

# Going Greener

2015 Report on Environmental Sustainability at Ontario Universities



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**Climate change is one of the most pressing issues we collectively face. This seventh annual Going Greener report highlights Ontario universities' actions to tackle climate change by developing both local and global solutions.**

**University research is exploring how Canadians will best be able to adapt to a changing climate, save energy in their homes, support locally produced food, and drive cleaner cars. Research on food sustainability and portable technologies has the potential to change the lives of people around the world.**

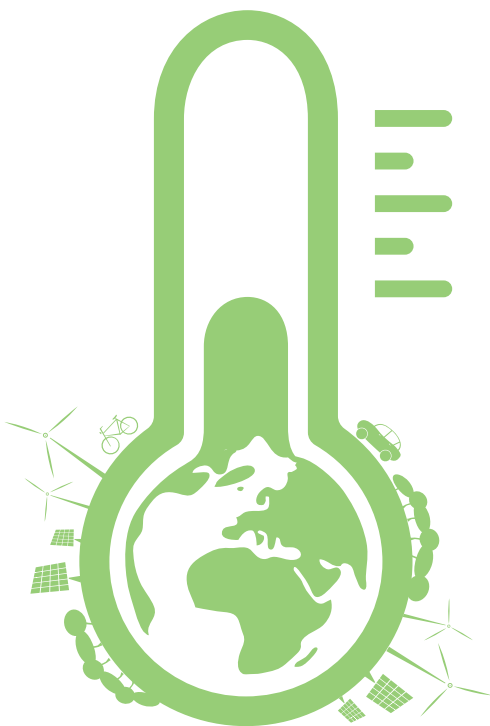
Many of the stories in this year's report highlight the importance of partnerships and collaboration – from student and staff engagement, to partnering with local governments and organizations, and technology and energy providers – in establishing a greener path to a cleaner future.

# Fighting Climate Change

“We have a responsibility to take decisive action on climate change.”

—Meric Gertler, President, University of Toronto

In June 2016, the Ontario government launched its five-year *Climate Change Action Plan*, which builds on a bold strategy to reduce the province’s greenhouse gas (GHG) emissions by 15 per cent below 1990 levels by the year 2020. Universities are stepping up to the challenge by demonstrating leadership, reinforcing their role in helping meet these targets, and supporting campus-based initiatives to spark broader action.



## CHANGE THROUGH LEADERSHIP

In March 2016, **University of Toronto** President Meric Gertler outlined a detailed plan to help address climate change in a report titled [Beyond Divestment: Taking Decisive Action on Climate Change](#).

Among the recommendations:

**\$750,000**

distributed over three years for climate-change related research and education initiatives;

- **Spotlighting and supporting climate change-related themes in selected programs and curricula;**
- **Formally adopting substantially more rigorous energy efficiency standards for capital projects;**
- **Launching a tri-campus clean-tech challenge to encourage environment and energy-related entrepreneurship;**
- **Establishing a U of T committee on the environment, climate change and sustainability with a mandate to coordinate and advance U of T’s environmental research, innovation, education and energy consumption initiatives;**

Increasing the Utilities Reduction Revolving Fund by

**50 PER CENT**

from \$5 million to \$7.5 million, to encourage more extensive implementation of energy-saving building retrofits.

## HOW TO ADAPT

As the impacts of climate change become increasingly apparent through flooding, forest fires, and droughts, researchers at the **University of Waterloo** are strengthening local and national adaptation responses. Waterloo is mobilizing knowledge to help homeowners and communities manage climate variability.

**Partners for Action** launched in 2015 to create and share knowledge on flood resiliency in Canada. In its first project, Partners for Action worked with 18 Ontario municipalities, two First Nations communities, and 15 Conservation Authorities to evaluate flood preparedness. The project uncovered key motivators, strategies, and barriers to properly identify and manage risks of increased flooding across communities representing over 2.4 million residents. These findings shed light on the country's need for increased funding and enforceable standards for flood risk management.

The **Intact Centre on Climate Adaptation**, also launched in 2015, helps homeowners, communities, and businesses. Three current areas of focus include helping homeowners identify and implement cost effective measures to reduce risk of basement flooding, advancing the design and application of characteristics for building flood-resistant communities, and engaging business sectors to manage risks associated with climate change and extreme weather events.

To tie efforts back to Waterloo's community, researchers from the **Interdisciplinary Centre on Climate Change** worked with the Region of Waterloo and three area municipalities to translate global climate models into localized projections. The results showed that there will be three times as many extreme heat days with temperatures over 30°C by the 2050s if current emissions levels continue. The report also projected an eight to 12 per cent increase in precipitation and a 40 per cent increase in freezing rain events by the 2050s. This is critical information that municipal staff and other stakeholders are now using to adapt community infrastructure and services for the future.



The University of Waterloo is leading the development of a proposal for a Network Centres of Excellence (NCE) for Climate Adaptation

## DRIVING INTO THE FUTURE

The **University of Windsor** is stepping up its work in electric vehicle science and engineering.

**CHARGE Labs** – the Centre for Hybrid Automotive Research and Green Energy – aims to break barriers in commercially available electric vehicles, including long charging time, high overall cost of ownership compared to equivalent gasoline vehicles, and “range anxiety,” which is often cited as the main reason people are reluctant to buy electric vehicles. Range anxiety is the worry that the car's battery will run out before the driver can reach a charging station or their destination.

In an effort to produce far-reaching research solutions, CHARGE Labs focuses on major research areas such as electric machine design and testing, machine drives and control, electric vehicle simulation and different methods of charging. CHARGE Labs also conducts advanced and high accuracy industrial-scale testing, funded through the Canada Foundation for Innovation, in the areas of next generation passenger and heavy-duty electric vehicle powertrain components and systems.

The facility enables national and international academic, industry and government researchers to conduct “battery-to-wheel” research, promoting creativity, collaboration and practical know-how to enhance current electric vehicle technology. They have active research collaborations and student/faculty exchange programs with universities in Canada and in countries such as China, France and India.

Recent alumni have been recruited by companies in the automotive and power sectors such as Ford, General Motors, Magna, Tata and Hydro One.

CHARGE, under the Canada Research Chair Program in Electrified Transportation Systems, is supported by the Natural Sciences and Engineering Research Council (NSERC) of Canada, Ontario Centres of Excellence (OCE), and industrial partners.



CHARGE Labs at the University of Windsor

# Building Green Communities

From retrofit projects to protecting waterways to supporting green transportation options, universities are helping create sustainable communities.

## \$350,000

investment funded entirely by students, the university's new bicycle shelter and pavilion boasts sustainable solar-powered lighting and a green roof.

### CLEAN TRANSPORTATION

The **University of Guelph's** \$26 million [Green Gryphon Initiative](#) continues to yield results. Established in 2013-14 to build on previous commitments, the Initiative is helping Guelph meet ambitious sustainable campus energy plan targets for 2020. It uses student fees and matching university contributions to support sustainable and energy-efficient projects around campus.

One example is a \$350,000 investment funded entirely by students for a new bicycle shelter and pavilion that boasts sustainable solar-powered lighting and a green roof.

Lighting in the shelter will be powered by solar panels installed this fall atop the adjoining Raithby House in Branion Plaza. Both buildings are now operating from that solar energy.

The wood and steel shelter holds 90 bikes in two tiers of new removable racks. Emptied of its racks, the structure can be used as an open-sided pavilion for small group events and gatherings.

Other recent projects include installation of the Raithby solar panels, retrofits to campus lighting and installation of a chilled water reservoir.



Guelph's solar bike rack and pavilion

**The University of Toronto - Mississauga (UTM)** is a suburban campus with a high commuter population: fewer than 30 per cent of UTM students live in residence. Spurring the debate to “pay or pave” was the projection that the campus population would nearly double. To preserve campus greenspace, reduce the demand for parking and avoid the expansion of surface lots, several alternative transportation programs have been implemented.

These include a BikeShare bicycle-lending program, which celebrated its 10th anniversary in 2004; Zipcar, a car-sharing program that allows users to rent cars by the hour or the day; a carpooling program, which provides ride-matching services and reserves the best parking spots for carpools; and the eco-park program, which provides partial rebates on parking fees to those who drive a fuel-efficient vehicle.

In addition, U-Pass was introduced to campus in 2007. All students pay a levy towards U-Pass, which allows unlimited travel for full-time and part-time students on MiWay, Mississauga’s transit system, for the eight-month school year. Those taking summer courses are also provided with a summer U-Pass. For those using Toronto’s transit system, discounted Metropasses are available for students, staff, and faculty to purchase. UTM also operates a shuttle bus service between UTM and U of T’s downtown Toronto campus, and between UTM and Sheridan College. The shuttle is free for UTM students.

The results are clear: the per capita demand for parking has continued to decline from a high of 30:100 to about 17.5:100.



UTM’s Bike Share bicycle-lending program

**BUILDINGS AND RETROFITS**

**Trent University** is partnering with Ameresco Canada to renew and upgrade over 20 campus buildings through the Energy Performance Contract, a facility renewal plan funded through energy savings. The \$15.5 million project supports the university’s mandate to foster environmental sustainability on campus as well as in the greater community.

Over the next two years, Trent will make energy efficiency and infrastructure upgrades to 26 buildings and 126,000m<sup>2</sup> of space on the Symons Campus and at Traill College. More efficient HVAC and boiler systems mean improved ventilation, air quality and temperature control; LED lighting retrofits mean increased efficiency and improved colour rendition and visibility. The upgrades will also result in:

• **An over-achievement of Trent’s energy reduction targets set in their five-year Energy Conservation Plan.**

• **\$1.5 million** in avoided energy costs annually for nine years.

• A reduction in the carbon footprint by approximately **2,650** metric tonnes of CO<sub>2</sub> annually – the equivalent of planting 20.5 acres of trees, or taking 563 cars off the road.

## Universities are partnering to save energy

**OCAD University** installed the Harmonizer, a device that saves energy by regulating incoming voltage levels:

- **Partner**  
Legend Power Systems Inc.
- **Saving**  
**\$20,000**  
per year with a payback period of 2.6 years.
- **Results**  
**31 metric tonnes**  
saving 171,000 kWh per year.
- **Equivalent**  
**Energy to power three homes for a year.**

**Queen's University** has committed to capping GHG emissions with CAPit, a \$10.7 million energy conservation initiative:

- **Partner**  
Honeywell
- **Scope**  
energy conservation projects in  
**66 buildings**  
in the areas of water, lighting, mechanical, and building envelope.
- **Goal**  
**2,800 metric tonnes**  
of reduction to contribute to the overall campus goal of a 35 per cent reduction in GHG emissions by 2020.
- **Equivalent**  
**Removing 944 medium-sized cars from Canadian roads.**

The Robarts Library Energy Reduction Project at the **University of Toronto - St George** is another highly successful building energy reduction project recently funded through the Utility Reduction Revolving Fund (URRF) – in fact, it is Facilities & Services' most successful building energy reduction project to date.

This project employs the unique use of customized occupancy sensors to provide real-time occupancy data on each floor of the building, a new building automation system (BAS), Variable Speed Drive (VSD) fans, and a wireless room level thermostatic control system. The library's air flow and temperature can now be automatically adjusted based on occupancy needs across the building's roughly 100,000 square metres of space.

This project elevated a 1970's building to run as efficiently and effectively as many newer buildings on campus. The net result is an improved climate for staff and a remarkable reduction in energy costs of \$1 million annually, thereby also reducing the campus' environmental footprint.

Total energy saved will eliminate 1,221 tonnes of GHG per year – equivalent to the GHG emissions from 438 tons of waste sent to landfill.

**The \$2.2 million initiative included \$595,500 in incentives from Toronto Hydro and Enbridge Gas, bringing the net cost of the project to \$1.6 million with a simple project payback of less than two years.**



University of Toronto - St George Robarts Library



This year, **University of Toronto – Scarborough (UTSC)** opened the Environmental Science and Chemistry Building (ESCB). This is the first LEED Gold certified laboratory building at U of T.

Of its many sustainability features, none is more progressive than its *earth tubes*, which leverage the thermal mass of the earth to passively precondition fresh outdoor air before it reaches the building's mechanical air handling system. The earth tubes help the ESCB achieve more than a 40 per cent reduction in energy intensity over comparable buildings, and do so at a much lower cost than alternative technologies.

In addition to drastically reducing building energy consumption, UTSC Facilities Management engineering staff are collaborating with Department of Physical and Environmental Science students and CanmetENERGY (a clean energy research and technology division of Natural Resources Canada) to conduct research that will help improve models and design guidelines for such systems, providing critical support for their adoption more broadly.



UTSC Environmental Science and Chemistry Building Earth Tubes

#### PROTECTING LOCAL WATERWAYS

A new campus rain garden at **Laurentian University** has created a natural and sustainable way to treat stormwater before it enters Ramsey Lake.

A rain garden is a shallow depression, planted with deep-rooted native plants that thrive in damp or wet soil. Rain gardens can help to reduce flooding as they soak up runoff from downspouts, driveways and parking lots, while acting as a filter to keep pollutants from draining into waterways.

“Planting more native species helps to heal the landscape, improves biodiversity, and protects lakes and rivers from erosion and pollution,” says Lilly Noble, Co-Chair of the Ramsey Lake Stewardship Committee. “We hope people will come to the raingarden and find out what they can do in their yard or on their shoreline, to protect our lakes.” Among the plants to be included in the rain garden are wild bergamot, bayberry, highbush cranberry, cardinal flower and blue flag iris.

The rain garden, a collaborative project between numerous community and university partners, serves as a teaching opportunity for the School of the Environment and provides habitat and food for local birds, bees and butterflies.



Laurentian's new rain garden

## Game-Changing Environmental Research

Over the past several years, universities have stepped up their commitment to research in the areas of climate science and sustainability. In this year's Going Greener survey, 17 of 21 university campuses report adding new research initiatives since 2013.

What follows is a snapshot of just a few research initiatives that are underway and emerging.

### Brock University

#### The Environmental Sustainability Research Centre

Home to numerous projects, this centre focuses on transdisciplinary research on environment, sustainability and social-ecological resilience. The ESRC has undertaken numerous new initiatives. Among them, the ESRC Sustainability Science Postdoctoral Fellowships Program was launched in 2013. It has already provided funding (matched) awarded competitively to three junior researchers supervised by ESRC faculty to conduct innovative research in sustainability. As well, the ESRC and the Brock Department of Geography are currently working toward an application for a Tier II Canada Research Chair in Water Resilience.

#### The UNESCO Chair in Community Sustainability: From Local to Global

In June 2014, Liette Vasseur was announced as the inaugural Chair. "The mandate is to strengthen initiatives in sustainable agriculture and community-based natural resource management in China and Africa, with special emphasis on empowering women." To date, the Chair has initiated research projects and community outreach in Canada, China, and Latin America.

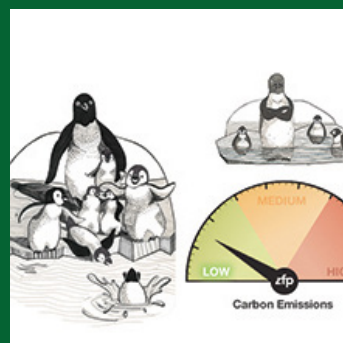
### Carleton University

#### Pursuing Food Sustainability in Canada's High Arctic

A collaboration with Queen's University on a project initiated by a local group of hunters and fishers to study the sustainability of Arctic char (and eventually Arctic cod and Northern shrimp) in the region, which also includes other communities in the Kitikmeot region. This four-year project was awarded \$5.6 million from Genome Canada's 2014 Large-Scale Applied Research Project Competition.

#### Sustainable Energy Research Centre

SEC supports research into leading-edge policies in sustainable energy and innovative engineering technology, as both are necessary to tackle sustainability challenges.



### University of Guelph

#### Sustainable Food Institute

Their vision is to transform global food systems including producing more food with less land, with fewer inputs.

#### Research Chairs

In food security, sustainable food production, bee and pollinator health, and other areas of environmental sustainable and ecology.



Photo by Luther Caverly

#### Urbandale Centre for Home Energy Research

The 1,600 square foot, two-storey solar-powered house is perched on a low hill at the north end of Carleton's campus. Inside, long-term research projects are responding to a growing demand for resource-sustainable, energy efficient houses. The house will be a test bed for innovative concepts that challenge the traditional way houses are designed and built, with a goal of reducing energy use and greenhouse gas emissions in the Canadian residential sector.

### OCAD University

#### Zero Lab

Sustainable Futures is one of eight priority research themes at OCADU. New research initiatives include the Zero Lab, which "is a research lab dedicated to using art and design practice and research to make sustainable futures visible, accessible, and equitable."

### Laurentian University

#### Ontario Centre for Climate Impacts and Adaptation Resources

The OCCIAR is dedicated to assisting communities and sectors adapt to climate change through the provision of climate science and adaptation tools. The Centre is also a resource hub for researchers and stakeholders searching for activities, events and resources on climate change impacts and adaptation.

#### Environmental Research and Research Chairs

In the environment, microbiology, stressed aquatic systems, conservation and ecology.

### Lakehead University

#### Research Centre for Sustainable Communities

Launched in March 2015 on the Orillia campus to promote research in the areas of social justice, political economy and environmental sustainability.

#### The Water, Land, and People program

Will support research and scholarship by students and faculty that focuses on, and aims to contribute to, the geographic and cultural regions that the university serves throughout Ontario. Collaborative proposals are also encouraged, as are multidisciplinary and transdisciplinary perspectives.

#### New Canada Research Chair

in Sustainable Food Systems and University Research Chair in Global Climate Change and Boreal Forests.

#### University of Ontario Institute of Technology

### Microgrid Research and Innovation Park

Starting in late 2016, this first large-scale project will explore “microgrids,” or small-scale power grids that can operate as “islands” away from the main grid. Such projects are useful for institutions like hospitals and other facilities that require a seamless continuation of power, even in an outage.



#### Queen's University

### Engineered Nickel Catalysts for Electrochemical Clean Energy (Ni Electro Can)

An international research project based at Queen's that is focused on developing new clean energy technologies to develop the next generation of nickel-based materials, which will give Canada's energy sector a competitive advantage.



#### Ryerson University

### Centre for Urban Energy (CUE)

Is a unique academic-industry partnership that is exploring and developing sustainable energy solutions to major challenges related to climate change. These solutions include smart grid technologies, energy storage, electric vehicles, net-zero homes and renewables. CUE was launched in 2010 with the support of Ryerson and three principal sponsors: Hydro One, the Independent System Electricity Operator and Toronto Hydro. CUE has worked with over 40 industry and government partners to deliver real-world solutions, and become a leading light in the fight to create a clean energy future for Ontario and Canada. CUE Quick Facts:

- CUE has reached over 200 students through its research projects, student awards and ongoing education programs
- 45 applied research projects initiated in five years of operation; 27 completed and many becoming commercialized
- iCUE, an incubation lab, has hosted 21 energy-related start-ups, created 40 jobs, and two postgraduate education programs

#### University of Waterloo

### AE4H

Partnership with Karlsruhe Institute of Technology and the Waterloo Institute for Sustainable Energy to bring clean, affordable power to the 2.5 billion people globally that lack reliable access to basic energy services.

### Canada Research Chairs

in Advanced Materials for Clean Energy, Data Analytics for Sustainability, Ecosystem and Climate, and Groundwater Remediation.

#### Trent University

### Trent Research and Innovation Park (TRIP)

The City of Peterborough and Trent signed a Memorandum of Understanding for the formation of the Trent Research and Innovation Park (TRIP), which will be operational in 2018. The Research Park will be designed to attract Green Economy companies. Trent is hosting CleanTech start-up company Noble Technology Inc., which is developing a new bio-filtration technology that uses a select species of algae to remove a wide range of contaminants from water systems. The company has announced its plan to build a bio-filtration system manufacturing operation in the Research Park.

#### University of Toronto

### Reinventing the Toilet

40 per cent of the world's population lives without access to basic sanitation. Professor Yu-Ling Cheng, Director of the Centre for Global Engineering, and her team developed a cheap, off-the-grid toilet that processes waste quickly and safely. The project received \$2.2M in funding from the Gates Foundation. The toilet uses a solar panel and battery, and can be set up without the need for electricity or running water. They are working with partners in Bangladesh on a prototype.

### AirSENCE Air Quality Monitoring

U of T and Environment Canada researchers have developed an inexpensive air quality monitoring system (AirSENCE), first used at the 2015 Pan Am Games, that measures air pollution across urban regions and tracks it on an online interactive map, enabling users to make better-informed choices in managing their exposure to pollutants.

### Car Parts from Renewable Resources

In a partnership with Ford Motor Company, U of T researchers are using two key ingredients from wood pulp – micro-cellulose fibre and lignin carbon fibre – to create a high-strength composite that will be used to manufacture automotive components. The manufacturing process will be greener, and the components lighter, leading to reduced vehicle emissions.

### Impact Centre: Cleantech Cluster

The Cluster is devoted to creating a hub in Ontario that connects industries, academic institutions, government, and related organizations to spur the development of technologies that contribute to clean air, water, soil, and better cities in Canada and in communities around the world. It provides a platform to connect parties for joint product development and research projects, organize meetings and industry days, and facilitate access to funding opportunities.

#### York University

### Task Force on Sustainability Research

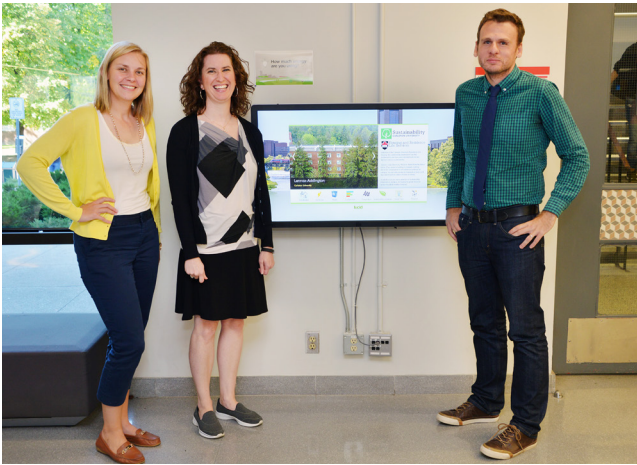
Established in 2014 to evaluate current and emergent research strengths in the area of sustainability. The mandate of the Task Force was to engage the community to identify current and potential sustainability research strengths at York, and develop recommendations for structures that best capture York's strengths in sustainability research. It was also to provide advice on potential linkages between researchers at York and external partners. The final report contains a current inventory of sustainability research projects and researchers at the university.



# Inspiring Campus Engagement

Universities are finding unique ways to engage staff and students in the quest to integrate sustainability in all facets of campus life, and encourage green practices beyond time at school.

Carleton's residence building energy dashboard



## Residence Building Energy Dashboard

Static energy dashboards have been installed in all residence buildings and a touch screen display has been installed in Residence Commons. This allows residents, occupants and visitors to view energy and water use in real-time, and waste recycling data monthly, helping promote behavioural changes to energy use. The screens are also utilized to showcase sustainability events and projects on campus, and sustainability tips and ideas.

## COMMUNITY FUNDS

**Carleton University's** \$1 million Green Revolving Fund began in 2013 to provide an active source of capital for sustainability projects and programs. Funded by the university's Finance Office, these low-interest loans have been a successful tool for encouraging the Carleton community to develop ideas that generate cost savings and reduce environmental impacts.

The Fund has successfully financed projects that reduced the university's expenses for electricity, natural gas, water, and waste disposal, along with lowering other operating costs.

In order to engage and inspire, Carleton hosted a launch event and held workshops to explain the process, and used social media to spread the word.

The Fund is open to any member of the Carleton community for a period of two months in the fall semester. All submissions are then reviewed by the Green Revolving Fund committee, which includes representation from faculty and staff across the university. Each year three winning projects are selected for implementation. Just two examples of successful projects include:

### Smart Building technology

This winning student submission promotes the application of smart technology to complement the ongoing energy management program on campus. An Energy Study recently completed for one building has identified a number of opportunities to reduce utility consumption. Recommended measures to reduce electricity and steam load will yield annual savings of up to

# \$47,590

per year when implemented.

In 2015, **Wilfrid Laurier University** launched a seed fund to directly engage the Laurier community in sustainability projects on campus as well as provide an avenue for active learning and professional experience. Through the **Sustainable Hawk Fund (SHF)**, Laurier’s Sustainability Office dedicated \$20,000 per year to launch student, staff, and faculty projects that benefit sustainability on campus, particularly for the student experience, by leveraging Laurier’s entrepreneurial and community spirit. The SHF is part of Laurier’s successful **Launch Pad** program that provides support, mentorship, and resources for student entrepreneurship while at the university. The program is further supported by Laurier’s relationship with **The Communitech Hub** and the **Accelerator Centre**.

Projects are based on the degree to which they positively impact social, ecologic, and/or economic systems as well as operational considerations. The projects are judged individually by Sustainable Campuses Committee (SCC) members and the finalists are asked to present a ten-minute pitch to members of the SCC.

In its first year, the SHF received 22 applications and awarded funding to three projects: the Veritas Café (Graduate Student Association) veggie and herb garden; Brantford Campus gender neutral washroom signage; and a student carpooling database platform.



Wilfrid Laurier University Sustainable Hawk Fund (SHF)

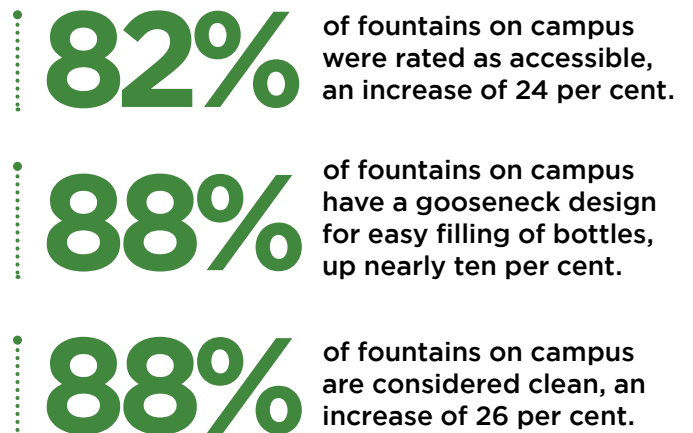
**WATER BOTTLES**

In 2010 the **University of Ottawa** became the first campus in Ontario to ban the sale of bottled water on its campus, thanks to a partnership between the Student Federation and Food Services. The Student Federation runs the programming wing of the “bottled water free” campus campaign, which has resulted in a greater awareness of water access issues on campus.

Removing bottled water and increasing access to water fountains represents significant savings for both students and the environment. Aside from the consumption of plastic, there are numerous environmental impacts stemming from the use of disposable bottles, including CO2 emissions associated with transportation of bottles to campus and the energy used in recycling.

A pivotal part of going “bottled water free” was the revitalization of the drinking fountains on campus. As the stewards of the water infrastructure network on campus, the Facilities department undertook the task of surveying all the fountains on campus, repairing those in bad condition, and installing new ones. Each year Facilities invests approximately \$30,000 to improve the water fountain infrastructure and add new fountains.

To monitor the quality and condition of the fountains, four students from Community Service Learning programs were trained to evaluate the fountains against criteria that are considered critical for an appealing and hygienic drinking fountain. The results indicate an impressive improvement over last year:



A **water fountain report** is published annually so that students and staff can see year-over-year progress and improvements made to the fountains.

### CHALLENGING OURSELVES

**Queen's University** showed incredible leadership spearheading the nation-wide [Blue Dot Campus Challenge](#). The [Blue Dot](#) movement, a project of the David Suzuki Foundation, calls for governmental recognition of the right to a healthy environment: the rights to breathe clean air, drink clean water, and eat safe food.

Inspired by a David Suzuki speech in October 2014, members of the Queen's community decided to start the Blue Dot movement on their campus, which spread to other postsecondary institutions in March 2015.

The Challenge brought together 16 postsecondary schools across Canada to raise awareness and collect petitions for environmental rights, engaging over 3,600 students in a single week.

The Queen's Blue Dot team brought together a variety of environmental groups to raise awareness about the campaign through classroom talks, social media and campus booths. Queen's secured 800 signatures, the highest of participating campuses.

The Campus Challenge has had a broader impact: months after the Queen's Campus Challenge, the City of Kingston signed the Blue Dot Declaration. As of September 2016, 142 municipalities in Canada have passed the declaration and over 100,000 Canadians have signed the Blue Dot pledge.

The Blue Dot movement has shifted conversations about climate change to a more personal, relatable level – from access to a healthy environment, to the right to be informed about environmental pollutants and the right to participate in government decisions about the environment and climate change.



Queen's Blue Dot Challenge

The We Grow Trees challenge is an initiative developed through the **University of Ontario Institute of Technology (UOIT)**'s Healthy Workplace Committee in which all UOIT staff were encouraged to participate.

The goal of the challenge was to promote the connection between a healthy lifestyle and a healthy environment. Staff participants were given information packages explaining the process of growing a tree. They learned how to collect seeds/acorns, foster the seeds over the winter, plant, care for and water them during the growth process into a small tree.

A kick-off event for the challenge took place in November 2015 and garnered 84 registrants. It ended in mid-April 2016 when the trees were transplanted to the campus farm grounds. Prizes were given out for the tallest tree, the tree with the biggest leaves, the first tree to sprout above the soil, and to participants who could identify their type of oak tree. Once the trees reach an appropriate height they will be transplanted again to different areas of campus as part of the Campus Master Plan.

This "growing together" challenge helped staff members work towards positive, tangible environmental change in the UOIT community, while spending time outdoors and learning planting skills. These trees planted on campus contribute to the carbon sequestration and overall carbon footprint of UOIT, and improve the campus' natural environment including air quality, biodiversity and wildlife conditions. The initiative also built environmental awareness among community members.



UOIT's 'We Grow Trees' challenge

# Teaching & Learning

From programs and courses to hands-on experiments with a practical outcome, universities are growing the ways in which they integrate sustainability into learning.

## CULTIVATING LEADERS

The Faculty of Education at **Lakehead University** recognizes that sustainability is one of the biggest challenges of our time. By including sustainability content in the curriculum, future students will have access to teachers who are knowledgeable in this field. In fact, Lakehead is one of the first universities in Canada to offer a Climate Change Pedagogy course to teacher candidates.

In 2013-14, Lakehead began offering Climate Change Pedagogy as a special topics course in the Faculty of Education at both the undergraduate and graduate level. It explores climate change as a defining issue for educators, students and citizens. It inquires how humans – including teachers – can effectively engage with climate change as an environmental, economic, political, and social justice issue.

This course is meant to develop future teachers' capacity as engaging and effective climate change educators. Bringing together theory and practice, the course considers important questions such as:

- What responsibility do educators have to engage with climate change?
- Do we hope our students will change private-sphere behaviours or become active politically as a response to climate change?
- How do we balance teaching about the negative impacts of climate change with the opportunities responding to climate change presents?
- How can teachers teach about issues of politics, science, and ethics in our classrooms?
- What role can educators play in shaping a living future?



Addressing sustainability in our society poses interdisciplinary challenges that require interdisciplinary solutions. With this in mind, **McMaster University** created the [Interdisciplinary Minor in Sustainability](#) with the goal to develop students' knowledge and understanding of sustainability.

The Minor provides a path for students to study diverse aspects of sustainability by taking courses from different Faculties and integrating them into a cohesive whole. The program promotes engagement among students, faculty, and staff across all Faculties, and importantly, provides opportunities to meaningfully engage with communities both within and outside of McMaster. It also encourages opportunities for student experiential learning.

Through the development and implementation of this program, students are now able to choose from over 64 courses from Faculties across campus to gain a truly interdisciplinary perspective of sustainability as well as tailor a minor that complements their major.

## In only two years of operation, 19 students have declared an Interdisciplinary Minor in Sustainability.



### A HANDS-ON APPROACH

**OCADU** has installed a “hydroponic window dye garden.” Called [ChromaFARM](#), this garden was installed as a source of natural dyes and pigments in the Fibre Studio. This project is one of multiple installations by grOCAD, a Student Union-funded group of students, faculty and staff who are working together to enhance urban sustainability and integrate plant life into the everyday experience.

The ChromaFARM project investigates sustainable design and how to optimize plants' dye yield. The purpose is to grow natural dyes, rather than using synthetic chemicals, to colour fabrics locally, safely and with little energy and waste. It also seeks to reduce carbon emissions associated with the dyeing process and give designers a sense of agency and curiosity about the possibilities of the natural world.

The pilot project, which ran from June to December 2014, investigated three different growing mediums (clay pellets, vermiculite and soil) and three different native plant species (calendula, chamomile and marigold). The pilot found that marigolds provided the most intense colour for weight. By focusing on marigolds and regularizing their grow space, the participants found that they could increase production by 700 per cent. The pilot was used as an in-class learning tool in the existing Fibre Curriculum: Dyeing course in the Material Art & Design program.

In April 2015, a second version of the ChromaFARM was installed by grOCAD at the Toronto Stock Exchange, working with Brookfield Office Properties to bring hydroponic gardening into the heart of the Financial District for Earth Week.



The ChromaFARM from McCaul Street



# Food Sustainability

The production of sustainable and local food sources is integral to the broader concept of sustainability. The more we can grow local, the better.

Ryerson Urban Farm



In 2014, Ryerson's Urban Farm utilized almost the entire roof of 1,000 square feet to produce

## 2,350kg

of food and \$9,971 in revenue.

In 2015, the conversion of the entire 10,000 square foot rooftop was completed, producing

## 3,588kg

of food and \$18,634 in revenue.

### HOME GROWN

**Ryerson University** is home to a quarter acre rooftop vegetable farm located on the Andrew and Valerie Pringle Environmental Green Roof on top of the George Vari Engineering and Computing Centre. The green roof was originally built in 2004 as part of the original infrastructure of the building. It works to reduce negative environmental impacts by decreasing the amount of paved surfaces, diverting stormwater runoff by slowly absorbing and releasing rainwater, and reducing the urban heat island effect. The rooftop also supports a community of living organisms, such as pollinators that are at risk of extinction, thus increasing the biodiversity of the city.

In 2013, the campus urban agriculture initiative, **Ryerson Urban Farm [RUF]** (formerly Rye's Homegrown), was brought in to manage the space. RUF's mission is to scale up urban agriculture through production, education, and demonstration. RUF draws upon principles of ecological garden design to create beautiful gardens that are productive, sustainable, and nourishing. To achieve this, RUF works to incorporate local resources, build nutrient-rich soil, divert waste through the composting of campus food, and incorporate low-impact techniques into the design and implementation of gardens both on and off the ground.

The pilot project saw the successful conversion of 1,000 square feet of the rooftop into an edible garden. RUF expanded in 2014 utilizing almost the entire roof to produce 2,350kg of food and \$9,971 in revenue. In 2015, the conversion of the entire 10,000 square foot rooftop was completed, producing 3,588kg of food and \$18,634 in revenue.

As a model of local food production within an institution and urban community, the farm has drawn significant attention: more than 1,000 people have visited and volunteered with RUF since 2013, 75 per cent of which are Ryerson students, staff and faculty; 25 per cent of which are from the broader community.

As a result, Ryerson has had a major impact on the potential to improve the quality of life of communities in the downtown core and practices in environmental sustainability.

York University's Food Services department has installed an "[Urban Cultivator](#)" to grow herbs and micro greens in-house. With sustainability and affordability top of mind, the new kitchen greenhouse is helping to not only reduce the university's carbon footprint, but also increase the supply of fresh and local ingredients available for use in food preparation on campus.

The Urban Cultivator is an all-in-one indoor home garden that can be used 365 days of the year to grow many of the greens that are used daily in the kitchen. Having to only buy the seeds, the Cultivator provides perfect conditions to grow a vast array of herbs and micro greens quickly. The produce grown is used daily at the salad bars, in everyday recipes in the dining facilities, and as ingredients for healthy juices and smoothies. The project is in partnership with Aramark Canada.

York's sustainability efforts were recognized by the Canadian College and University Food Service Association (CCUFA), as Food Services received the Magazine Award for an article focusing on greener food services.



York University's Urban Cultivator

#### FAIR TRADE

In January 2016, **Western University** was designated Canada's 11th Fair Trade Campus.

Fair Trade is a global movement, which helps ensure fairness for farmers and artisans. These farmers have access to global markets and, thanks to Fair Trade, they can get fair wages, better working conditions, minimum prices for their products, and a premium that is distributed throughout the community.

For Western, it started with a conversation in 2010 within the Western chapter of Engineers Without Borders when the goal to become a Fair Trade campus was established. In 2013, two important university partners joined in the efforts: Hospitality Services and the University Students' Council (USC). Hospitality Services committed to meeting all [requirements to become a Fair Trade campus](#) by Fall of 2015, and the USC approved their "Purple Paper," which highlighted their commitment toward Fair Trade.

In 2014 and 2015, Hospitality Services participated in Fair Trade Week by offering a Fair Trade chocolate fountain in each residence. 130kg of Camino Brand Fair Trade Chocolate was purchased from the Ontario Natural Food Co-op. Additional events were hosted in order to raise awareness of Fair Trade on campus. By September 2015, a Fair Trade Campus committee was also established.

Hospitality Services, which includes all residence dining operations, campus outlets, Great Hall Catering and vending services, now offers products that meet Western's Fair Trade campus designation. They intend to continue the growth of Fair Trade products on campus, while helping plan events, introduce new products, monitor consumer satisfaction, maintain and further relationships on campus, and work with private franchises.



Western receives their Fair Trade Designation

**Brock University** was named Fairtrade Canada's Campus of the Year in 2015 for its continuing efforts to provide students with fair trade options where food is sold or served.

The national award is given to a university that makes offering fair trade options a priority by not only ensuring they are available and visible, but also educates and raises awareness about the importance of fair trade products.

Brock was designated a Fairtrade Canada campus in 2013. To earn the designation, fair trade-certified coffee, three types of tea and chocolate must be available at the university's cafes, vending machines and restaurants. Coffee served on campus – fair trade and organic – is roasted onsite, which makes the coffee more affordable with the added benefit of freshness.

The university is always looking to add new fair trade-certified products as part of their commitment to ensuring workers who produce food and products are treated fairly. Brock's students are also committed to using their purchasing power for good: "there are a lot of bad things that happen in the world. If we can have a part in fixing it or helping, it can go a long way in making things better," says Anneka Bosse, co-chair of Brock's fair trade committee.

**Progress on Fair Trade: Six Ontario university campuses have the Fair Trade designation, with eight more considering or moving toward the designation. In 2016, UTSC also received a Fair Trade campus designation.**



Anneka Bosse, student representative on the Brock Fair Trade Committee

A **Waterloo** student-run service has implemented a standardized compost program that diverts organic waste from landfills, provides campus-made fertilizer to the community, and raises awareness about sustainable waste management.

Launched in May 2014, the students collected approximately 2,000 pounds of food waste annually from eight locations and several events at Environment and Engineering Orientation Weeks. Student volunteers bring the organic waste to a 1,550 litre on-site tumbler to decompose. The resulting compost is then added to naturalized gardens around the nearby Arts and Environment buildings.

Campus Compost received funding for a second compost tumbler in 2015, which has doubled the group's capacity and enabled the student volunteers to collect from additional locations. The second drum also came equipped with a small heating unit to overcome winter freezing.

The project has been a powerful learning opportunity for the student volunteers. It has created a new respect for the chemistry and environmental conditions needed to compost effectively, and has built strong coordination, leadership, and relationship management skills.



Waterloo Campus Compost

**This report shares just a few of the many stories that highlight how campus communities – students, faculty members, staff, researchers and local partners – are deeply engaged in issues related to climate change and sustainability. Sharing best practices and innovative ideas with other universities and the broader community can drive positive change and, ultimately, help create a more sustainable future for us all.**

Do you want to learn more about any of the projects and initiatives featured in this report? Contact the Council of Ontario Universities <<http://cou.on.ca/about/contact-us>> to put you in touch with the right contact at each campus.