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POLICY PAPER

***Environmental Sustainability***

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**Table of Contents**

lntroduction 4

[Food and Waste 6](#_TOC_250020)

[Food-related Waste Reduction 6](#_TOC_250019)

[Solid Waste Management: Recycling and Composting 9](#_TOC_250018)

[Electronic Waste CE-Waste) Management 11](#_TOC_250017)

[Concerted Collection Efforts 13](#_TOC_250016)

[Food Waste Reduction and Food Literacy 14](#_TOC_250015)

[Reducing Resource Consumption 18](#_TOC_250014)

[Unnecessary Energy Usage 18](#_TOC_250013)

[Paper Usage 20](#_TOC_250012)

[Greenhouse Gases 22](#_TOC_250011)

[Sustainable Energy and Technology 22](#_TOC_250010)

[Sustainable Transportation 24](#_TOC_250009)

[Water 27](#_TOC_250008)

[Single-use Water Bottles 27](#_TOC_250007)

[Water Usage 28](#_TOC_250006)

[Accountability and Innovation 30](#_TOC_250005)

[Transparency, Outreach, and Accountability 30](#_TOC_250004)

[General Sustainable Practices Education 34](#_TOC_250003)

[Policy Creation 36](#_TOC_250002)

[University Sustainability Initiatives 38](#_TOC_250001)

[Policy Statement: 41](#_TOC_250000)

**Introduction**

McMaster University, one of four Canadian universities listed among the Top 100 universities in the world, is renowned for its innovation in both learning and discovery. Fundamental to its role as an innovator is its adoption of environmentally­ sustainable practices. While the University has demonstrated a commitment to environmental sustainability, there are further steps the University can take to secure McMaster's spot as a leading innovator both in and outside of the classroom.

The first section of the policy addresses environmental sustainability issues related to food on campus and waste. There is a high volume of waste produced on campus, much of which is related to food. Through the implementation of sustainable waste management strategies such as incentivizing reusable utensils and introducing portion sizing for campus food, there can be an effective reduction in such waste.

More awareness regarding composting practices and electronic waste disposal, accompanied by more convenient access to disposal, will also serve to promote more sustainable waste management.

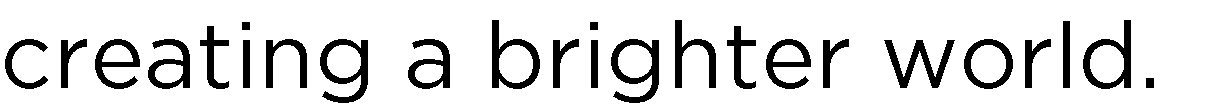
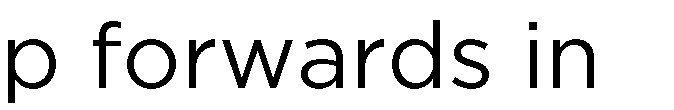
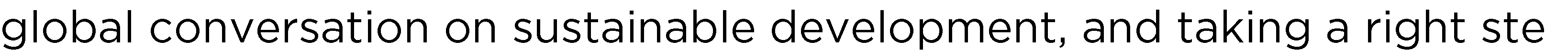
The next section discusses energy, focusing specifically on sustainable energy practices and steps towards further energy conservation. Aspiring towards a green energy campus, the University should consider fossil fuel divestment, LED and sensor lights wherever possible, in addition to other sustainable energy sources. Strategies such as reducing any nonessential usage of energy on campus and a deep energy retrofit will also successfully reduce utility costs expended on energy usage.

Next, the policy puts forth recommended means to reduce the University's carbon footprint, outlining various concerns around greenhouse gas and carbon dioxide emission as well as paper usage. A discussion on the topic of water follows,

with recommended strategies for eliminating the usage of single-use water bottles and reducing the University's water consumption.

Finally, the policy closes with recommendations for greater accountability to sustainable goals and more innovation in sustainable practices. The University is urged to improve its transparency regarding water and waste management and energy usage; increase its efforts in educating students in sustainable practices; keep its sustainability policies up to date and include more student consultation; and expand its sustainability initiatives while promoting greater interconnectedness across different University bodies with environmental sustainability causes.

By addressing these specific components of the University's environmental sustainability, McMaster can establish itself to not only be a leader as an academic institution but also a leader in sustainable development as well. The MSU would like to call on university policy makers and relevant stakeholders to tackle these student concerns at a system level, improving the student experience, contributing to a





# Food and Waste

## Food-related Waste Reduction

Principle: All members of the university community have a responsibility to reduce production of all forms of waste.

Principle: McMaster Hospitality Services should aspire towards developing and implementing sustainable food-related waste management and reduction strategies.

Concern: A high volume of waste is produced on-campus, and a significant proportion of this waste is neither recyclable nor biodegradable.

Concern: Students are unaware of existing discount programs for when they bring reusable containers.

Recommendation: The University should implement a ban for single-use plastic products, including plastic cutlery, styrofoam plates, hot beverage cups, and straws; replace them with compostable products; and encourage the use of reusable metal utensils.

Recommendation: Food vendors should implement and explicitly advertise discounts for students who bring their own food and beverage containers.

Recommendation: Hospitality Services should expand the Eco-Takeout Container Program to all its facilities and increase promotional efforts for the program.

Recommendation: All McMaster-affiliated groups and events organized on McMaster property should adhere to the Waste-Free Event Guidelines.

McMaster University has implemented commendable initiatives to reduce the production and regulate the disposal of waste. However, numerous gaps still exist in the current system, and the University has a responsibility to address them at the institutional level. A waste audit was conducted in October 2015 for the Hamilton campus of McMaster University. At the time, McMaster hosted over 30,000 students, over 1,400 faculty members, and over 7,500 staff members, which totalled to nearly 40,000 individuals.1 The audited buildings were Hamilton Hall, Burke Science Building, John Hodgins, Brandon Hall, McMaster University Student Centre, and Mills Library. In total, over 2.5 million kilograms of waste was produced, of which two­ thirds went to the landfill. Less than one-quarter was recycled (paper, electronics, metal, wood, etc.), and only 9% was composted (organics). 2 1.68 million kilograms represents a staggering amount of waste that will permanently reside in landfills.

The most viable approach to reducing landfill-bound waste is to tackle the root of the issue: waste production. Although the university cannot control how its members produce waste, it can take strategic measures to minimize or discourage waste

1 Spinnaker Recycling Corporation, Waste Audit Report 2015 McMaster University Hamilton Campus, p. 3, [http://facilities.mcmaster.ca/documents/Waste%20Audit%20Report%2020l5.pdf,](http://facilities.mcmaster.ca/documents/Waste%20Audit%20Report%2020l5.pdf) accessed February 2018. 2 Ibid., 7.

production. Promising efforts that have been made include the installation and promotion of water-refill stations by Facility Services, the Eco-Takeout Container Program by Hospitality Services, and the MSU Plastic Bottle Free Policy. 345 However, more improvements must be made.

First, most on-campus food facilities provide plastic or non-recyclable/non­ compostable utensils, thereby producing a high volume of landfill-destined waste. McMaster University offers food products and services primarily through Hospitality Services. Certain products and services incorporate more sustainable materials. For instance, single-use takeout containers for hot food from Bridges, Cafe One, La Piazza, Centro, East Meets West Bistro, and CaFFelNe are composed of sugarcane fibers and are therefore com post ab le.6 Additionally, the clear plastic takeout containers from the aforementioned locations are reportedly produced from corn and are compost ab le.7

Despite these efforts, there are a number of remaining gaps that have yet to be addressed. To begin, the compostable containers should be available at all food service locations on campus, including independent franchises (e.g., Teriyaki Experience). Further, the university and Hospitality Services should actively promote their compostability, as compostable items that end up in landfills do not break down well and therefore contributes to large volumes of waste rather than being processed into a valuable resource. Considering that single-use containers still require greater production of material and may end up in the landfill despite its compostability, the Eco-Takeout Container Program should be expanded to more dining locations, especially La Piazza. This system requires greater promotional and educational backing, particularly amongst students living in residence, who obtain the majority of their food from on-campus Hospitality Services facilities.

Regarding single-use plastic products, Hospitality Services should halt their usage of plastic utensils and opt for entirely compostable utensils, ensuring to acknowledge the distinction between "compostable" and "biodegradable". The latter can often be deceiving; it signifies that the material can be broken without oxygen within a short length of time, but it does *not* mean that no toxic residue will remain.8 In other words, *everything* is biodegradable over time. With respect to straws, the complete removal

3 McMaster University Facility Services, 2016 Sustainability Annual Report, p. 14,

[https://www.mcmaster.ca/](http://www.mcmaster.ca/sustainabil)sustaina[bil](http://www.mcmaster.ca/sustainabil) ity / documents/ Annual%20Report%202016.pdf#page=14, accessed February 2018.

4 McMaster Hospitality Services, "Eco-takeout container program: Keeping Mac green," McMaster University. accessed February 15, 2018, <http://hospitality.mcmaster.ca/sustainability.html>

5 Sustainability at McMaster, "MSU plastic bottle free policy," McMaster University. accessed February 15, 2018, [https://www.mcmaster.ca/sustainability/waste\_bottle.html](http://www.mcmaster.ca/sustainability/waste_bottle.html)

6 Sustainability at McMaster, "MSU plastic bottle free policy," McMaster University. accessed February 15, 2018, [https://www.mcmaster.ca/sustainability/waste\_bottle.html](http://www.mcmaster.ca/sustainability/waste_bottle.html)

7 Ibid.

8 BioBag USA, "Compostable vs biodegradable," BioBag Americas Inc. accessed February 15, 2018, <http://biobagusa.com/environment/compostable-and-biodegradable/>

of straws may pose accessibility concerns for individuals who may require them due to physical conditions. Therefore, paper straws should be provided instead.

Second, active measures should be taken to encourage students to bring reusable utensils, container

, and cups. Contrary to popular belief, coffee cups are *not* recyclab le.9 Certain food vendors have existing policies that offer discounts for customers who bring their own beverage containers, including Tim Hortons, Starbucks, Williams, and even Union Marke t.70 The university should push for all vendors, including Booster Juice, to offer this promotion. Moreover, most students are unaware of the discount. The university and MSU should collaborate with the vendors as well as the OPIRG McMaster Group, Mugs at Mac, to actively promote it.11 For instance, they could run an awareness campaign. The "Bring Your Own Mug" incentive should be expanded to reward those who bring their own reusable containers. In the implementation of this recommendation, Hospitality Services should adopt a calibration system that accounts for the weight variation amongst different containers. This initiative would primarily apply to food items that are charged by weight, such as self-serve salad bars. Alternatively, Hospitality Services can decrease the per-kilogram cost of food; this would also incentivize students to bring their own reusable containers.

Events hosted on campus grounds or by University-affiliated groups, such as MSU clubs, GSA clubs, and McMaster departments, should strive to maximize environmental sustainability. In particular, these groups should be required to review the Waste-Free Events Guide developed by Sustainability at McMaster and adhere to all feasible recom mendat ions. 12 Recommendations include encouraging participants to bring their own mugs and reusable containers, ensuring compostable materials are used if single-use items are required, considering alternatives to paper advertising, minimizing hand-outs, and ensuring that recycling, composting, and waste bins are accessible and well labelled. In order to ensure the active adoption of the guidelines, they should be integrated into the McMaster University Sustainability Policy, which has not been updated since March 2011.13 As this may require time, immediate actions should be taken to actively promote the use of the guide amongst all event­ organizing groups. Groups should be encouraged to explicitly request catering services, including Paradise Catering and TwelvEighty, to use china and metal instead

9 Sustainability at McMaster, "Coffee cups," McMaster University. accessed February 15, 2018, [https://www.mcmaster.ca/sustainability/waste\_cups.html](http://www.mcmaster.ca/sustainability/waste_cups.html)

10 Ibid.

11 OPIRG McMaster, "Mugs@ Mac," OPIRG McMaster. accessed February 15, 2018, [https://www.opirgmcmaster.org/portfolio-items/mugs-mac-2/.](http://www.opirgmcmaster.org/portfolio-items/mugs-mac-2/)

12 Sustainability at McMaster. 2012. "Looking to make your event sustainable and waste-free?" [https://www.mcmaster.ca/sustainability/waste\_waste\_free\_events\_guide.html](http://www.mcmaster.ca/sustainability/waste_waste_free_events_guide.html)

13 McMaster University. 2010. "McMaster University Sustainability Policy." [https://www.mcmaster.ca/](http://www.mcmaster.ca/sustainabil)sustaina[bil](http://www.mcmaster.ca/sustainabil) ity /policies/McMaster\_University\_ SustainabiIity \_Policy.pdf

of paper service, or cream and milk cartons and sugar bowls instead of individual creamers and sugar packets.

## Solid Waste Management: Recycling and Composting

Principle: Sustainable solid waste management strategies that promote correct recycling and composting practices are an essential component to sustainability.

Concern: Recyclable and compostable waste is not effectively diverted from the landfill, as students and staff do not practice correct waste separation.

Concern: There are not enough designated compost disposal bins available on campus.

Recommendation: Facility Services should ensure all bins for composting, recycling, and garbage should be located in close proximity to limit incorrect waste disposal.

Recommendation: Facility Services should design waste bins to aid correct disposal and keep the design consistent across all campus buildings to minimize confusion.

Recommendation: Facility Services should implement clear signage above waste collection bins to inform individuals and encourage them to practice correct disposal.

Recommendation: Facility Services should implement compost bins at more locations on campus.

Recommendation: Facility Services should clear compost bins daily.

The University needs to implement more substantial reforms in its solid waste management system in order to increase its waste diversion. Less than one-third of the waste produced in 2015 was diverted to recycling or compost.14 Residences scored even lower with a 28.6% diversion rate, underscoring the need to educate and promote proper waste disposal among that particular student populat ion. 15 Conflicting information was presented in the 2016 Sustainability Annual Report released by Facility Services, which reported that 38% of waste was diverted in 2015, increasing to 48% in 2016.16 The large discrepancy in statistics also highlights the need for more accurate waste auditing.

In 2015, the University released a Waste Reduction Work Plan, as mandated by the Ministry of the Environment, outlining its intention to improve waste diversion and

14 Spinnaker Recycling Corporation, Waste Audit Report 2015 McMaster University Hamilton Campus, p. 4, [http://facilities.mcmaster.ca/documents/Waste%20Audit%20Report%202015.pdf,](http://facilities.mcmaster.ca/documents/Waste%20Audit%20Report%202015.pdf) accessed February 2018. 15 Ibid., 5.

16 McMaster University Facility Services, 2016 Sustainability Annual Report, p. 13,

[https://www.mcmaster.ca/](http://www.mcmaster.ca/sustainabil)sustaina[bil](http://www.mcmaster.ca/sustainabil) ity /documents/ Annual%20Report%202016.pdf#page=15, accessed February 2018.

reduce waste pro duct ion.17 However, many of the stated goals were vague and/or were not supported with definitive action plans. For the majority of the recyclable materials, the goal statement was "Continue to recycle", with the accompanying implementation plan as "Increase the number of bins and provide educational material". The University should design a comprehensive waste reduction plan with an ongoing evaluative component as well as more detailed and sizeable action items. Moreover, the waste diversion plan should be undertaken with the reduction of waste production as the forefront priority.

Facility Services should redirect their focus from increasing the number of waste bins to increasing the correct and regular usage of recycling and composting bins by students and staff. Proper separation of waste at the source is essential to reduce contamination and, by extension, increase the possibility of recovering the materials to actually be recycled or composted. When non-recyclable items, such as food- or grease-smeared paper, are placed in recycling bins, they contaminate the recyclable items. Facilities and manufacturers are less likely to accept contaminated materials, meaning the items will ultimately end up in the landfi ll.18

To limit incorrect waste disposal, the bins for composting, recycling, and regular waste should always be located in close proximity to one another. The design of the bins is another critical consideration. Certain recycling bins on-campus have wide openings and differ from waste bins only in their colour; these should be replaced with bins that have openings corresponding to the physical shape of recyclable items. One study recognized that recycling bins with holes in the lids increased the recycling rate by 34%, while those lacking holes were essentially used as regular waste bins.19 The waste bin design should also be as consistent as possible across all campus buildings to limit confusion. Moreover, Facility Services has implemented a "new waste labeling criteria aimed at enhancing waste diversion and reducing cross­ contamination between different types of recycled waste," which is currently undergoing evaluat ion. 20 This system may be improved further; Facility Services should also place consistent signs above waste bins to better guide individuals in identifying the acceptable items for each bin. Inspiration can be drawn from waste bin signage employed by other institutions, such as Harvard Universit y.21

17 McMaster University Facility Services, Ministry of the Environment Waste Form: Report of a Waste Reduction Work Plan, [http://www.mcmaster.ca/sustainability/documents/Waste%20Reduction%20Work%20Plan-Schools-2015.pdf,](http://www.mcmaster.ca/sustainability/documents/Waste%20Reduction%20Work%20Plan-Schools-2015.pdf) accessed February 2018.

18 Stanford Recycling, "Frequently Asked Questions: Contamination," Stanford University. accessed February 15, 2018, https://I bre.stanfo rd.edu/ pssistanford-recycling/frequently-asked-questions/frequently-asked-questions­ contamination

19 Sean Duffy, Michelle Verges, "It Matters a Hole Lot Perceptual Affordances of Waste Containers Influence Recycling Compliance," Environment and Behavior 41, no. 5 (2009): 1

20 Sustainability at McMaster, "Waste," McMaster University. accessed February 15, 2018, [https://www.mcmaster.ca/sustainability/waste.html](http://www.mcmaster.ca/sustainability/waste.html)

21 Office for Sustainability, "Frequently Asked Questions: Contamination," Harvard University. accessed February 15, 2018, https://green.harvard.edu/topics/waste/signage

McMaster's composting program includes the McMaster Students Union office kitchen, Mary E. Keyes kitchen and dining area, Bridges Cafe kitchen and dining area, Twelve Eighty kitchen and dining area, Union Market, La Piazza kitchen area, Phoenix kitchen and dining area, Centro@ Commons kitchen and dining area, and the Communications Research Laboratory kitchen areas and paper towels from certain washro oms.22 Only recently in Fall 2017 was a compost bin implemented in the Student Centre thanks to a Sustainability 3X03 student initiative. While the availability of compost disposal bins is important in kitchen areas given the amount of food scraps or waste that are inevitably produced, this does not account for other areas on campus where students eat or produce other forms of compostable waste. This makes it difficult for students to adequately dispose of compostable materials, including the take-out containers in which most campus food is served, thus diminishing the potential to reduce campus-wide landfill waste and incineration.

Thus, it is recommended that compost bins are implemented at additional locations on campus such as libraries, as well as at all sit-down eateries and cafes including but not limited to the Williams Cafe in the Health Sciences Building, IAHS Cafe in the Institute of Applied Health Science, and DSB Bistro in the DeGroote School of Business.23 Bins for compost disposal should also be made available in residence buildings.

In addition to increasing the number of compost bins, these bins should be adequately labelled as being for the purposes of composting and accompanied by accessible education material indicating permissible materials to be composted, such as a poster outlining what may be placed in the bin. Coupled with these launches should be awareness campaigns on reducing food waste overall. Currently, composting rests at the bottom of the United States Environmental Protection Agency's (EPA) food recovery hierarchy. 24 Thus, the university should strongly consider first of all prioritizing food waste reduction. Additionally, the university should consider investing in, or contributing to efforts that convert food waste into industrial energy.

## Electronic Waste CE-Waste) Management

Principle: Students should be equipped with the knowledge and means of safely disposing their electronic devices.

Concern: Due to a lack of knowledge and convenient disposal locations, students incorrectly dispose of e-waste.

22 Sustainability at McMaster, "Compost," McMaster University. accessed February 15, 2018, <http://www.mcmaster.ca/sustainability/waste_compost.html>

23 McMaster Hospitality Services, "Hours of operations," McMaster University. accessed February 15, 2018, <http://hospitality.mcmaster.ca/hours.html>

24 EPA, "Food Recovery Hierarchy," United States Environmental Protection Agency. accessed February 15, 2018, [https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy](http://www.epa.gov/sustainable-management-food/food-recovery-hierarchy)

Recommendation: McMaster University should inform students of appropriate e-waste disposal practices.

Recommendation: McMaster University should establish accessible drop-off locations for e­ waste disposal across campus.

McMaster University has a total student population of 31,265,25 and with post­ secondary student owning an average of 7 technology devices,26 there is a clear need for investment in electronic waste services. As well, providing the McMaster community with several accessible locations to dispose of, and recycle old electronics aligns with the university's mission to strive for sust ainabilit y.27 On June 22 2017, the Energy Management and Sustainability Office held an "e-waste recycling day" - setting up booths to collect obsolete electronic equipment - which saw the collection of 2,245 pounds of equipment from McMaster staff, faculty, and students, supporting a need for the increased accessibility and convenience of e-waste collection services. 28

Electronic products that have become obsolete need to be disposed properly. Electronic equipment contains harmful chemicals such as cadmium, mercury, and lead.29 This means that they cannot be disposed of along with regular waste, and should be diverted from landfills. Responsible e-waste disposal is expensive and may be inconvenient due to difficulties with access. 30 As such, it is important that McMaster invests in a robust e-waste collection system that promotes responsible e­ waste disposal and facilitates e-waste reuse and recycling. Currently, there are initiatives in place that serve this purpose. However, there is limited knowledge of these services among the student body.

As of July 2017, collection cages are located year-round in locations across campus including the Arthur Bourns Building (ABB), John Hodgins Engineering Building (JHE), Information Technology Building (1TB), in a shed outside of Mills Memorial Library, Michael DeGroote Centre for Learning and Discovery (MDCL) loading dock, Engineering Technology Building, General Sciences Building, Ivor Wynne Centre, and

25 McMaster Communications and Public Affairs, "McMaster fact facts," McMaster University. accessed February 15, 2018, <http://www.mcmaster.ca/opr/htmI/opr>/fast\_facts/main/about.htmI.

26 Tammy Nelson, "Tech-Savvy College Students Are Gathering Gadgets, Saying Yes to Showrooming and Rejecting Second-Screening", Globe Newswire, June 13, 2013, <http://www.globenewswire.com/news-> reIease/2013/06/13/554002/l0036312/en/Tech-Savvy-Co11 eg e-Students-A re-Gat hering-Gadgets-Saying-Yes-to­ Sh owrooming-and- Rejecting-Second-Screening.htm I, accessed February 2018.

27 McMaster University Facility Services, 2016 Sustainability Annual Report, p. 15,

[https://www.mcmaster.ca/](http://www.mcmaster.ca/sustainabil)sustaina[bil](http://www.mcmaster.ca/sustainabil) ity /documents/ Annual%20Report%202016.pdf#page=l5, accessed February 2018.

28 Sustainability at McMaster, "Electronics recycling," McMaster University. accessed February 15, 2018, [http://www.mcmaster.ca/sustainability/waste\_lT.html.](http://www.mcmaster.ca/sustainability/waste_IT.html)

29 Sustainability at McMaster, "Electronics recycling," McMaster University. accessed February 15, 2018, [http://www.mcmaster.ca/sustainability/waste\_lT.html.](http://www.mcmaster.ca/sustainability/waste_lT.html)

30 Ibid.

Campus Services Build ing.31 While the abundance of locations for electronics collection is commended, the obscurity of the actual collection cages-from inconspicuous basement rooms to outdoor sheds-should be called into question. Thus, it is recommended that more concerted efforts should be directed toward providing information about these e-waste drop-off locations to students. Some avenues to disseminate such information include taking advantage of programming such as "tech lit" week, through information cards available in libraries, campus television screens, and student groups such as the Student Representative Assembly, and faculty societies, etc. Additionally, in an effort to make these drop-off locations more convenient, designated e-waste containers (along with pictorial instructions of what constitutes e-waste) should be placed in high-traffic areas, such as libraries and the Student Centre. Further, e-waste drop-boxes should also be made available to the almost 3600 students in residence who bring with them several electronic devices into their temporary living sp aces. 32 These initiatives will hopefully increase the amount of e-waste that is diverted from landfills.

The Sustainability at McMaster webpage includes very detailed instructions outlining what materials are permitted to be recycled, and in which dropbox it belongs. 33 Dropbox locations may differ for toner cartridges depending on their brand, discs, batteries, cell phones, etc. For example, discs can be dropped off at the Service desks in the Commons Building as well as Mary E. Keyes Residence, and at the OPIRG Office in the Student Centre, while batteries' locations include the service desks in addition to several other locations, such as the ABB room B166, the OPIRG Office in the Student Centre, and more.34 Given the intricacies of the specific item, it is vital that staff at these drop-off locations are knowledgeable of what materials will be accepted, and that there is clear and informative labelling.

With regards to disposing hazardous waste (e.g. biomedical products, chemicals, syringes, etc) which require special disposal, this should be done in compliance with procedures established by the Environmental and Occupational Health Support Services (EOHSS) office.

## Concerted Collection Efforts

Principle: Reusing and re-purposing materials is necessary to reduce waste production. Concern: During periods such as move-out, massive tons of waste is produced.

31 Sustainability at McMaster, "Electronics recycling: Battery recycling," McMaster University. accessed February 15, 2018, [http://www.mcmaster.ca/sustainability/waste\_lT.html#battery.](http://www.mcmaster.ca/sustainability/waste_lT.html#battery)

32 McMaster Student Life, "Residence & housing," McMaster University. accessed February 15, 2018, [http://future.mcmaster.ca/student/residence/.](http://future.mcmaster.ca/student/residence/)

33 Sustainability at McMaster, "Electronics recycling."

34 Ibid.

Recommendation: McMaster University should offer specialized waste management services during move-out periods that incentivize reusing and repurposing materials.

An event that occurs during the springtime among North American universities is student move-out. This includes students in university residences and, to a lesser extent, surrounding residential areas. A common trend during periods of student move-out is the production of massive amounts of trash that are no longer useful to the owner but retain the potential to be reused or repurposed; this includes kitchenware, laundry supplies, lamps, general furniture, et c.35

In the past during move-out at McMaster, rescinded student group MACgreen, in collaboration with the City of Hamilton's Waste Reduction Division, coordinated an initiative known as Swap-O-Rama. Swap-O-Rama encouraged students and residents in McMaster's surrounding areas to put out onto the curb lightly worn but reusable furniture, utensils, bicycles, electronics, household items, etc. These items are then free to be picked up by other students and community members, and Waste Management typically collects any unclaimed items on a specified date.36

It is strongly recommended that an initiative similar to Swap-O-Rama - which seems to have been last held in 2006 based on available media records - be re-established. This initiative can be spearheaded by the Sustainability at McMaster office, in collaboration with student volunteers, Residence Life, the City of Hamilton's Waste Reduction Division, and other relevant stakeholders.

To prevent the cycle of wastefulness, unclaimed items can be donated to Hamilton community centres or services that may need them. Alternatively, to reduce waste as well as promote affordability of what some may consider student essentials, leftover departing students' reusable gear can be sold at lower prices or redistributed for free to incoming students. This is currently in place, and items are sold at on-campus yard sales at the University of Massachusetts Amherst and Northeastern Universit y.37

## Food Waste Reduction and Food Literacy

Principle: Food-related sustainability practices are an important component of sustainable development.

35 Matt Rocheleau, "Students' old gear gets a recycling push", Boston Globe, September 2 2014, https:/[/www.bostongIobe.com/metro/2014/09/01/tackle-ca](http://www.bostongIobe.com/metro/2014/09/01/tackle-campus-move-out-mess-groups-colIect-selI-colIege)m [pus-move-out-mess-groups-colIect-selI-colIege­](http://www.bostongIobe.com/metro/2014/09/01/tackle-campus-move-out-mess-groups-colIect-selI-colIege) students-used-gear/ dbjILEzA tRmqKigxZuWddN/ story.htmI, accessed March 4, 2018.

36 McMaster Office of Public Relations, "McMaster and City of Hamilton prepare for student move-out," McMaster University. accessed March 4, 2018, [http://www.mcmaster.ca/opr/html/opr/media/main/NewsReleases/2005/NR\_moveout.html.](http://www.mcmaster.ca/opr/html/opr/media/main/NewsReleases/2005/NR_moveout.html)

37 Matt Rocheleau, "Students' old gear."

Concern: Many students have limited experience in food literacy, which encompasses the knowledge and skills related to the nutritional, health, environmental, and economic impact of food decisions.

Concern: Currently, food received from some vendors goes to waste.

Recommendation: McMaster University should provide more accessible resources for food literacy.

Recommendation: Hospitality Services should introduce portion sizes options by providing customers with the option of using smaller containers or receiving a reduced portion while adjusting for costs.

Many students have limited experience in food literacy, which encompasses the knowledge and skills related to the nutritional, health, environmental, and economic impact of food decisions. Consequently, their attitudes or behaviours relating to food choices may have detrimental impacts. The limited knowledge is partly due to a lack of awareness of the food literacy resources available to students. Consequently, students require more accessible resources for food literacy. This may include workshops on meal preparation, budgeting and spending, grocery shopping, and food waste. Both on-campus and off-campus groups should collaborate to organize food literacy programming. This programming should be financially, temporally, and geographically accessible, and it should be strongly promoted to the student body.

Existing programming should be more heavily promoted. For example, the Food for Thought program, which is a collaborative effort between the Student Wellness Centre, Mac Farmstand, and Mac Bread Bin, offers interactive meal preparation classes.

In Canada, about 40% of food intended for human consumption is wasted annually. 38 In addition to obvious ethical concerns, food waste has significant short- and long­ term environmental and economic consequences.39.4° For one, this results in a loss of approximately $31 billion worth of food annually. 41.42 McMaster University's sustainability efforts should include strategies to decrease food waste. Reducing food waste decreases associated food waste costs as well as contributes to reducing

38 Petergaye Gilliard, "Assessing and Quantifying Food Waste on the University of Saskatchewan Campus: Developing a Comprehensive Food-Waste Reduction Plan" (PhD diss., University of Saskatchewan, 2017), p. 9. Retrieved from https://sens.usask.ca/documents/msem-projects/P.Gilliard\_Final\_Report\_30-07-17 \_Rec%2010-31- 17.pdf.

39 Ibid.

°4 Kylie Merrow, Phillip Penzien, and Trevor Dubats, "Exploring Food Waste Reduction in Campus Dining Halls" (PhD

diss., Western Michigan University, 2013), p. 3. Retrieved from https://wmich.edu/sites/default/files/attachments/ENVS%204100%20Final%20Project%20Report%20-

%20Merrow,%20Penzien,%20Dubats.pdf.

41 Petergaye Gilliard, "Assessing and Quantifying Food Waste", p. 11.

42 Toronto Food Policy Council, "Food waste: The issue of food waste," Toronto Food Policy Council. accessed February 15, 2018, [http://tfpc.to/food-waste-landing/food-waste-theissue.](http://tfpc.to/food-waste-landing/food-waste-theissue)

the release of harmful greenhouse gases (such as methane) produced from decomposing food.43

First, it is important to conduct a food waste audit at high traffic food locations of both pre-consumer and post-consumer waste. Once adequate and accurate methods for data collection and analysis have been established, such audit can be expanded to other food vendors on campus. Pre-consumer waste is also referred to as "kitchen waste" which tends to accumulate due to food spoilage, meal overproduction, expiration, and such. This is said to be under the control of kitchen staff, while post­ consumer or "plate waste" is controlled by the consumer/guest due to food behaviours, portion sizes, and the like.4 4

One such waste audit conducted at the University of Saskatchewan's Marquis Culinary Centre revealed the highest contributor of food waste to be at the pre­ consumer (kitchen) stage, followed by the post-consumer stages of edible plate waste, and then non-edible wast e.45 This highlights a need to educate both kitchen staff and the general student body about how they contribute to, and can work to reduce food waste. The former can be achieved through the provision of training of kitchen staff on waste reduction. An avenue for education can be focused on increasing awareness of food waste on campus-information from such audits can be published by MSU's student-run newspaper, The Silhouette, to increase outreach and information dissemination to a larger student audience. Another means by which this can be done is through the use of clear bins (as green bins) that show the food waste they contain as is done at Carleton Universit y.46 Additionally, simple awareness campaigns can have far-reaching effects. For example, a study on food waste at Kansas State University revealed that 15% fewer students wasted their food after short anti-waste slogans were placed in the dining hall.4 7 Moving beyond simple awareness campaigns, it is possible to follow in the footsteps of the University of Guelph by integrating the issue of food waste into students' education plan. The unit plan is reportedly accessible to over 200 teachers from Ontario, China, and

Aust ralia. 48

With regards to portion control, McMaster University is encouraged to consider reducing the size of plates used to serve food based on the theory that smaller plates result in less waste by holding less fo od. 49 With such an initiative, it is important that meal costs are adjusted to reflect the amount of food provided. Specifically, the price per unit should remain consistent as to not discourage students from purchasing

43 Petergaye Gilliard, "Assessing and Quantifying Food Waste", p. 9.

44 Andrew Shakman, "Food waste tracking: The path to pre-consumer food waste prevention" Leanpath Inc., p. 9. accessed February 15, 2018. [https://www.epa.gov/sites/production/files/2016-](http://www.epa.gov/sites/production/files/2016-) 01/documents/2\_leanpath\_shakman.pdf

45 Petergaye Gilliard, "Assessing and Quantifying Food Waste", p. 24.

46 Ibid., 18.

47 Ibid., 19.

48 Ibid.

49 Ibid., 10.

smaller portion sizes. In other words, lower-cost meals with smaller portion sizes should offer the same value as higher-cost meals with larger portion sizes.

Another strategy to reduce food waste would be to collect and review data on students' eating preferences and patterns; this way, food that is preferred by consumers is served and waste generated from unsold foods is limited. Thus, it is recommended that Hospitality Services use consumer feedback to not only inform what meals they serve at campus vendors, but also how much of it is prepared.

# Reducing Resource Consumption

## Unnecessary Energy Usage

Principle: Energy consumption across campus buildings should be conserved whenever possible.

Principle: Energy conservation efforts should not detract from the quality of education and student, faculty, and administrative life.

Concern: Many buildings are outfitted with outdated lighting technology that uses more energy than newer and more innovative designs.

Concern: After evening classes have been completed, many lecture halls and buildings remain with lights on through the duration of the night.

Concern: The temperature in the University's building is sometimes either too cold or hot, wasting energy used on heating or air conditioning.

Recommendation: McMaster University should reduce nonessential energy use, such as heating and lighting, when campus buildings are not in use.

Recommendation: McMaster University should retrofit buildings, whenever possible with LED lights.

Recommendation: McMaster University should install sensor lights in buildings wherever possible in order to avoid unnecessary usage of energy on lighting.

Recommendation: McMaster should reduce unnecessary usage of energy on temperature control in campus buildings through adjusting building temperatures according to time of day and weather.

McMaster University space is regulated and managed by an extensive group of personnel and systems. The consumption of energy for lighting and heating to provide comfortable and safe environments is essential. However, the university should not be wasteful in its consumption of energy and seek to improve practices with current technology. The campus net electricity consumption/student/year (amount of energy consumed based on one student in one year) has remained somewhat steady since 20 0 9.50 This statistic indicates that not enough measures are being taken to reduce unnecessary usage of electricity over the course of the last several years.

Fifty one percent of McMaster's greenhouse gas emissions come from its electricity use.51 If 1000 of McMaster staff members unnecessarily leave the lights on in their offices for 2 hours each work day, this would consume 86,000 kWh of electricity

°5 Campus Sustainability Best Practices. 2008. [http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain­](http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain)

practices.pdf

51 Facility Services. 2016. "Energy Management Plan". McMaster University.

each year. This is equivalent to powering three average Canadian homes for an entire year. Hamilton Property Standards By-law requires that that all buildings have illuminated hallways, stairways, common areas and underground parking at all times. However, spaces not covered under the bylaw such as hallways, stairways, common areas and underground parking often have lights left on. By ensuring that lighting in non-essential spaces is shut off when not in use, there will be a significant reduction in overall energy usage.

Like most other Canadian universities, the academic year runs from September to April; with approximately 3,700 students occupying 12 residences. Even during summer, the energy cost is not significantly decreased with just 10,000 students and staff on campus. Most of the energy consumption is takes place due to heating, ventilation, lighting et c.52 McMaster needs to take active measures to reduce unnecessary use of energy. This includes ways to conserve energy for existing buildings and for infrastructure to implement more sustainable methods of insulation/heating practices.

While McMaster Sustainability's website provides suggestions on "Living Green" like turning off lights, the university should take a proactive approach in enforcing this practice. One approach that has been used to great effect at American universities is an innovative, volunteer-driven initiative known as Friday Night Lights Out. At Penn State University, student volunteers come together weekly on Fridays to turn off unnecessary classroom lights that would otherwise stay on all weekend. This program has been in operation since 2006 and has saved Penn State more than 700,000 kilowatt hours of elect ricit y.53 Moreover, the university should also look to either installing scheduling lights or occupancy sensors which have been noted to reduce lighting costs by 30% and 35% respect ively. 54 While the 2013 Climate Action Plan has outlined recommendations such as placing "Turn Me Off" stickers on light switches located in offices and lab spaces, students believe that the university should take a multifaceted approach and run multiple projects/campaigns. Additionally, McMaster should also continue to adopt the use of light sensors in their buildings to reduce energy waste on campus. Although adopted in some buildings such as Burke Science Building, many buildings on campus lack this technology. If McMaster were to adopt the use of more occupancy sensors, it would ensure that once an individual exits a room, the lights turn off. This would thereby help to prevent any unnecessary usage of electricity on campus and save the University more money with regard to utility expenses.

52 McMaster University. "Annual Sustainability Report 2012". [https://www.mcmaster.ca/sustainability/documents/20l6-Energy-Management-Plan.pdf#page=46](http://www.mcmaster.ca/sustainability/documents/20l6-Energy-Management-Plan.pdf#page%3D46)

53 First Joint Campus Lights Out Event Proves Successful. (2014, November 12). Retrieved March 3 2018, from <http://sustainabiIity.psu.edu/spotIight/first-joint-campus-Iights-out-event-proves->successfuI

54 Lighting Controls Strategies Can Save Money, (2010). [https://www.facilitiesnet.com/lighting/article.aspx?id=ll9l6](http://www.facilitiesnet.com/lighting/article.aspx?id=ll9l6)

Energy consumption can also be greatly reduced through addressing heating in campus buildings. For example, the University can implement stick policies that overlook the use of air conditioning in buildings. There are numerous buildings that are either too cold or hot, thereby not only wasting energy but also affecting students and staff comfort.

The State University of New York at Buffalo adopted a heating policy that calls for the university's facilities to be heated to 68 degrees (Fahrenheit) during normal occupied hours and 55 degrees during off -hour s.55 This helped substantially reduce energy consumption especially during peak hours. McMaster can implement a similar policy and the temperature may change based on the weather conditions. At Cape Cod Community College a solar array has been installed on the school's new science building. Combined with the dual occupancy/daylight sensors and daylight controls, the building systems used 35% less energy than conventional syst ems.56

Therefore, by reducing unnecessary usage of energy for lighting and heating purposes, the University can drastically decrease its overall energy consumption as well as its utility costs.

## Paper Usage

Principle: Sustainable practices should be followed in the classroom.

Concern: Many courses at McMaster currently rely on physical handouts and submissions, using unnecessary energy and creating waste in the campus environment.

Concern: Many courses at McMaster currently rely on physical custom courseware using unnecessary energy and creating waste in the campus environment.

Concern: Many course outlines in a variety of programs do not contain information related to the Sustainable Written Work Submission Guidelines or relevant McMaster sustainability policies.

Recommendation: McMaster University should mandate that professors, whenever possible, should accept student submissions for assignments using online tools such as Avenue to Learn or Learnlink.

Recommendation: McMaster University should mandate that custom courseware is made available online.

Recommendation: McMaster's Sustainable Written Work Submission Guidelines should be included on every course outline and uploaded to the program's website for easy access.

55 Campus Sustainability Best Practices. 2008.

56 Ibid.

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As students make up the majority of the university's population, it is of great importance that they are both encouraged to follow and to become involved in sustainable practices. The classroom setting is a great opportunity for students to become sustainable leaders. Despite efforts of many faculty members to decrease their waste, many course assignments and evaluations are still submitted and communicated on paper. Thus, since a great portion of the average student's time on campus takes place in the classroom, McMaster's ability to create sustainably-minded students will be most effective by focusing on this environment.

Students believe that the ability to submit work online is ideal as there is generally no waste created in the process, apart from being an easier option than a physical submission. Courses that already use Avenue to Learn or Learnlink for their courses have the option to have course work submitted online. By doing so, students would not need to print physical copies or travel to campus. Furthermore, several university courses require purchasing of custom courseware.

Unlike most textbooks, courseware are not available online requiring students to purchase physical copies of them. Students would like to see professors allow students to have the option of accessing online copies of courseware. Moving forward, professors should look to Open Educational Resources making additional materials required for courses accessible to all students.

When requiring a physical submission, many course instructors currently have strict course submission guidelines, often requiring double-spaced, one side of text per page rules, among other margin outlines. A study was done at McMaster through the Sustainability Office where professors in the faculties of Social Science and Arts & Science were surveyed to see whether they would consider changing the requirements for assignment submissions to be more sustainable with the amount of paper used. Options they were given included reducing margins, printing single­ spaced and printing double sided. This data was used to create the Sustainable Work Submission Guidelines to be implemented on McMaster's campus.This policy, however, is currently not heavily advertised or implemented in the classroom environment as they are rarely included in course outlines are conveyed to classes.57

57 McMaster University. "Annual Sustainability Report 2012". <http://www.mcmaster.ca/sustainability/documents/Annual%20Report%202012.pdf>

# Greenhouse Gases

## Sustainable Energy and Technology

Principle: Sustainable energy practises are fundamental to a sustainability-friendly campus.

Principle: LED lighting is more efficient and cost effective and McMaster should continue to adopt its usage on campus.

Concern: Currently the University relies heavily on fossil fuels for many of its energy needs, and these are not a sustainable means of powering the University's operations.

Concern: McMaster continues to use less-than-optimally-sustainable lighting technology, which is old, costly, and environmentally unsustainable.

Recommendation: McMaster University should divest from the use of fossil fuel.

Recommendation: McMaster University should use more sustainable energy sources to reduce its greenhouse gas emissions.

Recommendation: McMaster University should replace regular light bulbs in its buildings with LED lights wherever possible.

Recommendation: McMaster should replace regular light bulbs in lamps and equipment used on campus to compact fluorescent lights (CFLs) wherever possible.

Recommendation: McMaster should conduct deep energy retrofits in its buildings to identify specific areas to improve energy efficiency.

Recommendation: McMaster University should ensure that all new infrastructure on campus should adopt the most cutting edge technology and innovative practices in green energy and sustainable energy.

If the University adopted more sustainable practices, McMaster would also cut back on costs of utilities given its large usage of energy.

Fossil fuel use represents approximately 80% of all energy used in Canada and is the main source for greenhouse gas emissions.58 McMaster is one of the largest energy consumers in Ontario, and the University currently relies heavily on fossil fuels for energy, which this is not a sustainable pract ice.59 The University should consider implementing more localized and sustainable methods for energy production, such as solar panels, for example. Although implementing sustainable technologies such as solar panels requires a large upfront investment, after installation they simply require maintenance for up keep. Solar panels have the potential to long-term savings while reducing McMaster's greenhouse gas emissions.

58 Canadian Council on Renewable Electricity. 2016. "Canada's Advantage: A Vision For Renewable Electricity In Canada."

59 "Chasing The Peak". 2017. Mcmaster.Ca. [https://www.mcmaster.ca/sustainability/e\_chasing\_the\_peak.html.](http://www.mcmaster.ca/sustainability/e_chasing_the_peak.html)

Although McMaster has begun to implement more sustainable lighting technologies, it is imperative that all new lighting installed at McMaster is LED. LED lighting has a longer life span and significantly lower energy use compared to traditional lighting methods. LED bulbs use 75-80% less energy than a traditional incandescent bulb and the estimated lifespan of about 30 000 - 50 000 hours.60 In 2014, McMaster implemented LED lighting in stairways and corridors of various buildings on campus. Buildings included Gilmour Hall, Togo Salmon Hall, Chester New Hall, Kenneth Taylor Hall and Thode Library. This change resulted in savings of $154,500 annually and had a payback time of 2.6 years.61 In the interest of sustainability, efficiency, and cost effectiveness, McMaster should switch as many light bulbs as possible to LED. Last year, McMaster Facilities Services completed the replacement of nine residence buildings with LED retrofits. The initiative builds on the previous success of implementing LED lighting retrofit in campus stairwells and corridors. The estimated annual electricity consumption saving is around 985,000 kWh, and the annual GHG avoidance is estimated to be 123 metric tonnes.62 Moving forward, the university should consider fully replacing all lights with LEDs. The fact that the advantages to retrofitting have been immediate and drastic in areas where it has already taken place should make clear the benefits of such action.

In addition, changing to use of compact fluorescent lights (CFLs) in lamps and equipment when possib le.63 CFLs use 75% less energy and last seven to ten times longer than regular light bulbs. Sensor lights are an amazing way to reduce unnecessary energy consumption. The university should look into implementing vending misers, which allow vending machines to turn machine lights off. This piece of equipment cuts energy consumption in half for the beverage vending machines. Vending Misers were implemented by Tufts University on 90 machines, and they were able to save $17,0000 on 100 tons of Carbon dioxide annually. 64

McMaster should explore and fund the implementation of other sustainable energy sources on pre-existing university buildings. For example, uOttawa deep energy retrofit in the Roger Guidon Hall has savings of 1 million dollars and more than 1000 tonnes of GHG.65 A deep energy retrofit is a whole-building analysis and construction process that uses "integrative design" to achieve much larger energy savings than conventional energy retrofits. The Pembina Institute reports that two-thirds of GHG

60 McMaster University. "Annual Sustainability Report 2016". [https://www.mcmaster.ca/sustainability/documents/Sustainability%20Report%202016.pdf](http://www.mcmaster.ca/sustainability/documents/Sustainability%20Report%202016.pdf) 61 Facility Services. 2016. "Energy Management Plan". McMaster University.

62 Council of Ontario Universities. (2018). Going Greener 2017: The Road to Low-Carbon University Campuses I

Council of Ontario Universities. [online] Available at: [http://cou.on.ca/reports/going-greener-2017/.](http://cou.on.ca/reports/going-greener-2017/)

63 Campus Sustainability Best Practices. 2008. [http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain­](http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain) practices.pdf

64 Campus Sustainability Best Practices. 2008. [http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain­](http://www.mass.gov/eea/docs/eea/lbe/lbe-campus-sustain) practices.pdf

65 Council of Ontario Universities. (2018). Going Greener 2017: The Road to Low-Carbon University Campuses I

Council of Ontario Universities. [online] Available at: [http://cou.on.ca/reports/going-greener-2017/.](http://cou.on.ca/reports/going-greener-2017/)

reductions from buildings will come from retrofits to existing building st ock. 66 Deep energy retrofits take a holistic approach to renovations, targeting "energy hog" buildings, and using proven methods and technologies, will quickly help to achieve emissions reductions targets and ensure that current buildings are as energy efficient as possible. Infrastructure is essential to the economic, social and political fabric of communities. Infrastructure that is adaptable to new and improved ways of energy use will not only restore and sustain these buildings but may also protect them against disasters. The University should look to the construction of greener buildings and for the renovation of existing buildings to retrofit them with sustainable energy sources. Construction of such buildings is possible, as illustrated by the Engineering Technology Building (ETB), which is outfitted with a rainwater treatment mechanism and the ability to house solar panels. 67 The L.R. Wilson Hall is a gold LEED certified building.68 The University should look to continue outfitting upcoming buildings, such as the residence on Traymore Avenue, with renewable energy usage potential.

Students commend the University for taking steps in deep energy retrofitting and would like to see this process applied to other buildings. In 2016, the University completed work to retro-commission the ventilation in several energy-intensive labs using Demand Control Ventilation (DCV), which is recognized by the U.S. Department of Energy as a best practice. Retrocommissioning is a type of deep energy retrofit that improves the systems and equipment within a building. With DCV, ventilation is automatically adjusted based on the number of occupants or the demands they create. The Michael DeGroote Centre for Learning and Discovery and the John Hodgins engineering building now reduces CO2e (carbon dioxide emissions) by 760 tonnes annually. By continuing to apply this in other buildings, McMaster could save upwards of $400000 annually. 69

## Sustainable Transportation

Principle: Higher education institutions are looked to as leaders in promoting sustainable practices to address greenhouse gas emission.

Concern: While McMaster University current efforts are directed towards reducing emissions originating from powerplant and energy production, the university can also act to reduce emissions in smaller and mobile sources across campus.

66 Pembina Institute. 2018. "Deep Emissions Reduction In The Existing Building Stock". Pembina Institute. [http://www.pembina.org/pub/building-retrofits.](http://www.pembina.org/pub/building-retrofits)

67 Canadian Consulting Engineer. 2009. "Engineering building at McMaster shows how times have changed." [https://www.canadianconsultingengineer.com/buildings/engineering-building-at-mcmaster-university-shows-how­](http://www.canadianconsultingengineer.com/buildings/engineering-building-at-mcmaster-university-shows-how) times-have-changed/1000347313/

68 New Liberal Arts Building Moving Forward. 2012 Jun 28, <http://www.mcmaster.ca/opr/html/opr/media/main/NewsReleases/2011/BackgrounderTheWilsonBuildingforStudies> inHumanitiesandSocialSciences.htm

69 Council of Ontario Universities. (2018). Going Greener 2017: The Road to Low-Carbon University Campuses I

Council of Ontario Universities. [online] Available at [http://cou.on.ca/reports/going-greener-2017/.](http://cou.on.ca/reports/going-greener-2017/)

Concern: The thousands of automobiles arriving on and driving through campus contribute to the University's greenhouse gas emissions.

Recommendation: McMaster's Climate Action Plan, like other universities, should set a target to be carbon neutral by 2040 in the interim set to reduce the carbon footprint by 35 percent by 2020 and 70 percent by 2030.

Recommendation: McMaster University should update and enforce a campus-wide no-idling policy.

Recommendation: Parking Services should establish discounts and other incentives to encourage carpooling.

Recommendation: Parking Services should look to expand preferential parking programs for Electric Vehicles, Low Emission Vehicles and Carpool Vehicles.

Recommendation: Facility Services should increase green spaces on campus.

The Ontario university community is deeply aware of the challenges that face the world arising from climate change and the degradation of natural environments. Accepting this responsibility, universities have long been committed to addressing climate change. In 2009, Ontario's universities pledged to "assist in finding solutions to the challenges of environmental sustainability; to share knowledge about sustainability and climate change; and to incorporate, wherever possible, principles of sustainability into our own operat ions." 70 The University and College Presidents' Climate Change Action Plan, signed by Patrick Deane in 2010, commits McMaster to reducing its greenhouse gas emissions. In accordance to this action plan, all Canadian university signatories must commit themselves to reducing emissions in collaboration with their communities to develop reduction targets and measurement procedures and develop initiatives to achieve said targets.

Much work has been undertaken over the past decade to reduce reliance on fossil fuels in university operations. Over the next two years, every Ontario university will develop a plan to commit to a low-carbon campus. McMaster's Climate Action Plan in 2013 outlines a goal of reducing fleet emissions by 20% over the next four

years.71 However in order to be leader in sustainability, students believe that McMaster should establish a goal of becoming carbon neutral in the future. In the interim, it should be setting higher targets similar to that of other universities such as Queen's University which has set low-carbon solutions to reduce the carbon footprint by 35 per cent by 2020 and 70 per cent by 2030, set against a baseline year of

20 0 8.72 Moreover, universities like University of British Columbia have also followed a

°7 Council of Ontario Universities. (2018). Going Greener 2017: The Road to Low-Carbon University Campuses I

Council of Ontario Universities. [online] Available at: [http://cou.on.ca/reports/going-greener-2017/.](http://cou.on.ca/reports/going-greener-2017/)

77 Council of Ontario Universities. (2018). COU Exec Heads Green Pledge. [online] Available at: [http://cou.on.ca/wp­](http://cou.on.ca/wp) content/uploads/2015/06/COU-Exec-Heads-Green-Pledge.pdf [Accessed 3 Mar. 2018].

72 Ibid.

commitment to carbon neutrality in their operations as mandated by British Columbia law.73

Current recommendations on the Climate Action Plan involve a commitment to encouraging alternative forms of transportations. Students believe that McMaster should look to other avenues such as updating and enforce a campus-wide no-idling policy. For example, at the University Calgary the fine for idling is $50, which will be reinvested in sustainable transportation initiatives on camp us.74 Furthermore, carpooling has been found to be beneficial for both employers as it reduces the need for parking and also reduces transportation costs for employee75. Students believe that McMaster should look to encourage carpooling through programs such as incentivization. The university should also encourage sustainable transportation by expanding preferential parking programs for Electric Vehicle, Low Emission Vehicle and carpool vehicles.

An updated Climate Action Plan **will** reinforce McMaster University's leadership in and commitment to a sustainable future, including reducing energy use and emissions, and helping Ontario meet climate change targets.

Lastly, the university should look to installing more greenspaces on campus to reduce McMaster's carbon footprint. Green spaces are defined as soil surface area capable of supporting vegetation and the vegetation being supp ort ed.76 Green spaces can balance energy consumption causing changes in bio-geochemical cycles and pollution levels thereby affecting McMaster's carbon foot print .77

73 Council of Ontario Universities. (2018). Going Greener 2017: The Road to Low-Carbon University Campuses I

Council of Ontario Universities. [online] Available at: [http://cou.on.ca/reports/going-greener-2017/.](http://cou.on.ca/reports/going-greener-2017/)

74 Idle Free I Office Of Sustainability I University Of Calgary". 2018. Ucalgary.Ca. [https://www.ucaIgary.ca/](http://www.ucaIgary.ca/sustainabil)sustaina[bil](http://www.ucaIgary.ca/sustainabil) ity /transportation/idie-free.

75 "Carpool Incentive Programs: Implementing Commuter Benefits As One Of The Nation's Best Workplaces For Commuters A Website - Cite This For Me". 2018. Bestworkplaces.Org. [https://www.bestworkplaces.org/pdf/carpoo1\_June07.pdf.](http://www.bestworkplaces.org/pdf/carpoo1_June07.pdf)

76 Rajput, Swati, and Kavita Arora. "Analytical Study of Green Spaces and Carbon Footprints." In Sustainable Smart Cities in India, pp. 369-382. Springer, Cham, 2017.

77 : Strohbach, M.W., Arnold, E. & Haase, D. (2012) The carbon footprint of urban green space - A life cycle approach. Landscape & Urban Planning. 104: 220-229.

# Water

## Single-use Water Bottles

Principle: Institutions have a responsibility to eliminate unnecessary waste.

Concern: Plastic water bottles are unsustainable due to costly productions and significant impact to the environment and local communities.

Recommendation: McMaster University should be a water-bottle free campus, enforcing a water-bottle free policy and refraining from selling plastic water bottles.

Recommendation: Where possible, the university should retrofit water fountains with water bottle refill stations.

Water bottles pose a significant environmental concern. In the United States alone, 17 million barrels of oil each year are used to produce water bott les78. Plastic water bottles take an average of 450 years to biodeg rade 79. Students applaud McMaster University's collaboration with the Office of Sustainability to provide fountain stations all over campus. To date, there are over 100 water stations since its implementation in 2010, leading to a reduction of about 6.9 million water bottles in 2016.80 Students believe that the university should to continue to retrofit water fountains to provide drinking water to campus in an effort to reduce the use of disposable single-use plastic water bottles and encourage refilling reusable water bottles.

Moreover, students believe that the university should continue to conduct its operations in a socially, economically and environmentally responsible manner. Students believe the university has a responsibility in eliminating unnecessary waste. McMaster should follow the pledge of McMaster Students Union in making campus water bottle free. Several universities have pledged to being water-bottle free such as University of Toronto, Queens University, University of Guelph and University of Western.

It is important to recognize that banning single use water-bottles could result to an increase in purchasing of other drinks such as bottled soda, juices or sugar-free

drinks81 Students believe that the university should take a multi-pronged approach

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to addressing this such as promoting the sale of Boxed Water or increasing the usage of reusable water bottles.

78 "Bottled Water And Energy Fact Sheet - Pacific Institute". 2018. Pacific Institute. [http://pacinst.org/publication/bottled-water-and-energy-a-fact-sheet/.](http://pacinst.org/publication/bottled-water-and-energy-a-fact-sheet/)

79 Ibid.

80 McMaster University Facility Services, 2016. Sustainability Annual Report.

[https://www.mcmaster.ca/](http://www.mcmaster.ca/sustainabil)sustaina[bil](http://www.mcmaster.ca/sustainabil) ity /documents/ Annual%20Report%202016.pdf#page=l5, accessed February 2018.

81 Hutchins, Aaron. 2018. "How Banning Bottled Water Can Backfire - Macleans.Ca". Macleans.Ca. [http://www.macleans.ca/news/canada/how-banning-bottled-water-can-backfire/.](http://www.macleans.ca/news/canada/how-banning-bottled-water-can-backfire/)

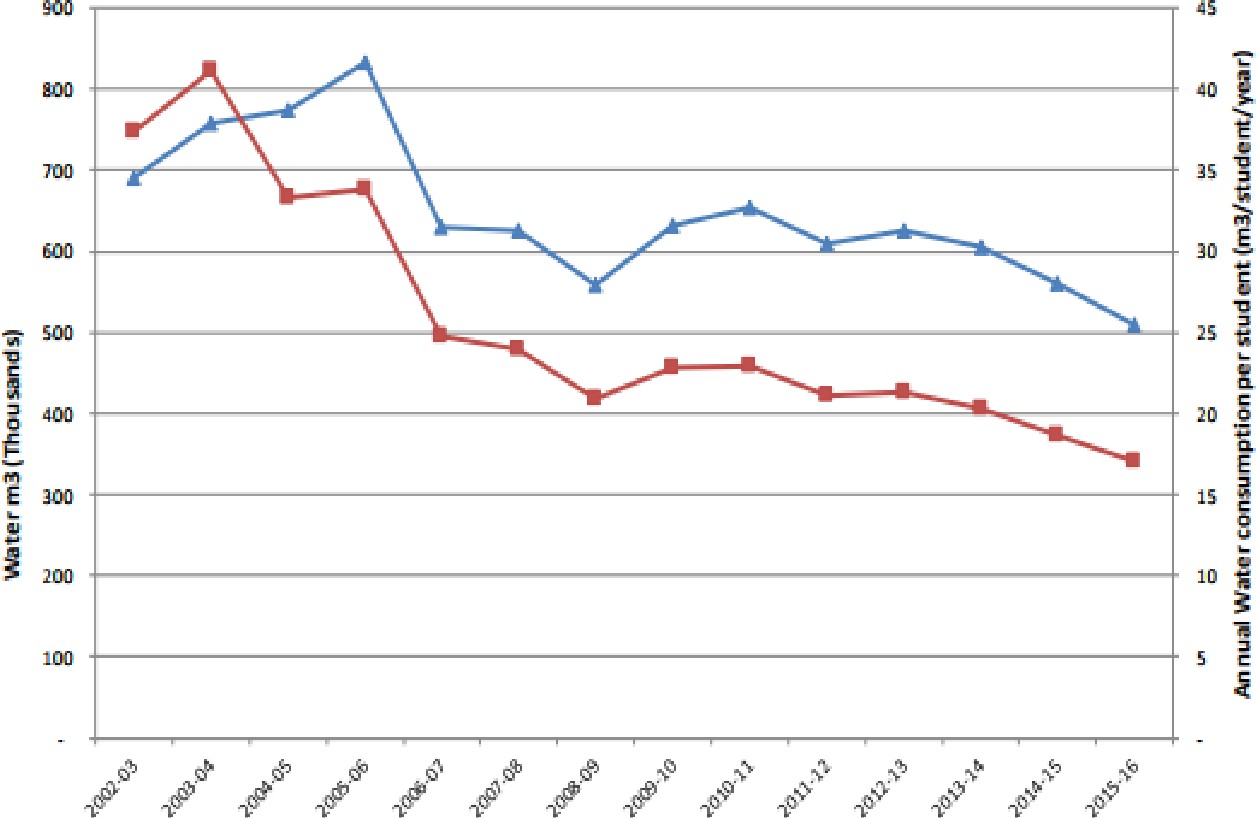
## Water Usage

Principle: When it does not detract from the quality of education and student, faculty, and administrative life, the University should conserve water whenever possible.

Concern: McMaster University consumed 500 000 m3 of water in 2015-2016.

Recommendation: The University should develop a strategy to reduce water consumption in buildings through the creation of a Water Management Plan.

McMaster currently consumes about 500 000 m3 of water. The largest demands are for use in residences, athletics, power plant cooling systems, laboratories and food preparation and serving.



**campusWater Consumption { 2002-161**

**....,\_iN'e1Wili er Consumption - Wili er Cmsumptlm / Srudent/ 'l'e·ar**

Table 1: Campus water consumption from 20 0 2-201682

The university should assess where water is being consumed and target specific areas where additional conservation where possible. Students believe that McMaster should continue its progress to reducing water usage and develop a Water Management Plan to outline strategies for further waster conservation.

McMaster Water Management Plan should consider such aspects as:

82 McMaster University Facility Services, 2016. Sustainability Annual Report.

[https://www.mcmaster.ca/](http://www.mcmaster.ca/sustainabil)sustaina[bil](http://www.mcmaster.ca/sustainabil) ity /documents/ Annual%20Report%202016.pdf#page=15, accessed February 2018.

* Standards for plumbing fixtures for use at McMaster University. The standards need to be detailed and address the different typed of fixtures that may be needed in different settings at McMaster University (residence, public washroom being renovated in an existing building, washrooms in a new building).
* Development of a McMaster University Water Conservation Policy.
* A review of all laboratory equipment to ensure that water efficiency is considered.
* An assessment of the sewage infrastructure that is needed to support decreased flow rates.
* The provision and maintenance of public drinking fountains and water bottle filling stations.
* Impact on the capacity of the sewage pumping station.
* Exploring further opportunities for using grey water and/or rain water from roof areas.
* Ensure that the implications of current and future sewer use bylaws and the associated cost are considered as part of the water management plan.
* Exploring reduction of water usage in washrooms and showers in residence

such as retrofitting taps to be more efficient and showers

# Accountability and Innovation

## Transparency, Outreach, and Accountability

Principle: The energy usage, water management, and waste management on campus should be communicated clearly and transparently.

Principle: Students are stakeholders in the well functioning of the University and should have ease of access to information about the university's environmental practices.

Concern: Students have reported cases of unclean or discoloured drinking water in various buildings across campus.

Concern: Students are not aware of single-stream recycling programs taking place on campus.

Concern: Students are not aware of matters regarding the institution's energy use.

Concern: Students are not aware of how the University is disposing of waste, recyclables, e­ waste, and composting.

Concern: Due to a lack of up-to-date information, McMaster is unable to be held accountable for their waste management actions.

Recommendation: The University should inform students of water quality and work to actively maintain drinkable water quality across campus.

Recommendation: The University should inform students more effectively of their waste disposal methods, recycling programs, e-waste disposal, and composting on campus.

Recommendation: The University should inform students of their energy use, and initiatives in place to decrease energy use.

Recommendation: The University should use online (website, social media) and in person (posters, digital signage, signs on trash and waste disposal cans) means to educate the McMaster community.

Recommendation: The University should centralize its sustainability-related reports to improve ease of access as well improve its information outreach efforts.

Recommendation: The University should keep the sustainability website and reports up to date.

Recommendation: The University should perform yearly waste audits to determine waste composition, the success of current waste diversion programs, and to identify possible program improvements in reducing, reusing and recycling waste.

As students are also stakeholders in the overall wellbeing and well functioning of the institution, McMaster University should make efforts to increase transparency of its procedures of water and waste management on campus, thereby improving the access to such information for students. Currently, students are largely disconnected

from the reporting practices employed by the university with regards to waste management practices and environmental sustainability initiatives.

One such area of concern is that of water quality on campus. Students who have lived in one of the twelve current on-campus residence buildings have reported yellow water flowing from their taps at times. This has generally been an issue of the building's water system being temporarily shut down for maintenance, leading to rust from the pipes being carried into running water when the water system is initially turned on once more. In these cases, students should be informed not only

when the water is turned off for maintenance but also when the water is safe again to use in cases of discoloured water.

Also relevant to the discussion on water quality on campus is the drinking water available through the bottle filling stations. Following a 2010 sampling and testing program done by the University to test for the concentration of lead in the drinking water, where concentrations above the Ontario drinking water standard were found in some campus buildings, the University undertook control measures including the installation of lead filters from water at the tap. Buildings constructed before 1990 with original fountains continue to be tested annually, with newly-installed fountains being tested biennially. 83

While the University's concern for safe drinking water with acceptable concentrations of lead is clear, many students remain unaware of such concerns surrounding the drinking water on campus. Looking to the enhanced bottle filling stations across campus that came as a result of a water fountain retrofits initiative that begun in 20 0 9,84 they use a filter that reduces aesthetic chlorine, taste and odour, particulate class I, and notably, lead. 85 The enhanced bottle filling stations come with visual filter monitor lights. Many students are unaware of the monitor lights or unknowing of what the different lights mean. The LED lights on the bottle filing station are there to indicate the status of the filter. The green light means the filter is in good condition and does not need any attention. A yellow light indicates that a new filter will be needed shortly. At this point, the unit is still safe to drink from as water is still being filtered. A red light indicates that the filter has reached 100% of its useable life and should be replaced promptly. The filters are good for 3000 gallons, or the equivalent of 24,000 16-ounce bott les.86 Given the total student enrolment population of over 31,000 st udent s,87 it's evident that filters will reach 100% of their useable lives and need to be changed often. The University should

83 McMaster University. n.d. "Drinking Water Quality Testing." Accessed March 3, 2017. <http://www.workingatmcmaster.ca/eohss/prevention/drinking-water-quality-testing/index.php> 84 McMaster University. 2007. "MSU Plastic Bottle Free Policy." [https://www.mcmaster.ca/sustainability/waste\_bottle.html](http://www.mcmaster.ca/sustainability/waste_bottle.html)

85 Elkay Manufacturing Company. 2017. "ezH2O Water Bottle Filling Stations." <http://www.elkay.com/ezh2o>

86 Ibid.

87 McMaster University. "McMaster Fast Facts." Accessed March 3, 2018. <http://www.mcmaster.ca/opr/htmI/opr>/fast\_facts/main/about.htmI

improve awareness of the visual filter monitor lights so that students are better informed of their drinking water quality. Furthermore, certain buildings such as Hamilton Hall, the Institute for Applied Health Sciences Building (IAHS), the DeGroote School of Business (DSB), and the Health Sciences library only have one enhanced bottle filling st at ion. 88 Therefore, when one station's filter needs to be replaced, those in the building do not have another station with the same filtered water to use in the meantime. While there is information online on the Sustainability at McMaster website regarding the locations of water fountains, it is out of date and widely unknown. Thus, it would be fruitful for the purposes of better communicating to the students the locations of the bottle filling stations to create a more accessible, updated resource that relays the information. For example, this could a map of water

fountain locations in each of the buildings or an online resource with greater visibility, which would ultimately allow students to seek out working water fountains whenever possible in the interest of optimal drinking water quality.

In addition, the University can improve in its transparency regarding waste disposal practices and energy usage. For example, the Waste Audit Report 2015 indicates that McMaster University is now using single-stream recycling, a fact of which the

majority of students are unaware. Should students be informed, this could help reduce unwanted intermingling of garbage and recyclables as students will have less sorting to do initially. A typical student will not seek out waste audit reports without being prompted to do so, and it is therefore on the initiative of the University to implement outreach efforts to spread its updated waste disposal strategies. It is also very difficult to find any information on McMaster's energy sources and energy usage reduction initiatives, which both directly impact and are directly impacted by students.

Further on the point of outreach, on the Sustainability at McMaster website, there is a link to a waste management resource video for the City of Hamilton created by the Off-Campus Resources Centre. Looking at the Off-Campus Resources Centre's Facebook page, it has less than 650 likes as of March 2018 and was last updated in the summer of 2017. In comparison, MSU Student Community Support Network's Facebook page has over 1000 likes, and their resource video published in November on city bylaws relevant to students in off-campus housing (including bylaws related to waste disposal) has been viewed over 11,000 times. Therefore, the University should aim to improve outreach through using a variety of means to communicate with students, such as better utilizing social media to spread awareness and educational information as well as employing in-person tactics such as posters, digital signage, and signage on all trash and waste disposal bins.

88 Sustainability at McMaster. 2008. "Water Fountain Locations." <http://www.mcmaster.ca/sustainability/waste_fountainlocations.html>

One of the main reasons why the University is facing issues in terms of outreach regarding such environmental sustainability-related matters may be the source of the outreach and information. In the McMaster Waste Reduction Work Plan 2015 (which is outdated, including a goal to work with the discontinued MSU service MACgreen to "expand their 'used but not bruised' notebook program"), the document outlines amongst its goals providing educational materials and information regarding source separation, cell phone recycling, and IT recycling. For the cell phones 3Rs and IT 3Rs programs in particular, it's mentioned that Facility Services will host collection events every 6 mont hs.89 However, students are unaware of such events, indicating that the collection events need to be better advertised, if they should still be ongoing regularly. Section VI of the McMaster Waste Reduction Work Plan, "Communication to Staff, Customers, Guests and Visitors," lays out "how the Waste Reduction Work Plan will be communicated to employees, customers, tenants, guests/visitors and

st ud ent s." 90 According to the plan, "McMaster's Facility Services website provides information on proper disposal of containers, paper fiber, organic material, electronics, batteries, CD and DVD's as well as information on hazardous waste and the City of Hamilton waste pro gram." 91 Unfortunately, the reality is that students will not, unless specifically prompted to do so, search out such information on the Facility Services website.

Facility Services also leads an initiative to upload monthly waste reports for each campus loading dock to McMaster's electronic resource management system and manages the McMaster Teaching and Learning Community Garden (MTCG). Given that Facility Services does so much outside of taking care of work orders and repairs, more efforts need to be undertaken to extend their relationship and communication with students. Alternatively, the educational and information function currently being spearheaded by Facility Services could be centralized elsewhere in a department or location with greater outreach with the general student population.

On the front of accountability, currently, as Winter 2018 semester draws towards a close, the most recent "Annual Sustainability Report" published is that from 2016. Additionally, the last waste audit report published by the University is from 2015. The University should aim to keep the sustainability website and reports up to date. In addition, the University should commit to annual waste audits to determine waste composition, the success of current waste diversion programs, and to identify possible program improvements in reducing, reusing and recycling waste; this would in turn help with keeping the sustainability website and reports up to date. In one

89 McMaster University. 2015. "Waste Reduction Work Plan." <http://www.mcmaster.ca/sustainability/documents/Waste%20Reduction%20Work%20Plan-Schools-20l5.pdf>

90 Ibid.

91 Ibid.

study, the implementation of analysis tools for waste management helped boost organization, transparency, and work productivity for facility services. 92

In improving the visibility and ease of access of its reports and any progress or updates, the University will also have a greater degree of accountability to uphold its commitments to its sustainability goals as well as elicit greater engagement from the student population in such matters.

## General Sustainable Practices Education

Principle: Sustainability education should begin when students arrive on campus and should continue through their undergraduate education.

Concern: Some students do not know how to properly dispose of waste, recyclables, and compost due to a lack of awareness, education and resources.

Concern: Many McMaster students who live in student housing in the greater Hamilton community do not know how to properly dispose of wastes, recyclables, and compost.

Concern: Students foreign to Hamilton and McMaster University's surrounding area may be unaware of the cleanliness of Hamilton's drinking water and, as a result, resort to plastic water bottles, reboiling tap water, or using external water filters that are sources of waste.

Recommendation: McMaster University should be proactive in educating students of proper waste, recyclables, and compost management as soon as they come to McMaster and throughout their university experience.

Recommendation: The City of Hamilton should inform all residents, including students, of municipal tap water quality and potability.

McMaster University should educate students of proper waste, recyclables, and compost management as soon as they come to McMaster and throughout their time at university. Students may not be aware of the best waste management practices, and information regarding proper waste disposal may be cumbersome to access. At the moment, the McMaster Sustainability website's guidelines for proper disposal of waste, recyclables, and compost are disjointed because information regarding the disposal of wastes, such as coffee cups, compost, plastic bottles, and electronics are on separate tab s.93 To address this, McMaster should develop a sustainability toolkit to summarize waste disposal and sustainability best practices on campus, similar to

92 Kettemann R., Fridrihsone A., Coors V. 2017. "ecoGIS-A Solution for Interactive Facility Management to Support the European Eco-Management and Audit Scheme (EMAS)." In: Leal Filho W., Mifsud M., Shiel C., Pretorius R. (eds) Handbook of Theory and Practice of Sustainable Development in Higher Education. World Sustainability Series. Springer, Cham.

93 McMaster University. "Sustainability at McMaster. McMaster University. [https://www.mcmaster.ca/sustainability/index.html](http://www.mcmaster.ca/sustainability/index.html)

the sustainability toolkits used by Western Universit y.94 The contents of these toolkits summarize how to dispose of common campus wastes (plastic bottles, food containers, and electronics), and sustainable practices (shorter showers, eating seasonally, and bringing reusable containers).

In addition, students are unaware of McMaster's switch to single-stream recycling. A toolkit should also be developed to help students transition into using single-stream recycling bins, similar to the guide produced by University of Sas katchewan. 95 These guides describe what is single stream recycling, and what can and cannot be recycled via single stream recycling.

As students transition from living on campus to living off campus, they may not be properly educated on disposal of waste in their new homes. Off-campus-housing landlords may not adequately prepare or inform their new tenants in matters of proper waste management, and the responsibility thereby falls upon the students as tenants to be educated. McMaster University should take a more proactive role in educating its students to be contributing members of the Hamilton community through collaborating with the city of Hamilton to teach students how to properly dispose of waste when they transition into their new homes. For example, McMaster can work with the city of Hamilton to provide recycling bins or trash tags to students who do not have them already in their homes. As well, they can disseminate information regarding the use of trash tags and weekly-garbage days.96 Taking these actions will ease the transition for students from residence to off-campus housing, preparing them to be a responsible member of the greater Hamilton community.

Students have expressed concerns regarding the quality of tap water at McMaster University and the greater Hamilton area. Many students have resorted to wasteful and non-sustainable "purification" practices of boiling tap water, purchasing bottled water, or using external filters prior to consuming Hamilton tap water. To prevent these practices from occurring, McMaster University should inform students that Hamilton's drinking water is potable in accordance with Ontario's Drinking Water Quality Management St andard. 97 Through taking these direct measures to educate students in proper waste disposal, single-stream recycling, waste-management off campus, and the quality of Hamilton's drinking water, McMaster University can assure that students maintain the thriving green space of the Hamilton community.

94 Rezlife. n.d. "Sustainability Toolkit Make purple more green!". University of Western Ontario. Accessed 4 March 2018. <http://www.rezlife.uwo.ca/book_sustainability/sustainability_toolkit.pdf>

95 University of Saskatchewan. n.d. "Single Stream Recycling Guide". University of Saskatchewan. Accessed 4 March 2018. <http://sustainability.usask.ca/documents/Single_Stream_Recycling_Brochure.pdf>

96 The City of Hamilton. n.d. "Garbage & Recycling". Accessed 4 March 2018. [https://www.hamilton.ca/garbage­](http://www.hamilton.ca/garbage) recycling

97 Hamilton Water Division. (2015). "Drinking Water Quality Management Standard (DWQMS)".

https:// d3fplIfl m7bbt3.cloudfront.net/sites/def auIt/fiIes/ media/browser /2 015-04-15/certi ficateofaccreditation­ dwqms\_may2015.pdf

## Policy Creation

Principle: The University should establish goals for sustainability and continue support and creation of green initiatives to accomplish these goals on campus.

Principle: Students should be involved in institutional changes related to maintaining and improving sustainability practices on campus.

Principle: Institutional sustainability policies should be up-to-date.

Concern: McMaster University's current policy base is outdated and small in both the number of policies it contains and the scope of each individual policy.

Concern: The University does not currently emphasize student opinions in their sustainability policies.

Recommendation: McMaster University should update its Climate Action Plan to include its stances and approaches to current sustainability related issues on campus, while also including research and tangible steps to accomplish each of their goals.

Recommendation: The University should revisit its sustainability policy, referring to the United Nations' Sustainable Development Goals as a guideline for developing such policies.

Recommendation: When appropriate and relevant, McMaster policies on sustainability should emphasize the student consultation that occurred, and how this consultation ensures that new sustainable practices are amenable to students.

As a world leader in innovation, McMaster University has a responsibility to aspire to the highest standards of sustainable practices within the institution. A fundamental requirement of sustainable practices is the vision: in other words, established sustainable goals put forth by the University. The University should be establishing such goals for sustainability milestones as well as moving forwards with innovative green initiatives to accomplish these goals.

Despite these expectations, the University's sustainable goals are outdated. Currently, McMaster University has developed a Climate Action Plan in 2013 that set out their intentions for maintaining sustainable practices, while also keeping these efforts accountable to society at large. McMaster University's Office of Sustainability is responsible for the sustainability of the University's campus, including areas of focus such as education, energy, transportation, waste, and wat er.98 This office also contains McMaster's policy bank on sustainability, which includes policies on sustainable buildings, battery recycling, environmentally green purchasing, plastic

98 McMaster University. McMaster Office of Sustainability: About. <http://www.mcmaster.ca/sustainability/about.html>

bags, and the official McMaster University Sustainability policy. 99 These policies and plans have not been updated for the past five years, and the MSU is concerned regarding the lack of updated official stances the university has taken on sustainability. The current "McMaster University Sustainability Policy" in particular was originally approved in December 2010 and most recently approved in March 2011.10 0 Interestingly, within the policy, it's written that the policy "will be reviewed each year and reauthorized by the Board of Governors every five years."70 7 Though

accountability for the University's sustainability goals has already been mentioned, it is worth noting that the current sustainability policy is not only outdated but also ineffective in serving as a guideline for accountability and institutional vision. The University should look towards the United Nations' (UN) Sustainable Development Goals as an example and guideline for how to write sustainability policies that hold weight in the institution's decision-making processes. With bodies such as the newly formed Sustainability Education Committee, the University should review its outdated sustainability policy and develop a new policy with more specific and clearly-defined deliverables that demand accountability. In 2012, the UN's world summit on sustainable development (WSSD) emphasized the need for higher education institutions to enhance their transparency, effective governance, and the commitment of decision-makers to implement sustainable development (SD) **in** all university operations. Integrating educational sustainable development through audited systems was a key component of embedding sustainable practices, such as universities' quality assurance system and an environmental management system.

Auditing facility services waste disposal and common practices is key to lower the University's greenhouse gas em issions.10 2 Therefore, the process itself of revisiting and redeveloping a university sustainability policy **will** contribute to the institution's commitment to and accomplishment of set goals.

For sustainability practices to be solidified on campus, the University should look for new and creative ways to integrate students. All five of McMaster's sustainability­ related policies do not include or allude to student consultation having been conducted during the policy creation process. With students participating in the University experience as fully as faculty, staff, and administration, **it** is important for student opinion to be included in sustainability efforts. One section of the McMaster University Sustainability Policy provides a strong example of the importance of student consultation outlining objectives: **1)** Provide faculty, staff and administration with opportunities to increase their awareness and knowledge of sustainability; 2)

99 McMaster University. McMaster Office of Sustainability: Policies. <http://www.mcmaster.ca/sustainability/policies.html>

100 McMaster University Sustainability Policy."

101 Ibid.

102 Karvinen M., Lundgren U., Malkki H., Sorvari J. 2017. "The Implementation of Sustainable Development in the Nordic Higher Education Institutions (HEls)." In: Leal Filho W., Mifsud M., Shiel C., Pretorius R. (eds) Handbook of Theory and Practice of Sustainable Development in Higher Education. World Sustainability Series. Springer, Cham.

Provide students with internships and volunteer opportunities in the areas of sustainable developm ent.70 3

Allowing students to engage in conversations with the University could increase the effectiveness of any future sustainability methods. Although McMaster's policy base is not as expansive as students may desire, this is not to say that McMaster does not have a robust plans on sustainability as evidenced in the Sustainability Annual

Rep or t.70 4 Students would definitely like to see McMaster's policies completed with the same level of thought and insight as their reports and action plans. Students believe that McMaster should update the Climate Action Plan and policies based on surveys and involvement with students, staff, faculty and community members in order to establish a carbon neutrality goal. The newly identified plan should also identify reduction opportunities and successes in the past.

It is important for McMaster to move towards conducting and then including student consultation and opinions in their policies. This provides several benefits. First, it empowers students to look at sustainability issues critically, and to be able to see their influence on the university environment. Second, it strengthens the University's policies because it includes an additional perspective. Students are often recognized for bringing unique contributions and solutions to global problems, and student insight into University sustainability practices is no different. Lastly, including student consultation satisfies an important accountability measure for McMaster. Students are just as active of a stakeholder in the well-being of universities as faculty and staff and therefore deserve the right to shape how their university operates.

## University Sustainability Initiatives

Principle: Sustainability initiatives should reflect unified interests of relevant university parties with sustainability causes.

Principle: Students should be provided with adequate opportunities and resources to lead sustainability initiatives.

Concern: Currently, sustainability initiatives on campus are separately organized and implemented, lacking elements of interconnectedness and collaboration.

Concern: There are limited opportunities for students to lead sustainability initiatives with the support of relevant university bodies.

Recommendation: McMaster University should coordinate a unified sustainability campaign to standardize sustainability practices among different facilities, including but not limited to

103 "McMaster University Sustainability Policy" (2011). McMaster University. [http://www.mcmaster.ca/sustainab iiity](http://www.mcmaster.ca/sustainabiiity) /policies/McMaster\_University\_ SustainabiIity \_Policy.pdf 104 "McMaster University Sustainability Report 2016" (2016). McMaster University. [https://www.mcmaster.ca/sustainability/documents/Sustainability%20Report%2020l6.pdf](http://www.mcmaster.ca/sustainability/documents/Sustainability%20Report%2020l6.pdf)

Hospitality Services, University Facility Services, McMaster Student Union, OPIRG, and Hamilton Health Sciences

Recommendation: McMaster University should establish a network of sustainability-related groups and initiatives on campus and in Hamilton.

Recommendation: There should be a physical space on campus that acts as a central location or office for university parties involved in sustainability causes to meet.

Recommendation: The University parties involved in running sustainability initiatives should employ robust cross-departmental and cross-institutional engagement to identify important questions on pertinent issues.

Recommendation: The University should increase its funding of McMaster University's sustainability education program, or the Academic Sustainability Programs Office, to allow for more undergraduate student participation in sustainability initiatives.

Sustainability initiatives on campus are currently separately organized and implemented by individual university bodies invested in sustainability causes. Such initiatives have included "The Sustain Campaign" run by various MSU parties in March 2016 and another campaign run by a student group project as part of the SUSTAIN 3S03 course. While these initiatives are not ineffective on their own, it is when sustainability initiatives reflect unified interests of and are supported by all relevant parties that they achieve their maximum potential for impact. A unified sustainability campaign should therefore be pursued, allowing the development of standardized sustainability practices across different facilities, including but not limited to Hospitality Services, Facility Services, the McMaster Students Union, OPIRG, Academic Sustainability Programs Office, and the Hospital, with input from the Sustainability Education Committee. Research by the Massachusetts Public University found that continuity and consistency with one authority was essential for

sustainable development decisions. 70 5 On that note, inter-party communication and relations should be maintained so that sustainability initiatives on campus are better connected not only internally but also externally (i.e. with parties outside of the University such as other universities), which can be achieved through various means such as meetings, email groups, or conferences. Having a physical space on campus that acts as a central meeting point for university bodies committed to sustainability causes will also help to facilitate these relationships. As an example of external connections, the coalition between Nordic universities to improve education for sustainable development includes four pillars - education, research, university operations, and external community. The coalition of Nordic countries ran successful workshops with university staff from different universities in different countries to

105 Pavlova-Gillham L., Swinford D. 2017. "Becoming Sustainable in Our Own Way: Sustainability at the Flagship Massachusetts Public University." In: Leal Filho W., Mifsud M., Shiel C., Pretorius R. (eds) Handbook of Theory and Practice of Sustainable Development in Higher Education. World Sustainability Series. Springer, Cham.

raise awareness about implementing sustainable change.706 Through the implementation of cross-departmental and cross-institutional engagement to identify important questions on pertinent sustainability issues, McMaster University can spearhead better sustainability initiatives with greater impact and broader outreach.

Finally, it is worth investing more resources into expanding the University's current sustainability education program. The Academic Sustainability Programs Office has been successful in fostering relationships between university staff, community members, and students in their efforts to engage more undergraduate students in taking leadership within sustainability initiatives. In one instance in the United Kingdom where undergraduate learning for environmental management systems was linked with small campus development projects, there was a resulting response from support staff from estates, facilities management, learning resources and catering.

These staff identified proposed projects **in** which students could get involved, for which they needed further data such as that on lighting in learning resources centre areas and food waste management schem es.70 7 Therefore, in expanding the Academic Sustainability Programs Office, the University **in** turn increases environmental initiatives on campus and incentivizes the collection of further data that can be used to inform sustainability initiatives. Expanding the Academic Sustainability Programs office is thus a central part of sustainability integration as it would motivate change makers to action and promote innovation.

106 Holm, T., Sammalisto, K., & Vuorisalo, T. 2014. Education for sustainable development and quality assurance in universities in China and the Nordic countries: A comparative study. Journal of Cleaner Production 107: 529-537. 107 Taylor, Ros, Elise Barron and Katherine A.T. Eames. 2018. "Embedding Sustainability Learning: Robustness in Changing Circumstances - Perspectives From a United Kingdom (UK) Higher Education Institution (HEI)."

In Sustainable Development: Concepts, Methodologies, Tools, and Applications, ed. Information Resources Management Association, 486-515, accessed February 27, 2018. doi:10.4018/978-1-5225-3817-2.ch023

# Policy Statement:

**Whereas:** The University should employ environmentally-sustainable practices whenever possible.

**And Whereas:** All members of the university community have a responsibility to reduce production of all forms of waste.

**And Whereas:** McMaster Hospitality Services should aspire towards developing and implementing sustainable food-related waste management and reduction strategies.

**And Whereas:** Sustainable solid waste management strategies that promote correct recycling and composting practices are an essential component to sustainability.

**And Whereas:** Students should be equipped with the knowledge and means of safely disposing their electronic devices.

**And Whereas:** Reusing and re-purposing materials is necessary to reduce waste production.

**And Whereas:** Food-related sustainability practices are an important component of sustainable development.

**And Whereas:** Energy consumption across campus buildings should be conserved whenever possible.

**And Whereas:** Energy conservation efforts should not detract from the quality of education and student, faculty, and administrative life.

**And Whereas:** Sustainable practices should be followed in the classroom.

**And Whereas:** Sustainable energy practises are fundamental to a sustainability­ friendly campus.

**And Whereas:** LED lighting is more efficient and cost effective and McMaster should continue to adopt its usage on campus.

**And Whereas:** Higher education institutions are looked to as leaders in promoting sustainable practices to address greenhouse gas emission.

**And Whereas:** Institutions have a responsibility to eliminate unnecessary waste.

**And Whereas:** When it does not detract from the quality of education and student, faculty, and administrative life, the University should conserve water whenever possible.

**And Whereas:** The energy usage, water management, and waste management on campus should be communicated clearly and transparently.

**And Whereas:** Students are stakeholders in the well functioning of the University and should have ease of access to information about the university's environmental practices.

**And Whereas:** Sustainability education should begin when students arrive on campus and should continue through their undergraduate education.

**And Whereas:** The University should establish goals for sustainability and continue support and creation of green initiatives to accomplish these goals on campus.

**And Whereas:** Students should be involved in institutional changes related to maintaining and improving sustainability practices on campus.

**And Whereas:** Institutional sustainability policies should be up-to-date.

**And Whereas:** Sustainability initiatives should reflect unified interests of relevant university parties with sustainability causes.

**And Whereas:** Students should be provided with adequate opportunities and resources to lead sustainability initiatives.

**Be It Resolved That (BIRT):** The University should make efforts to adhere to the best possible environmental sustainability practices.

Be It Further Resolved That (BIFRT): The University should implement a ban for single-use plastic products, including plastic cutlery, styrofoam plates, hot beverage cups, and straws; replace them with compostable products; and encourage the use of reusable metal utensils.

BIFRT: Food vendors should implement and explicitly advertise discounts for students who bring their own food and beverage containers.

BIFRT: Hospitality Services should expand the Eco-Takeout Container Program to all its facilities and increase promotional efforts for the program.

BIFRT: All McMaster-affiliated groups and events organized on McMaster property should adhere to the Waste-Free Event Guidelines.

BIFRT: Facility Services should ensure all bins for composting, recycling, and garbage should be located in close proximity to limit incorrect waste disposal.

BIFRT: Facility Services should design waste bins to aid correct disposal and keep the design consistent across all campus buildings to minimize confusion.

**BIFRT:** Facility Services should implement clear signage above waste collection bins to inform individuals and encourage them to practice correct disposal.

**BIFRT:** Facility Services should implement compost bins at more locations on campus.

**BIFRT:** Facility Services should clear compost bins daily.

**BIFRT:** McMaster University should inform students of appropriate e-waste disposal practices.

**BIFRT:** McMaster University should establish accessible drop-off locations fore­ waste disposal across campus.

**BIFRT:** McMaster University should offer specialized waste management services during move-out periods that incentivize reusing and repurposing materials.

**BIFRT:** McMaster University should provide more accessible resources for food literacy.

**BIFRT:** Hospitality Services should introduce portion sizes options by providing customers with the option of using smaller containers or receiving a reduced portion while adjusting for costs.

**BIFRT:** McMaster University should reduce nonessential energy use, such as heating and lighting, when campus buildings are not in use.

**BIFRT:** McMaster University should retrofit buildings, whenever possible with LED lights.

**BIFRT:** McMaster University should install sensor lights in buildings wherever possible in order to avoid unnecessary usage of energy on lighting.

**BIFRT:** McMaster should reduce unnecessary usage of energy on temperature control in campus buildings through adjusting building temperatures according to time of day and weather.

**BIFRT:** McMaster University should mandate that professors, whenever possible, should accept student submissions for assignments using online tools such as Avenue to Learn or Learnlink.

**BIFRT:** McMaster University should mandate that custom courseware is made available online.

**BIFRT:** McMaster's Sustainable Written Work Submission Guidelines should be included on every course outline and uploaded to the program's website for easy access.

**BIFRT:** McMaster University should divest from the use of fossil fuel.

**BIFRT:** McMaster University should use more sustainable energy sources to reduce its greenhouse gas emissions.

**BIFRT:** McMaster University should replace regular light bulbs in its buildings with LED lights wherever possible.

**BIFRT:** McMaster should replace regular light bulbs in lamps and equipment used on campus to compact fluorescent lights (CFLs) wherever possible.

**BIFRT:** McMaster should conduct deep energy retrofits in its buildings to identify specific areas to improve energy efficiency.

**BIFRT:** McMaster University should ensure that all new infrastructure on campus should adopt the most cutting edge technology and innovative practices in green energy and sustainable energy.

**BIFRT:** McMaster's Climate Action Plan, like other universities, should set a target to be carbon neutral by 2040 in the interim set to reduce the carbon footprint by 35 percent by 2020 and 70 percent by 2030.

**BIFRT:** McMaster University should update and enforce a campus-wide no-idling policy.

**BIFRT:** Parking Services should establish discounts and other incentives to encourage carpooling.

**BIFRT:** Parking Services should look to expand preferential parking programs for Electric Vehicles, Low Emission Vehicles and Carpool Vehicles.

**BIFRT:** Facility Services should increase green spaces on campus.

**BIFRT:** McMaster University should be a water-bottle free campus, enforcing a water­ bottle free policy and refraining from selling plastic water bottles.

**BIFRT:** Where possible, the university should retrofit water fountains with water bottle refill stations.

**BIFRT:** The University should develop a strategy to reduce water consumption in buildings through the creation of a Water Management Plan.

**BIFRT:** The University should inform students of water quality and work to actively maintain drinkable water quality across campus.

**BIFRT:** The University should inform students more effectively of their waste disposal methods, recycling programs, e-waste disposal, and composting on campus.

**BIFRT:** The University should inform students of their energy use, and initiatives in place to decrease energy use.

**BIFRT:** The University should use online (website, social media) and in person (posters, digital signage, signs on trash and waste disposal cans) means to educate the McMaster community.

**BIFRT:** The University should centralize its sustainability-related reports to improve ease of access as well improve its information outreach efforts.

**BIFRT:** The University should keep the sustainability website and reports up to date.

**BIFRT:** The University should perform yearly waste audits to determine waste composition, the success of current waste diversion programs, and to identify possible program improvements in reducing, reusing and recycling waste.

**BIFRT:** McMaster University should be proactive in educating students of proper waste, recyclables, and compost management as soon as they come to McMaster and throughout their university experience.

**BIFRT:** The City of Hamilton should inform all residents, including students, of municipal tap water quality and potability.

**BIFRT:** McMaster University should update its Climate Action Plan to include its stances and approaches to current sustainability related issues on campus, while also including research and tangible steps to accomplish each of their goals.

**BIFRT:** The University should revisit its sustainability policy, referring to the United Nations' Sustainable Development Goals as a guideline for developing such policies.

**BIFRT:** When appropriate and relevant, McMaster policies on sustainability should emphasize the student consultation that occurred, and how this consultation ensures that new sustainable practices are amenable to students.

**BIFRT:** McMaster University should coordinate a unified sustainability campaign to standardize sustainability practices among different facilities, including but not limited to Hospitality Services, University Facility Services, McMaster Student Union, OPIRG, and Hamilton Health Sciences

**BIFRT:** McMaster University should establish a network of sustainability-related groups and initiatives on campus and in Hamilton.

**BIFRT:** There should be a physical space on campus that acts as a central location or office for university parties involved in sustainability causes to meet.

**BIFRT:** The University parties involved in running sustainability initiatives should employ robust cross-departmental and cross-institutional engagement to identify important questions on pertinent issues.

**BIFRT:** The University should increase its funding of McMaster University's sustainability education program, or the Academic Sustainability Programs Office, to allow for more undergraduate student participation in sustainability initiatives.