Dalhousie University

Sustainability Progress Report for Campus Operations 2010–2013
## Table of Contents

Summary – 3  
Increased diversion of solid, liquid, and hazardous waste – 4  
Reduce electricity, fuel, and water consumption per person – 7  
Reduce Green-House Gases (GHGs) – 12  
Increase renewable energy supply on campus – 13  
Increased travel (commuting and business) through sustainable modes – 14  
Enhanced urban biodiversity – 16  
Buildings achieve green building certification status – 17  
Sustainable food offerings – 18  
Major planning, policy, reporting, and communication products – 19  
Sustainability is reflected as a core concentration in the University – 21  
Positive student and employee experience – 22  
Future Plans – 24

---

**Acknowledgements:**  
Thank you to the many departments, faculties, and community partners who have worked and supported sustainability initiatives across campus. These efforts are reflected in progress that has been made.  
A special thank you to all the Dalhousie students who have worked in the Office of Sustainability on a variety of initiatives and members of the President’s Advisory Council on Sustainability for support.  
The Office of Sustainability works with many partners on operational projects from Facilities Management to Ancillary Services. These partner’s interest and engagement is essential and appreciated as we move forward.

The Sustainability Progress Report for Campus Operations was prepared by The Dalhousie Office of Sustainability.
Dalhousie University has been engaged in environment and sustainability issues in its day-to-day operations, curriculum, research, and student life for many years. In January 2008, Dalhousie University began a period of new growth and focus on environment and sustainability issues with the addition of the University Office of Sustainability, Dalhousie Student Union Sustainability Office, and the College of Sustainability. In 2008, the President’s Advisory Council on Sustainability was formed with representation from students, Deans, senior administrators, faculty, staff and alumni.

In August 2010, Dalhousie adopted a Sustainability Plan designed to provide strategic direction for achieving sustainability outcomes in campus operations. One of the requirements of the University Sustainability Policy and Plan is to issue a public report every three years outlining Dalhousie’s sustainability efforts as it relates to plan indicators. This report covers results for Phase 1 targets from 2009 to 2013. In these years, Dalhousie and partners have invested over $40 million in energy and water related projects. Most targets for this reporting period were achieved (Table 1). In September 2013, the Nova Scotia Agriculture College in Bible Hill, N.S. merged with Dalhousie University to become the Faculty of Agriculture. In future reports, information will be provided for all Dalhousie campuses including the Agricultural campus.

### Table 1. Progress summary in reaching sustainability targets.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Targets (Phase 1)</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased diversion of solid, liquid, and hazardous waste</td>
<td>55%</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Reduce electricity, fuel, and water consumption per/person</td>
<td>5%</td>
<td>Achieved for electricity and water but not fuel.</td>
</tr>
<tr>
<td>Reduce greenhouse gases (GHG)s</td>
<td>10%</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Increase renewable energy supply on campus</td>
<td>Plan &amp; pilot</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Increased travel (commuting and business) through sustainable modes</td>
<td>Transportation Demand Management (TDM) Plan</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Enhanced urban biodiversity</td>
<td>Natural Environment Plan</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Buildings achieve green building certification status</td>
<td>All new buildings</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Sustainable food offerings</td>
<td>Comprehensive plan</td>
<td>Targets set and actions taken.</td>
</tr>
<tr>
<td>Major planning, policy, reporting, and communication products incorporate sustainability concepts and criteria</td>
<td>Documents will be listed</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Sustainability is reflected as a core concentration in the University curriculum at the undergraduate and graduate level</td>
<td>Assessed at each phase</td>
<td>Achieved.</td>
</tr>
<tr>
<td>Positive student and employee experience</td>
<td>Assessed at each phase through qualitative and quantitative measures</td>
<td>Positive experiences identified/Issues identified for action.</td>
</tr>
</tbody>
</table>
Target: Increased diversion of solid, liquid, and hazardous waste (Target: 55%)

Target was achieved

Dalhousie University is committed to the four ‘R’s’: re-think, reduce, reuse, and re-cycle. Waste diversion refers to the quantity of waste that becomes directed, or ‘diverted,’ away from landfill sites and/or incinerators. The diversion rate refers to the total waste that is diverted from landfill sites.

In recent years, the University has devoted an increasing amount of time and resources to waste management. A number of documents were created in this reporting period including a Materials Categorization Guide, a Bin Ratio study, a What Goes Where Guide, a Construction and Demolition (C&D) Debris opportunities study, and an Institutional, Commercial, and Industrial Waste Management Guide. Over eight waste audits were completed including a full campus audit.

Some examples of on-going waste diversion programs include switching single printers to multi-functional devices on campus. This program, led by the Print Centre, reduces paper waste, saves electricity, and toner costs. A large annual community

Figure 1. Dump and Run event at the Studley Gym.
yard sale, the Dump and Run, is populated with material from the community and residences (Figure 1). This event is led by the Saint Mary’s University student society in conjunction with Dalhousie. A program to switch single office garbage bins to recycling bins and mini-waste bins was launched by Facilities Management to help to promote diversion (Figure 2).

Efforts have been made to standardized bin signage across campus and identify the need to reduce single garbage cans (Figure 3). As part of new building construction high levels of construction and demolition (C&D) diversion were achieved through initiatives such as deconstruction (Figure 4). Through the Procurement department, goods at end of life are marketed online to other Departments and eventually the community to extend the life of material. On campus, there are programs and facilities to divert paper and cardboard, recyclables, organics (throughout buildings and in kitchens), electronics, construction and demolition waste, fluorescent lights, paint, batteries, and other universal waste. The Environment, Healthy, and Safety Office provides some chemical recycling and is working on an online-database for chemical purchasing. For some materials streams such as electronics and paper, diversion weights are accessible and tracked (Figure 5). For other materials, accurate weights are not available. Further work is being done to receive regular weights for all materials. Having some weights and not others makes
it challenging to create a solid baseline. As such, other methods such as auditing are used to create estimations. In the next version of the Sustainability Plan it is suggested waste management progress also be tracked by population, percentage of diversion, and/or total material stream weights or volumes.

As a result of a number of initiatives and policies, the University has been able to meet the target of 55% waste diversion and is currently diverting approximately 60% + of material from the landfill. These figures includes estimated and real weights for paper and cardboard, recyclables, organics, and waste.

If other material streams such as C&D and electronic waste are added the percent diverted from the landfill increases. There is room for improvement, as the University eventually would like to have a landfill diversion rate of 75%.

A number of initiatives are currently being worked on including a University Waste Management Plan. More information on what Dalhousie is doing to increase diversion rates can be found at the Procurement and Waste Management section of the Office of Sustainability website.
Reduce electricity, fuel, and water consumption per person (Target: 5%)  
Target was achieved and exceeded for electricity and water but not fuel

There are a number of variables that impact utility consumption including weather, occupant density, space use (lab buildings use more energy than academic buildings), square footage, and construction projects. The utility budget is impacted by consumption and costs. The cost of utilities (electricity, fuel, and water) are on an upward trend.

**Electricity:** On campus, electricity is used for functions such as lighting; heating, ventilation, and air conditioning (HVAC) systems; chilling (large electrical chiller); and equipment. Depending on the building, HVAC and equipment maybe the primary source of electricity use.

During this reporting period, a number of electricity projects were completed including campus lighting upgrades at all houses, 38 buildings, and all outdoor lighting; upgrading of commercial kitchen equipment and clothes washers to ENERGY STAR products in residences, and the replacement of 491 old fridges and freezers. An ongoing educational campaign, “Rethink,” has been launched. This includes activities from the residences annual Ecolympics to the Brightest Idea Competition (Figure 6).
For electricity, on average 1% of total kilowatt hours (kWh) have increased compared to the 2009 baseline year. The kWh per square foot of campus property has reduced while campus population rose by 10%.

There is a 5% kWh reduction per person comparing 2009 to 2013. Costs have risen by 13% since 2009 (Figure 7).

**Figure 7.** Electricity consumption per person from 2009–2013.

**Figure 8.** Potable water stations used at Orientation Week.
**Water:** On campus, potable water is used for fixtures (faucets, toilets, urinals, showers); laundry and kitchen use (there are seven commercial kitchens at the Halifax campuses), water-cooled equipment, process water (ex. cooling towers), for research, and the pool.

During this reporting period, a number of water projects were completed including water fixture upgrades at the Life Science Centre (LSC), boiler control upgrades at the Central Heating Plant, a rain water cistern built as part of the Mona Campbell building for flushing toilets, and reducing the number of water-cooled units. A water reduction policy was passed at the university and a bottle water ban for 2015 at the Dalhousie Student Union (DSU) Bld. Using potable water instead of bottled water at events is encouraged as demonstrated at Orientation Week when the HRM Water Commission provides water stations for events (Figure 8). New fountains with filtration and reusable bottle fill ups are replacing older versions each year.

On average, water consumption was reduced from 2009 baseline by over 15%. Costs went up by 14% and population by 10%. A total reduction of 27% per person per m³ (1000 liters) was achieved in 2013 compared to 2009 (Figure 9).

**Figure 9.** Water consumption per person from 2009–2013.
**Fuels:** On campus, fuel (diesel, propane, light fuel oil, and natural gas) is used for back-up generators, kitchen cooking, lab equipment, heating, humidification, and some cooling (large steam chiller). Approximately 95% of the Halifax campuses structures are on a District Energy (DE) system. Natural gas is used at the central plant to make steam which is sent to buildings for heating. Some buildings also receive cooling through a central chilled water loop.

A number of projects were completed including steam-trap upgrades, water tank insulation, and the addition of variable air volume controls in the Life Science Centre (Figure 10). Fuel consumption from the 2009 baseline increased (Figure 11).

The fuel energy, expressed in kWhe was normalized for weather (line shown to consider Heating, Degree, Days (HDD). In 2010-2011 the campus switched from Bunker C to natural gas. Bunker C has a higher heat content value per comparable unit than natural gas. A weather normalized adjusted heating value trend line is shown to compare different fuel types (Figure 11).

*Figure 10. Hot water tank insulation wrapping with Efficiency NS partner.*
More projects have been targeted for heating reductions for the future. Consumption analysis will need to take into consideration the type of buildings being added to our portfolio and what types of heating systems are being used (electricity versus steam based).

On average, fuel consumption increased by 10% from 2009 baseline. Costs were highly variable with a decrease in price from switching from oil to natural gas and then a couple of years of varying gas prices. Population increased by 10%. A total increase of 6% per person per kWh was seen in 2013 compared to 2009 (Figure 11). When normalized for weather and heating value, the average per consumption increase is closer to a 5% increase.

Figure 11. Fuel trends with consideration for weather and heating value.
Dalhousie supports reducing GHGs emissions and other air pollutants through various operations. On December 11 2009, Dalhousie’s President signed the University and College’s Climate Change Statement for Canada.

In 2010, Dalhousie released its comprehensive Climate Change Plan that includes key goals of reducing greenhouse gases, adapting to a changing climate, and increasing knowledge through action strategies. Each year a GHG inventory report is released to track progress on climate change objectives. During the reporting period, Dalhousie switched from Bunker C oil to natural gas. The switch is a major factor in the reduction of greenhouse gas emissions in this period. Since 2009, scope 1 and 2 GHGs have been reduced by 14% and by person by 25% (Figure 12).

**Figure 12. Emissions reductions based on total CO\(_2\)e from 2012 compared to 2009.**
Increase renewable energy supply on campus (Target: Plan and pilot)

Target met

Renewable energy refers to energy that comes from natural resources such as sunlight, the earth, the sea, and wind, and organic sources. Dalhousie is making strides in increasing the percentage of renewable energy sources on campus.

In 2012, the University released a Campus Energy Master plan that includes a major chapter on renewable energy opportunity. Dalhousie’s newest building, the Mona Campbell Building, generates approximately 5% of its building heat via a solar wall. In 2011, 40 solar panels were installed on the LSC to pre-heat domestic hot water. More opportunities have been identified and will be pursued in the coming years.

Figure 13. Solar thermal panels on-top of the Life Science Centre.
Increased travel (commuting and business) through sustainable modes (Target: TDM plan)

**Target Met**

In 2011, Dalhousie University released its Transportation Demand Management (TDM) plan. The goal of the plan is to improve the efficiency of the transportation system and to maximize the use of existing transportation investments by increasing vehicle occupancies, improving efficiency in travel time and travel routes and reducing trip frequency and distance.

During the reporting period, a number of programs and processes were launched including:

- an annual commuter survey;
- a Smart Trip website;
- an Employee Bus Program with HRM;
- an Institutional TDM committee with Capital Health, IWK, SMU and HRM;
- a Campus Bike Centre (Figure 14);
- a university-wide tele-working policy;
- an agreement for Car Share services on campus;
- the installation of 250 more bike racks;
- active transportation guidelines for the university; and
- many events on campus and in the community. More information can also be found under the Transportation section of the Office of Sustainability website.

Regarding fleet management, Facilities Management has purchased bikes for staff for campus travel, purchased mini-trucks for grounds work, and have deployed GPS units in vehicles to help with tracing fuel and idle rates (Figure 15).

![Figure 14. Student Bike Centre volunteer.](image-url)
Enhanced urban biodiversity (Target: Plan)

Achieved

Enhancing urban biodiversity and urban green space not only improves campus aesthetics, but such enhancement is essential for particular ‘natural’ services like water filtration and absorption, air filtration, and nutrient recycling.

From 2009–2013, a study was conducted on campus that investigated Dalhousie’s plant species (Figure 16). The data from this natural environment inventory has been used along with focus groups, bird inventories, surveys, and mapping to create the Natural Environment Plan and design guidelines.

The new design guideline offers details including species selection and diameter replacement calculation for any trees taken down on campus so they can be restored.

The Natural Environment Plan provides detailed objectives, actions and targets. More information on Dalhousie’s Natural Environment can be found at the Natural Environment section of the Office of Sustainability website.

Figure 15. Grounds staff in mini-trucks.

Figure 16. Dalhousie students surveying tree attributes for the Natural Environment Plan.
Buildings achieve green building certification status (Target: All new buildings)

Green building seeks efficiencies in energy, water and materials use, more efficient operations, and proper materials re-use and disposal at the end of a building’s life cycle. In addition to the positive environmental impacts of green building, an organization’s operating costs can be substantially reduced, and human health can be improved through better indoor air quality and reduced levels of toxic substances in the building process.

Since 2009, all new buildings opened or under development are registered through LEED and certification is being pursued. In September 2010, Dalhousie opened the Mona Campbell building (Figure 17), which received LEED Gold certification. The Life Science Research Institute (LSRI), opened in 2011. It has received LEED silver certification. In 2011, a LEED Gold building policy for new construction was approved. Other initiatives on campus included the multi-million dollar retrofit of the Life Sciences Centre.

Major energy and water retrofits for existing buildings are underway. Energuide assessments have been completed on all campuses houses and work is being done. Energy audits have been completed for all campus buildings. For videos, fact sheets, and other information on Dalhousie’s commitment to green building, please visit the Built Environment section of the Office of Sustainability website.

Figure 17. Bubble Deck floor slabs being installed in the Mona Campbell Building.
Sustainable food offerings
(Target: Comprehensive plan)

Adopting STARS policy framework for dining services

Dalhousie is a Charter participant of the North American University Sustainability rating system behind the Computer Science Building. Students, faculty, and staff have access to space for growing food at the South House garden on the Studley campus and at the Common Roots Urban Farm in central Halifax.

Food Services programs started during the program reporting period include initiatives such as introducing TrayLess Dining to campus (Figure 18); vegetarian, vegan, and local food days; and Farm-to-Table Programs where local farmers interact with students at residence halls about products being served. Ancillary Services is working to renovate kitchen areas with new ENERGY STAR equipment, adding variable speed drives on fans, and adding low-flow water spray heads. Educational signage and posters are promoted at food service locations. Reusable dishware and organics collection is used in dining halls.

The Dalhousie student Community Garden at the Halifax campus is located behind the Computer Science Building. Students, faculty, and staff have access to space for growing food at the South House garden on the Studley campus and at the Common Roots Urban Farm in central Halifax.

The ‘Loaded Ladle’ is a non-profit cooperative run by students and community members with the mandate to provide fresh and healthy food to the campus while educating the public about food and environmental politics. Students pay a small fee with their tuition that funds the Loaded Ladle’s alternate food options, served three days a week.

Figure 18. Trayless Dining on Campus
Major planning, policy, reporting, and communication products incorporate sustainability concepts (Target: Documents listing)

In January 2008, the Office of Sustainability was established at the university as a means to better address today’s emerging sustainability operational challenges. The Office works to incorporate sustainability concepts and criteria into major planning, assessment, policy, reporting and communications products and procedures, as well as to engage and enhance student, staff, and faculty in sustainable living and operation.

Dalhousie issues a President’s Sustainability plan every five years. Another key assessment and reporting requirement outlined in the University Sustainability Policy includes public reporting of the University’s sustainability efforts every three years. The University was awarded a silver rating for its participation in the STARS (Sustainability Tracking, Assessment & Rating System) program. The next rating will be submitted in 2014. Major plans, policies, guidelines developed in this reporting period include a:

- Sustainability Plan and Policy
- Climate Change Plan
- Transportation Demand Management Plan
- Campus Utility Master Plan
- Active Transport Guidelines
- Green Building Policy
- Natural Environment Plan and Guidelines
- Idle Free Guidelines

More reports and programs are available from the Office of Sustainability website. A Sustainability Blog was created that is administered by the Office of Sustainability, the College of Sustainability and the Student Sustainability Office. Sustainability is a key theme in the University Campus Master Plan and is referenced as an area of action in the University Strategic Plan (2010–2013).
Dalhousie University has been involved in environment and sustainability issues in its operations and curriculum for many years. Canada’s first ever College of Sustainability has been created by the university.

The international award-winning College of Sustainability offers an undergraduate Major in Environment, Sustainability and Society (Figure 19). The ESS Major integrates with seven Bachelor’s degree programs and forty subject areas in five Faculties, offering a common place for work on sustainability to students and faculty from all parts of the university. Other College offerings include a Sustainability Leadership Certificate, and a planned Graduate Certificate. Across all twelve faculties, over 150 faculty members teach and conduct research on environment and sustainability topics.

Many courses and co-operative education opportunities have an action-orientated focus such as Campus as a Living Lab, Management Without Borders (all management disciplines work together on client projects), to the Volunteer Co-curricular program where students get recognition for volunteering at locations like the Campus Bike Centre.

At the graduate level, the School for Resources and Environmental Studies (SRES) offers a Master of Environmental Studies (MES) degree and Master of Resource and Environmental Management (MREM).

**Sustainability is reflected as a core concentration in the University curriculum at the undergraduate and graduate level** *(Target: Assessed at each phase)*

*Figure 19. College of Sustainability celebration.*
Positive student and employee experience (Target: Assessed each phase through qualitative and quantitative measures)

Both the College and Office of Sustainability collect annual survey data to capture feedback from students and employees. This data is used to identify emerging issues, gauge success, and improve on programs. In the recent employee workplace survey, employees were asked about the importance of being a green employer.

The Office of Sustainability’s annual survey collects data, on average, from 1500–2000 students and employees each year. Management Without Borders students (Faculty of Management course project) helps the Office administer and report this survey data. A number of issues for further work are identified by survey responses and student groups including more promotion of plans and programs, clarifying and updating waste signage, supporting better bus connections and bike corridors, reducing fossil fuel dependency and increasing sustainable investments, and supporting sustainable food sourcing. Survey data also highlights positive support for and engagement in sustainability initiatives (Figure 20). New ideas and support for programs are highlighted each year (Figure 21).

Figure 20. Campus-wide support for sustainability initiatives 2011–2013.
Figure 21. Sample of survey question outlining importance rating by year.

Please rate importance of the following on-campus sustainability initiatives

Initiative
Solar energy
Geothermal
Biomass and biogas
Wind energy*
Green walls
Green roofs
Student summer bus pass**
Other***

Percentage of respondents who rated important (either somewhat important or very important)

0% 20% 40% 60% 80% 100%
90% 92%
81% 83%
66% 72% 73% 73% 76% 77%
66% 70%
63% 75%
63% 70% 75%
9.1%

* “Wind energy” is listed for Truro campus only as HRM by-law prevents installation at Halifax campuses.
** “Student summer bus pass” was listed in a different question in the 2013 survey.
*** Only the 2013 survey had an “Other” option. Some examples of ideas in other included energy and water efficiency projects; active and sustainable transportation enhancements including faster bus service and university ave. improvements, better waste management signage and bins, and more urban agriculture.
Future Plans

Much has been accomplished during this progress report by many groups on campus. Ideas and strategies have been identified for future action. The next Sustainability Progress Report, due in 2017, will report on the Phase 11 targets for 2013–2016. This progress report will compare the university against its own metrics and others through enrollment in programs like ENERGY STAR’s Building Portfolio and STARS.

Many projects are currently underway including initiatives at the Agricultural Campus. Some highlights of future initiatives include:

- Building rain gardens;
- Lighting upgrade for the Agricultural Campus;
- Renewable energy study for the Agricultural Campus;
- Planning for energy and water upgrades to five major buildings;
- Kitchen, laundry and lab equipment replacement;
- Building dashboard software for energy, water, heat, and renewable systems;
- Solar PV installation, and
- Urinal tank sensor controls.