The inaugural McMaster Climate Action Plan (CAP) was developed and adopted in 2010, with the first reporting year taking place in 2011. The outcomes of that year, including actions taken and results achieved thus far, are summarized in Appendix A: Climate Action Plan 2010: Year One Report. This report sets the framework for the 2013 renewal of the CAP, with respect to determining achievable reduction targets to strive towards and to help guide proposed initiatives to implement. Similar to the process that was used in 2010, the 2013 CAP has been developed through the consultation of working groups consisting of University administration, faculty and students focused around energy, waste and transportation.

Reduction targets for energy, waste and transportation have been defined through consultations held with the members of three CAP working groups during the month of January 2013. Each working group focused on one target area for reduction. The working group meetings were utilized to review the Climate Action Plan 2010: Year One Report, recommend target reductions for the 2013 CAP, gain perspective of current challenges and opportunities that exist in the context of sustainability, and brainstorm specific initiatives that working group members and individuals can champion within their respective areas.

It is important to note that a representative from each sub-department that holds operational responsibility for energy, waste and transportation maintained representation on each of the respective working groups. This collaboration ensured that the targets, timelines and initiative recommendations of the CAP were aligned with the strategic direction and plans for each operational area.

As recommended by each of the 2013 CAP working groups, the following targets were established:

- Energy – reduction of 4% annually for a five year period, resulting in a 20% reduction by the end of the fiscal year 2017/18
- Waste - reduction of 10% annually for the next five years respectively.
- Transportation – maintain current emission levels despite growth in population for the next five years.

The following summarizes the outcomes of and recommendations put forth by the working groups. Each group focused on educational programs and initiatives that include active management of resources consumed as well as that enable leadership by supporting and developing programs that foster engagement and provide the opportunity for members of the community to champion sustainability at the individual, group and/or department level. These initiatives are provided under “Next Steps”.

Energy: The energy working group has identified the following as examples of initiatives to help achieve the reduction goals: providing education to building occupants to support behaviour change towards sustainability, removal and recycling of inefficient electronic office and laboratory equipment as well as providing resources to support sustainable procurement. More information on these and additional initiatives to support energy reduction can be found in the McMaster Energy Management Plan that has been developed by Facility Services.

Waste: The waste working group has identified the following as examples of initiatives to help achieve the reduction goals: expanding the campus composting program and electronics recycling program as well as providing resources to support sustainable procurement. More information on these and additional initiatives to support waste reduction and diversion can be found in the McMaster Waste Reduction Work Plan that has been developed jointly by the Office of Sustainability and Facility Services.
**Transportation:** The transportation working group has identified the following as examples of initiatives to help achieve the reduction goals: identifying locations for more campus bike racks, supporting employee engagement focused on sustainable operation of vehicles to reduce fuel consumption and developing specific policies and methods of testing vehicle fuel efficiencies and setting sustainability standards for campus vehicle fleets.

**Next Steps**

The following tables comprise the initiatives put forth by the working groups, which will support the targets for reduction, for implementation in 2013.

**Energy**

Having successfully the achieved reduction goal in year one with a 2.4% reduction in energy use and to align with the forthcoming Energy Management Plan, the 2013 CAP energy working group recommends a goal to reduce electricity by 4% annually for the next 5 years.

Initiatives identified to support the reduction goal are as follows:

<table>
<thead>
<tr>
<th>Strategy to Support Reductions</th>
<th>Specific Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>“Turn Me Off” Stickers</td>
<td>“Turn Me Off” stickers will be designed and placed on light switches in office and laboratory spaces on campus. The purpose of the stickers is to remind and encourage occupants to turn off the lights when not required to further reduce energy related emissions.</td>
</tr>
<tr>
<td>Occupancy Behaviour</td>
<td>Building Energy Challenge</td>
<td>An energy reduction challenge will take place between Kenneth Taylor Hall and Chester New Hall, facilitated by the Certificate for Advanced Leadership and Management (CALM). The challenge aims to engage employee occupants within the aforementioned buildings in methods for reducing their energy consumption through changes to behaviour.</td>
</tr>
<tr>
<td>Engagement</td>
<td>Laboratory Refrigerator Removal</td>
<td>Current process used by researchers for the selection of laboratory fridges as well as removal procedures by Facility Services will be reviewed. With an understanding for these processes, education will be provided regarding fridge specifications to encourage the purchase of sustainable laboratory fridges, and an improved means of disposal for unwanted equipment will be developed.</td>
</tr>
<tr>
<td>Waste Diversion</td>
<td>Electronic Waste Collection</td>
<td>Expanding electronic waste collection on campus through the installation of more electronic waste collection cages along with continued hosting of electronic waste collection day. Prior to hosting the collection day providing educational resources and information to faculty, staff and students of what are permitted at the collection. Electronic waste collection will continue to occur once every six months on campus.</td>
</tr>
</tbody>
</table>
| Procurement                   | LED lighting | The LED lighting installation is a project being undertaken by a group of students completing a community-supported project in the course Sustain 2A03: The Sustainable Future Project. They are examining the feasibility of implementing LED lighting in four campus locations. The current rooms being considered are:  
  • McMaster University Student Centre, room 204  
  • Commons Building, room B108  
  • John Hodgins Engineering Building, room 333 |
Procurement

<table>
<thead>
<tr>
<th>Sustainable Procurement Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Sustainable Procurement Program is being designed to provide university faculty and staff with the ability to easily account for sustainability in their purchasing and procurement practices. This will be achieved by providing individuals with a Sustainable Procurement guide to assist them. The second way it will be achieved is through the amending of Request for Proposal forms to include a component of sustainability/life cycle analysis of the product being purchased.</td>
</tr>
</tbody>
</table>

Active Management

<table>
<thead>
<tr>
<th>Hiring of an Energy Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Ontario Power Authority provides funding of up to 80% of the salary costs for institutions to hire an energy manager to reduce the organizations’ consumption.</td>
</tr>
</tbody>
</table>

Waste

Having successfully achieved the reduction goal in year one, with a 45% reduction in waste generated, as well as to align with goals of McMaster’s Waste Reduction Work Plan, the 2013 CAP waste working group recommends to revise the target set in 2010 of reducing by 5% annually for the next four years by increasing the target to achieve a 10% reduction over the next five years.

Initiatives identified to support the reduction goal are as follows:

<table>
<thead>
<tr>
<th>Strategy to Support Reductions</th>
<th>Specific Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Diversion</td>
<td>Waste Reduction Work Plan</td>
<td>The Waste Reduction Work Plan was developed by Facility Services and the Office of Sustainability to actively determine methods of reducing waste produced and disposed of on McMaster University’s campus. The plan places emphasis on education for occupants and increased waste diversion infrastructure to support behavioural changes with the objective of achieving increased reduction and diversion. The full plan is available at sustainability.mcmaster.ca.</td>
</tr>
<tr>
<td>Waste Diversion</td>
<td>Office Space Composting</td>
<td>The Office of Sustainability is working to provide campus office occupants with educational resources and infrastructure (i.e. bins) to facilitate in-office composting through the identification of office champions who will engage members within their specific area in composting.</td>
</tr>
</tbody>
</table>
Transportation

The 2013 CAP transportation working group recommends the goal of maintaining fuel consumption in spite of campus population growth.

Initiatives identified to support the reduction goal are as follows:

<table>
<thead>
<tr>
<th>Strategy to Support Reductions</th>
<th>Specific Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure</td>
<td>Campus Bike Racks</td>
<td>Over the next 3 years, 600 bike parking spaces will be added campus wide to meet increased demand. In 2013, ~20 bike racks will be added campus-wide. One location of interest identified by the working group was the intramural sports facilities of the David Braley Athletic Centre.</td>
</tr>
<tr>
<td>Active Management</td>
<td>Fleet Vehicle Efficiency Policy</td>
<td>The development of this policy will ensure that campus fleet vehicles have a component of sustainability in them. If the vehicles do not meet the sustainability criterion then a department manager needs to approve them prior to purchase. To determine the sustainability criterion, the eligible vehicles of the current Ontario Ministry of Transportation, Electric Vehicle Incentive Program will be used as a frame of reference.</td>
</tr>
<tr>
<td>Active Management</td>
<td>Vehicle Renewal Program</td>
<td>The Vehicle Renewal Program aims ensure that the most fuel efficient vehicles are kept in use, while vehicles lagging in efficiency are replaced. More specifically, vehicles should be evaluated every 3 years or every 150,000 km for fuel efficiency, maintenance costs and necessity of vehicle.</td>
</tr>
<tr>
<td>Occupancy behaviour</td>
<td>Employee Engagement for Fuel Reduction Goals</td>
<td>Employees who operate vehicle fleets or who rely on transportation vehicles for to fulfill their duties on campus will be engaged to set goals for reducing fuel use on campus and making recommendations on how the reductions could be met.</td>
</tr>
</tbody>
</table>

Conclusion

In order to meet the ambitious goals defined in the 2013 Climate Action Plan, it is encouraged that all McMaster departments contribute to and engage in sustainability efforts across campus. In keeping with the recommendations of this plan, McMaster will continue to strive towards maintaining a socially, environmentally and economically sustainable campus, while promoting a culture of sustainability within the community.

Acknowledgements

Acknowledgements must be made to all the departments and individuals involved in making this Climate Action Plan happen, the contributions made are tremendous and the maintained commitment to sustainability on campus is what makes all of this possible. A list of the 2013 Climate Action Plan working group committee members can be found in Appendix B.
Appendix A: Climate Action Plan 2010: Year One Report

Introduction

This is the first report on McMaster’s Climate Action Plan (CAP). The report summarizes actions taken thus far at McMaster University and provides an update to the initial climate action document prepared in 2010. Updates include data on the 2011 calendar year, regarding reductions achieved in the three defined areas: energy, waste and transportation.

This document provides a blueprint of the current state of the CAP and will be used to guide consultations and formulate recommendations with respect to the next steps of updating the CAP for release in winter of 2013.

Overview

The three primary greenhouse gas emission sources outlined in the Climate Action Plan encompass: energy, waste and transportation. Three working groups were established, each of which focused on a specific source and was responsible for setting a timeline to track reductions, establishing reduction goals and recommending initiatives that, through successful implementation, would enable reduction targets to be achieved. An overview of the reduction goals, timelines to measure reductions and the strategy to measure consumption for each respective source is provided below.

Energy: The energy working group established a goal to reduce overall energy consumption by between 2-5% in year one* of the CAP from the current consumption in 2010. McMaster has metered each campus building for energy usage and is now able to track energy usage in real time. In order to obtain information on energy usage by devices and occupant behaviour in each academic and administrative building, a plug load analysis of the entire campus was conducted during the summer of 2010.

Waste: The waste working group established goals of 10% reduction in overall waste generated in year one and a 5% reduction each year for the subsequent four years for a total of 30% reduction in waste over five years. Waste pertains to all refuse produced and disposed of in the following four categories: organics, metals and plastics, paper and cardboard and general waste. To measure, track and manage the amount of waste disposed, monthly waste reports are prepared by McMaster’s waste service provider, BFI, as well as a bi-annual waste audits are conducted, which are facilitated in compliance with the Ministry of Environment’s standards for waste auditing.

Transportation: The transportation working group established a goal of reducing fleet emissions by 10% in year one and by 20% over the following four years. Based on the 2007 Greenhouse Gas Emissions Inventory, three specific fleets were focused on: Facility Services, Security and Parking Services, and Hospitality Services. Data has historically been tracked manually. However, an automated monitoring system was installed in October 2012, and became operational in November 2012. This new fuel management system will provide the ability to actively manage fuel consumption going forward, while also providing more accurate and detailed information being measured.
## Energy

The chart below highlights recommendations made by the energy working group, along with the results of each recommendation.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Measurable Outcome</th>
</tr>
</thead>
</table>
| Removal or upgrading of energy-inefficient research equipment                 | • Facilitated through Electronic Collection, Reuse and Recycle events. Twice annual collection events take place in April and October.  
  • Permanent collection cages for waste electronics have been installed in two key campus locations: Chester New Hall and Psychology Building |
| Improve fume hood efficiency by decreasing fume hood airflow and fume hood belt replacement | • Implemented programming upgrades and analysis conduction to ensure optimal efficiency  
  • Fume hood belt replacements have been conducted and have demonstrated a 5% increase in efficiency of energy transfer. The belt replacement was conducted in E.T. Clarke Centre. |
| Increase use of occupancy sensors for building lighting                      | • Mechanical rooms have been retrofitted with occupancy sensors  
  • Campus locations and number of fixtures installed with indicated control type [timer or motion sensor]:  
    o Ivor Wynn Centre (Building 24)- 65 fixtures [timer]  
    o John Hodgins Engineering Building (Building 16)- 71 fixtures [motion sensor]  
    o A.N Bourns Building (Building 25)- 116 fixtures [motion sensor]  
    o Michael DeGroote Centre for Learning and Discovery (Building 52)- 231 fixtures [motion sensor]  
  • Annual operation costs for the aforementioned buildings have been reduced from $27 079 to $1 128, resulting in an annual savings of $25 951  
  • Prior to installing occupancy sensors, annual energy usage was 270 789 kWh; this usage has been reduced to 11 283 kWh  
  • Total annual energy savings: 259 506 kWh |
| Education campaign regarding current energy consumption and energy conservation | • A residence-wide energy challenge was implemented. As a result of the challenge, numerous energy saving tips were communicated to residence students via community meetings and Inter Residence Council gatherings.  
  • In total, McMaster residence buildings conserved a cumulative amount of 14 270 kg of carbon equivalents. |
| Computer shutdown by power management software when not in use                | • Software installed on 23 computers has yielded annual savings of $45.00/computer.  
  McMaster’s Faculty of Health Sciences piloted the desktop power management software on 24 PCs.  
  Upon implementation, each PC is saving approximately $4/month. This is a total annual savings of approximately $1 152 for the entire computer lab.  
| Adjust heating and cooling to support the removal of electric baseboard heaters | • Facility services is continuing to work with building occupants to adjust building control systems to meet occupants needs regarding the functional design of the space with respect to heating and cooling and temperature control |

**Overall outcomes:** The reduction goal for the energy working group has been met with a current reduction of 2.4% per year and strategies implemented have proven to be efficient in terms of cost and environmental impact.
Waste

The chart below highlights recommendations made by the waste working group, along with the results of each recommendation.

<table>
<thead>
<tr>
<th>Waste</th>
<th>Measurable Outcome</th>
</tr>
</thead>
</table>
| Encourage the use of multifunction devices (MFD) to manage documents, print, scan, fax, copy and print double-sided | • Facilitated through informative presentations and Electronic Collection, Reuse and Recycling events, which focused on removal of print devices, 100 devices were collected and recycled. Following the events, thirty-one stand-alone devices were removed from campus. *Source: 2010 Sustainability Annual Report, pg. 5 [http://mcmaster.ca/sustainability/documents/Annual%20Report%202010.pdf](http://mcmaster.ca/sustainability/documents/Annual%20Report%202010.pdf)*  
• Sustainability student intern, Melissa Gallina, undertook a study to improve the usage of fleet printers in Mills Memorial Library with the goal to decrease use of personal printers and adopt use of campus MFD’s. An overview of Melissa’s study can be found at: [http://www.mcmaster.ca/sustainability/documents/Sustainability%20Open%20House%20Poster.%202012.%20Sustainable%20Printing.pdf](http://www.mcmaster.ca/sustainability/documents/Sustainability%20Open%20House%20Poster.%202012.%20Sustainable%20Printing.pdf) |
| Establish a composting system with Hospitality Services and Facility Services | • Composting services have been implemented in eight high-traffic campus buildings with support from BFI, and compost service providers, Walker Environmental Group |
| Reduce the amount of plastic bought on campus through retrofits of water fountains, education or take back packaging | • McMaster has successfully retrofitted over 60 water fountains across campus. This retrofit was accompanied by an educational and promotional campaign.  
• Plastic bottle free zones have been implemented. To promote the use of reusable water bottles, filling stations and water fountains include a poster image with the advert “’tis better to refill than to landfill”. The McMaster Students Union (MSU) has also adopted the Plastic Bottle Free Policy and implemented plastic bottle free zones in the MSU main office and other service locations. The policy can be found at: [https://msu-production.s3.amazonaws.com/content/documents/Link/General%20and%20Other%20Policies/2011-2012/Plastic%20Bottle%20Free%20Policy.pdf](https://msu-production.s3.amazonaws.com/content/documents/Link/General%20and%20Other%20Policies/2011-2012/Plastic%20Bottle%20Free%20Policy.pdf)  
More information about McMaster’s water fountain retrofit initiative and MSU Plastic Bottle Free Policy can be found here: [http://mcmaster.ca/sustainability/waste_bottle.html](http://mcmaster.ca/sustainability/waste_bottle.html) |
| Increase the number of recycling bins on campus and educate to encourage proper recycling practice | • Increased the number of waste and recycling bins across campus and expanded the campus “this, that, the other” campaign  
More information about recycling at McMaster can be found here: [http://mcmaster.ca/sustainability/waste_recycle.html](http://mcmaster.ca/sustainability/waste_recycle.html) |

Overall outcomes: Success has been seen in implementing and taking steps towards alternatives means of waste disposal (i.e., waste diversion). The targeted goal was a 10% reduction. This goal has been surpassed with a total reduction of 45% of total waste generated on campus between 2009 and 2011.
Transportation

The chart below highlights recommendations made by the transportation working group, along with the result of each recommendation.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt fuels such as natural gas or propane to fuel campus vehicles</td>
<td>• An alternative fuel model, including natural gas or propane, has not been implemented; however, a focus on electric vehicles has been employed. Examples include an additional electric vehicle purchased by Security and Parking Services, as well as an electric cart purchased by Facility Services for mail delivery.</td>
</tr>
<tr>
<td>Encourage alternative forms of transportation</td>
<td>• McMaster installed 20 additional bike racks on campus in the spring of 2011 and has facilitated events such as the Clean Air Commute and Carpool Week</td>
</tr>
<tr>
<td>Ensure the right-sized vehicles are used on campus and are suited to their tasks</td>
<td>• Facility Services ensures that smaller electric vehicles are employed for light-duty tasks, rather than larger vans or trucks</td>
</tr>
<tr>
<td>Determine whether there are more efficient means of moving goods across campus</td>
<td>• With the implementation of McMaster’s new office supplies contract, an electric cart has been purchased to deliver office supplies once each week, rather than employing a van to deliver goods on a daily basis</td>
</tr>
</tbody>
</table>

Overall Outcomes: Introduction of electric vehicles and adjusting the flow of goods on campus has enabled total transportation-based emissions to remain constant, while McMaster’s population has grown. There is a need for better active management and measurement of fuel consumption and fuel efficiency of all on-campus vehicles.

Conclusion and Next Steps

In response to the first report on McMaster’s Climate Action Plan, each of the working groups will convene to review progress made and to formulate a new list of initiatives and recommendations that will help guide the setting of future emission reduction targets. This first report and the forthcoming list of recommendations comprise the 2013 Climate Action Plan.
Appendix B: Climate Action Plan Committee Working Groups

**Energy Working Group**

Assistant Vice-President, Facility Services: Mohamed Attalla

Chief Operating Engineer: Joe Emberson

Facility Services Energy Manager: TBA

Senior Manager, University Sustainability: Kate Whalen

Chief Risk Officer (Administration): Rob Cooper

Director, Strategic Procurement: Austin Noronha

Service Manager, Facility Services: Bill Clark

Administrator, Research & Facilities (Faculty of Science): Seanna-Lin Brodie-Keys

Special Projects Coordinator/Undergraduate Coordinator, Chemistry: Leah Allan

Lab Manager, Chemical Engineering: Doug Keller

Residence Service Specialist: David Speagle

Electrical Engineering Student: Zeinab Rahal

Sustainability Student Intern: Meaghan Langille

Manager, University Sustainability: Katie Ferguson
**Waste Working Group**

Assistant Vice-President, Facility Services: Mohamed Attalla

Director, Custodial Services, Facility Services: Carlos Figueira

Senior Manager, University Sustainability: Kate Whalen

Chief Risk Officer (Administration): Rob Cooper

Service Manager, Facility Services: Bill Clark

Chef Manager, Bridges Café, Hospitality Services: Leigh Laidlaw

Director, MacGreen, McMaster Students Union: Scott MacDonald

Director, Strategic Procurement: Austin Noronha

Sustainability Student Intern: Meghan Langille

Manager, University Sustainability: Katie Ferguson

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**Transportation Working Group**

Assistant Vice-President, Facility Services: Mohamed Attalla

Supervisor, Materials Handling & Trucking, Facility Services: Don Leyland

Director, Security & Parking Services: Terry Sullivan

Senior Manager, University Sustainability: Kate Whalen

Chief Risk Officer (Administration): Rob Cooper

Manager, Paradise Catering, Hospitality Services: Larry Marsh

Assistant Professor, School of Geography and Earth Science: Antonio Paez

Student, Transportation: Madeline Ferguson

Sustainability Student Intern: Meghan Langille

Manager, University Sustainability: Katie Ferguson