seems to be a good strategy for much of the administrative paperwork done by the SSMU (documents which are used once or twice and never looked at again—the equivalent to low-access journal articles). The energy burden could be further reduced if such documents were kept on storage devices rather than networked servers. This would be more secure as well, since it would be less remotely accessible.[3]

Minutes & Agendas If many people are reading the same digital document projected onto a screen, then even if it is only 'used' once, its relative energy burden decreases exponentially. We encourage the SSMU Council to adopt this approach for its meetings.

Advertising On the other hand, these findings do not support the idea that advertising should be moved online. While there are merits to Facebook and other online ads—such as the ability to more directly engage students, and incorporating links to other resources—reduced environmental impact is proven not to be valid. It is more resource efficient to print a good poster that will be seen by dozens of people, rather than contacting each of those people individually online.[4]

References Documents which will be used over and over again are great candidates for printing. Resources and guides fall into this category. We suggest that frequently used and infrequently altered documents be printed and kept in the SSMU Front desk area, with copies for office staff as well as the public. While digital documents are remotely accessible, paper is actually the more mobile medium. Resource printed on paper are ideal for sharing, fostering collaboration, and passing knowledge from student to student.

Reduce IT's Impact

Offices housed in the Shatner University Centre include the SSMU Office, SSMU Daycare, the Legal Aid Clinic, Travel Cuts, three media organisations (TV McGill, McGill Daily, McGill Tribune), and dozens of offices for clubs & services. Most offices have one computer, if not many more. We have catalogued every computer we could find active in the building, as well as noting when offices have out of commission equipment in the corner.

Of all the offices, more than 30 contain IT equipment. There are over 100 active computers, two thirds of which use flat panel displays. There are 7 servers in three offices, and 33 printers (including copiers) throughout the building. Based on average power consumption by item type, we calculate that all of this IT equipment uses 1,480 kWh during an average week.[5]

Intensive IT usage is as much a requirement for today's SSMU as it is for any corporation, or the average McGill student, for that matter. We do not expect the SSMU to stop using computers, or to use them less. To reduce our 1,500 kWh per week of IT power consumption, the SSMU need only use its IT more efficiently. First and foremost, the SSMU must eliminate the time our computers spend idle—our standby power consumption.

APPENDIX: IT POWER CONSUMPTION SPREADSHEET

This spreadsheet catalogues every computer we could find active in the building, and calculates their cumulative power consumption for a single week.

We regard the data used to calculate power consumption to be reasonably accurate. We used the power ratings of actual equipment in use to find an average, and applied the average power rating uniformly to each category. To find the amount of time that equipment is in use, we estimated usage for each office, and applied our estimate uniformly to the equipment in each office. For most offices, we assumed that equipment is in use only during the office's open hours, which we based on interviews and experience.

Of course, many people probably leave their computers on overnight—this will not be reflected in the spreadsheet. However, we conducted our walkthrough in June and July, and we noticed that many club offices had computers that were still left on—*months after the end of school*. For such offices, we indicated that the IT equipment is on for the full 168 hours per week. We can only hope that our spreadsheet overestimates for these offices.

Moving Forward We recommend that the SSMU refine the data in our spreadsheet in the following ways. The SSMU should survey the computer use habits of our office-workers and students, to establish a) whether or not we are turning OFF our computers when we leave the office b) how many hours per week the office is in use.

We also suggest that the SSMU establish more concretely whether or not the computers in clubs & services' offices have energy management features in place. It could be that computers we thought were left ON were in fact in some sort of high-powered standby mode. Finally, for a better estimate of our IT energy consumption, the SSMU should assess the standby power for computers and monitors. The spreadsheet already assesses such data for printers and copiers.

Targeting Standby Power

When left unmanaged, IT can end up draining enormous amounts of electricity. On an individual basis, most IT equipment can be very efficient. But there are so many appliances, large and small—and much of our IT equipment remains active 24 hours a day—that IT equipment will always be a significant concern.

The 'standby power' ie. energy consumed while an appliance is not in use, and might even appear to be OFF, is particularly concerning. According to an Australian study of government agencies, equipment in standby mode produced between 4 and 8 percent of the average office's total electricity expenditure. The International Energy Agency claims that standby energy amounts to 5 or 10 percent of all residential energy expenditure. At some Australian sites, however, standby power ranged as high as 20 or 30 percent! Let's hope that we are not so far above the average ourselves.

There are several ways that the SSMU can address the burden of our standby power:

Powerbars should be installed at the desk of each individual in the office.

Modern computers and monitors, and much of our other IT equipment, cannot be truly powered down. When we think that something is 'shut down' or switched OFF, it is actually in a low-power sleep mode. While any one device might use no more than a handful of watts in sleep, this accumulates into a huge problem.

The most practical answer is to plug our computers, monitors, printers and other appliances into a powerbar. If a powerbar is turned OFF, then power is truly severed from the appliance. If SSMU Office staff turned OFF their powerbars before heading home, we would save 16 hours worth of standby power every day.

Photocopiers should be turned OFF after hours.

Xerography works by burning toner onto the surface of a paper sheet. Most copiers use halogen lamps to heat up the drum that presses the toner and paper together. Heating up this drum can take a while, which is why most copiers try to keep the drum hot as long as possible.

This explains why most copiers have ridiculously high standby power ratings. Of all office equipment surveyed by the Australian government study on standby power, photocopiers were found to consume the most per item. They found that copiers used an average of 475 kWh / year in standby power (almost 55 W at all times) (Figure 1).

The SSMU Office's photocopier is much worse than that. Although less than 5 years old, it has laughable power management features. It is rated for 1257 W while printing, which is average. But its standby mode ranges between 225 W and 285 W (this is the mode where it remains warmed-up and ready to print). Finally, like most photocopiers it does not turn OFF completely, but enters a Sleep mode requiring 75W.

By contrast, an Energy Star rated photocopier uses only 5 to 20 W in sleep mode. Energy Star photocopiers also enter Sleep mode automatically after 30 to 90 minutes of inactivity, depending on the user's preference. (NRCan).

The SSMU Office's photocopier still works well, so we do not recommend replacing it with an energy efficient copier just yet. Instead, we recommend turning the copier OFF during the after hours. As it is rare for an office to use more than one copier, we recommend that the Office Manager arrange for the photocopier to be turned OFF at a reasonable time each night. This could perhaps be achieved with a timer. Note also that this means actually cutting power to the machine at the outlet by using a power bar.

NOTE: Before setting any large appliance on a timer, it is a good idea to first contact the vendor. Some machines—refrigerated vending machines come to mind—cannot be turned OFF at just any old time, or they will wear out too quickly. The vendor should let the SSMU know whether the photocopier can be turned OFF using a simple timer, or not.

Power Saving Features on computers and appliances must be used.

All computers, whether Windows or Macintosh, have built-in power management features. In more recent computers, this could mean actual optimization of disk and processor use. At a minimum, this means scheduling the computer to enter Sleep (Mac) and Standby or Hibernate (Windows) after an interval of inactivity. Computers could also be scheduled to Shut Down automatically at night.[6]

The problem with all of these features, is that they are often not enabled! While we encourage everyone to take a few minutes to familiarize themselves with their own computer's power management features, the SSMU needs a more systemic approach. The SSMU's IT Director informed us that these features could be enabled uniformly across in all of the SSMU's computers (including clubs & services). We recommend that the SSMU do precisely that.

Many laser printers and photocopiers also have energy management features. Basically, the time that a printer spends warmed-up prior to entering a low-power sleep can be modulated. The interval can range as high as 90 or 120 minutes, so we recommend that offices ensure printers are set for something closer to 15 minutes.

On the other hand, many of the SSMU's laser printers are built by Hewlett-Packard. hp claims that their printers have an instant-ON capability which enables them to use negligible standby power. This claim is reflected in the power ratings used for our spreadsheet.

To us, this reinforces the point that we must start by ascertaining the on-the-ground reality as the basis for prioritizing improvements.

Depending on past purchases, different offices should target different appliances to achieve the most rapid energy savings.

Infrequently Used Equipment must be unplugged.

Sometimes IT equipment that is rarely used, or maybe never used, is left plugged-in. This equipment could be needlessly drawing standby power. Unplug it!

Other Reduction Targets

Night-time Routines It is common practice in IT to have servers and office computers run backup and maintenance routines in the middle of the night. This could mean leaving office computers running 24/7 or it could mean an automatic wakeup call at 3 AM. In either case, Natural Resources Canada recommends against night-time routines. Modern operating systems are more than capable of running such tasks in the daytime, when computers would already be running.

Network File Storage Servers use a lot of energy—they are power rated three or four times higher than a desktop computer. That's just the power needed to run the server, though. Commercial grade servers generate so much heat that they need to be kept in climate controlled facilities—that usually means air conditioning is involved. And servers are left running 24 hours a day, so they may be accessed at any time.

We know from personal experience that SSMU Executives work hard. Often this means staying in the office until 5 AM. But really, how often does someone need to access the file server at 5 in the morning? The SSMU should look into options for minimizing its overnight file server use. If everyone knew that their files could not be backed up between 10 PM and 8 AM, would the world end? No, it would not.[7]

Natural Resources Canada actually recommends using removable hard disk storage instead of network storage, if possible. External drives can be turned OFF along with the rest of the computer, and if theft is a concern, they can be security locked to the desk.

If networked file storage is still desired (because of the greater ability to share files among co-workers and access files remotely) the more efficient option could be purchasing online storage. In a commercial file storage situation, servers are used more efficiently—by sharing disk space among different clients, and by using higher quality equipment. Instead of air conditioning, large facilities can use heat recovery systems, which retrieve wasted energy in the server room and uses it to heat the hot water tank. Some companies are further geared toward environmentally-minded clients, investing in solar and wind energy to power the servers.

Contrast such options against our current situation: several of the SSMU's servers are kept in the sub-basement inside a walk-in refrigerator. A WALK-IN REFRIGERATOR! Even if the refrigerator was equipped with a heat-recovery system, it would still be overkill for our server needs.

CLUBS & SERVICES' IT IMPACT

Clubs and services are fundamental to the SSMU, and are necessarily factored into this assessment of the SSMU's sustainability. At the same time, clubs and services are more or less autonomous actors, and there is little that can be done to increase oversight from the SSMU Executive. The SSMU must therefore encourage clubs and services to take on the challenge of sustainability for themselves.

Clubs and services can meet this challenge by following many of the same guidelines that we have set before the SSMU. For instance, they can use powerbars to ensure their standby power is minimised, and they must ensure that power management features are enabled on their computers.

We also present the SSMU with the following considerations, exclusively concerning clubs and services:

Clubs' Servers Several clubs and services, and tenants such as the Legal Aid clinic and the McGill Daily, have servers in their offices. The clubs generally use a desktop computer, rather than a commercial-grade server.

We know that they are serving files or databases, because they are often covered in post-it notes, shouting "DON'T TURN OFF—EVER!" Obviously, these signs caused us no end of tears. A desktop computer, left ON for an entire year, could consume up to 1000 kWh. That's equivalent to running two full-size refrigerators!

We encourage these groups to consider online storage. It seems that these clubs are using their servers to hold databases of membership lists, equipment rentals, and financial transactions. Free, online services can store this information in spreadsheets, and can do so more reliably and securely. Google Docs & Spreadsheet is the leading option, but there are quality alternatives such as Think Free Online or Zoho.

To encourage such a transition, we recommend that the VP Clubs & Services create incentives, perhaps tied to the office space allocation agreement.

Used IT A little less than half of these offices also contained unused, out of commission equipment that could be recycled or given a new life elsewhere. In clubs' offices, used equipment is particularly worrisome—clubs will discard huge quantities upon vacating their offices, and we do not want toxic IT equipment to wind up in the landfill.

Printers We found that two thirds of offices with computers also had printers. Since these printers belonged to the respective clubs and services, we would have expected most of them to be inexpensive, low-power inkjet printers. In fact, the vast majority were more expensive, energy-intensive laser printers.

If all of these printers were plugged into a powerbar, along with the computer and monitor, and the powerbar were turned OFF at night, all of these laser printers would not present much of an extra burden. If the SSMU does not trust clubs and services to do this (many clubs already leave their lights ON overnight), the SSMU might consider networking the fourth floor computers to a few, high quality laser printers. That would easily eliminate the standby power of 15 laser printers.

Inspiration & Motivation Office leaders might find that practical changes, while cheaper and often more effective, are harder to institute. Afterall, if we purchase energy efficient equipment, we can all feel good about our environmentalism, without making any personal sacrifice or inconvenience. Practical changes, therefore, must be accompanied by ample communication with office members.

Leaders can inspire change by showing a good example. Demonstrating good environmental practices show colleagues that change is manageable and easy. Inspiring leaders also involve their colleagues in the excitement of collective transformation. The key is not to impose change, but to foster a system of collaborative management. Empowering staff is crucial to successful implementation, and also to the longterm stability of any practical changes.

The danger is that staff dissatisfied with change may disable the process, from turning OFF timers, blocking automatic sensors, or emptying trays of reused paper. This would not be done out of malice, but out of misunderstanding. Thus it is important that staff understand what is changing and are involved in the implementation.

Natural Resources Canada elaborates on this issue:

"Strong staff commitment and participation are essential to any efforts to reduce energy consumption across the office. Consider launching an awareness and promotional effort to make staff aware of the issues, opportunities and actions needed to achieve energy savings. A well-organized initiative with a credible message and management buy-in stands a good chance of being successful. Keep it simple, perhaps beginning with only one or two initiatives. It could be as basic as designating an individual in each work unit to shut off the photocopier at day's end." (NRCan)

They also recommend giving staff and colleagues incentives to stick with the changes. This can be as elaborate as organising a friendly competition, such as the Environmental Residence Council's annual inter-residences energy reduction competition. Or it can be as simple as bringing a box of organic goodies to the office—and letting people know it's because they've been so awesome at greening the office.

The SSMU Office could run into trouble with this motivation issue. While people are very friendly, the office rarely meets all together. There are two office parties, at Christmas and at the end of the year. There are also monthly birthday breaks, and the frontdesk staff sometimes meet with the Office Manager. Figuring out the best way to involve all of the staff and students together, could be an issue for the General Manager to think about.

Reuse IT

Having taken steps to reduce the impacts of our IT equipment, perhaps even purchasing less IT equipment than we currently do, we will still need to procure new IT equipment. At this point, the SSMU will have two principal options: to follow the principle of 'reuse' by purchasing used equipment, or to purchase the newest, greenest equipment available. There are good reasons to pursue either option.

To help the SSMU make its decisions, we explore the pros and cons of different products below. But first, we must explain the paramount importance of the used computer market.

Why Reuse IT equipment?

Lifecycle analysis of desktop computers show that computers are likely the most energy intensive appliance in any home or office, aside from furnaces and air conditioners (Williams, 84). In 2004, Eric Williams of the United Nations University published an indepth analysis of the average computer system's environmental impacts, from cradle to grave. He found that the annual life cycle energy use for a computer with a three year lifespan is around 2,900 MJ. To put that into perspective, a refrigerator's annual life cycle cost is only 2,000 MJ (Williams 2004, 83).

"Researchers found that manufacturing one desktop computer and 17-inch CRT monitor uses at least 240 kg of fossil fuels, 22 kg of chemicals and 1,500 kg of water – a total of 1.8 tonnes of materials" (http://update.unu.edu/archive/issue31_5.htm). Not only does a computer use enormous amounts of raw resources, but all of this manufacturing necessarily creates a great deal of greenhouse gas emissions. Williams calculates that computers create 12 times their weight in CO2 equivalent GHG emissions (80). This is orders of magnitude greater than most other manufactured goods, including automobiles and refrigerators (1–2 times their weight).[8]

Williams' Study: What does it mean for the SSMU?

The methodologies of all scientific studies must be scrutinized, to establish exactly what the study means for our specific situation. Looking at Williams' study, we should note the following qualifying factors:

1. Williams claims that computers emit twelve times their weight in greenhouse gases. This calculation is based on a worldwide

average of 0.32 kg of fossil fuels (coal, oil and gas) burned per kWh of energy. At McGill, our mix is predominantly hydroelectricity and natural gas, which means we produce much lower carbon emissions.

2. Williams bases his calculation for the computer's use phase on a three hour day. At the SSMU, we are dealing with a range of use cycles, from eight hours per day, to five hours a week, to 24/7. In Williams study, the use phase contributes 20% of the energy consumption. This would be higher in the SSMU's case.
3. Williams study is based on CRT monitor use. At the SSMU, we use a mix of CRT and more efficient LCD monitors (72 LCD vs. 34 CRT). We calculate that LCD monitors probably reduce the system's impact by 15%.

Williams suggests the reason computers are such energy hogs is that clean-rooms require extremely high-grade chemicals and energy-intensive manufacturing processes. Unfortunately, all of the energy invested in the finished microchips is lost during e-waste recycling (when electronics are smashed apart to recover the raw materials). Because of this loss, Williams explains that "the energy savings potential of reselling or upgrading is some 5–20 times greater than recycling" (UNU Update).

The SSMU Re-Uses...

The SSMU has over 100 computers in various states of disassembly and reuse in the Sub-basement. The IT Director told us that McGill units, especially the McGill Libraries, like to donate their used equipment to the SSMU. At its current pace, that means an influx of Libraries' computers every two to three years! The SSMU puts working computers to use in clubs & services' offices—where only SSMU desktop computers are allowed—and in the SSMU Office and lounges. The IT Director scavenges parts from donated computers that are too old or broken.

We commend the IT Director for his initiative. It shows that cost-saving and reuse often go hand-in-hand, and that decision-makers should not always associate sustainability with added expense.

We recommend that the SSMU continue to maximize use of second-hand equipment, and to continue accepting equipment from McGill departments. That said, the IT Director should prioritize bringing energy-efficient equipment online. This could mean asking donors for Energy Star products, but it's always best to know the actual power ratings, since Energy Star is constantly raising the bar on newer products (Energy Star guidelines are currently at version 4.0, which means that some of our older computers are Energy Star, but use more energy than newer computers).

...And Recycles. But Do Students?

It is crucial that unused electronics are promptly sold to the used-product market, if we truly want our old computers to find new homes (nobody wants to buy an outdated computer, no matter how cheap).

At the same time, students face the pressure to purchase a lot of electronics, from laptops and mobile phones to iPods and Nintendos. Today's SSMU Executives even carry Blackberries! Social questions aside, the fact that students have so many electronics poses a big challenge to the environment. Even if most students tried, they would not be able to find homes for all of their old electronics.

Students tend not to be aware that electronics are toxic, and must be properly recycled. The UN estimates that 50 million tonnes of e-waste are generated annually, of which 5.6 million computers come from Canadians (freegeekvancouver.org). Most of these electronics are not recycled, and instead pollute landfills at home and abroad.

Students in the know still face the challenge of finding a drop-off location. Without a car, and without good knowledge of the Montreal environs, it is unlikely that many students will lug their used electronics all the way out to an Écocentre for recycling.[9]

Re-SSMUsed Computers [10]

We urge the SSMU to take a leadership role on the issue of used computers, by starting an Electronics Donation Drive. This will ensure that the toxic impact of McGill students' electronics is contained.

We would expect such a programme to start off slowly, growing in complexity only with time and success.[11] While initially a system that helps students avoid releasing toxic waste, our ultimate goal is a system that encourages students to take responsibility for minimizing the resource burden of their IT needs.

In its first phase, computers that are still useful could be handed over to a charitable organisation, such as Green Solutions North America, that re-donates equipment to schools and NGOs. Older or broken equipment destined for recycling could be collected by McGill, as the University already collects e-waste from its own units.

In its second phase, we hope this programme will become a computer swapping service (students swap products that they don't need for things they do) or a computer re-sale service. Computers donated to the SSMU by McGill, but which the SSMU does not require, could also be contributed to the service.

Now, some critical students might be wary of any attempt to recycle electronics. E-waste is often shipped away from Europe and North America to South Asia, East Asia, and East Africa. Once there, proper recycling facilities are non-existent, and the e-waste poisons workers and villagers. We would be better to keep our e-waste stockpiled at home than to contribute to such a situation.

Fortunately, McGill uses a facility right here on the island of Montreal, where processing is completed in-house (Kathleen Ng, McGill's Environmental Officer 2007). As a putative unit of McGill University, we feel that the SSMU has the right to arrange for students' e-waste to be picked up for recycle by McGill. [12]

Upgrading IT

Given the caution against disposing of IT equipment prior to its end-of-life, what are we to do with functional but energy-intensive equipment that could be replaced by today's energy efficient options? The decision to upgrade must be made with consideration to the specific products in question.

Tablets and Laptops Several SSMU Executives suggested that they could eliminate their paper use by purchasing dedicated SSMU laptops or tablets. This would allow them to keep all of their documents and emails digital, and to take digital notes in meetings.

We recommend against this. Portable computers do have better power consumption than desktop computers, but the cost of manufacturing miniaturized components contributes to extra high life cycle energy costs. Portable computers are more fragile, and are in fact only designed to last for two years. Because of their size, they cannot be upgraded, which means the entire computer must be disposed of, no matter how many components continue to function.

Portable computers do have some obvious virtues. They facilitate collaboration, good recordkeeping, and allow people to work on the go. But as far as their environmental impact goes, they do not compare to more adaptable, durable desktop computers. And as elaborated in the Waste Management chapter, computers only 'save' paper if they are used for many, many years.

That said, the SSMU will undoubtedly continue to purchase portable computers. What should the SSMU look for?

A year ago, the only really environmentally friendly portable computer was the OLPC (One Laptop Per Child) XO. This computer is a learning tool designed for children in remote, low-

infrastructure areas. It is therefore, extremely durable and energy-efficient. It is designed to last at least 5 years, the battery is efficient enough to be be hand charged, and it is completely recyclable and non-toxic. The XO is available to Canadians through a 'Give One Get One' program, allowing enthusiasts to support a child's education while owning an XO.

While OLPC is an incredible initiative, with an fantastic product, it is not designed for office use, and its kids-friendly design would make SSMU Executives the laughing stock of campus. Fortunately, the OLPC ushered in a generation of 'ultra portable' laptops from traditional manufacturers that offer energy efficiency and other environmental benefits. The best of these are certified EPEAT Gold (www.epeat.net). Such products are Energy Star and RoHS compliant, and must further reduce harmful materials while designing for easy upgrades and recyclability.

EPEAT Gold portable computers are not on the same level as the OLPC XO—they prioritize energy efficiency over deeper environmental and social issues. But it is the best place to start looking for a new portable computer. We recommend the SSMU prioritize portables that are upgradeable, non-toxic, include a recycling take-back programme, and have good resale value.[13]

LCD vs. CRT Monitors In the Shatner University Centre, we are currently using twice as many flatscreen LCD displays as older CRT monitors. LCD displays are easier on the eyes, allowing for more computer use without health stress. They are also much more energy efficient. So the question is, should we keep using the older CRT monitors, or replace them prematurely?

While still well functioning, they require more power. We calculate that a single LCD display is 30–60% more efficient. This will create considerable power savings, especially considering that newer displays have better power management functions that minimize standby power.

But what about the whole lifetime costs of a new LCD—are they low enough that manufacturing an LCD display will have less impact than continuing to use our older CRT monitors?

There are reasons to worry about LCD manufacture. An EPA study compares LCD manufacture to semiconductor chip manufacture, requiring energy-intensive clean rooms and bunny suits. Based on Eric Williams study of computer chip life-cycle energy, this suggests that LCD displays are heavy energy users in the manufacturing stage.

This summer we also received the first official report from scientists worried about Nitrogen trifluoride (NF3), a greenhouse gas released during LCD manufacture. This synthetic chemical is not tracked by Kyoto and other regimes because prior to the rise of flat-panel displays, there was no significant supply of NF3. In 2008, however, the equivalent to 67,000,000 tonnes of NF3 was produced—and Prather & Hsu estimate that 2-3% of that escaped into the atmosphere.

Keeping these concerns in mind, we found data suggesting that LCD displays could require as little as 15% of the energy over its lifetime, as that needed for a CRT monitor's lifetime. The same report claims that CRT monitors actually release more mercury than LCD displays. Only LCD displays actually contain mercury (in the fluorescent back-lights), but mercury is also released during power generation. CRTs use so much more electricity in both the manufacture and use phases, that it seems LCD displays are a clear winner.

We recommend that the SSMU phase out CRT monitors as soon as possible, prioritizing replacement with re-used LCD displays.

Laser vs. Inkjet Printers[14] In the Shatner University Centre, we predominantly use laser printers. These produce crisp, black & white documents at a low cost per page, but high capital cost. Inkjet printers are cheaper alternatives, producing colour documents with a

slightly less crisp look. Are Inkjet printers also better for the environment?

The SSMU's inkjet printers require far less power to print than the SSMU's laser printers, between 10 and 50 percent of the power depending on the products in question. Of course, printers spend relatively little time printing and most of their time idle. There is unlikely to be any difference in sleep or standby power consumption between an Energy Star laser and inkjet printers. Hot-fuser laser printers, though, use more energy in standby and stay warmed up longer.

The different printing methods impact whether or not the printed paper can be recycled. Recycling facilities must 'de-ink' their paper stock before it can be re-manufactured into 100% post-consumer recycled paper or even newsprint. Photocopied paper is the easiest to de-ink, because the toner sits on the surface of the paper without staining the fibres. Laser printers are often a little more burned-in, making laser printed paper more difficult to de-ink. Unfortunately, inkjet inks are generally not water-soluble, making inkjet printed paper extremely difficult to de-ink (44-45). This could mean that inkjet printed paper is simply trashed at the recycling facility, although we do not know exactly what happens to it.

Both inkjet and laser cartridges are recyclable and refillable. With laser or photocopiers, only 10% of the shipped toner does not make it onto paper. The industry takes returned cartridges and reuses this toner in 're-manufactured' toner cartridges. The SSMU currently does recycle its toner cartridges through McGill. We recommend that the SSMU go a step further and purchase re-manufactured toner, which is 30 to 50 percent cheaper in any case.

While toner cartridges last for thousands of copies, inkjet cartridges only last for a few hundred copies. So while inkjet cartridges might cost less, their cost is more per copy. Furthermore, given the issues with de-inkability, we do not feel that inkjet is an environmentally friendly technology, despite its better energy efficiency.

We recommend the SSMU continue to invest in laser printers.

Reduce Purchases Finally, we only ask that the SSMU remember to purchase and use IT equipment only if it is necessary. It is reasonable for everyone to have their own computer, but does everyone in the office also need a Blackberry? Does any staff need a personal laser printer, when there is a high-quality photocopier just outside their door? If we can easily do without an electronic gadget or appliance, then environmental considerations suggest that we really should do without.

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[1] Interested readers should check out the paper calculator's results, which analyse emissions of SO2, NOx, particulates and air pollutants, VOCs, sulphur, suspended solids and absorbable organic halogens. We did not venture into quantifying the toxicity of computers, but many studies are available, especially concerning toxic dumping in Guiyu, China.

[2] The study first establishes the fixed costs of producing a single reading of a paper journal article and of a digital journal article (12 pages). They found that the paper article had an energy burden 2.5X greater than the digital article.

The paper document, however, can be read and re-read. A digital document is essentially 'reproduced' on each reading. In other words, the paper document's fixed costs are re-distributed over its entire lifetime of use. Conversely, the digital document is a mere may-fly, lives once and disappears. Thus, after 1000 readings, the paper article is actually 6.7X more efficient than a digital article.

[3] Of course, they must be physically secured. Otherwise, some unscrupulous person could walk off with years of SSMU data.

[4] It would be even better for the environment if those posters were printed on reused paper, and if the posters are recycled after the event finishes.

[5] 1500 kWh is the equivalent to running three refrigerators for an entire year.

[6] Only in case someone forgets to turn off their powerbar, of course.

[7] There are several other servers in the Shatner University Centre, owned by groups such as Legal Aid and the McGill Daily. The SSMU could work with their owners to have them shutdown overnight too, if possible.

[8] More than a quarter of this impact comes directly from semi-conductor chip manufacture. This means that pretty much any electronic device will have a GHG emissions impact far greater than its small size belies.

[9] Of course, if anyone does want to find their local Écocentre, search ville.montreal.qc.ca to find the coordinates. The closest Écocentres are near the intersections of Rosemont & Papineau, Côte-des-neiges & Jean-Talon, and in the Sud-Ouest across the Lachine Canal from the St. Ambroise brewery.

[10] All credit for the "ReSSMUsed" label must be given to Marcelle Kosman, who originally coined "ReSSMUsed Bikes."

[11] This programme could not be left in the hands of the already over-burdened IT Director, so a student Coordinator would need to be hired.

[12] This year, the University was considering using Éco-centre Côte-des-Neiges, and conducted a field inspection to ensure that working conditions were good. While inconclusive, the SSMU could always doublecheck before contacting McGill.

[13] On the other hand, we would love it if our Executives had the guts to bring an OLPC to their next meeting with Deputy Provost Student Life and Learning, Morton Mendelson (if only to see the look on his face).

[14] This question could me rendered moot, based on an LCA by hp from the mid-90s. It councludes the vast majority of an inkjet printer's environmental impact comes from paper production. The LCA chose Natural Resource Depletion, Global Warming Potential, Acidication Potential, and Nutrification Potential as its four barometers. Producing an inkjet cartridge caused on average 5% of the total impacts, while paper production causes almost 90% of the impacts. The energy-use impact ranged between 7–15% (Pollock, Figure 5). It seems, therefore, that reducing paper consumption is far more important than worrying about whether or not we should phase out inkjet printers in favour of an alternative technology. (Pollock and Coulon)


Paper
&
Purchasing

Paper & Purchasing

Why Paper?

It is important to discuss the SSMU's paper consumption practices. As a university, McGill consumes over 75 million sheets of paper, or 9,000 trees[1] annually.[2] The SSMU and its membership undoubtedly make up a considerable portion of this number. Anyone who has had contact with the the SSMU Office will be familiar with the immense paper trail that the office leaves. Many executives as well as staff members identify paper consumption in the office as quite significant in the organization's overall environmental profile. Many individuals made suggestions on where they could see reductions; these suggestions were taken into consideration as we drafted recommendations for the SSMU.

Our Prodigious Paper Trail

It is not unreasonable to describe the SSMU Office as bureaucratic; many of the transactions—from room booking to funding to accounting to agendas—need to go through a series of approvals and of applications. Out of habit, or out of an assumption that paper trails produce accountability, the SSMU has continued to use and develop paper-based records in many of their departments.

According to the Administrative Assistant's records, the SSMU Office photocopier churned out almost 100,000 copies in the 2007-08 year. This number only includes the sheets photocopied by each department on the office copier; it does not take into account printing from any of the laser printers, paper that was photocopied off campus (at Copie Nova, Katasoho, etc.), the consumption of clubs and services, posters printing, agenda printing, etc. The total paper-product consumption of the SSMU likely exceeds the 100,000 mark per annum.

Efforts to more accurately gauge the SSMU's paper trail as an organization are difficult as many of the SSMU's clubs and services act autonomously and do not submit records of their printing and paper use practices. Most of the following discussion will mostly focus on the SSMU Office but some of it will be applicable on a larger scale to clubs, services and other affiliates.

SSMU accounting is the most paper-intensive department by a considerable margin, accounting for nearly 17% of paper use in the SSMU Office. Once again, this total does not include the yellow, pink or green cheque requisition forms that are required for each purchase made by a club or service. Although all the accounting is done on computer, many transactions are printed out on paper, generally one-sided. One of the reasons stipulated was that the SSMU keeps paper copies of all their accounting for several years, thus a copy of each transaction is required. Another reason for printing was that many documents required the signature of a signing officer or accountant. The VP Finance and Operations states that his office could go completely paperless with the exception of receipts for purchases. His office currently accounts for another 4.3% of paper (in addition to that of the accounting department).

Echoing the sentiments expressed in the Computers & IT chapter, we recommend that accounting documents are kept in a digital form using external hard drives. The security of an external hard drive is comparable to that of paper if the hardware is locked (both physically and with a password). This reduces the amount of paper that is consumed annually and also avoids the energetic trade-offs of storing on a server.

It is also recommended that the use of electronic or digital signatures be considered as a substitute for handwritten signatures. Digital signatures can serve the same purpose as traditional signatures and if properly used, can be more difficult to forge. There are many digital signature services currently available on the market. A case study done in 2004 to assess the feasibility of digital signatures in healthcare found the range of implementation prices to

be $2,695 to $33,000[3] (the large difference in costs being due to a one-time server fee that a company in question charged). Although there is an initial cost for implementation, the option should be considered and a cost-benefit analysis (both fiscal and environmental) should be conducted.

Outside of the accounting department, much of the paper that is used in the office is related to contracts, applications and forms used by clubs and services within the building. Much of this occurs on paper but a transition to a digital format is quite feasible and perhaps easier as this is largely in the control of students in office. This year, clubs and services were strongly encouraged to submit audit forms online, with great success. Unfortunately, the Clubs Auditor was not required to follow through online, and so paper copies were made anyway.

If there was an easy way for SSMU staff to create new forms, the process established by the clubs audit could be streamlined and applied more broadly in the office. The SSMU's IT department is quite overloaded with work as it is and could not possibly handle the additional task of dealing with online forms. However, there are several online companies offering good form building services. This eliminates a reliance on SSMU servers and IT staff. Individuals, be they the Finance Coordinator, Interest Group Coordinator or Administrative Assistant, can quickly and easily create forms that fulfill their purposes. Because these forms can be completed online, and the responses stored online, they can completely replace paper.

It is recommended that the SSMU investigate the using digital forms for club & services and with Finance Committee. Forms in these portfolios are good candidates for digitization as they are generally read only a few times, and then stored away forever (refer to the Computers and IT chapter for elaboration). A smooth transition will likely require some commitment to educating users on what is expected and to familiarizing staff and students to the new format.

Examples of Online Form Services

Wufoo

Wufoo (http://wufoo.com) is an HTML form builder that allows users to create contact forms, online surveys, and invitations for data collection, registrations and online payments. Their least expensive package is the "Ad Hoc" which costs $9.95/month. This package includes 10 forms, 20 reports and 500/entries a month.

Jot Form

JotForm (http://jotform.com) is a web-based WYSIWYG (what you see is what you get) form builder. It has a drag and drop user interface which makes form building very easy. It can be used to create forms, integrate them into a website and for data collection. Jotform is free with a premium package available for $9/month.

Google Forms

Google Forms (http://docs.google.com) is part of Google Docs and like many of their features, is offered for free. They have a very easy-to-use system for building forms and offer an array of different reporting mechanisms. One can create an unlimited number of forms and have an unlimited number of entries.

Recommendations Review

Accounting should keep digital records on external hard drives, to maximize resource efficiency.

Consider purchasing a digital signature software system.

Forms should be digitized, using an online form service.

Paperless Meetings

Other areas that are often criticized for paper consumption are McGill Senate and SSMU Council meetings. Laptops are not allowed in either venue due to issues that have been raised with regards to the use of Instant Messaging and Facebook during meetings. Minutes, agendas and any required documents are currently printed for both bodies.

In Senate, documents have been printed double-sided for the last year and one can opt out of receiving the paper copies in the mail. Particularly long documents, those exceeding 20 pages, are generally made available online instead of being mailed; however, since laptops are banned from meetings, this only results in a displacement of printing duties rather than a reduction of printing. When asked about the possibility of laptops being used in senate in the near future, former VP UA Adrian Angus vehemently stated that it would never be allowed. He noted that the McGill Secretariat is interested in a built-in system, but that dream is far down the road.

It seems that paper reduction in Senate is a mighty challenge due to a resistance to change and issues with technology. But a more paperless Council is still a possibility. It is unfortunate that councilors cannot control their urge to browse the web during meetings but, having been to meetings, it is sometimes understandable. Council should take note of the Finance Committee's efforts. This year, they borrowed a projector from the library to screen required documents and items, instead of printing out all of the committee's documents. This greatly reduced paper consumption and was easier for the Finance Coordinator as he did not need to download, print and photocopy every application that came into his inbox.

A projector offers a way of sharing information with a group without needing to print papers or requiring individual laptops. It can be easily set up and is quite portable. Energy efficient projectors can cost anywhere from $500 to a few thousand dollars. It is important to note that one must account not only for the initial cost of the projector but also for the cost of replacement lamps. Replacement lamps are generally a few hundred dollars each. On average, a lamp will last 1500 to 2000 hours, depending on how it is cared for and used. Some models (ex. Mitsubishi) feature an eco-mode that prolongs the life of the lamp to 5000 hours. To put that into perspective, an average bulb would last approximately 667 three-hour meetings while a projector with an eco-mode could last 1667 three-hour meetings—that's a lot of hours in council.

While the Lev Bukhman Council Room already has a projector, most of the SSMU's meetings are not Council meetings. The SSMU should invest in an Energy Star certified projector[4] with an eco-mode setting for meeting use in the SSMU Office and in the Shatner University Centre. This projector should be used consistently for committee meetings and be made available to clubs, services and other groups who would like to make similar changes to their meeting habits. If security is an issue, the SSMU should contact the PGSS for tips, since they currently rent projectors for meetings held in Thomson House.

Increasing the Lamp Life of a Projector

From Projector Central[5]: "There are several things you can do to increase your lamp life:

- Do not allow the projector to become overheated by ensuring that there is adequate clearance near the intake and exhaust vents.
- Operate your projector in a clean, relatively dust-free environment.
- Clean air filters every 3 months or more often if there is a lot of dust or contaminants in the room.

- Striking the lamp ages the lamp as it causes slight changes to the shape of the electrodes that light the lamp, so light up your projector when you're ready to use it and avoid frequent on and offs.
- Avoid shock to the lamp or projector.
- Use 'Lamp Economy Mode,' If your projector has this feature, to lengthen the life of the lamp by reducing its brightness. In most cases you will get a 50% increase in lamp life with a 20% reduction in brightness and you will not likely notice the reduced lumen output.
- Allow the projector fan to turn off after you power down and before you unplug the projector. The only exception to this is a projector that is designed to keep the fan turning for a brief period after removing power."

Who Really Wants to Reduce?

Having interviewed the SSMU executives (outgoing and incoming) we were able to assess their attitudes towards paper use and get a better perspective of their environmental efforts and the roadblocks they faced in reducing their consumption. The University Affairs portfolio is the most paper-laden of all the offices. Its reputation is based on the fact that the VP UA does not do much else other than attend meetings and write memos. Furthermore, the VP UA stated that it was much easier to print his documents for meetings, and to have archives in paper form. He appreciated being able to read his predecessor's notes in the margins of meeting documents and to get a better idea of what happened before him; for these reasons, it was necessary for paper to be used.

We feel that the historically high paper consumption in University Affairs is not necessarily linked to the office, but more to the individual who occupies that role. It was confided to us that the VP UA refused to print double-sided out of sheer obstinacy. The new VP UA, a committed environmentalist, has reduced her printing by using digital documents for Senate, and for personal work. She continues to use paper for committee meetings, but she prints these documents double-sided. Her numbers suggest a dramatic decrease in photocopier use over the previous VP UA.[6] It goes to show, that historical precedent is not sufficient excuse for a poor paper consumption record.

Based on early numbers, the new President, VP University Affairs, VP Clubs & Services, and VP External are, on average, consuming less paper than their predecessors in 2007-08. These numbers cannot take into account fluctuations during the year when different offices require more or less paper. Nevertheless, it is a hopeful sign that there is a growing awareness about paper use in the SSMU office, and that some measures instituted by the predecessors are working well. We hope that the remaining executives will match the efforts of their peers in reducing their paper consumption.

There are many others in the SSMU Office who are interested in reducing their paper consumption but are restrained by the outdated system that is still in place. During our interview with the manager of the Daycare, she explained that her and many of the parents who use the daycare are not interested in having paper copies of their forms and would like to reduce their waste. They have taken steps within their own department to reduce their own waste by making simple changes: the daycare now corresponds via e-mail and items such as newsletters, notices and menus are sent digitally each week. Over the course of a year, this could represent significant reductions in paper use. In just menus alone, 30 sheets are saved each week, totaling an approximate reduction of 1500 sheets annually in just one aspect of a department. This is just one example of how small changes can add up to a large difference.

The manager of the daycare also indicated areas where she would like to see change but cannot institute it herself due to it being a

larger, systemic problem. One notable example has to do with the production of bills: SSMU departments cannot produce bills without printing a paper copy. Despite the fact that the daycare would like to reduce its billing impact, they are restricted by the system that is in place.

There are other legal restrictions that stand in the way of going completely digital. The government has certain mandates that require the daycare to keep triplicate copies of different forms in the office as well as printed copies of documents (despite digital copies that are available on the website). Some of these structures are beyond the reach of SSMU but consideration should be taken to question and change the structures we do have control of to enable departments to go further.

Tracking Paper Consumption

There is currently only one way to track individual paper consumption in the SSMU Office. The Administrative Assistant checks the office photocopier on a monthly basis, and records consumption numbers for each department. Every SSMU executive has a department, as do some staff units, committees, commissioners, and event organisers.

Unfortunately, the SSMU discovered irregularities in the 2007-08 records. Some departments were mixed up, resulting in only partially reliable data. The problems have continued in 2008-09, with some executives discovering that their computers neglected to track their printing.

Preliminary comparison shows that many of the numbers are reliable. For instance, the consumption of departments with no personnel turnover remain steady.

Given the historical preoccupation with paper consumption among SSMU executives, we hope that they will get their recordkeeping under control as soon as possible. Recordkeeping should be expanded beyond just photocopy use (there are five other printers in the office, and people often order printed paper products from external shops). Until then, we cannot accurately gauge progress.

So for now, enjoy these early comparisons, in all their fallible glory:

Department	2007-08 avg. / month	Summer 2008 avg. / month
Clubs & Services*	340	160
External	500	175
Finance & Operations	340	320
Internal*	240	825
President	700	70
University Affairs	375	25
Council	1000	2700

** The new VP Internal current tally is already greater than her predecessor's annual grand total. We hope this is a mistake.*

** The new VP C&S' tally for September was twice the three previous months combined. So either she is on track to surpass her predecessor, or these numbers are suspect.*

Paperless Course Packs

In 2007-2008, one of the major projects that the University Affairs portfolio undertook was to reduce the impact of course packs at McGill. The goal was to reduce the size of course packs by making

greater use of articles that are already available online to McGill students through the Online Journals. Aside from the ecological advantage, it doesn't make sense for students to pay copyright fees for coursepack publication—students already pay McGill Libraries an ancillary fee to cover copyright privileges on all library materials, including the online journals. Even chapter-sized portions of books could be digitized without extra charge.

If students print out their digital readings, than of course there is no net gain. But if students learn to read on-screen, these efforts could result in significant reductions in our campus' ecological footprint.

The VP UA was fortunate enough to have Senator Lynne Champoux-Williams taking the lead on the project. Lynne, dedicated to environmental issues on campus, did much of research throughout her term as senator. The library direction was involved and receptive to the idea, arguing that it would not mean significant extra work for Libraries staff. Unfortunately, finding support amongst the senior administration and faculty may not be as easy. The issue is sensitive to pre-existing agreements between McGill and Eastman Systems. The SSMU must push to resolve these legal questions before the project can move forward.

Ultimately, instructors will need to make the changes independently, but the Administration's support will be required to communicate the idea to faculty. Internal communication among the dozens of faculties and departments always seems to be the biggest stumbling block at McGill. For instance, the McGill website is managed by four different units and there are hundreds of editors, lacking any coherent leadership. Without the Administration's support, the SSMU would have to go after every single department to implement a new course pack policy. Given the Administration's track record with the Paper Policy, even their support could be a mixed blessing.

The efforts of Lynne Champoux-Williams and the VP UA are commendable; they have researched and pushed for changes to the status quo and acted as true leaders in sustainability. We are lucky to have a new VP UA this year with sustainability in mind and we hope that she and the senators do not give up on this endeavour.

Convincing senior administration that change is imperative can be a daunting task but the reward could be significant reductions in waste across campus. We hope to see the lines of communication between SSMU and the administration stay open on this issue. If current legal arrangements are unfriendly to the concept, the SSMU must push for a new legal framework. We also hope to see some grassroots efforts involving department chairs and professors, so that it is made clear to the administration that there is a demand for sustainability on campus.

Paper Use and Energy Consumption

When discussing the issue of paper consumption, a common suggestion for reduction is the use of computers to replace paper. It is important to analyze all our solutions and base our judgement on evidence and available information; it is simply irresponsible to make assumptions or go by a 'gut feeling.'

One way of equating and measuring the comparative differences in impact between paper and technology is to compare the lifetime energy consumption of each. Using life cycle analysis (LCA) gives us a more holistic view of the impact of each option and allows us to make an educated choice as to which system is least harmful for our planet.

Journal Publication

As discussed in the Computers & IT chapter, Gard and Keolian conducted a study comparing the life-cycle impacts of online journals and paper journals. Their findings suggest that digital copies are more resource efficient for documents that are read only a few

times. Documents that are re-read many times are more resource efficient if published on paper.

This was a useful study for considering the SSMU's many different paper uses. But it by no means provides the last word.

Another way to compare digital and paper documents is to consider their life-cycle impacts in terms of energy use.

Energy Use Data

The Environmental Defense Fund's online "Paper Calculator" provides information about the energy used over the average office paper's life cycle. The EDF reports that a single tonne of 100% Post-Consumer Recycled paper requires roughly 25 thousand MJ of energy. This includes electricity and all other fuels required to manufacture and dispose of the paper.

Of course, the SSMU Office does not currently use any type of recyclable paper. The paper purchased for the office is chosen for its low cost, and requires as much as 44 thousand MJ of energy per tonne. We recommend that the SSMU switch to Cascades' Rolland Enviro100 Copy, a 100% PC paper manufactured locally using recuperated biogas. Cascade has a strong reputation for being an environmental leader in the industry; this paper's impact is likely better than the average 100% PC paper.

To estimate the life-cycle energy requirements of a computer, we refer to Eric Williams' 2004 study for the United Nations University. He uses industry research that suggests that an average computer requires 8,840 MJ of energy to manufacture. Using this data and more, he concludes that computers are extremely energy intensive appliances. His inventory comes to the surprising conclusion that the average PC and CRT monitor system required *12 times its weight* in fossil fuels to manufacture. This is an order of magnitude greater than such energy-intensive appliances as refrigerators (2X) and automobiles (1-2X).

The majority of studies we analyzed were undertaken before LCD (flat panel) displays had really caught-on. We have therefore made two separate calculations. The first calculation uses a PC + CRT monitor as the basis of comparison. The second calculation uses a PC + LCD display as the basis of comparison. For the second calculation we have tried to account for the LCD's lower manufacturing cost based on a compilation of other studies.[7]

Calculated Break Even Point

The following calculations were to find the equivalency point between the LCA of paper and the LCA of a computer with an average lifespan. We wanted to find out how many sheets of paper we would need to consume for the energetic costs to be equal to that of using a computer.

For a PC + CRT monitor, the break-even point is 76,967 sheets of paper.

For a 2006 iMac, the break-even point is 65,422 sheets.

These numbers are equivalent to 12,828 and 10,904 twelve-page documents printed double-sided, respectively. If three such documents were printed every work day, it would take between 14 and 16 years to reach these equivalency points.

To put these numbers into perspective another way, the SSMU's photocopier recorded 96,000 copies over 2007-08. Over thirty different people are registered to use the photocopier.

The Moral of the Story

Computers have many virtues, but saving paper is not *really* one of them. Unless your computer lasts longer than many McGill students have spent in the public education system. Of course, we will all still continue to use computers, and since our computers will be in use for other things anyway, it makes sense to save paper by going digital. But it is harder to justify increased digitization based solely on the environmental benefits.

Newer, lighter, flat panel computers may come closer to meeting the expectation that digital documents are better than paper documents. Nevertheless, the average lifetime of a consumer PC throughout the post-industrialized world is a mere 3 years. From what we've seen in our five years at McGill, the University uses computers for even shorter time periods. As many LCAs reveal, the duration and quality of use has a significant effect on whether a product is genuinely better for the environmental or not. Computers, if well cared for, have the potential to last for more than 3 years, thereby improving their standing relative to paper.

The SSMU clearly needs to make a great effort to use its computers for longer that we currently do, upgrading and repairing instead of replacing when problems arise. If not, then the SSMU cannot begin to claim that it is improving its environmental record by displacing paper use with digital documents.

Purchasing

An assessment of the SSMU's purchasing will have to wait until this assessment's second edition.

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[1] Based on calculations from http://www.printgreener.com/earthday.html

[2] McGill's Paper Use Policy. Available: http://www.mcgill.ca/rethink/policies/paperuse/

[3] Tulu et al. "Design and Implementation of a Digital Signature Solution." Proceedings of the Tenth Americas Conference on Information Systems (2004): 295-303.

[4] Projector Central is a comprehensive online guide to different projectors with reviews. http://www.projectorcentral.com/home.cfm

[5] http://www.projectorcentral.com/projector-lamps-faq.cfm

[6] Please see the sidebar "Tracking Paper Consumption" for the details on the VP UA's photocopy tallies.

[7] We calculate that an LCD unit requires only 85% of the energy required by a CRT unit, based on Williams 2004 and the EPA.


Waste Management

Waste Management

The Shatner Building of the SSMU is a vibrant, active space where many individuals pass through on a daily basis. With dozens of offices and a number of restaurants, a large amount of waste is produced. Attention must be paid to the amount of waste generated by the SSMU as well as how that waste is taken care of. The mantra "reduce, reuse, recycle" is certainly most applicable here; the first approach that SSMU should consider is the reduction of wastes and unnecessary consumption. Mitigating waste not only reduces the volume sent to the landfills but can have an effect on the entire chain of consumption (consuming less results in less energy used and pollution created). Reusing computers, furniture, supplies, etc. whenever possible also affects the chain of consumption in a positive way. Finally, if we need to generate waste, proper recycling and composting is the last approach to reduce out ecological consumption.

The Plate Club

The Plate Club, since its inception in March 2007, has provided a much-needed service to the McGill community and the SSMU building. The Plate Club has organized the plate/cup/utensil lending system in the SSMU building during lunch last year while providing equipment to groups, clubs and individuals to borrow after hours. When the Plate Club first started with its idea to lend plates, there were approximately 5 volunteers and 15-20 users each day. Through word of mouth and sheer awesomeness, the Plate Club expanded to include many volunteers and its services were utilized daily (and night by event coordinators). The popularity of the club was overwhelming; it was difficult at times to keep up with the demand and concerns were raised about whether the Plate Club could continue to accommodate the sheer volume of patrons. As a result of the club's proven success and popularity, SSMU committed to an institutionalized lunchtime lending system by installing infrastructure for commercial cleaning and hiring a Work Study position in the fall of 2007. This transfer of responsibilities from Plate Club to SSMU was suppose to happen in the early 2008; however, due to a number of bureaucratic barriers, the project was not installed in time. As of September 2008, the dishwasher was not installed in the cafeteria and the Work Study position was not created.

Reusables vs. Disposables

It is often assumed that the use of reusable dishware and cups are better for the environment because they are not added to landfills after each use; however, many studies have suggested that the advantage of using reusables is not as large as one might think. It is necessary to analyze the entire life cycle of an item to assess the total energy and resource input; this is the only way to do a true comparison of what benefits the environment the most so we can make truly justified choices.

The Netherlands Organization for Applied Scientific Research released a study they performed comparing single-use cups with coffee mugs in a western European setting.[1] They considered a number of different effect categories and found that the two reusable options they analyzed scored as most detrimental in 9 of the 10 categories. The disposable paper cup scored as least polluting in 5 categories while the polystyrene insert cup scored lowest in the other 5. The research group expressed quite a bit of uncertainty about these results and stated that there were many variables that would affect the numbers. For the reusable cups, the method of cleaning the cup has a strong influence on the overall environmental profile of the item. One could reduce the overall impact of the reusable cups by reducing the amount of water and energy that is invested into the cleaning of them. The number of

uses per item also has an influence on the ecological impact (albeit not as strong as originally thought). The implications of these results in SSMU are two-fold; when considering the dishwasher, it was imperative to consider low-energy consumption and water use in order for the initiative to be justified. The dishwasher that was eventually chosen (a Swissh model) was produced locally and had very favourable consumption ratings. By choosing a more efficient cleaning system, the environmental profile of all the dishes and mugs that are used is reduced greatly.

The second consideration that needs to be taken into account is the number of uses and the retention of dishes, cups and mugs in SSMU. The dishes need to be durable enough to resist breaking and a system needs to be put in place to minimize loss or theft. If each plate only gets a handful of uses out of them before being lost or stolen, the environmental benefit is not achieved. Tiki Ming purchases 25 soup bowls each academic year at $6 a bowl in efforts to minimize their impact; unfortunately, only a few bowls remained as a result of theft and negligence. Not only is the environmental advantage lost, there is a heavy financial burden that is placed on the vendors as a result of a continuous need to replace wares.

The positive effects of reusable dishes over disposables are felt if the dishes are cleaned in a low-impact way and have a long life cycle before disposal. SSMU is encouraged to pursue the reusable route while bearing this caveat in mind; it is not enough to only purchase something more ecological, a fundamental change in behaviour is needed to accompany this.

Creating the SSMU Green Service

The Plate Club has enabled individuals to make a more sustainable choice in their event planning and daily lives, helping students live by the environmental commitments that SSMU as a whole signed onto. The service that the club offers is only the beginning of the potential support that SSMU could lend to its constituents.

The SSMU's events, large and small, have been implicated on many occasions as being wasteful and a large source of environmental impact. During our interviews with clubs as well as with the executives of SSMU, it was suggested that the impact of events such as Frosh and Snow AP could be reduced if there was assistance. The sentiments of the former VP Internals were echoed in the exit report submitted by the Green Frosh Coordinator (a pilot position attempted for the 2007 frosh)—it is too difficult for event organizers to run events as well as deal with educating those in attendance and follow-through on more environmentally sound disposal methods.

As noted by David-Grey Donald (Green Frosh Coordinator-2007), it was difficult to rely on participants and event volunteers during events like frosh due to the fact that the events are "characterized almost exclusively by rowdy drunkenness". Some initiatives, such as using a frisbee as a reusable plate, were not as effective as anticipated. Many frisbees "ended up being thrown out because individuals had no desire whatsoever to clean their filthy and poor quality product" and the net ecological impact was greater in the end then the traditional throw-away plates.

He was also noted that more basic actions, such as recycling, were overlooked during high traffic events. Disposable and recyclable beer cups (#5 plastic) are supplied by Boreale and used by Gerts and campus event coordinators for large functions. Tanya Stevens, the manager of Gerts, noted that the bar generally uses reusable glasses but turn to their stock of plastic cups when hosting larger events due to the logistical limitations. The use of glasses is highly impractical or impossible due to the limited stock of glassware and the likelihood for breakage. Asking patrons to rinse and recycle their cups results in similar difficulties as in frosh. The burden of sorting

through the garbage for recycling is too heavy for the small staff that needs to clean up late into the evening after the bar closes.

Extending from what the Plate Club started, SSMU could take a leading role in forming an environmental service for clubs and events. Taking the step to be more environmentally friendly can often take a backseat to the more pressing tasks of organizing a function; access and facility are integral to any service that is offered. This initiative could not only provide a number of different green services, consolidated into one access point, there is an opportunity to raise the environmental profile within SSMU as well as provide work opportunities for students.

Green Service Branches

An SSMU environmental service could be divided into four main branches:

Branch 1: Advising

Many students and students groups may wish to reduce their impact in their club operations or events but may not possess the knowledge or resources to do so. Offering an environmental advising service through SSMU could educate and enable individuals to make better choices. Groups can e-mail or meet with the service and discuss their event and where more ecological alternatives could be used. The advising branch of the service could be the go-to point; this branch could assess the needs of the group or event, collect the information and then coordinate with the other branches.

The advising branch could provide information for groups in ethical purchasing and organic and/or local food sourcing. Julia Webster and Jonathan Glencross worked hard on finding ethical and environmentally sound alternatives for frosh this year and gathered a lot of information about good companies to source item from. Organic Campus has contacts for organic and local farmers while a working group last year put together an Ethical Alternatives guide (available in the QPIRG library). The SSMU service could act as a place where information could be shared- SSMU could offer alternatives for groups while individuals can bring useful resources they've found to SSMU to be added to the database.

One or two hired coordinators, perhaps stipend positions funded by the Green Fee, would ideally staff the advising branch. This structure allows for streamlining of the whole process by having one or two people in charge of communications, money transactions and arrangements. Having the same individuals process the request as well as scheduling helps reduce the possibility of errors being made and simplifies things for all parties involved. The system also minimizes the number of contacts and follow-ups that event coordinators need to take care of, keeping the service accessible and easy to use.

Branch 2: The Plate Club

The Plate Club could be included as a second branch of the service. Any groups or individuals who need plates, cups, coffee mugs, wine glasses or serviceware could borrow from the Plate Club's stocks. This service has already been established and is well known in the community; the incorporation of the Plate Club into the SSMU service will increase their profile further and help streamline services. A suggestion for the Plate Club would be the addition of standard beer mugs that could be borrowed by event organizers to help reduce the amount of waste produced. Having resident beer mugs removes a reliance on organizers to purchase and sell mugs or participants to bring their own. Having a dishwasher in the SSMU building will make cleaning much easier for staff, organizers or the green clean team.

Branch 3: Green Clean Team

A common issue that many groups encounter is lack of human power to accomplish everything that needs to be accomplished. The clean up after a high-traffic event can be quite onerous. Organizers are faced with many tasks and efficiency and speed often win over

slower but more thoughtful disposal methods. In our interviews, it was suggested by some former execs that having a group dedicated to assisting with recycling, composting and waste reduction would be greatly beneficial. This was originally suggested as a volunteer group or as a club; however, it is highly doubtful that anyone, no matter how dedicated they are to the environment, would want to regularly dig through and sort garbage on a regular basis for free. It is unfair to expect these people to perform a valuable service without being paid. A suggestion for this branch would be to have a core group of organizers and a group of individuals who are interested in helping out for events. When there is a request for the Green Clean team, the organizers could contact those who have expressed interest to see who can work for the event in question. Individuals can take on the task based on their availability and be paid (either a salary or lump sum) to ensure recycling, composting and proper waste management strategies are used. This service satisfies the needs of events and properly compensates individuals for the work they do.

The funding structure for this could take on a number of forms:

A. The Green Team could be paid semester-long stipends directly by the SSMU from the Green Fee. With this funding structure, the service is available and pre-funded so event organizers do not need to worry about the financial aspects.

B. The Green Team could be made available but event organizers will need to pay individuals directly; this could be monetary or it could be a trade of food, entrance, etc for services. Some oversight will be necessary to ensure that the job is properly done in the by the team.

C. Event organizers, when applying for funding, could request funding for the Green Team in their application (this request could be integrated into the application form itself). In this structure, the event organizers do not need to pay the Green Team out of their pocket and the Green Team will receive payment on a per-event basis.

The cost to users of this service should be kept to a minimum. The advising should be offered for free and the only costs associated with the Plate Club are the damage deposit and the replacement costs for anything that is lost while rented. The use of the Green Clean Team branch may cost the group money but much of that could potentially be offset by the Green Fee.

The use of this service should be encouraged by SSMU and be considered in the year-end environmental audit that clubs will need to perform starting in the 2008-2009 year. If SSMU has made environmental commitments as a whole, it is only logical that members of SSMU and groups operating within SSMU should make efforts to abide by our commitments. Including event execution and efforts to reduce impact in the audit offer accountability as well as a way of rewarding those who have made positive changes.

Branch 4: Sustainable Food Sourcing

This branch would help event organizers address issues with food supply and minimize the impact of their food choices by providing more sustainable and more ethical options. When touring the offices of the SSMU building, it was noted that the vast majority of food items found in offices, left over from events, were not ethically sourced or "environmentally friendly". Some of these items included coffee (not from a fairly traded source), individually wrapped candies, boxes of individually wrapped plantain chips, etc. This branch of the service could help cater to the needs of different events and offer options that are organic, local, ethical and not excessively packaged.

The services we would like to be able to offer is a mash-up of many excellent student initiatives that already exist; it is our hope that groups like Midnight Kitchen, Organic Campus and Campus Crops will be willing to share their knowledge, experience and expertise with SSMU and collaborate on forming this branch. Respecting the autonomy of each of these groups (and any other collaborating

body) should be kept in mind; the aim of this service is not to usurp these groups but to work with them and increase their exposure to the general SSMU population.

This branch could offer more information on food as well as options such as ethical catering (local and ethically sourced foods) and ethical purchasing. The catering option could be something Midnight Kitchen could be involved with, either as the caterers themselves or as advisors on starting a catering service. The purchase of organic foods could potentially be streamlined through Organic Campus for event organizers. Organizers could tell the group of their needs and OC could provide some options (ex. sweet potato bread, apples, veggies). Event organizers could order, in part or in whole, through Organic Campus' regular order and arrangements could be made for storage until the date that items need to be used.

The More Responsible Waste

One of the most effective ways to reduce the impact of the cafeterias in SSMU is to encourage the use of reusable containers amongst all members of the community. The use of Tupperware and of travel mugs can reduce of waste output of the building; however, it is important to recognize the fact that this might not always be feasible and alternative options should be available to the consumers. SSMU's vendors can chose alternative forms of take-out containers to reduce their impact. Most vendors currently use some combination of the following take-out materials:

Styrofoam: Cheap and insulating, styrofoam has been used for years. Its popularity has suffered in the past few years as reports state that styrofoam does not break down after it has been disposed of.

Plastic: Plastic containers and utensils are made from petroleum, a non-renewable resource. Although plastics have the potential of being recycled, it is important to note that items that are contaminated will not be recycled and some municipalities do not recycle certain types of plastic (example: Montreal does not recycle #6 plastic, the type that is commonly used in coffee cup lids, take-away containers, food containers, etc.).

Paper/Cardboard: Paper and cardboard are often thought of as a more environmentally friendly alternative to styrofoam because it is made of a renewable resource and has the potential of being recycled. Considerations must be made to the hidden impacts of using paper or cardboard; paper could be made from virgin forests and the production process is highly consumptive in water and energy resources. Recycling, a highly energetic process, is dependent on whether the paper or cardboard is contaminated with food and whether the container is coated with materials that would render it unrecyclable.

Bioplastics: Bioproducts are a fast-developing option for food vendors. Bioplastics can be manufactured from agricultural by-products such as sugarcane, wheat, bamboo and rice pulps.[2] Using biowastes of industries instead of using potential food crops (ex. corn products) is a more ethical and sustainable choice. Bagasse, the pulp remaining from sugar-cane juice extraction, is a growing sector of bioplastics that could be a feasible choice for SSMU vendors.

In order for bioplastics to be maximally beneficial, it is important to consider the entire life cycle of the container. A bagasse container would ideally be composted after use. If composting is not possible the bioplastic container would need to be disposed of in a landfill. It is not possible to recycle bioplastics; the mixing of bioplastics with regular plastics can be quite difficult for the sorting facilities and would likely result in many recyclable plastics being thrown out with the bioplastics. If SSMU were to adopt the use of bioplastics, this fact would need to be made very clear and well-known amongst all members of the community and ideally, composting stations or facilities would be available on-site. Large, permanent signs as well as a publicity campaign could help mitigate the problem of mis-

recycling as well as bring attention to SSMU's efforts to become more green.

The adoption of bagasse or other bioplastics would ideally occur with all the vendors simultaneously. One of the main obstacles of adopting bioplastics is the increased cost of the containers compared to more conventional plastics and styrofoam. If all the vendors were coordinated in the use of bioplastics, bulk purchasing could help reduce the costs for all parties.

Another option for offsetting the cost is to introduce an economic measure to encourage more responsible practices as well as to offset the cost of more sustainable take-away containers. A styrofoam tax was introduced in the spring of 2008 in the Shatner cafeteria; however, this tax was not uniformly implemented and did not become institutionalized. Despite its initial failure, some version of this concept could still be useful. This would again require the coordination and enforcement of the standard by all the vendors in the building for uniform impact. The basis of this idea is to no longer keep the cost of containers hidden in the cost of food. By having the consumer pay for the containers as a separate cost from the food itself, it rewards individuals making more sustainable choices and offsets the increased cost of bioplastics for the vendors. This type of charge could be framed as a tax or as a discount. This type of structure has proven to be useful in similar situations in other parts of the world; a tax passed in Ireland in 2002 resulted in a 95% reduction in the use of plastic bags.[3]

Gorilla Composting

Gorilla Composting[4] is a student initiative that was first introduced as a pilot project in January 2005. The project had the aim of diverting organic wastes from the garbage stream and converting it to rich fertilizer that could then be put back into McGill-associated green spaces. This pilot project grew quickly and gained a lot of popularity on campus. The students of the graduating class of 2006 donated over $10,000 to the project in hopes of seeing more support for the initiative in the future. Unfortunately, the environmental impact of the pilot project was uncertain, particularly in terms of carbon dioxide emissions due to the high transportation distance. Administrative support for composting has always been there but has not supported high-cost projects of unknown impact. The currently proposed project has received almost complete administrative support but is relying on Gorilla Composting to provide initial funding and supervision but little beyond that.

Since the fall of 2007, Gorilla Composting has scaled down its operations and has focused more on developing organic waste management solutions in constant consultation with McGill staff and administrators. A public-drop off has been kept open in the Shatner Building, a final refuge for compost collection on campus. The crux of the operation is cleanliness, ensuring that mess and smell are not an issue. As such, GC has mostly moved the 2nd floor collection site down into the sub-basement as not to affect the individuals who use the 2nd floor cafeteria and subsequently the SSMU organization. Compost is currently collected in blue Rubbermaid bins of various sizes in the garbage storage area in the sub-basement until the bins are close to full. Bill Mersereau, operations and finance coordinator, either drives the bins out in his Honda SUV or he rents a van for the day. The compost is deposited at the Quinn Farm and used on the fields there. Gorilla Composting hopes to continue to publicize the importance of composting on an individual and organisational level and to begin treating compost directly on the downtown campus; this helps bypass the heavy ecological and financial cost of transporting water-rich compost long distances.

Mechanical composter models from the Quebec company Agri-Brome have been considered for processing significant amounts of compost into soil of a quality high enough to be used municipally. The initial costs of such a venture, estimated at $30,000 for the composter itself, could be covered by a combined contribution from the SSMU Green Fee and external contributions (ex. Government); however, the ongoing costs of operations would need to be passed onto McGill as the other sources of funding are only seed funding. Working collaboratively with McGill serve a dual purpose by providing a much needed alternative to the community as well as helping McGill fulfil the ecological obligations they signed onto in agreements such as the Halifax and Talloires Declarations.

Large-scale composters are capable of composting 100 tonnes of waste each year[5] from inputs that backyard composters are unable to break down (ex. meat, bones and dairy). Any rich topsoil generated through a composting system could be sold locally to the Montreal community as well as used on site for the green spaces on campus. Complimentary student groups such as Campus Crops could also benefit from the output of Gorilla Composting by using the soil for their plots.

At the end of the 2007-2008 year, SSMU took the first step and earmarked $10,000 for an industrial composter on campus. The money was guaranteed and would be transferred once other funding was obtained to ensure the completion of the project. Gorilla Compost has applied for funding through government grants as well as working closely with McGill to find the money needed to purchase the composter and operate it for the first three years.

Organic Waste Management at SSMU

In the past, Gorilla Compost has worked with the vendors within SSMU to collect organic wastes for composting. This has been somewhat successful but there have been issues with communication and capability. All parties involve are interested in reducing their impact and in composting but not all the employees within the building are aware of what can and cannot be composted. Due to the limited capacity as well as the changes in location, composting did not occur consistently.

During the inspection of the building, it was noted that the majority of club offices, SSMU offices included, did not have a compost collection bin of any sort. This could be a lack of awareness on the part of the executives of each club or a lack of coordination between groups who share offices. If composting continues to be collected within the SSMU, it is recommended that the clause "properly use" in by-law III, article 14.2 ("occupants must properly use and maintain their allocated space") be extended to include proper waste disposal (recycling and composting practices). Including this clause in the by-laws alone will not be effective; the onus of enforcement will be on SSMU, specifically the VP Clubs and Services. All student groups should be made aware of composting and waste management expectations in the building during the initial meeting in September but also be reminded about it on a regular basis. Student groups should be encouraged to work together in their space and take collective responsibility for emptying the compost. Assessments of the offices should be made to ensure compliance. A reminder and subsequently consequences should result for non-compliance to environmental by-laws. It Although the organic waste generation by most clubs in the building may be fairly low, this attitude towards waste management will hopefully serve the purpose of educating as well as fostering a culture of sustainable practices and expectations.

Most of the composting that has occurred in SSMU has been led by the efforts of Gorilla Composting. SSMU has relied on these services and is waiting on McGill to commit to a large-scale composter for on campus processing but little consideration has been given to a commercial composter for in-situ processing dedicated to the Shatner building. Rice University conducted a composting pilot project to test for the viability of a decentralized system on campus.[6] Rice evaluated many options and chose to purchase an in-vessel commercial composter called the Earth Tub by Green Mountain Technologies in Vermont.[7] Below is a summary table of specifications from their report:

Requirements per Earth Tub

Requirement	Value	Description
Earth Tub Cost	$5,550	equipment, shipping
Installation Cost	$2,075	installation, foundation, electrical access
Operational Cost	$447/yr	electricity, maintenance, labor cost
Labor	1:45 hrs/wk	time needed to load, mix, and maintain tub, cost included above
Siting Space	10'x10'	area needed to contain the tub, biofilter and operations
Curing Space	3.5 yd3	area needed to cure completed compost for grounds use

From: Rice University's Composting Pilot Project report

Although they experienced some technical difficulties at the start, the overall evaluation was that this was a viable system that could be implemented at different cafeterias in their school. Each tub was calculated to be able to divert approximately 38 m^3 of organic waste in an academic year; this was a sufficient amount for the output of the cafeterias at the Jones College (part of Rice). Based on this study, this could be a viable, affordable and effective option for SSMU. This alternative option would not be contingent on the university's support and could be largely funded by the Green Fee.

Best Practices: Concordia University's R4 Composting

Concordia University, just down the road from McGill, launched their latest composting initiative in September 2008.[8] Concordia recently began using a new large-scale composting system in situ on the Loyola campus. This thermophilic system is designed to allow for the processing of dairy, meat and grain products. Concordia has set a target of composting 100 tonnes of organic waste annually within 5 years; this represents a landfill diversion as well as significant reductions in greenhouse gas emissions (according to the R4 press release, every tonne of organic waste composted on campus will save 2 tonnes of GHG emissions). This composting facility has been added to pre-existing activities on both the downtown and Loyola campuses; 10 tonnes of food are composted each year at the Sir George Williams campus in 3 vermicomposting units. R4 offers a Worm Swap program with the worms of these units and also offers public workshops on a monthly basis.

The fertilizer produced downtown is used by the Geography department for plants grown for academic purposes. 30 to 50 tonnes from the new system will be used exclusively for the creation of green spaces within the university. R4 is currently developing a technical guide for institutions, business and industries to help others implement their own on-site composting programs.

The funding for the composter was obtained from the students through the Sustainable Action Fund as well as Eco-Action (Ministry of Environment Canada), the Concordia Council Student Life (CCSL), the department of Environmental health and safety (EHS) and the department of Facilities Management. R4 also received the Forces AVENIR environmental award in 2007.

Waste Audits and Recycling

A method of assessing the output of buildings and the efficacy of recycling programs is through waste auditing. The waste output for a certain time period is collected and sorted to analyze the amount and type of material that ends up in a garbage can. This gives us a better picture of our waste habits and helps us identify possible areas for improvement. Regular waste auditing is recommended to allow for the student union to set goals for improvement and monitor the successes of strategies implemented.

In the winter of 2003, a Waste, Recycling and Energy Audit was performed as part of ENVR-380. The breakdown for a single day is provided for the first and second floor cafeterias (from the original document). The first column in each box represents the mass in kg and the second column represents the overall percentage.

Waste from Shatner Building Cafeterias	**1st Floor**		**2nd Floor**	
Office Paper and Cardboard	6.7	23.5	10.0	11.5
Aluminum	1.0	3.5	1.8	2.1
Glass Containers	*3.0*	*10.5*	*1.4*	*1.6*
Plastic Containers	2.0	7.0	5.9	6.8
Plastic #6	0.5	1.8	14.1	16.1
Non-fat, non-oily organics	5.3	18.6	0.0	0.0
Oily Organics	5.0	17.5	36.3	41.7
Other	5.0	17.5	17.7	20.3
Total	**28.5**	**100.0**	**87.1**	**100.0**

It can be seen that organics accounted for 36.1% of wastes in the café and 41.7% of wastes in the upstairs cafeteria. Polystyrene and Styrofoam, used for take-out containers, accounted for 22.9% of waste by mass from the second floor. Considering that polystyrene and Styrofoam are not heavy but voluminous materials, this can be considered a significant percentage by mass.

Another audit was performed in 2006; volunteer coordination was organized by Greening McGill, one of many tasks passed onto the group by the ReThink Office. The audit was performed on three separate occasions between the hours of 5:30PM and 8:00PM to ensure that the wastes of the day were all collected and accounted for.

In this audit, the garbage was collected and separated into three categories: recyclables, compostables and non-recoverables. Recyclables included paper, cardboard, glass, plastics and metals while compostables consisted of organic food items, tea bags, coffee grounds and unbleached paper towels. Items that Gorilla Composting and Quinn farms could not handle, such as meat or dairy products, were counted as unrecoverable. These piles were eventually compared by weight and by volume.

Why Weight and Volume?

The weight and volume of the recoverable wastes are measured to account for the different characteristics of different materials. Organic waste tends to have a greater mass but is a compact waste material; on the other hand, polystyrene has very little mass but occupies a far greater volume in the trash. To give a more representative picture of the situation, both these values should be presented.

It was found that 49.71% by weight and 27% by volume of the materials found in waste bins in the Shatner building were recoverable (either organic wastes or recyclable materials). It was not specified in their report what proportion of those percentages were organics versus recyclables. It is interesting to note that the second audit indicated nearly 50% of waste in Shatner was considered recoverable even when oily organics were discounted. Based on ReThink's definition of recoverable materials, we can see that there

was an increase from 22.0% (sum of office paper and cardboard, glass, aluminum, plastics and non-oily organics) to 49.71% from the first to the second audit. This suggests that there may have been very little follow-through on the recommendations made from the first audit and little was done to divert recoverable waste. These audits indicate that recycling efforts in the building have not been optimized; students and staff in the building are still struggling with sorting their recycling due to a lack of knowledge on what can be recycled, due to a lack of adequate or transparent facilities or due to plain apathy.

In both 2003 and 2006, the groups performing the audit suggested that the placement of recycling facilities within the building had a large impact on how well they were used. In the 2003 audit, it was noted that there was a large difference in the amount of recyclable glass found in the waste stream between the first and second floor. 10.5% of the garbage on the first floor was made up of glass compared to 1.6% on the second floor. This difference could be attributed to the fact that the recycling receptacles were placed away from the main garbage on the first floor while recycling receptacles were placed alongside the garbage on the second floor. When re-evaluated in 2008, it was noted that there were a number of recycling facilities available throughout the building. The recycling islands had different compartments that allowed users to sort materials; however, the failure of these facilities may be related to the fact that instructions were not present and often there were no signs to indicate what should be sorted into each compartment. This confusion could result in contaminated recyclables that need to be thrown out.

Although some progress has been seen with an increase in the number of recycling islands throughout the building, SSMU needs to continue with efforts to ensure successful recycling occurs. The first and most simple recommendation is for the installation of very clear signs of what can be recycled and where different materials should be placed. It is often assumed that individuals at McGill are aware of the parameters for recycling in Montreal. It is important to keep in mind that McGill attracts a population with diverse backgrounds; many individuals may come from places with different recycling capabilities or no recycling at all. It is up to SSMU to not only offer recycling receptacles but to inform users of the building of how to utilize these facilities. It is recommended that an investment be made into more permanent signs; previous attempts at making signs for composting and recycling by students groups were not successful as these cardboard placards were damaged by water or fell off the wall.

What can be recycled in the city of Montreal?

- Glass (glass bottles and jars of all colours)
- Paper and cardboard (phonebooks, flat and corrugated cardboard, newspapers, magazines, flyers, books, fine paper, paper bags, milk, juice and sugar cartons, cardboard containers with metal interiors)
- Plastic (all containers bearing the recycling logo of a triangle with three arrows with the codes 1, 2, 3, 5, or 7 marked inside, as well as plastic bags)
- Metal (cans, metal lids, aluminium sheets or containers)

In the spirit of raising awareness, it is recommended to SSMU to go beyond passive information transmission and engage in more active means of educating its members. SSMU could take an active leadership role in helping coordinate a Green Rez Project (modeled after SACOMSS' successful consent promotion workshops) to educate and set campus standards with incoming students each year. If a green service is created, awareness campaigns could be held in the building by the Green Clean Team to promote better recycling practices. Awareness can be raised in a number of creative ways so

that we start moving as an entire organization towards more ecological practices.

A persistent but unverified rumour within SSMU is that all the materials collected in the building, whether it is garbage or recycling, ends up going into the garbage. This rumour, along with the fact that recycling bins are frequently lined with black garbage bags, may contribute to a poor attitude towards recycling in the building. Many individuals may believe that it doesn't matter where waste is placed because recycling may not be occurring. If recycling is not happening in an optimal manner and much of it is being sent to the landfill, we need to address the issue at many levels. Students may believe that recycling isn't happening so they are careless with their sorting; caretakers, in turn, may be fed-up with going through the recycling for contamination and just throwing everything out. To avoid this vicious circle, the building managers of SSMU need to be in communication about the state of recycling in the building with all the caretakers in addition to promoting recycling amongst students. It is ineffective to promote recycling while not working with those who need to deal with it on a daily basis. SSMU needs to make sure that as much is being processed through recycling as possible so that we are accountable to the students that we promote it to as well as the environment. This may require meeting with the caretakers regularly and consistently asking for their help and input on how we can decrease the amount of recoverables in our waste stream.

It is recommended to SSMU that separate blue, transparent bags be used to line any recycling bin within the building. Although some may consider this a frivolous recommendation, having the recycling packaged differently from the garbage, as most municipalities request, may help dispel rumours and indicate to students the SSMU is actually recycling.[9]

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[1] Ligthart, T.N. and Ansems, A.M.M. "Single use Cups or Reusable (coffee) Drinking Systems: An Environmental Comparison." TNO Built Environment and Geosciences Report. October 2007. www.tno.nl

Accessed: August 15, 2008.

[2] http://www.chow.com/stories/10870

[3] ibid.

[4] Personal correspondence with David-Grey Donald (current coordinator) and Daniel Spitzberg (co-founder) Sept. 2008.

[5] Smith, Wendy. "Sustainable Projects Proposed for Action Fund." The Link. Nov. 13, 2007. Accessed: October 11, 2008. From: http://thelink.concordia.ca/view.php?aid=40186

[6] http://www.ruf.rice.edu/~envintrn/report99/enviroreport-body.html#_Toc457206110

[7] http://www.gmt-organic.com/EarthTub/et-info.php

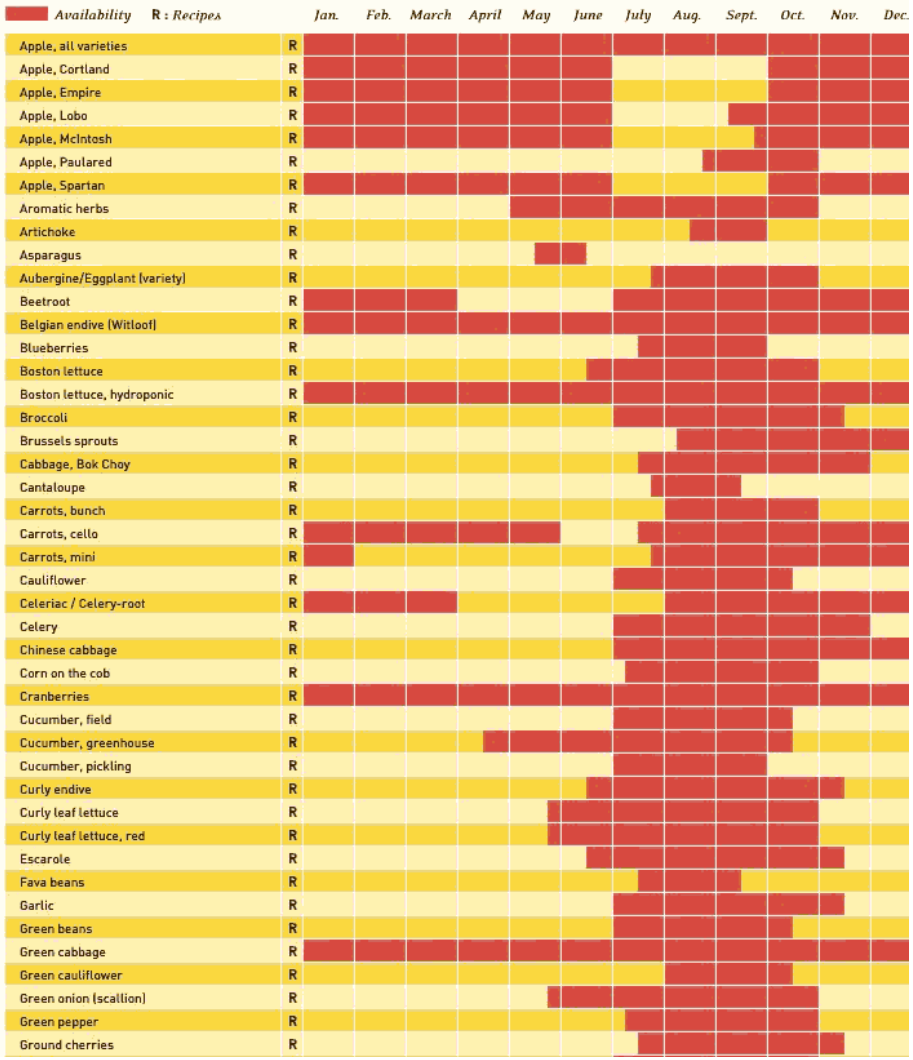
[8] http://sustainable.concordia.ca/ourinitiatives/r4/
Accessed: October 12, 2008

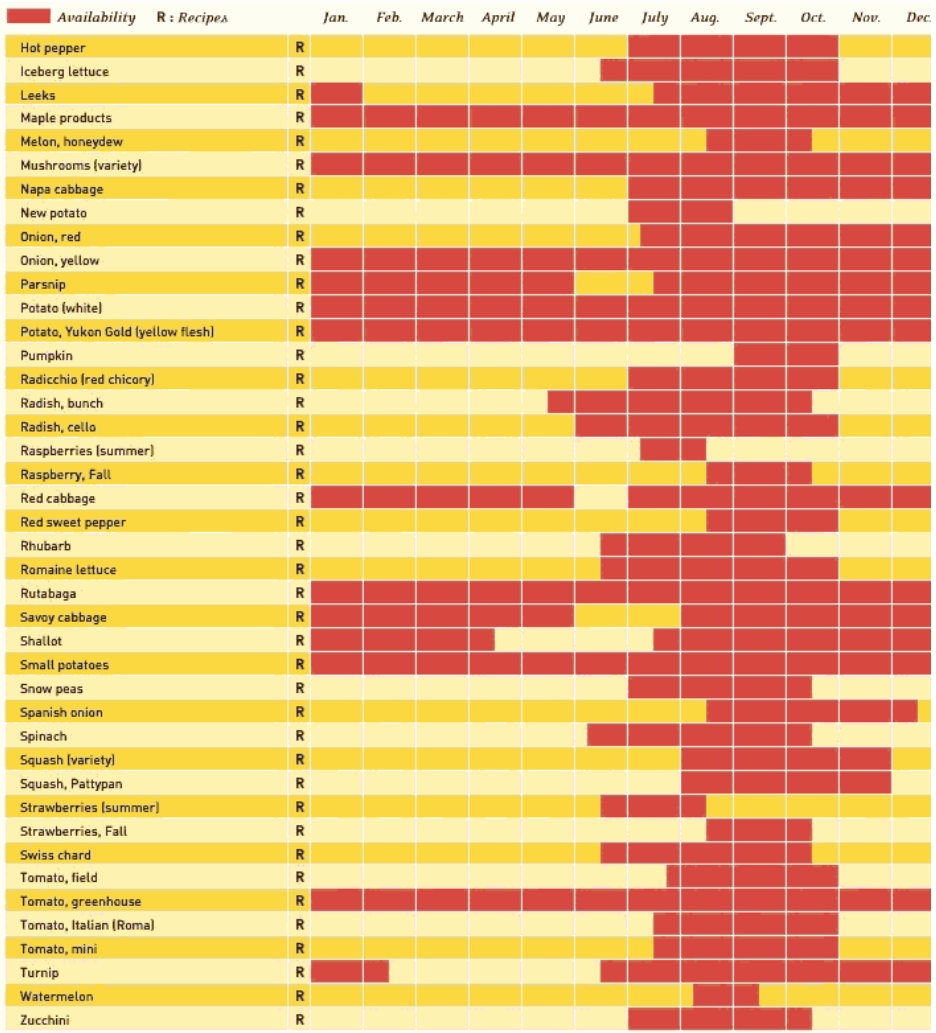
[9] Please note, this recommendation is not meant to suggest that we only get students to believe that we recycle—we actually need to follow through!

Appendices

Harvest Schedule for Quebec

Eating locally also means eating seasonally (unless you are eating canned or frozen produce). The chart below shows when fruits and vegetables are available in Quebec, either fresh or from cold storage.





Students Involved with the Environmental Movement at McGill

Below, you will find collected the names of all the students involved in McGill's past environmental initiatives that we could find. This is about more than simply recognising individuals—although everyone below deserves some congratulations and more.

In fact, we hope that in the future, you will *literally* recognise someone from the list below. It could help you make a valuable contact, someone with wonderful insight and knowledge into our movement's past. And many of these people probably have new, exciting projects, that you don't want to miss!

So take a browse, and thank you to everyone listed, for your vision and dedication to a greener campus.

Student Representatives

SSMU Environment Commissioners
2008-09 Maggie Knight, Nathaniel DeBono
2007-08 Derina Man, Graeme Lamb / Maggie Knight
2006-07 Trevor Chow-Fraser
2005-06 Adela Maciejewski, Caitlin Worrell
2004-05 Kim D'Souza
2003-04 Anne Sabourin
2002?-03 John Engler

PGSS SCE Representatives
2008-09 Anna Bailie
2006-08 Jonathan Pritchard
2005-06 Mehdi El-Ouali (PGSS President)
2004-05 Selvia Soegiaman
2002?-04 Brian Sarwer-Foner

MCSS SCE Representatives
2007-08 Kelly Seymour
2006-07 Praem Mehta / Jason Synnott (both never there)
2006 Chris Wrobel
2004-05 Andie (Andrée-Anne) Girouard / Marie-Eve Lemieux
2003-04 Mathieu Chabot-Morel
2002?-03 Paula Gravelle

Students and their Initiatives

The following names have been collected from the SCE Minutes, supplemented with some personal knowledge. © = Coordinator.

2008-09 — should this be here?
SMP: Jonathan Glencross ©, Marc-Etienne Brunet
Organic Campus: Matthew Hawco ©
PGSSEC: Alexandre Poisson, Jess Ward ©, Chris Wrobel
Edible Campus: Leila Marie Farah, Dana Lahey, Tim Murphy

2007-08
SMP: Nadya Wilkinson ©, Jonathan Glencross
Greening McGill: Sunny Zhai & Warren Huard ©, Tim Dowling, Saima Sidik
Gorilla Composting: David Gray-Donald ©, Bill Mersereau
Organic Campus: Josiane Lafleur ©, Curtis Murphy
Campus Crops: (Rafael) Rafe Wolman & Gillian Jackson ©
The Plate Club: Derina Man & Tim Dowling ©, Darren Stockard
SUS Greenweek: Julienne Hwang ©
SSMU Bike Collective: Kerri Westlake & Sarah Todd & Sébastien Beaulieu ©
Midnight Kitchen: Josh Pavan ©, Anabel Khoo, Elizabeth Higgins
PGSSEC: Chris Wrobel & Jess Ward ©, Priyanka Sundaram
SSMU Senators: Lynne Champoux-Williams, Jessica van de Vooren
ENVR 401 Sustainability Reporting: Alexandre Poisson
Bike study: Asa Bergman
Rachel Laurin (Assistant to Environmental Officer)
Nicole McLaren (Assistant to Environmental Officer)

2006-07
SMP: Sophie Mazowita ©, Nadya Wilkinson, Sarah Allux, Elizabeth Fraser, Val Hongoh

SMacP: Anthi Mimidakis, Johanne Philippe, Amélie Roy
Greening McGill: Saima Sidik ©, Michelle Lee, Sophie Zhang, Derina Man, Tim Dowling, Sunny Zhai, Warren Huard, Marianne Marcoux (Mac)
Gorilla Composting: Graeme Lamb & Caitlyn Chappell ©
Organic Campus: Georgia Rubenstein ©, Zoe Paquin-Gagnon
Campus Climate Challenge: Caitlin Macleod ©, Melanie Lefebvre, Lynne Champoux-Williams, Kyle Bailey (SSMU Councillor)
MESS: Gillian Jackson
SUS Greenweek: Keren Tang ©
PGSSEC: Jess Ward
SSMU Senators: Lauren McGruthers, Finn Upham (SSMU VP University Affairs)
Rachel Laurin (Assistant to Environmental Officer)

2005-06
SMP: Adela Maciejewski, Sophie Mazowita, Stephanie Palmer , Marie-Eve Lemieux (Mac), Kealan Gell (all ©s)
Greening McGill: Michelle Lee, Sophie Zhang
Gorilla Composting: Kealan Gell & Danny Spitzberg ©, Caitlyn Chappell, Charles Stephen, Graeme Lamb, Phil Lavoie & Brianna Schroeder (Mac composter)
Organic Food Coop: Zoe Paquin-Gagnon ©
PGSSEC: Chris Wrobel (PGSS Councillor)
Nina Berryman, environment student
Violet Compton (Assistant to Environmental Officer)
Rachel Laurin (Assistant for Recycling)

2004-05
SMP: Liz McDowell & Rosa Kouri ©, Erin Mackenzie
Greening McGill: Michelle Lee (co-©)
Environment Residence Council: Caitlin Worrell ©
Gorilla Composting: Kealan Gell, Alan Lai, Danny Spitzberg
Organic Food Coop: Kealan Gell
Midnight Kitchen: Kealan Gell
ENVR 401 Turflawn: Corinne Sperling, Taylor White
ENVR 401 SRI: Emmanuel Cappellin, Kim D'Souza
PGSSEC: Mehdi El-Ouali ©
SSMU Senators: Daniel Friedlander (SSMU VP Community and Government)
Violet Compton (Assistant to Environmental Officer)
Kristy Mills (Assistant to Green Building Task Force)

2003-04
SMP (McGill CSAF): Rosa Kouri ©, Nicole Arrell, Phelps Turner (Summer Workstudy), Sarah Schiff
Greening McGill: Michelle Lee ©, Heather Elliot
Recto-Verso: Kate Rhodes (SSMU President), Michelle Lee
Environment Residence Council: Heather Elliot, Nina Berryman
MUCS: Spencer Mann
ENVR401 Composting: John Engler, Peter McFarlane, Paula Gravelle, Julie Hamelin, James Snider, Erinn Piller, Helene Tivemark
ENVR401 Ecological Services: Anais de Valicourt, Ida Mak
Daniel Kapeluto, environment student

2003
Sarah Schiff (Sustainable Campuses Conference Coordinator)
Spencer Mann (Assistant to Environment Officer)
How-Sen Chong (Assistant to Environment Officer)

2001
Environmental Review: How-Sen Chong, Karine Kilisenko, Johanna Hume

2000
Greening McGill: Jeff Roberts © (University Relations Office ‘05)

SSMU Sustainability Policy

Adopted by General Assembly, 1 February, 2007

Introduction

We believe that our university's organisation, resource management, and pedagogy must in no way compromise our shared future.

We recognise the interdependence of our university, our community, and our ecosystem. Moreover, the vitality of our political, cultural and economic lives depends on the very ecosystems we so deeply impact. In a globalising world, we must learn to live equitably within the undeniable limits of the planets natural systems.

Given that sustainability is relevant to all aspects and members of the university community, McGill must not treat it as a specialist concern. We believe that students, staff and faculty must work together to be responsible participants in our communities and ecosystems.

We recognise that social equity positively impacts health, education and consumption habits, and is therefore crucial to sustainable development. Diversity in all senses provides the creative vitality needed to build a dynamic, equitable society. Inclusive institutions that allow meaningful participation to all are most capable of producing lasting decisions and effective solutions.

Preamble

Whereas leading universities across Canada and Quebec are initiating comprehensive campus-focused sustainability research and implementation projects;

Whereas all members of our community must engage in sustainable practices if McGill's campuses are to become sustainable, thereby earning its status as a leading university;

Whereas McGill's lack of administrative leadership on environmental stewardship—notably responsible waste management—has made progress contingent on student action;

Whereas McGill's staff and resource allocation is currently inadequate for the upholding of McGill's Environmental Policy;

Whereas the United Nations has designated 2005–2014 as the "Decade for Education for Sustainable Development", challenging McGill to offer a curriculum rich with interdisciplinary study of environmental and social equity concerns;

Whereas McGill's decision-making structures are notoriously resistant to student involvement, and recent innovations such as the Principal's Town Halls have failed to generate genuinely democratic engagement;

Whereas in recent years, the Student Society has become a strong advocate for securing the space and resource needs of student groups interested in social equity;

Whereas major changes at McGill depend on student involvement, and the Student Society is well positioned to engage with the administration on behalf of all students;

Whereas the Student Society's implementation of the Environment and Social Equity policies could be complemented by a Sustainability Policy that connects, integrates and reinforces their concerns;

Be It Resolved That the Student Society adopt the following Sustainability Policy:

1. The Student Society will actively promote the principles of ecological, economic and social sustainability on campus. This includes but is not limited to:

    1.1. Championing student-initiated sustainability projects to McGills administration;

    1.2. Working with McGill's administration to reduce our greenhouse gas emissions and to responsibly manage our waste;

    1.3. Working with McGill toward the establishment and maintenance of space where faculty, students and staff can

easily collaborate on campus-focused sustainability research and implementation;

1.4. Working with McGill toward the integration of sustainability issues into existing curricula in all faculties and programs;

1.5. Working with McGill to secure space and resources for operating services necessary for building diversity and social equity.

2. The Student Society will creatively implement organisational and operational changes toward becoming a model for sustainability at McGill. This includes but is not limited to:

2.1. Regularly monitoring the environmental impact of all Student Society events and operations;

2.2. Ensuring that the Shatner University Centres food offerings and provision meet a high standard of environmental and social responsibility;

2.3. Minimising unnecessary energy use and material consumption and striving to make ethical procurements;

2.4. Ensuring that independent student groups, clubs and services have access to training and resources to develop their capacities for equitable decision-making and environmental stewardship.

SSMU Environment Policy

Adopted by SSMU Council on April 11, 2002

Whereas the Society will strive to reduce its own negative environmental impact, and to encourage its affiliated clubs and services to progress towards environmental sustainability,

Be It Resolved That the Society will minimize energy use through efficiency and conservation, decrease the consumption of other resources and the production of waste, and seek to eliminate the release of substances harmful to the biosphere;

BIRT the Society will adopt purchasing policies which favour environmentally-benign, post-consumer, bio-degradable, and non-toxic products wherever possible;

BIRT the Society will apply the concept of "Re-think/Reduce/Re-use/Recycle," and always consider reduce and re-use options first;

BIRT the Society will take environmental concerns into consideration in future building renovations and constructions, such as energy efficiency, the origin of building materials, etc.;

BIFRT the Society will apply the principles of this policy throughout the planning, organization, and operation of special events.

Computers in Shatner

The table below catalogues all of the computers and IT equipment in the Shatner University Centre. Rooms are listed, and generally (but not always), each row represents a workstation or area within each room. An average power rating is assigned to each piece of equipment, and totaled in the **W** column. Hours of operation per week are estimated in the **t** column. The final column totals Wh per week. The Grand Total includes a separate calculation which was done for each individual printer.

Average power ratings are as follows: Desktop 110W; Tower 80W; LCD 30W; CRT 75W; Server 350W; Laptop 30W.

Room	Used	Desktop	Tower	LCD	CRT	Server	Laptop	Printer	MISC	W	t	Wh/wk
SB05	100											0
SB05			6							480	65	31,200
SB05				3						90	65	5,850
SB05					1					75	65	4,875
SB05						4				1400	168	235,200
TVM			1							80	20	1,600
TVM			1							80	20	1,600
TVM				1						30	20	600
TVM			1	1						110	20	2,200
TVM			1	1						110	20	2,200
TVM		1								110	20	2,200
TVM		1								110	20	2,200
TVM									1		20	0
sacomss			1		1					155	45	6,975
sacomss			1		1					155	45	6,975
sacomss								1			45	0
daily		7								770	50	38,500
daily		2								220	50	11,000
daily		1								110	50	5,500
daily	3											0
daily				1						30	50	1,500
daily			1							80	50	4,000
daily									1		50	0
daily								1			50	0
daily								1			50	0
daily				1						30	50	1,500
daily			1							80	50	4,000
daily						1				350	168	58,800
daily									1		50	0
daily b.								1			45	0
daily b.			1	1						110	45	4,950
daily b.									1		45	0

Room	Used	Desktop	Tower	LCD	CRT	Server	Laptop	Printer	MISC	W	t	Wh/wk
daily b.			1		1					155	45	6,975
daily b.		1								110	45	4,950
									1	100	45	4,500
daily b.			1		1					155	45	6,975
daily b.							1			30	45	1,350
daily b.								1			45	0
daily b.	3											0
daily b.	2											0
lounge			4		4					620	118	73,160
trib									1		30	0
trib								1			30	0
trib		3								330	30	9,900
trib			2	2						220	30	6,600
trib									1		30	0
legal			1	1						110	45	4,950
legal								1			45	0
legal								1			45	0
legal			1							80	45	3,600
legal			1							80	45	3,600
legal			1							80	45	3,600
legal			1							80	45	3,600
legal			1							80	45	3,600
legal				1						30	45	1,350
legal				1						30	45	1,350
legal				1						30	45	1,350
legal				1						30	45	1,350
legal				1						30	45	1,350
legal						1				75	168	12,600
legal						1				75	168	12,600
legal			1	1						110	45	4,950
legal			1	1						110	45	4,950
legal			1	1						110	45	4,950
legal			1	1						110	45	4,950
legal			1	1						110	45	4,950
advocacy			1		1					155	45	6,975
advocacy			1	1						110	45	4,950
advocacy								1			45	0
advocacy									1		45	0
travel								1			40	0
travel								1			40	0
travel								1			40	0
travel								1			40	0
travel									1		40	0

Room	Used	Desktop	Tower	LCD	CRT	Server	Laptop	Printer	MISC	W	t	Wh/wk
travel			1		1					155	40	6,200
travel									1		40	0
travel			1	1						110	40	4,400
travel									3		40	0
travel			1		1					155	40	6,200
travel								1			40	0
travel									1		40	0
travel			1	1						110	40	4,400
travel			1	1						110	40	4,400
travel			1	1						110	40	4,400
travel			1	1						110	40	4,400
travel									1		40	0
travel			1		1					155	40	6,200
ssmu		1								110	65	7,150
ssmu		1								110	65	7,150
ssmu			1	1						110	65	7,150
ssmu								1			65	0
ssmu									1		65	0
ssmu								1			65	0
ssmu									1		65	0
ssmu	1											0
ssmu		4								440	65	28,600
ssmu								1			65	0
ssmu							1			30	65	1,950
ssmu		1								110	65	7,150
ssmu		1								110	65	7,150
ssmu							1			30	65	1,950
ssmu								1			65	0
ssmu		1								110	65	7,150
ssmu		1								110	65	7,150
ssmu		4								440	65	28,600
ssmu			1							80	65	5,200
ssmu								1			65	0
ssmu								1			65	0
ssmu		1								110	65	7,150
ssmu		1								110	65	7,150
ssmu			1	1						110	65	7,150
ssmu		1								110	65	7,150
ssmu			1	2						140	65	9,100
misn				1						30	45	1,350
misn			1							80	45	3,600
misn								1			45	0
players			1		1					155	20	3,100

Room	Used	Desktop	Tower	LCD	CRT	Server	Laptop	Printer	MISC	W	t	Wh/wk
players								1			20	0
CL		1								110	168	18,480
CL					1					75	168	12,600
CL					1					75	168	12,600
CL					1					75	168	12,600
CL					1					75	168	12,600
CL			4							320	168	53,760
404					1					75	168	12,600
404			1							80	168	13,440
404	2											0
election			1		1					155	168	26,040
election								1			168	0
mups		1								110	168	18,480
mups									1		168	0
aiesec		1								110	168	18,480
aiesec								1			168	0
aiesec									1		168	0
408					1					75	168	12,600
ashraya					1					75	168	12,600
ashraya			1							80	168	13,440
ashraya					1					75	168	12,600
irsam			1		1					155	168	26,040
irsam			1	1						110	168	18,480
irsam			1		1					155	168	26,040
irsam								1			168	0
irsam									1		168	0
irsam										3	168	504
uge				1						30	168	5,040
uge			1							80	168	13,440
uge								1			168	0
musa			1		1					155	168	26,040
musa								1			168	0
bsn			1		1					155	168	26,040
bsn									1		168	0
417			1		1					155	168	26,040
417								1			168	0
417	1											0
417	1											0
417			1		1					155	168	26,040
safety			1		1					155	168	26,040
safety								1			168	0
moc			1		1					155	168	26,040
moc								1			168	0

Room	Used	Desktop	Tower	LCD	CRT	Server	Laptop	Printer	MISC	W	t	Wh/wk
debate								1			168	0
debate	1											0
savoy	1		1		1					155		0
QM			1		1					155	168	26,040
QM								1			168	0
AI			1	1						110	20	2,200
HRC									1		168	0
435							1			30	168	5,040
435			1		1					155	168	26,040
436			1		1					155	168	26,040
436								1			168	0
436	1											0
Sub Total	116	36	72	36	35	7	4	33	22	15,548	13,811	**1,436,174**
Printers *												42,473
Grand Total												**1,478,647**

* Below is the separately calculated sub-total for all printers. The Computers Grand Total includes the Printers sub-total.

Power Rating			Type	Model	Wh/wk	Location	Notes
Printing	Standby	Sleep					
340	70	6	laser	Brother HL1230 laser printer :: 100-120V 7.8A	1,342	club	
340	70	6	laser	Brother HL-1440 Printer : 100-120V, 7.8A	1,342	club	
610	80	9	laser	Brother HL5250DN :: EStar :: 110-120V 8.9A	5,432	travel	
?	-	-	inkjet	Brother MFC420CN: 100-120V, 0.45A (hardly used)	–	club	
?			copier	Canon Imagerunner 2200: 120-127V, 10A	–	daily	2002
?			copier	Canon Imagerunner 2200: 120-127V, 10A	–	daily	2002
?	-	-	dot-mtx	Documax DataSouth A3300 Series :: 115/230V 1.5/0.65A	–	travel	
?	-	-	dot-mtx	Documax DataSouth A3302 :: 115/230V 1.5/0.65A	–	travel	
250	2	2	laser	hp Laserjet 1012 :: 110-127V 4A	346	club	
250	2	2	laser	HP Laserjet 1012 : 110-127V, 4A	346	club	
250	2	2	laser	HP Laserjet 1020	346	club	TEC 795Wh/wk
250	2	2	laser	HP Laserjet 1020 :: 110-127V 3.5A	782	advocacy	TEC 795Wh/wk
250	2	2	laser	hp Laserjet 1020 :: 110-127V 3.5A	782	ssmu	TEC 795Wh/wk
320	7	7	laser	HP Laserjet 1150 :: 110-127V 4A	1,738	legal	
345	6	6	laser	HP LaserJet 1320n: 110-127V, 4.5A	1,617	daily	
330/300	14	14	laser	HP laserjet 3330: 110-127V, 3.5A, not Energy Star	2,364	club	scanner too, hand calc.
330	22	20	laser	HP Laserjet 4050TN :: 100-127V 4.8A	3,994	ssmu	
680	21	13	laser	HP Laserjet 4250dtn :: 100-127V 10A	3,702	ssmu	75 BTU/h in ready

325-330	30	<30	laser	HP Laserjet 5100tn :: 100-127V, 5A	5,574	trib	hand calculated
325	7	7	laser	HP laserjet P2015dn: 110-127V, 4.9A	1,189	club	25 BTU/hr in '06
325	?	?	laser	HP laserjet5000N: 100-127V, 5.4A	–	daily	2000
40	-	-	inket	HP PSC 1510 all-in-one, Energy Star	–	club	scanner too
120?	-	-	inket	Kodak EasyShare 5100 All-in-One Printer :: B en Gros :: new, not EStar.	–	club	scanner too
250	2	2	laser	hp Laserjet 1020 :: 110-127V 3.5A	346	club	TEC 795Wh/wk
330	22	20	laser	hp Laserjet 4050TN :: 100-127V 4.8A	3,994	ssmu	
420	80	7	laser	Lexmark E238	1,558	club	2005 Estar
420	80	7	laser	Lexmark E238 laser printer :: 110-127V 6A	1,558	club	30 min. to sleep
?			inkjet	Lexmark Z33 :: EStar :: 30V 0.4A	–	club	
330	-	<10	laser	Samsung ML1520 Laser printer	2,254	ssmu	UK version, hand calc.
?			copier	Photocopier :: Canon Imagerunner 400S :: 120-127V 12A	–	legal	Estar
1257	223-284	<75	copier	Photocopier :: Xerox Workcentre Pro 55 :: XEW1 :: 100-127V 12A	–	ssmu	
300	8	8	laser	Printer :: Dell 1110 :: EStar	1,868	travel	
?			dot-mtx	Texas Instruments OMNI 800/Model 885	–	travel	
Sub Total					**42,473**		

Lighting in Shatner

The table below catalogues all of the lighting in the Shatner University Centre. Rooms and areas are listed by floor, from the Sub-basement to the Fourth floor. Lighting is generalised into 3 categories: Fluorescent, Compact Fluorescent, and Incandescent. Within Fluorescent, we have give separate counts for Square Troffers (four 17W tubes), Regular 34W tubes, and 32W "Eco" tubes. Within Compact Fluorescent, we give separate counts for single and double bulb luminaires. All Incandescent bulbs are assumed to be 100W. An additional table catalogues all lighting that does not fit into the above categorization, including observed and estimated wattage.

Hours of operation per week are estimated for each space. Estimates are based on the typical usage pattern of the area or room. For some offices, we had an idea of the usage based on interviews. For other areas, we made estimates based on observation. These estimates are conservative, given that we assume lights are turned OFF when spaces are not in use. In reality, lights are often left ON, and cleaning staff might keep lights ON late through the night. The data is also incomplete in some areas. Some data is also incomplete, further deflating the total.

Total Wh per week	Fluorescent	Incandescent
8,409,346	6,650,256	1,759,090

Area	Time Estimate
All hours	**168** = 24/7
Open hours	**118** = 0700-0100 + 0800-0000 + 0900-2100
All night	**98** = 1800-0800
Specific Rooms	
Cafeteria	**45** = 1000-1900
Gerts	**59** = 1000-2000 + 2 + 2 + 5
McGill Daily	**50** = 1200-1600 *5 + 1600-0200 *3
McGill Tribune	**30** = 1200-1600 *5 + 1600-0200

Travel Cuts	**40** = 0900-1700
SSMU Office	**65** = 0830-1730 + 4*5
Caferama	**78** = 0800-2000/5 + 0800-1800 + 0900-1700
Midnight Kitchen	**33** = 5/5 + 4/2
Ballroom	**53** = 9/5 + 8
Lev Bukhman	**50** = 10/5
Clubs' Offices	
Afternoon & Evening	**45** = 1200-2100
Evening	**25** = 5/5
Typical	**20** = 4/5

Space	Square FL			FRL			Eco FRL			CFL			Double CFL			Incandescent		
	4 17W	h/wk	Wh/wk	1 34W	h/wk	Wh/wk	1 32W	h/wk	Wh/wk	26W	h/wk	Wh/wk	2 26W	h/wk	Wh/wk	100 W	h/wk	Wh/wk
Sub Basement																		
stairs A	3	168	504	11	168	1,848			0			0			0	2	168	336
stairs B	3	168	504	23	168	3,864			0			0			0			0
sub-basement			0	6	168	1,008			0			0			0			0
hall			0	10	168	1,680			0			0			0			0
sb05			0	10	40	400			0			0			0	2	-	
BWs fem.			0			0			0			0			0	3	-	
BWs men.			0			0			0			0			0	1	-	
porters'			0	14	118	1,652			0			0			0			0
sb12			0	8		0			0			0			0			0
sb elevator			0	1	168	168			0			0			0			0
sb17a + hall			0	7	168	1,176			0			0			0			0
sb17d			0	1		0			0			0			0	1		0
sb17b,c			0	4		0			0			0			0			0
sb17e			0	70	168	11,760			0			0			0			0
sb17f			0	6		0			0			0			0	1		0
theatre storage			0	9	168	1,512			0			0			0			0

Space	Square FL			FRL			Eco FRL			CFL			Double CFL			Incandescent		
hall			0	8	168	1,344			0			0			0			0
garage			0	18	168	3,024			0			0			0	19	168	3,192
garage			0	44	168	7,392			0			0			0	1	168	168
Basement																		
Gerts			0	2	59	118			0			0			0	1	59	59
hall	1	168	168			0			0			0	4	168	672			0
BWs Fem.			0	17	168	2,856			0			0			0			0
BWs Men.			0	10	168	1,680			0			0			0			0
Stair to 1st			0			0			0	4	168	672			0			0
Bike Collective			0			0			0	12	15	180			0			0
MSA			0			0			0	6	20	120			0			0
			0			0			0	6	20	120			0			0
B30			0	18	20	360			0			0			0			0
B28-29			0	30	20	600			0			0			0			0
TVMcGill			0	8	20	160	2	20	40			0			0			0
hall	2	168	336	1	168	168			0	7	168	1,176			0			0
hall			0	8	168	1,344			0			0	27	168	4,536			0
Daily			0	12	50	600			0	16	50	800			0			0
	4	50	200			0			0			0			0			0
Daily Bus..			0	6	45	270			0	9	45	405			0			0
First Floor																		
1Ws Men.			0	18	168	3,024			0	1	168	168			0			0
entrance	12	168	2,016			0			0			0			0			0
foyer	7	168	1,176	6	168	1,008			0	4	168	672	22	168	3,696			0
Lounge			0	24	168	4,032			0			0	8	118	944			0
Trib	4	30	120	12	30	360			0			0			0			0
hall			0	12	168	2,016			0	5	168	840			0			0
1Ws Fem.			0	13	168	2,184			0	4	168	672			0			0
Legalaid	19	45	855			0			0			0			0			0
Advocacy			0	8	45	360			0			0			0			0
Travelcuts			0	26	40	1,040			0			0			0			0
	4	40	160			0			0			0			0			0
	4	40	160			0			0			0			0			0
	4	40	160			0			0			0			0			0
Sadies	8	168	1,344			0			0			0			0			0
Caferama			0	22	168	3,696			0	4	78	312			0			0

Space	Square FL			FRL			Eco FRL			CFL			Double CFL			Incandescent		
Brown Building																		
SSMU Office			0	98	65	6,370			0	24	65	1,560			0			0
MISN			0	14	168	2,352			0	2	168	336			0			0
Second Floor																		
hall			0	22	168	3,696			0	6	168	1,008			0			0
Caf eating			0	96	168	16,128			0	27	168	4,536	25		0			0
PC			0	4	-				0			0			0			0
Caf serving			0	20	45	900			0			0			0	29	45	1,305
			0			0			0	4	45	180			0	10	45	450
			0	2	45	90			0			0			0	5	45	225
Lev Bukhman			0	18	50	900			0			0			0			0
Third Floor																		
3Ws Men.			0	8	168	1,344			0			0			0			0
MK			0	20	33	660			0			0			0			0
			0	4	33	132			0			0			0			0
stairs			0			0			0	14	168	2,352			0			0
skylight			0			0			0	128	168	21,504			0			0
hall	1	168	168	20	168	3,360			0			0			0	1	168	168
3Ws Fem.			0	16	168	2,688			0			0			0			0
Ballroom	11	53	583			0	26	53	1,378			0			0			0
302			0	23	25	575			0	8	25	200			0			0
310			0	10	-				0			0			0			0
Players			0			0			0			0	12	20	240			0
			0			0	6	20	120			0			0			0
			0	2	-				0			0			0			0
			0	4	-				0			0			0			0
			0	2	-				0			0			0	2	-	
			0	6	-				0			0			0			0
			0	1	-				0			0			0			0
			0	8	-				0			0			0			0
Fourth Floor																		
hall	9	168	1,512			0			0			0	8	168	1,344			0
433A			0			0	12	25	300			0			0			0
hall	5	168	840	1	168	168			0	6	168	1,008			0			0

Space	Square FL			FRL			Eco FRL			CFL			Double CFL			Incandescent		
CL	16	168	2,688	24	168	4,032			0			0			0			0
WS			0	4	-				0			0			0			0
404			0			0	8	14	112			0			0			0
405			0			0	4	6	24			0			0			0
406			0			0	4	10	40			0			0			0
407	2	6	12			0			0			0			0			0
408	2	10	20			0			0			0			0			0
409		18	0			0			0			0			0			0
410	2	15	30			0			0			0			0			0
411 *actually UTubes	4	6	24			0			0			0			0			0
412	2	18	36			0			0			0	2	18	36			0
413	2	18	36			0			0			0	2	18	36			0
414	3	10	30			0			0			0			0			0
415	2	6	12			0			0			0	2	6	12			0
416	2	18	36			0			0			0	1	18	18			0
416A			0	2	-				0			0			0			0
417	2	14	28			0			0			0	2	14	28			0
418	4	14	56			0			0			0			0			0
418 Kitchen			0	1	-				0			0			0			0
418 WS			0			0			0			0			0	1	-	
426	2	-				0			0			0			0			0
427	2	10	20			0			0			0			0			0
428	2	10	20			0			0			0			0			0
429	2	10	20			0			0			0			0			0
430	4	18	72			0			0			0			0			0
431	1	-				0			0			0			0			0
432			0			0	12	10	120			0			0			0
433			0			0	8	14	112			0			0			0
434	3	6	18			0			0			0			0			0
435	3	10	30			0			0			0			0			0
436	3	10	30			0			0			0			0			0
Sub-Totals	4 17W	h/wk	Wh/wk	1 34W	h/wk	Wh/wk	1 32W	h/wk	Wh/wk	26W	h/wk	Wh/wk	2 26W	h/wk	Wh/wk	100 W	h/wk	Wh/wk
	166	2,373	953,632	933	5,655	3,607,366	82	172	71,872	297	2,379	1,009,346	115	884	601,224	79	866	590,300

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