

BRIGHTER WORLD





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President's Letter

Welcome to the third annual Sustainability Report, created in alignment with McMaster's university-wide Sustainability Strategy: A Living Laboratory for Sustainability 2022-26.

This report shares our progress over the last year within the four strategic drivers of our strategy:

1. A Culture Focused on Sustainability 2. Teaching, Learning and Research 3. Self-Sustaining Campus and Sites and 4. Operational Excellence.

Transforming McMaster's campus into a living laboratory for sustainability is a university priority and is in keeping with the essential role we all play in supporting the university's vision to advance human and societal health and well-being.

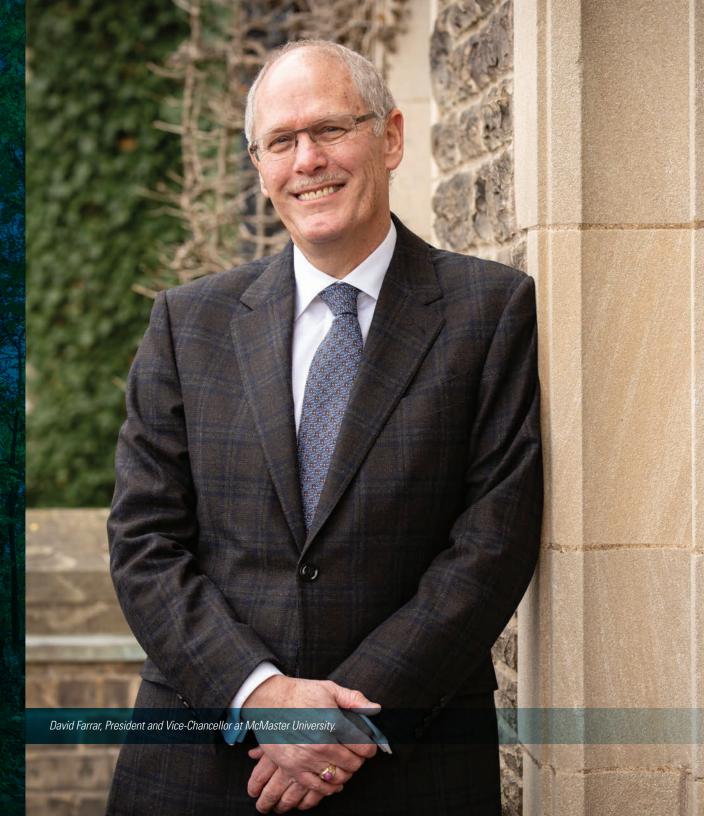
Within each of the strategic drivers, I hope that the selected stories will inspire you to consider how you can affect sustainable change in the McMaster community and be part of the significant progress we are seeing on campus.

Just as we need multiple strategies to achieve a carbon-free campus, we need the support of the entire McMaster community to meet our ambitious goals.

David Farrar

DHT

President and Vice-Chancellor



Sustainability Strategy Drivers and Guiding Principles

McMaster's Sustainability Strategy: A Living Laboratory for Sustainability was developed through an engagement process with input provided by students, faculty and staff. Interwoven throughout the strategy's four drivers continues to be the principles guiding our campus' transformation into a living laboratory of sustainability.



STRATEGIC DRIVER 1:



Culture Focused on Sustainability

Leadership and Vision
Communications

Strategic Partnership and Continued Engagement

Learning and Development

McMaster is committed to promoting a campus culture of sustainability through leadership, communications, engagement and learning. The following stories of progress, projects and initiatives are just a few of the ways McMaster's students, faculty and staff furthered our community's culture of sustainability over the past year.





The Sustainability Policy can be found under McMaster's Policies, Procedures and Guidelines.

Class of 54' Oasis Garden located behind Hamilton Hall overlooking Faculty Hollow.



Strategic Partnership and Continued Engagement: Sustainable development goals pitch competition

McMaster hosted its first United Nations' Sustainable Development Goals (SDGs) Pitch Competition as part of SDG week across Canada. The competition, which was open to all McMaster students, had 21 participating teams from all six faculties.

The winners tackled issues such as reducing waste in McMaster's Centro dining hall, increasing active and sustainable travel before, during and after Light Rail Transit construction and achieving gender equity in pre-clinical medical trials.

21 teams of students took part in McMaster's first Sustainability Development Goals (SDG) pitch competition in the McMaster University Student Centre (MUSC) on March 8th, 2023. Photo by Antonio Adams.

Learning and Development: Bring your own water bottle campaign

A cross-campus working group of students, faculty and staff reduced single-use plastic water bottles through their Bring Your Own Bottle (BYOB) campaign.

The team secured funding through the McMaster Okanagan Special Projects Fund to promote campus water bottle filling stations with a website, an interactive map, signage and communications programs. For their efforts, the group was recognized with a President's Award for Outstanding Service.



SPOTLIGHT:

Going back to high school to fight climate change

Climate change is one of the most complex issues of our time, challenging the brightest minds to find a way to save the planet. So, how do you explain it to a 10th grader?

For the past 10 years, graduate students and faculty from the McMaster Centre for Climate Change (MCCC) have visited high schools in the Greater Toronto Hamilton Area. They bring their environmental sensors, tipping gage buckets and cross-sections of trees to bring this global issue to life in the classroom.

"We want to engage with youth so they are aware of the issues at a local level and provide them with some way they can contribute to fighting climate change," says Tariq Deen, a PhD student in the hydrometeorology and climatology group in the School of Earth and Environmental Sciences.

"Climate change is a global issue with so many different ways it can impact people, but we try to show them it as a local issue – how it affects them in Hamilton and Halton."

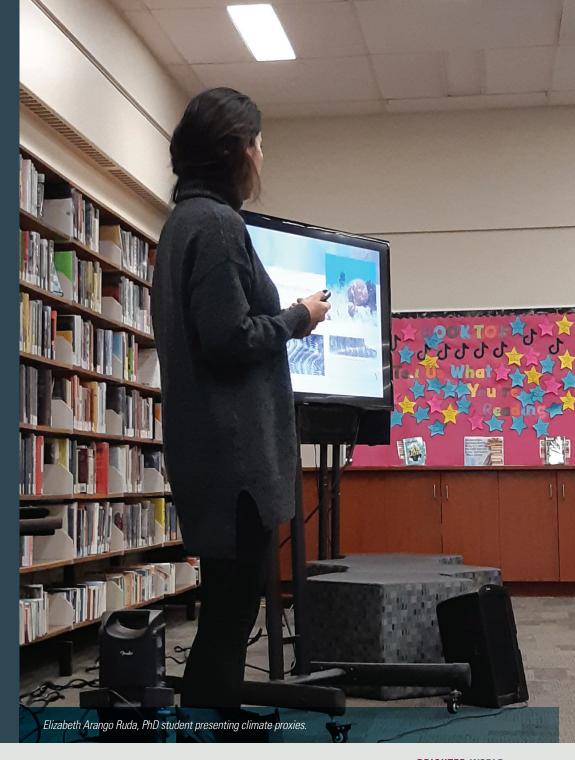
High school teachers often invite MCCC into their classrooms as a way to engage students when introducing a new climate change or sustainability unit.

One of the most popular activities has students comparing apples to oranges, literally. "We provide a list of foods and students try to determine whether they have low, medium, or high carbon footprints," said Deen.

"We want them to feel that there is something they can do, so we talk to them about the choices they can make in what they eat, in what they buy and how that makes an impact."

This program has also introduced many students to the possibility of climate change research as a career path. "Our Ph.D. students are getting to share their passion with the next generation of researchers," said M. Altaf Arain, director of the McMaster Centre for Climate Change.

"Community outreach and engaging high school and McMaster students is key to the success of environmental sustainability."



STRATEGIC DRIVER 2:

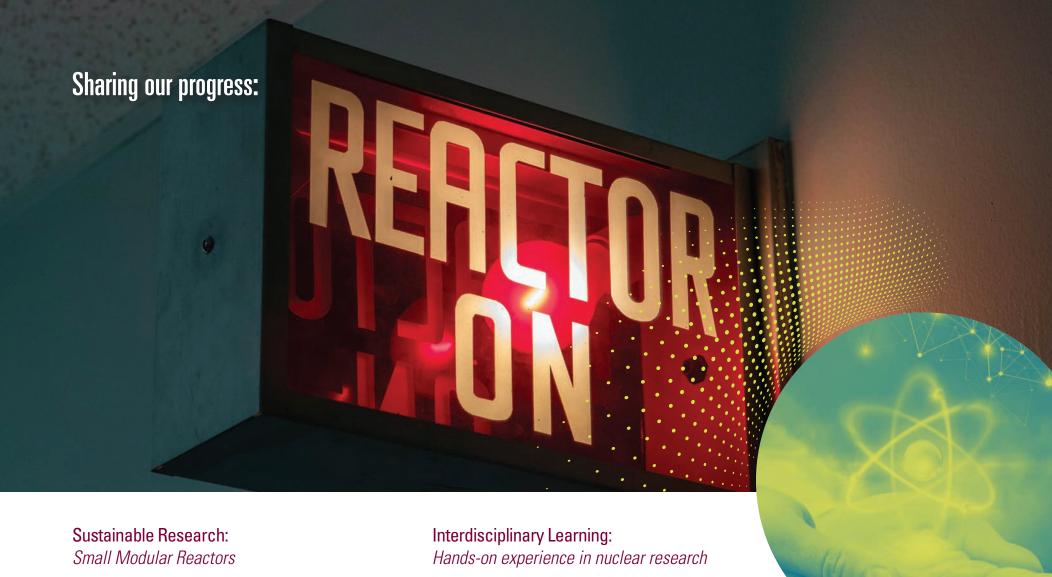


Teaching, Learning and Research

Sustainable Research
Interdisciplinary Learning
Digital Learning and Environment
Campus as a Living Laboratory

McMaster is committed to supporting sustainable research, teaching and learning. We are pleased to share highlights from new McMaster research that addresses big sustainability challenges. We also share examples of how our students have been active partners in developing a living laboratory for sustainability on campus during the 2022/23 academic year.





McMaster entered into a partnership with the Ultra Safe Nuclear Corporation and Global First Power to advance research in Small Modular Reactors (SMRs), a clean energy technology that could play an essential role in Canada's Net Zero by 2050 goal. The partnership involves examining the feasibility of deploying a Micro Modular Reactor at McMaster University, helping pave the way for Canadian communities considering the adoption of this new approach to greenhouse gas free energy.

During the summer of 2023, 12 undergraduate students participated in a new program from the Canadian Nuclear Laboratories (CNL), where they conducted nuclear research in cutting-edge facilities and worked with leading academic and industry experts. This eight-week Nuclear Undergraduate Research Experience Program engaged students from the faculties of Science and Engineering to gain hands-on experience working with CNL researchers and staff, as well as with McMaster researchers working with our Nuclear Reactor.



Digital Learning and Environment: ARTEMIS improves climate change model accuracy

McMaster researcher Andrew Gadsden and his team of experts have worked with NASA to build an autonomous, robotic telescope mount to help create more accurate climate change models. The first-generation robotic mount — named ARTEMIS, short for the Autonomous, Robotic

TElescope Mount Instrument Subsystem — was designed to ensure the telescope stays trained on the Moon while in motion. The airborne lunar spectral irradiance mission — air-LUSI —will send a telescope into high-altitude flight to measure reflected moonlight with unprecedented accuracy.

(Photo credit: NASA photo/Ken Ulbrich)

Campus as a Living Laboratory: Storing and reusing excess heat

Co-founded by mechanical engineering professor James Cotton and research lab manager at the McMaster Institute for Energy Studies, Jeffrey Girard, HARvEST aims to capture excess heat generated as a by-product of industry and redistribute or repurpose that heat to where it is needed.

To prove the HARVEST concept, Cotton and Girard established a research facility on campus that allows for a full-scale implementation of this technology. The Research Facility for Integrated Building Energy Harvesting Systems provides the means to validate the processes behind HARVEST and can also heat, cool and power the Gerald Hatch Centre.

Recently, they collaborated with Pizza Pizza Limited and Thermal Electronics Corporation to successfully demonstrate HARvEST in three Ontario Pizza Pizza restaurants. The system captures waste heat from cooking appliances to offset energy consumption in other restaurant operations. Implementing this technology can support the decarbonization of the restaurant industry by providing a fuel-less, carbon-free hot water heating system.

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SPOTLIGHT:

Protecting the environment through Indigenous knowledge and western science

Dawn Martin-Hill, professor in the Indigenous Studies and Anthropology departments says by looking at a satellite view on Google Maps one can easily find the Six Nations of the Grand River — just look for the intact forest. For Martin-Hill, that preservation of the old-growth Carolinian forest shows how the Indigenous community of the Six Nations knows how to treat the land with care.

Through her work with the Ohneganos water research project, she is advocating for Indigenous knowledge to be used alongside western science to protect the environment.

Martin-Hill attended the UN Water Conference in March 2023 to promote the use of Indigenous and western ways of knowing to tackle water security issues in Six Nations of the Grand River.

"We're hoping to forge a new path, using western and Indigenous knowledge systems," she said. "The UN is starting to realize how valuable Indigenous knowledge can be, but they're unsure how to fit that into the existing frameworks."

And there's a definite sense of urgency in protecting the environment around Six Nations of the Grand River.

Highlighting the damage done to the section of the Grand River which flows through the community, Martin-Hill showed drone footage of the river, showing the sludge coming in from 25 wastewater plants upstream.

As part of the Ohneganos project, the team is trying to provide water-quality sensors to the community to monitor the water for chemicals.

Another part of the project also used a Household Water Insecurity Experiences (HWISE) survey to see the scale of water insecurity on Six Nations.

Martin-Hill says this was the first time the HWISE had been used in a developed country, since it's a tool typically used in the Global South. But the results, which parallel those found in developing countries, show Six Nations, a community only half an hour from Hamilton, is significantly water-stressed, she says.

The HWISE survey showed that 58 per cent of the Six Nations households surveyed had moderate to extreme water insecurity, to the point where families worry about flushing the toilet because they may not have enough water.

By speaking at events like this one, the team at Ohneganos hope to highlight the urgent need to take action to improve water security at Six Nations.







Eco Parks and Greenspace: Planting trees to tackle climate change

More than 125 students, two dozen medical residents and students, community volunteers were joined by President David Farrar to grow the McMaster Carbon Sink Forest by planting 300 trees.

The McMaster Carbon Sink Forest in West Hamilton is the latest research initiative by the McMaster Centre for Climate Change. The centre, led by Professor M. Altaf Arain from the Faculty of Science, continuously monitors how much carbon dioxide is being pulled out of the atmosphere by each tree. That data, along with the centre's experience in growing the forest, will be shared with researchers around the world who are growing similar forests to help mitigate the impacts of climate change.



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Health and Well-being:
Shaping the food system on campus

Community members were invited to share their thoughts on campus food systems to help evolve and serve our growing and diverse community. The McMaster Campus Food Charter survey included a series of questions seeking to understand what people value in "healthy" food, what would make food more accessible on campus and the degree of interest in publicly accessible kitchens, amongst other issues. The survey results have helped shape the Campus Food Charter, which will inform future strategies and actions that the university and stakeholder groups can take to foster food sovereignty. The charter is in the design stage and expected to be formalized by the end of 2023.

Active and Alternative Transportation: *Green transportation on campus*

Facility Services has upgraded their fleet of maintenance trucks to zero-emission vehicles and will continue to prioritize the adoption of electric vehicles. This transition will help reduce emissions on campus in alignment with McMaster's **Net Zero Carbon Roadmap**.

McMaster further supports green transportation by partnering with the City of **Hamilton Bike Share**. Racks of bicycles across campus, offers students, faculty and staff an active mode of transportation 24 hours a day, 365 days of the year. Over the 2022-2023 academic year, over 86,000 bike rides started or ended on McMaster's main campus.

SPOTLIGHT:

Parks Canada supports protecting natural lands surrounding McMaster

Parks Canada provided \$3.5 million in funding to the Royal Botanical Gardens (RBG) and other members of the Cootes to Escarpment EcoPark System, including McMaster University, to support the development of ecological corridors in protected areas and parklands between Cootes Paradise and the Niagara Escarpment.

The funds will be used to protect 2,200 hectares of land and connect wildlife across a highly urbanized landscape, through initiatives such as restoring natural habitats, increasing native plants, removing invasive species and protecting wildlife. The program will also involve Indigenous communities in sharing knowledge about the land.

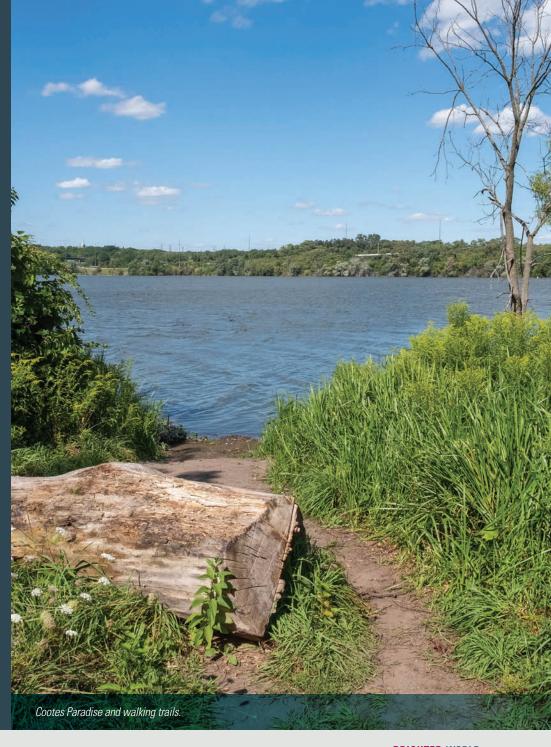
"This funding will enable us to continue and expand upon initiatives that protect natural lands owned by and neighbouring McMaster University," says Wayne Terryberry, coordinator of natural lands at McMaster.

"The university's long association with local conservation organizations ensures that McMaster's natural backyard is protected and preserved."

A commitment to protecting greenspace on campus and beyond is outlined in McMaster University's Sustainability Strategy and recognized in the university's responsibility to address the United Nations' Sustainable Development Goals.

"As a member of the Cootes to Escarpment EcoPark System, McMaster has a responsibility to support the stewardship of natural lands on and surrounding our campus, which are home to diverse and ecologically sensitive ecosystems," said McMaster President David Farrar. "McMaster continues to be committed to collaborating with our neighbours and partners to promote and protect this uniquely biodiverse area."

The nine organization members include the Royal Botanical Gardens, Bruce Trail Conservancy, City of Burlington, City of Hamilton, Conservation Halton, Halton Region, Hamilton Conservation Authority, Hamilton Naturalists Club and McMaster University. The Government of Canada's most recent nature conservation campaign aims to protect 30 per cent of Canada's lands and waters by 2030.



STRATEGIC DRIVER 4:



Operational Excellence

Sustainable Infrastructure, Energy and Water Waste

Responsible Investing and Sustainable Procurement Sustainable Operations Metrics

The university is dedicated to transforming administrative and operational practices to be more sustainable: reducing our use of carbon and energy with the goal of being a carbon-free campus, reducing waste and committing to environmentally responsible procurement. Developing time-bound metrics that benchmark our progress across all strategic drivers is a priority and a responsibility shared by all McMaster leaders. The progress included here is a sample, and more efforts and initiatives will build on this foundation every reporting year.





Sustainable Infrastructure, Energy, and Water: *Geothermal green energy system on campus*

McMaster will heat and cool its new campus greenhouse, under construction in front of the Life Sciences Building, with emission-free geothermal energy. The university anticipates that the new greenhouse will be ready in the spring of 2024, welcoming researchers, faculty, students, staff and a variety of plants to a new place to learn and grow. It will be the second geothermal system on campus, adding to the one that primarily supports clean energy research in the **Gerald Hatch Centre**. The university continues to explore other campus locations for additional geothermal sites.

Waste: Improving campus composting habits

Fourth-year student Skye Earley collaborated with Luc Bernier, professor from the Faculty of Science, and Carlos Figueira, the director responsible for waste management at McMaster, on a thesis project looking at ways to encourage the use of compost bins on campus. When food waste goes to the landfill, it produces greenhouse gases as it decomposes beneath inorganic waste. Diverting organics into the compost bin avoids the creation of additional harmful gases and provides campus with a form of natural fertilizer.

The project surveyed students, faculty and staff for input on how to improve composting at an individual level. Expanding and encouraging participation in composting is a part of **McMaster's Sustainability Strategy** and the results of Earley's survey will both be incorporated into Facility Services' sustainability planning.

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Responsible Investing and Sustainable Procurement: Continuing to decarbonize our investment portfolio

McMaster has surpassed its carbon reduction targets for its investment portfolio a full two years ahead of schedule.

The university has successfully reduced the carbon intensity of its investments by 70 per cent from 2018 levels, surpassing its original goal of 65 per cent by 2025.

Over the past five years, in addition to transitioning to low-carbon investments, McMaster has divested from higher-carbon holdings, decreasing its holdings in the Carbon Underground 200 (CU200) to 1.6% from 2.7% last year.

McMaster has also invested \$10 million in a global fund which only invests in infrastructure such as wind and solar projects. This investment will grow to \$30 million over the coming years.

Read more about our efforts in Responsible Investing and the financial status of the university in the **Annual Financial Report**.

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Metrics: Tracking McMaster's research related to the United Nation's Sustainable Development Goals (UN SDGs)

Interested in further exploring McMaster's contributions to research related to the UN Sustainable Development Goals? Check out **Dimensions**, a research output and citation platform available to McMaster University students, staff and faculty to explore research within and beyond the university. Want to know how many McMaster research papers were published in 2022 related to UN SDG 7: Affordable and Clean Energy (165), or how McMaster compares to other universities in these areas of research? **Explore the data online** and reach out to McMaster Library's Research Impact Specialist to learn more.

Sustainable Operations Metrics

Waste Management

- In 2022-2023, 1,295 tonnes of total waste was generated
- Total waste diversion rate of 52.5%, up from 51.9% in 2021-2022

Water use

 During the 2022-2023 academic year, 572,785 m3 of domestic cold water was used at McMaster, down from 861,734 m3 used during 2019-2020

Energy use and carbon emissions

In 2022, McMaster emitted 42,265 tonnes of CO2, down from 46,720 tonnes of CO2 in 2021



SPOTLIGHT:

Encouraging Composting Champions on campus

A group of McMaster students in an Academic Sustainability Program course are breaking down the benefits of composting on campus, encouraging everyone, including staff, faculty and students, to become **Composting Champions**. Staff members from Custodial Services supported the students in this experiential learning project, helping turn campus into a living laboratory of sustainability.

Composting Champions are volunteers who make it easy for the McMaster community to dispose of food scraps and organic materials responsibly, wherever they are on campus.

The champion shares composting tips, promotes composting in their area and empties their office compost bin at regular intervals at the convenient drop-off locations on campus. A vendor then takes all the organic waste to make compost that is used to enrich soil and help plants grow.

"The program the students helped develop has made composting at our office on campus easier," says John Hemmer, director of maintenance and composting champion. "I noticed that office colleagues were very receptive and started following the signs, using the composting bins right away."

Every McMaster team, department, faculty, student club or area is invited to opt into a revitalized composting program at the university. Anyone with an office, space or event on campus can <u>sign up online</u> to become a Composting Champion. A compost bin, liners and instructions are then delivered to their location on campus.

The <u>Composting Champions web page</u> is available for anyone looking to learn more about composting on campus and includes a map of all composting drop-off locations on campus, downloadable signs with tips on what can and cannot be composted and quick access to ordering materials like a compost bin and liners.

A Message from the Co-Chairs of McMaster's Sustainability Advisory Council:

Dave Cano, Director, Sustainability

Kate Whelan, Associate Director, Academic Sustainability Programs

Over the past year, McMaster staff, faculty, administration and students have been working hard to raise the performance and awareness of our sustainability efforts. We continue to have many students engaged in hands-on learning experiences through our SUSTAIN series of courses, which tackle real-life challenges both on and off-campus. The university launched its first-ever sustainability strategy, and we are moving forward with the implementation of our ambitious Net Zero Carbon Roadmap.

Our community's sustainability efforts and leadership are getting noticed. The 2023 Times Higher Education Impact Rankings placed McMaster University in 33rd place worldwide out of 1,591 participating universities in 112 countries/regions. In Canada, we ranked 7th out of 26 participating institutions. This is a great achievement, and one that helps us not only celebrate our accomplishments, but motivates us to reach the top 10 universities worldwide.

We would like to express our gratitude to all the members of McMaster's Sustainability Advisory Council (MSAC) and to all students, staff and faculty that worked hard in making our campus more sustainable over the past year. First and foremost, to Debbie Martin, associate vice-president Real Estate, Partnerships and Ancillaries, and former chair for MSAC. Her contributions and leadership role for this group, and for sustainability in general at McMaster, have allowed the institution to reach new heights. We wish to acknowledge the great support provided by Susan Tighe, Provost and Vice-President Academic and Saher Fazilat, Vice-President, Operations and Finance, who are the champions of McMaster's Sustainability Strategy.

McMaster's Sustainability Advisory Council will continue to support, connect and work with students, staff, faculty and administration who are leading initiatives that can help transform our campus into a living laboratory for sustainability. But we can't do it alone. We need support from our entire campus community to get involved and to help us achieve our sustainability goals. You can start by reading this report, finding inspiration about sustainability successes to date and opportunities to extend our impact. We look forward to your ideas and involvement in McMaster's sustainability journey.



Connection to United Nations Sustainable Development Goals

Please note that the initiatives highlighted in this report are non-exhaustive. For more information on how McMaster is addressing all 17 of the United Nations Sustainable Development Goals (UN SDGs), visit **McMaster's Sustainable Development Goals site**.

















McMaster initiatives covered in this report Leadership and Vision: Refreshing the Office of Sustainability Communications: Updated Sustainability Policy Strategic Partnership and Continued Engagement: Sustainable development goals pitch competition Learning and Development: Bring your own water bottle campaign Spotlight: Going back to high school to fight climate change Sustainable Research: Small Modular Reactors Interdisciplinary Learning: Hands-on experience in nuclear research Campus as a Living Laboratory: Storing and reusing excess heat Digital Learning and Environment: ARTEMIS Improves climate change model accuracy Spotlight: Protecting the environment through Indigenous knowledge and western science Eco Parks and Greenspace: Planting trees to tackle climate change Health and Wellbeing: Shaping the food system on campus Active and Alternative Transportation: Green transportation on campus Spotlight: Parks Canada supports protecting natural lands surrounding McMaster Sustainable Infrastructure, Energy & Water: Geothermal green energy system on campus Waste: Improving campus composting habits Responsible Investing and Sustainable Procurement: Continuing to decarbonize our investment portfolio Metrics: Tracking McMaster's research and operations related to the United Nations' Sustainable Development Goals Spotlight: Ecouraging Composting Champions on campus

United Nations	Sustainable Development Goals
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Connect with us:

You can learn more about McMaster's Sustainability Strategy and view previous sustainability reports on our website at **sustainability.mcmaster.ca**. Have a question for McMaster's Office of Sustainability? Email sustainability@mcmaster.ca.

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