

2019
2022

Sustainability and Climate Action Plan

Going Further



Fleming College

**Fleming College respectfully acknowledges that we are situated
on Michi Saagiig lands and the traditional territory
covered by the Williams Treaties.**

**G'chi Miigwech to the Michi Saagiig peoples for allowing us
to continue our work in your territory.**



Our Fleming Our Future

Table of Contents

Executive Summary.....	4
Background and Community Consultation Summary	5
Our Institutional Framework	7
“Our Fleming Our Future” Strategic Plan 2019-2024.....	8
Fleming and the Global Goals for Sustainable Development.....	8
Green Campus.....	11
Green Culture.....	15
Green Curriculum.....	19
Green Research.....	23
Green Community.....	27
Metrics (2012/2013 Baseline).....	30
Conclusion.....	31
Appendix 1 Fleming College Climate Change Action Plan.....	33
Waste Management at Fleming College.....	40
Appendix 1a GHG inventory.....	43
Appendix 2 Five Year Plan Results 2013-2018	46

Executive Summary

Fleming College has a long history of progress and leadership in sustainability. From being the first Canadian College to ban bottled water sales on campus in 2011, to our recent ranking as a top ten performer in the AASHE 2018 Sustainable Campus Index Report, we continue to lead the way.

This Sustainability Plan sets the roadmap for Fleming College for the next three years in supporting the 2019-2024 Strategic Plan *Our Fleming Our Future* and the United Nations 17 Sustainable Development goals, while achieving carbon and waste reduction targets identified in the Climate Action Plan ([Appendix 1](#)). The plan also reflects the priorities of College stakeholders, staff, students and the broader communities that we serve.

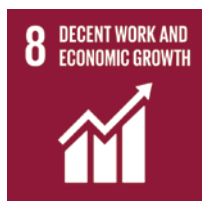


This plan is divided into five sections and follows a framework for a “whole institutional” approach to sustainability as defined by UNESCO (UNESCO, 2017. *Greening Technical and Vocational; Education and Training*). The five sections represent a systems approach to Green: Campus, Culture, Curriculum, Research and Community, which are interrelated and synergistic. Each section aligns our sustainability goals with the five commitments in Fleming’s 2019-2024 Strategic Plan, namely; Labour Market Focus, Community Partnerships, Empowering Staff, Embracing Technology and A Welcoming Place. Finally, each section also reflects progress since our first sustainability plan (2013-2018), that set a baseline for measurement of targets and goals for the next three years. There are 28 goals in total.

The progress to achieve each goal will be monitored and reported annually. Fleming College will continue to use STARS (Sustainability Tracking and Assessment Rating System), a comprehensive benchmarking and reporting system to publicly report progress every three years. We aspire to achieve a STARS Gold rating by 2022.



Finally, as a higher education institution Fleming College is uniquely positioned to address sustainability and climate change challenges and prepare our students with the skills and knowledge for a sustainable future. Therefore, each section of the plan addresses how we will embed sustainability in our campus, as a living lab, and through our programs, curriculum and extracurricular offerings. Our graduates are our greatest impact. With our graduates we will go further!



Sustainable
Development
Goal 8

“UNESCO’s education sector, including technical and vocational education and training (TVET), currently finds itself at a crossroads. The end of the Education for All (EFA) movement, and the adoption of the Sustainable Development Goals (SDGs) at the United Nations Summit in September 2015, highlights the need to reconsider the role of the education sector in a more globalized world, accentuated by interlinkages between social, economic and environmental issues.”

- UNESCO (2015). *UNESCO TVET Strategy 2016-2021*. Bonn, Germany.

Background and Community Consultation Summary

Fleming College launched its first Sustainability Plan in 2013 to achieve our strategic goal of being a leader in sustainability. The plan was developed with broad consultation of over 200 internal and external stakeholders and the guidance of a cross sectional steering committee comprised of staff and student leaders. The results of the plan are summarized in [Appendix 2](#) (Report Card). The vision in the plan was that “Fleming’s culture delivers innovative programs and practices that build healthy futures for people, communities and the environment.” With the launch of the Fleming Strategic Plan (2019-2024) and the mission to **“empower our students with the innovative education, research and real-world experiences they need to build better lives, better communities and a better world”**, this vision for sustainability still holds true for Fleming.

In 2013, some strong themes were identified and prioritized, namely, a desire for more applied learning, greater collaboration and visibility of sustainability and a quality education experience to incorporate a sustainability skillset into program outcomes. This Plan highlights the significant progress in five years relating to these themes. However, in recent consultations, we have heard that the College needs to do a better job of shifting to a culture of sustainability and accountability, including reducing campus waste. The following summary highlights the results of the 2018 consultations in preparation of this three-year plan.



The Association for the Advancement of Sustainability in Higher Education (AASHE) ranked Fleming fourth overall among North American community colleges.

- 2018 Sustainable Campus Index

Consultation

Fleming conducted a staff and student survey in 2018 with 422 respondents. The Office of Sustainability also conducted broad consultations between January and December, 2018, gaining feedback from approximately 220 stakeholders as follows:

Internal Leadership Groups:

- Senior Management Team
- Service Leaders Team
- Deans and Chairs
- Student governments at Frost and Sutherland Campuses
- Academic Coordinators

External Stakeholders:

- Open focus group at Frost Student Eco Conference
- City of Kawartha Lakes Healthy Community Plan Steering Committee
- Sustainable Peterborough Coordinating Committee

Representative Groups:

- President's Advisory Committee
- Academic Task Force-Sustainability
- Sustainability Steering Committee
- Alternative Transportation Task Force

Students:

- Classes at Frost and Sutherland Campus which incorporate Fleming's sustainability learning outcome

Overall, stakeholders recognized Fleming's great progress, yet pointed toward a stronger need to advance our commitment in our day-to-day actions on campus to support sustainability. The specific highlights are the following:

Culture of Sustainability – need a more demonstrable shift in culture, through how we deal with waste and materials flow on campus, including paper use.

Energy Management and Carbon Reduction – considered highly important and rated as a #1 priority for both staff and students (second only to waste reduction).

Education – 84% of students and 83% of staff rate sustainability in curriculum as important to very important, and Fleming can do more to support faculty in making this real in the classroom.

Innovation and Research – Fleming needs to do even more to support innovation and research in the field of sustainability.

A Bold Stance – part of shifting culture is to embrace a leadership position in a significant aspect of campus life, similar to our early pioneering ban of bottled water sales - this includes eliminating paper and plastics on campus.

Policy-Directed Decision Making – Fleming needs written policies that are binding and drive effective decision making in our purchasing, in how we manage our facilities and in how we support quality and consistency in learning about sustainability.

Alignment with the new Strategic Directions - Fleming's new Strategic Plan (2019-2024) is setting an exciting new direction for the College and the Sustainability Plan needs to align.

Most targets and goals in Fleming's 2013-2018 plan were achieved (but not all). During our 2018 consultations, we heard that there is more that we can do. This plan commits to go further as it aligns with Fleming's new Strategic Plan - Our Fleming Our Future!

Our Institutional Framework

Implementation and Reporting.

Fleming's Sustainability Plan includes measures to drive towards a net zero campus and a sustainable campus community. Following the UNESCO five dimension framework for a "whole institution" approach to sustainability, this plan's categories are:

Green Campus • Green Culture • Green Curriculum • Green Research • Green Community

Each of these section categories identifies areas of alignment with commitments in the 2019-2024 Strategic Plan priorities: labour market focus, community partnerships, empowering staff, embracing technology and a welcoming place.



The College plan also aligns its sustainability goals with the **17 United Nations Sustainable Development Goals** (SDGs) which support the vision for worldwide Sustainable Development by tackling issues from reducing inequality, improving health and education and addressing environmental challenges. The SDGs provide a clear framework for business, government and social sector organizations to work together on the world's most pressing societal challenges, from protecting our planet, enabling meaningful work in our communities and creating inclusive societies that honour our diversity. Therefore the SDG goals are highlighted within the five categories in the plan, connecting our local and regional work at Fleming College with these important global targets.

THE GLOBAL GOALS For Sustainable Development



"Our Fleming Our Future" Strategic Plan 2019-2024

Our Mission

To empower our students with the innovative education, research and real-world experiences they need to build better lives, better communities and a better world.

Our Values

We will achieve our vision and mission by adhering to our values, which are:

Responsiveness,
Innovation,
Collaboration,
Inclusiveness, and
Accountability

Our Vision

Creating prosperity and transforming communities through education and innovation.

Fleming and the Global Goals for Sustainable Development:



368%
enrollment increase
in **Sustainable Agriculture**
and **Aquaculture** from
2013-2018.



Between 2013-2018
there have been
1,868 graduates of
our **Health and Wellness**
Programs.



76% of all **trades**
and **technology** students
were **employed after**
graduation.



There has been a **95%**
increase in **female enrollment**
in our **trades programs**.

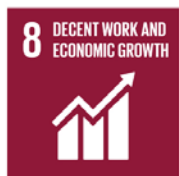


Fleming has been awarded
\$17,740,545
in **Research funds**.

Center for Advancement of Water and Wastewater Technologies



Saved **47.3K** annually
by **switching to LED**
lighting.



Fleming has regional
economic impact of
\$497.5 Million.

Fleming Strategic Plan 2019-2024



134 **Project Industry**
Partners are involved in our
Center for Advancement
of Water and Wastewater
Technologies.



118 Graduates of
English Language
Basics since 2015.



2017 Fleming
launches the **Centre for**
Sustainable Municipalities.



Reduced **Paper consumption**
46% and use of
Potable water per square
meter by **10%**.



Reduced **GHG** by
10% per campus
user over 5 years.



Raised **12,500**
Muskellunge Fingerling
to stock in Ontario lakes.



78% Graduates
from the School of
Environmental and
Natural Resource Sciences
were **employed after**
graduation.

* most statistics sourced from Fleming's Institutional Research Office/Fleming Website.



The "Green Roof"
at our Frost Campus
which will convert
1,200 square feet
of dead space into
living systems.

1. Green Campus



SUPPORTS STRATEGIC PLAN COMMITMENTS:

- ✓ We will be focused on the needs of students and employers in the labour market
- ✓ We will be a welcoming place for all

Bringing the Goals of Sustainable Development to Campus

A Green Campus supports the SDGs and Fleming's Strategic Plan by focusing on a campus that provides open, accessible, inclusive and "Welcoming Places" for staff, students and community. The "living lab", with the latest low carbon technology and experiential learning spaces, supports the needs of the labour market and emerging clean technology jobs in the low carbon economy.

Since 2013, the college has implemented a number of initiatives to reduce our carbon footprint and set specific targets for reducing energy, water, waste and paper use on campus. All targets and measurements were aligned with the STARS system for measuring campus sustainability. The College has tracked energy use and has reduced our direct Scope 1 and 2 GHG emissions (carbon tons per weighted campus user) achieving the 10% reduction target. GHG emissions are reported annually and we publicly report our progress. The summary of achieved reductions is detailed within the Climate Action Plan ([Appendix 1](#)).

The College has also tracked water usage and reduced use of potable water per square metre by 10%.

Reductions were achieved through the following measures:

- Upgraded interior and exterior lights to LED and residence appliances to energy efficiency models
- Upgraded building automation systems for all campuses
- Installed electrical sub metering and digital timers
- Weekly monitoring/reporting for HVAC occupied/unoccupied at all campuses
- Upgraded roof insulation and installed air curtain at the Sutherland main campus
- Installed variable frequency drives for air handling
- Installed EV Charging stations at Sutherland Campus
- Installed a rain water catchment system in Kawartha Trades and Technology Centre
- Installed water harvesting systems for campus community gardens and low flush toilets in all residence rooms
- Built the Kawartha Trades and Technology Centre to LEED Gold Standard

The College has reduced use of **potable water** per square metre by **10%**.



Fleming College has demonstrated effective land stewardship of our campuses. The College has expanded the trail systems at Sutherland Campus, conducted biological inventories of plant and wildlife species, introduced a new wetland complex, apiary and pollinator gardens to enhance and monitor our natural environment and campus ecosystems.

Energy and Water

There are a number of planned capital and infrastructure initiatives underway to contribute to the 2030 and 2050 Greenhouse Gas reduction targets in the Pan-Canadian Framework on Clean Growth and Climate Change and in Ontario's new plan "Preserving and Protecting our Environment for Future Generations. Using a 12/13 baseline inventory, Fleming's total Scope 1, 2 and tracked Scope 3 emissions for the baseline year were 5688 tCO₂e (using operational boundaries of properties and equipment owned and controlled by the College). The Climate Action Plan in [Appendix 1](#) highlights the details of how the College plans to reduce its emissions by 2030 and 2050 toward a net zero or carbon neutral campus.

Flemings Main Sources of Greenhouse Gas Emissions 2017/2018

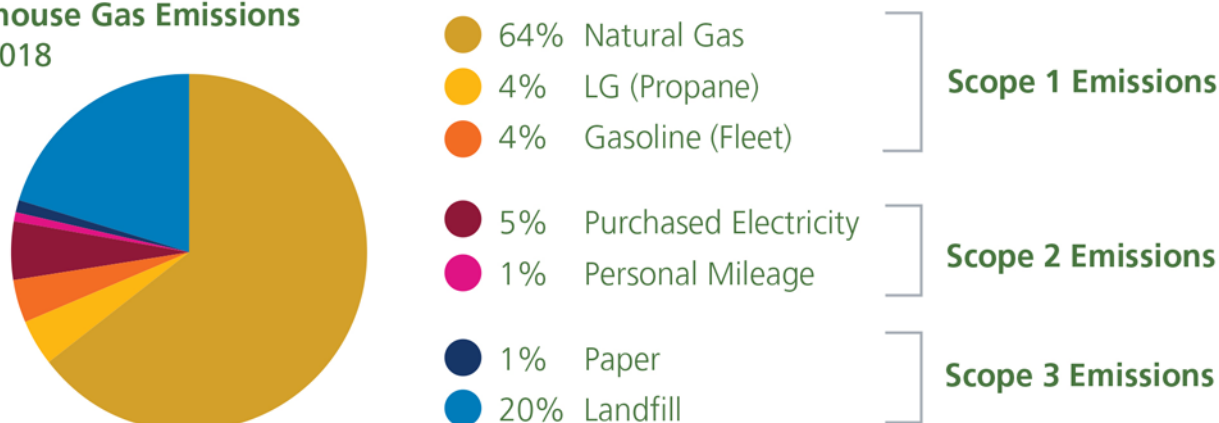


Figure 1: Breakdown of GHG emission sources at Fleming College in 2017/18.

In 2018, Fleming completed projects funded under the Federal Strategic Investments Fund. As a result of these investments, the College was able to make considerable capital improvements on Sutherland and Frost Campuses including improving the weather envelope of the Sutherland Campus A wing and upgrading HVAC and lighting. Detailed reductions are in the attached Climate Action Plan.

In 2018, Fleming received funding approval under the Ontario Greenhouse Gas Campus Retrofit Program. The projects included retro-commissioning of HVAC, windows, installation of a building automation systems (BAS) to improve overall energy consumption and installation of a wind power system. The projected CO₂ reductions are in [Appendix 1](#) (Climate Change Action Plan). The planned facility upgrades provide an active "living lab" environment for trades and technology students to learn about the evolving technology in alternative energy such as geothermal, solar, wind and energy storage solutions.

Further reductions in GHG emissions will be gained through a fuel switch for our campus fleet and equipment as well as increasing the use of equipment simulators, particularly in programs such as Artist Blacksmith, Heavy Equipment Operator and Drilling and Blasting Technician.

The College will continue to implement water saving measures (where feasible) such as low flow urinals and water saving aerator faucets in campus washrooms, replacing approximately 60 faucets in 2018. Rainwater catchment systems will be installed in our community gardens and tree seedling beds at the Frost Campus.

Sustainable Campus Plan

By 2022, Fleming will have a Sustainable Campus Plan maximizing our campus natural environments while providing open, accessible, inclusive and culturally enriched spaces to support learning and gathering opportunities.

This plan will be aligned with the Campus Master Plans in guiding all future campus open space development. It will reinforce a commitment to sustainability in all aspects of campus design and programming, prioritize infrastructure for alternative modes of transportation to and throughout the campus, support food production and provide education opportunities.

The Campus Master Plans will include innovative approaches to reduce, collect and re-use storm water on campus and detail how Fleming's lands and forests will be managed to increase carbon offset capacity, support biodiversity and climate change resiliency. This includes increased naturalization and lowering GHGs through reduced seasonal grass cutting. The redevelopment of the Frost Green Roof and expansion of the Frost Arboretum will continue with an emphasis on species at risk, seed cultivation and applied research in climate science.


The Living Lab

With our growth of trades, technology and environmental programs housed in the Kawartha Trades and Technology Centre and at our Frost Campus, Fleming is furthering our track record as an experimental learning "living lab" where students learn within and from the campus. Through new programs such as sustainability planning, sustainable agriculture, sustainable waste management and geothermal systems, our students will learn from our campus operations — how we steward our natural and built environments. This will prepare our students for jobs in the low carbon economy.

Goals:

Using a baseline of 12/13 by 2022 Fleming College will:

- ✓ **1.1** Reduce energy use by 15% and CO² emissions toward 30% by 2030 and 80% by 2050 through measures identified in the Climate Action Plan ([Appendix 1](#)).
- ✓ **1.2** Reduce water consumption by 20% per square metre.
- ✓ **1.3** By 2022, Fleming will have developed a comprehensive sustainable campus plan for all campuses based on ecological design principles.
- ✓ **1.4** Build all new construction projects to LEED Gold standards.



The "Bike Share"
at our Sutherland
campus station.



2. Green Culture



SUPPORTS STRATEGIC PLAN COMMITMENT:

- ✓ We will empower our staff
- ✓ We will embrace technology and digital tools

How We Work, Learn, Dine and Travel.

A Green Culture supports the strategic plan by engaging staff and students in an energized workplace culture that respects diversity, inclusivity and the environment. This is accomplished through engagement and professional development opportunities based on the Sustainable Development Goals and workplace greening tools, using our Living Planet at Work partnership with World Wildlife Fund - Canada. By 2022, Fleming will also pursue a designation as one of Canada's Top Green Employers.

In Fleming's 2013 Sustainability Plan we committed to reducing our paper consumption by 30%, increasing our local food content in our cafeterias to 25%, and using alternative transportation for 20% of our staff and 50% of our students. We also committed to engaging our campus by creating more awareness regarding the impacts of how we work, learn, live and travel to reduce our individual and collective ecological footprint while embracing diversity in campus life.

Fleming launched the Office of Sustainability, tasked with the responsibility to work with staff and students to implement the goals and to track and report progress each year. Two public reports have been published using the STARS international benchmarking system - the first in 2013, receiving a Bronze rating, and the second in 2016, receiving a Silver rating.

The highlights of the accomplishments are detailed in these reports and include the following:

- Student governments launched comprehensive transportation initiatives including a commercial bike loan and ride share program, Sutherland transit pass with expanded public transit and a Frost intercampus campus shuttle service
- Reduced paper consumption from 10,980,441 sheets to 5,939,862 sheets or 46%
- Partnered with World Wildlife Fund - Canada to launch the Living Planet @ Campus and Living Planet @ Work campaigns
- Launched a local Enactus chapter to support the UN Sustainable Development Goals
- Reduced waste generated on campus by 10% on a per campus user basis (6.6% in total kg) and launched the Fleming "Sort It Out" Campaign
- Launched video conference technology solutions to reduce intercampus travel
- Launched campus community and pollinator gardens, an arboretum and an apiary at Frost Campus

How we Work and Learn.

Going forward, Fleming will reduce waste generated on campus through adopting the principles of the circular economy and waste free Ontario. To do so, Fleming will implement an organics solution at both Frost and Sutherland campuses by 2022, reduce plastics in our food systems, reduce food waste and adopt sustainable procurement guidelines to reduce packaging waste and promote the Three Rs. Details of Fleming's waste reduction strategies are included in the Climate Action Plan ([Appendix 1](#)).

Fleming will implement a goal of paperless course delivery where feasible. All of Fleming's courses are hosted on the College's Learning Management System (Desire to Learn). Each course has a dedicated course page providing a platform to host all course resources in a digital format, supporting elimination of paper use in all courses except when a student requires accommodation. By 2022, Fleming courses will be paperless by leveraging our digital technology.



Much learning happens outside of the classroom and it is through our students and staff working together that we change our culture. To support our organizational sustainability competency for all staff, we will continue to expand the Living Planet @ Campus and Living Planet @ Work <http://atwork.wwf.ca/EN/> initiatives while supporting growth of student-led initiatives (e.g. Students for Sustainability, Enactus). Through these collective efforts, we will also launch a "Fleming Serves" model so that every staff and student have the opportunity to engage in community activities promoting sustainability.

How we Dine.

By 2022, Fleming will achieve 40% local food content in all food services using the definition for local food (i.e. region of Ontario) adopted by the Mohawk College led local food project "Increasing Local food Procurement at Ontario Colleges: The Evolution of Campus Food Services" www.mohawkcollege.ca/about-mohawk/sustainability/local-food.

To reduce food service waste, we will work to eliminate the use of straws in all of our food services and single use non-recyclable plastic cups, coffee cups and plastic cutlery in our cafeterias and hospitality services by 2022 ([Appendix 1: Climate Action Plan](#)). Fleming will also develop a system to track and reduce food waste in our campus food service facilities.

How we Travel.

By 2022, Fleming will expand infrastructure for cycling, including improved cycling signage and routes, on-site showers and secured covered storage at Frost and Sutherland campuses. Sutherland will expand its public transit connections to become a transportation hub for the local communities that we serve and into connections to the GTA. We will review the shuttle service between Frost and Sutherland campus using solid business analysis working in partnership with the Frost Student Association. Fleming's parking services will provide dedicated car pool parking for staff and students at both campuses. Finally, we will continue to utilize and expand video conference technologies to reduce inter-campus travel.

Goals:

Using a baseline of 12/13, by 2022 Fleming College will:

- ✓ **2.1** Reduce waste to landfill by 20% and improve waste diversion to 70%.
- ✓ **2.2** Reduce paper usage by 60%.
- ✓ **2.3** Implement Sustainable Procurement Guidelines for all college purchasing and a new Board Sustainability Policy to guide decision-making for the College.
- ✓ **2.4** Improve local food content in our food services to 25%.
- ✓ **2.5** Improve alternative transportation use to 60% of students and 20% of staff.
- ✓ **2.6** Provide every staff and student an opportunity to engage in sustainability-related activities through a “Fleming Serves” framework.
- ✓ **2.7** Provide every staff and student an opportunity to participate in workshops offered through our Living Planet @ Campus and Living Planet @ Work programs.
- ✓ **2.8** Achieve a designation as a Top 100 Canada’s Greenest Employers

Fleming’s culinary programs focus on sustainable and local food choices.



A group of female students are participating in a tree-climbing activity. They are wearing red helmets, green safety vests, and harnesses. They are using ropes to ascend tall, thin trees. The background is a clear blue sky with some bare branches visible. The students are at various heights on the trees, some are already high up, while others are just starting to climb. The ropes are orange and yellow, and the trees are mostly bare with some green foliage at the bottom.

Female Arboriculture
students learning the ropes!

3. Green Curriculum



SUPPORTS STRATEGIC PLAN COMMITMENTS:

- ✓ We will be focused on the needs of students and employers in the labour market
- ✓ We will be true partners in our communities

Learning for Sustainability

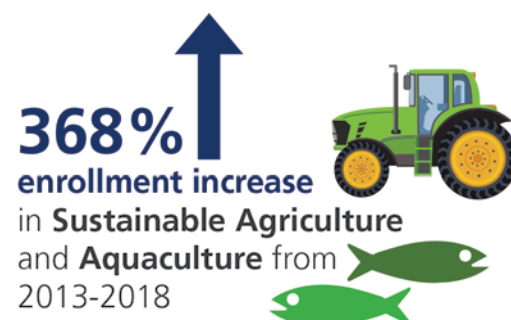
Green Curriculum supports the strategic plan commitment of meeting the needs of the current and future job market, as there are an increasing number of “green jobs” as we transition globally to the low carbon circular economy, and a changing climate. Through existing and new programs, our students will be prepared with the skills and knowledge needed, including clean technology, sustainability entrepreneurship and social innovation.

The greatest impact that we make as a college is through our graduates and we are committed to graduating students with knowledge, awareness and skills to support a sustainable future.

To accomplish our goals to “incorporate sustainability into the student experience” we have achieved the following:

- Developed a sustainability learning outcome which is required for all diploma programs – adopted in 89% of programs
- Committed to increasing the number of sustainability focussed and related courses by 50% from a baseline of 16% in 2012/2013 – as of 2017/2018 20% of courses offered
- Included the sustainability learning outcome in the student co-curricular record
- Implemented a graduate award for sustainability funded by Sustainable Peterborough
- Launched new programs such as Sustainable Agriculture and Sustainable Waste Management
- Increased sustainability-related applied learning opportunities through project grants, Indigenous Student Services and FASTstart

Fleming is the only Canadian institution named by the Association for Advancement of Sustainability in Higher Education (AASHE) as a Centre for Sustainability across the Curriculum, offering workshops in integrating sustainability into courses to faculty from institutions across Canada. Fleming College is also part of a newly designated UNU Regional Centre of Expertise in Sustainability Education www.rcekawarthas.com/ in partnership with local organizations and Trent University. RCEs



are committed to advancing the UN Sustainable Development Goals through education and research. The Peterborough Kawartha Haliburton RCE, launched in 2017, specifically commits to advancing Indigenous knowledge and connecting Fleming and Trent programs to green jobs and the local green economy. Both of these initiatives expand our reach and reputation as a sustainability focused institution.

In 2017, Fleming also signed the CICan Indigenous Education Protocol committing to Indigenous education across our curriculum which provides the opportunity for all students to learn about Indigenous knowledge and worldview – the original sustainability.

Finally, Fleming College committed to advance sustainability education and training in our 2017-2022 Strategic Mandate Agreement (SMA) “We will deepen and expand our expertise and programming related to sustainability in both natural and built environment and we will pursue our commitment to a low-carbon economy.”

Our Programs

As noted in our SMA, Fleming College will expand program and applied research activity related to developing the low-carbon economy and sustainability, including growth in our Centre for Advancement of Water and Wastewater Technologies and the Centre for Sustainable Municipalities (CSM). Specifically, the CSM will provide a “one-stop shop” for training and research to support municipalities in developing sustainable infrastructure and low carbon resilient communities <https://sustainablemunicipalities.ca/>.

All of our diploma graduates will learn about sustainability. As a Centre for Sustainability across the Curriculum we will continue to provide system leadership in embedding our sustainability learning outcome in all of our programs and provide more faculty development tools. These tools will support faculty to develop meaningful learning activities and assessments for transformational learning as we prepare our students to be global thinkers and lifelong learners in a rapidly changing world.

Fleming College’s Centre for Advancement of Water and Wastewater Technologies (CAWT), which is located at our Frost Campus, is an internationally recognized research institute that conducts research in water and wastewater treatment science.



Goals:

Using a baseline of 12/13, by 2022 Fleming College will:

- ✓ **3.1** Maintain the number of sustainability courses at a minimum of 25% of total courses and further develop tools for faculty to support quality learning.
- ✓ **3.2** Include the sustainability learning outcome in 100% of the Diploma programs.
- ✓ **3.3** Launch a comprehensive sustainability and climate action general education course incorporating the UN SDGs.
- ✓ **3.4** Implement a sustainability literacy assessment available for all graduating students.
- ✓ **3.5** Launch a living lab in the Kawartha Trade and Technology Centre for alternative energy technologies, including wind, solar, geothermal and energy storage solutions.
- ✓ **3.6** Launch new programs supporting sustainability, low carbon building and the circular economy, including Adaptive Forest Management, Supply Chain Management - Global Logistics, Leadership in Sustainable Business Practices, Hydronic Systems Design and Conservation Biology.
- ✓ **3.7** Expand training programs and tools for municipalities through the CSM with a focus on both climate mitigation and adaptation.



Fleming's
Fish and
Wildlife
Program
students
conducting stream
assessments.



4. Green Research



SUPPORTS STRATEGIC PLAN COMMITMENTS

- ✓ We will be true partners in our communities
- ✓ We will embrace technology and digital tools

Research Strengths

Our Fleming Our Future commits to developing an Applied Research Development Strategy to expand research activities to contribute to innovation in Canada and find solutions to issues our municipalities and regions as are grappling with. Like many other signatory nations, Canada is committed to the Paris climate action targets and the UN SDGs. Our local communities are also striving to meet these targets and achieve social, economic and environmental resiliency in a time of rapid climate change. Fleming's existing research strengths and expanded expertise will focus on real world solutions to sustainability challenges locally, nationally and internationally. In doing so, we will also look to Indigenous knowledge, to find answers.

Fleming's research innovation was recognized in the AASHE 2017 Sustainable Campus Index Report. Fleming has a reputation for its research focus in the area of alternative water and wastewater technologies and species restoration work through aquaculture. In 2017, Fleming's Centre for Alternative Wastewater Treatment was re-branded as the Centre for Advanced Water and Wastewater Technologies (CAWT) and has an expanded scope of research in water resources technology, as well as broader sustainability technologies such as waste management. The CAWT is a world class research facility, finding solutions to sustainability challenges through clean technology.

Highlights of Fleming's research portfolio include:

- The launch of the Centre for Sustainable Municipalities to provide research, tools and training for municipalities to manage infrastructure and greenhouse emissions
- Research in the field of aquaculture and aquaponics technology for food production
- Species restoration research: the successful reintroduction of Atlantic Salmon into the Great Lakes and the restoration research and population tracking work of the Muskellunge Restoration project

In **2009**

Fleming signed the **CICan Pan Canadian Protocol for Sustainability.**



Expanding Sustainability Research

Fleming's 2019-2024 Strategic Plan commits to expanding research across all programs. This includes expanding research in CAWT, aquaculture technology and in the Centre for Sustainable Municipalities (CSM). The CSM will help municipalities meet their greenhouse gas emission reduction targets and achieve community resiliency through sustainable infrastructure and adaptation.

By 2022, Fleming will develop more interdisciplinary research capacity, specifically in low carbon building technologies and in health and community development.

Fleming's living lab in the Kawartha Trade and Technology Centre will provide an ideal learning and research environment for our range of trades programs. Research and showcase opportunities will also be pursued with our community partners to support deep energy retrofits to meet reduction targets in local Climate Change Action Plans.

Fleming will build upon our local involvement with the Age Friendly Peterborough initiative, and provincial membership on the advisory committee for the Ontario Centres for Learning, Research and Innovation in Long Term Care, to pursue action research in both age friendly communities (healthy aging) and long term care. Healthy aging includes resiliency to the vulnerability challenges posed by a rapidly changing climate.



PETERBOROUGH KAWARTHA HALIBURTON
Sustainability Education Network
Located on Michisagig territory | A UNU Regional Centre of Expertise

Carpentry students working on the "Raising the Barn" at Lang Pioneer Village.



Fleming's partnership with the environmental educational research initiative "Pathways to Stewardship and Kinship", and with the Provincial Centre of Excellence for Child Care led by Western University, will involve further research in development of social justice and eco-stewardship through innovation in early childhood pedagogies and an Indigenous worldview.

Finally, through Fleming's involvement with the Peterborough Kawartha and Haliburton (UNU) RCE Education for Sustainability, we will engage in research to support quality education for indigenous learners and to draw upon Indigenous Knowledge in our region in addressing sustainability challenges through education and research. Specifically, Fleming is a partner with 120 other post-secondary institutions internationally in a UNESCO research project: "Indigenous Education for Sustainable Development – Reorienting Education and Training Systems to Improve the Lives of Indigenous Youth". The results of this study will be published internationally in 2021.

Goals:

By 2022, the College will:

- ✓ **4.1** Increase the number of applied research opportunities for faculty and students in building science, aquaculture, health, justice and community development programs.
- ✓ **4.2** Continue to expand low carbon technology and water and waste water technology related research in our CAWT.
- ✓ **4.3** Through the CSM, develop further research and tools for municipalities to use in both mitigation and adaptation to climate change.
- ✓ **4.4** Increase applied sustainability and indigenous knowledge research both on campus and with the partners in the Regional Centre of Expertise.
- ✓ **4.5** Conduct a comprehensive inventory of all sustainability related research at Fleming.

Local high school students participating in our annual "Envirothon".



5. Green Community



SUPPORTS STRATEGIC PLAN COMMITMENT:

✓ We will be true partners in our communities

Working with Our Communities

Fleming's Strategic plan was built in partnership with our community stakeholders and commits to a positive impact on social and economic development while becoming a destination of choice to work and play. Fleming will work in all of our communities to support green jobs growth and a clean technology hub while contributing to community resiliency through climate change action, social innovation and protecting our natural environment.

Since its inception, the College has worked closely with committed community partners from government, business, civil society and education to advance environmental, social and economic sustainability. In the next three years we will continue to work with our partners in Peterborough Kawartha Haliburton and Northumberland to advance community sustainability and provide rich applied experiential learning opportunities for our students.

Some highlights of the last five years include:

- Active member of Sustainable Peterborough and the Greater Peterborough Innovation Cluster working with multiple community partners to establish real life applied projects for students to foster innovation in a green jobs economy
- Partnered with the Otonabee Region Conservation Authority and Kawartha Conservation on initiatives including establishing a regional Envirothon competition and a summer nature camp to educate future green leaders - from early years to high school and beyond
- Partnered with Trent University, community groups and NGOs to frame research projects supporting the goals of the RCE in Education for Sustainability in advancing Indigenous Knowledge
- Expanded our Frost Campus community gardens and farmer's market at Sutherland campus to support the local food economy
- Provided students from various disciplines with real life applied projects while supporting culturally significant community projects (such as Lang Pioneer Village redevelopment)

Expanded our Frost Campus **community gardens** and **farmer's market** at Sutherland campus to support the **local food economy**.



- Provided language skills training and supports for new immigrants
- Worked with numerous local businesses and organizations to support local economic development and had a total annual impact on the regional economy of \$497.5 million

Going Further with Our Communities

During the next three years Fleming will continue to work with our partners in the region, particularly our business, municipal and educational partners to promote social, environmental, economic progress in a culturally diverse and inclusive community. We will also focus on green jobs and innovation. The Trent's Research and Innovation Park (Clean Tech Commons), combined with Fleming's excellence in training and research, will be fundamental to regional success.

Fleming will also partner with Trent and others in the region to support the research and public education initiatives to advance the Peterborough Kawartha Haliburton UNU RCE in Sustainability Education, with the primary goals of recognizing the vital importance of Traditional Environmental Indigenous Knowledge systems across curricula and linking post-secondary programs to green jobs, research and innovation in the region.

Finally, Fleming will continue to leverage our social infrastructure and work with our communities to support our recent growth in international students and new immigrants through our range of language support and community integration programs.

The Farmer's Market at our Frost campus.



Goals:

By 2022, the College will:

- ✓ **5.1** Provide every diploma student with the opportunity through either curricular or extracurricular experiences a minimum of one opportunity to work on a community project supporting local sustainability goals.
- ✓ **5.2** Launch a minimum of one research partnership per year with community partners under the auspice of the UNU Regional Centre of Expertise.
- ✓ **5.3** Provide every staff member with an opportunity for one community service opportunity annually administered through the Office of Sustainability.
- ✓ **5.4** Continue to work with the local community and services to support our international students and new immigrants through adequate housing, language skills training, transportation and cultural events.

Students in the School of Business promoting campus sustainability.



Metrics (2012/2013 Baseline)

Goal	Target	Projected Cost
Reduce CO ² emissions	30% by 2030 and 80% by 2050	up to \$10 million
Reduce water consumption per square meter	20% by 2022	\$4k-\$20K range of strategies
Develop a sustainable landscape plan	Each campus by 2022	TBD - \$5-\$10K per year for Frost arboretum
Reduce waste kg to landfill	20%	\$60-\$220K
Improve waste diversion	70%	\$50-\$100K
Reduce paper usage	60%	n/a
Local food content	40%	n/a
Alternative Transportation	60% for students and 20% for staff	TBD
Engagement activities	Opportunity for every staff & student	Office of Sustainability budget
Sustainability Workshop	Opportunity for every staff & student	Office of Sustainability budget
Sustainability learning outcome	100% of Diploma Programs	Office of Sustainability budget
Sustainability Courses	25% of total courses	Office of Sustainability budget
Sustainability literacy assessment	All Diploma students by 2022	Office of Sustainability budget
Increase # of applied research – sustainability	One per year in support of RCE	TBD – pursue research funds
Inventory of sustainability related research	By 2020	Office of Sustainability budget
Student Work with community sustainability projects	Every diploma student by 2022	Office of Sustainability budget
Staff engaged in community service	Every staff annually by 2022	TBD

Conclusion

This three year plan builds upon the achievements in our 2013-2018 Sustainability Plan – Moving from Commitment to Results and is propelled further by Fleming’s bold new Strategic Plan - Our Fleming Our Future. It goes further because our College community expects Fleming to go further to maintain our commitment to be a leader in sustainability. It goes further so that we can continue to graduate our students as confident, skilled and knowledgeable problem solvers in a world that is increasingly complex.

Throughout each section of the plan, reference is made to the UN Sustainable Development Goals as well the commitments in Our Fleming Our Future. These goals enshrine the necessary elements for a sustainable future – whether it is decent work and economic growth, life on land, life below water, climate action, social justice, gender equality or the elimination of poverty. One of the central tenets of the UN SDGs is education as a fundamental way to achieving these goals. Therefore, as a higher education institution Fleming College has a responsibility to set the example of excellence and in our new strategic plan commits to “quality and future-oriented education for our community, Ontario and beyond”.

The leadership of Fleming’s Senior Team and the ongoing work of a college-wide Sustainability Steering Committee will be critical to guide the plan implementation. The achievement of the goals in the plan will be evaluated each year. The results will be reported annually and publicly. The Office of Sustainability will continue to be responsible for this annual reporting as well as any international benchmarking reports such as STARS. However, the achievements belong to the college community as a whole and will require the participation and commitment of the college community, our staff and students, to shift our culture to a culture of sustainability.

With many thanks...

For Guidance

The Sustainability Plan Steering Committee and the College Sustainability Steering Committee:

Robert Monico, Tania Clerac, Angie Sims, Barb Winn, Barry Knight, Brett Goodwin, Cathy Bazinet, Brian Baker, Christopher Smith, Dalton Irwin, Judith Limkilde, Jennifer Olauson, Mary Overholt, Jennifer Ramsdale, Kayla Smith, Kylie Fox, Joel Willett, Madeline Williams, Terry Williams, Travis Doak, Trish O’Connor

For Wisdom

The Academic Task Force for Sustainability:

Sharon Archibald, Fereydoon Diba, Barb Elliott, Scott Fleming, Thom Luloff, Mary Lou Lummis, Rose Manser, Les Smith, Dale Northy, Lisa Stefaniak, Wendy Morgan

For Valuable Input

The many staff and students who responded and participated in consultation



For more information please contact:

Trish O'Connor

Director of Sustainability

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Fleming College

Appendix 1 Fleming College Climate Change Action Plan

1 Introduction

Climate change has been identified as one of the most important environmental issues of our time. Scientific evidence indicates that the increase in anthropogenic greenhouse gas emissions since the industrial revolution is directly linked to the increase in temperature during the last century. These unprecedented climate changes have had widespread impacts on human and natural systems [IPCC,2014][IPCC,2018].

Changes in extreme weather events have already been observed in Ontario, including an increase in warm temperature extremes and an increase in heavy precipitation and storm events, affecting human and ecosystem health and causing infrastructure failure. Projections for the future indicate a rise in frequency and intensity of such events.

Continued emission of greenhouse gases will cause further warming and changes of the climate system, potentially leading to irreversible impacts for people and ecosystems [IPCC,2014]. The most recent report from the IPCC indicates that unless action is taken; the world will pass the 1.5°C threshold within the next twelve years [IPCC, 2018]. Limiting climate change can only be achieved through substantial and sustained reductions in greenhouse gas emissions. In response, international, national, regional and local initiatives are being developed and implemented in an attempt to limit the increase of GHG concentration in the Earth's atmosphere.

In 2015, the Paris Agreement was adopted at the UN Climate Change Conference which aims at limiting global warming to less than 2°C, which requires net zero or even negative emissions before the end of the century. As part of the Paris Agreement, each signatory country plans and regularly reports its own contribution to climate change mitigation.

Following the Paris Agreement, provinces and territories of Canada developed in consultation with Indigenous people the Pan-Canadian Framework on Clean Growth and Climate Change (2016), outlining the plan to meet emission reduction targets, grow the economy and build resilience to a changing climate. Ontario released its draft climate change plan in November, 2018.

As a post-secondary institution, Fleming College has the opportunity to lead by example, educate and influence students and staff as well as the wider community.

2 Greenhouse Gas Reporting

Initiatives to limit the increase of GHG emissions rely on quantification, consistent monitoring and reporting of GHG emissions.

The four principle greenhouse gases which are included in greenhouse gas reporting are carbon dioxide (CO²), methane (CH⁴), nitrous oxide (N²O) and the halocarbons or CFCs (gases containing fluorine, chlorine and bromine). Greenhouse gas data is, for reporting purposes always expressed in CO² equivalent units using the most recently revised global warming potential (GWP) values. The GWP was developed to allow comparison of the global warming impacts of different gases relative to the emissions of carbon dioxide. By definition, CO² has a GWP of 1 because it is the gas being used as the reference. Since 2012/13, Fleming College has reported on greenhouse gas emission reductions. The GHG inventory included the following categories of emissions:

Scope 1 Emissions:

Also referred to as direct GHG emissions, are emissions that are owned or controlled by Fleming College such as:

- Stationary Combustion: from the combustion of fossil fuels (e.g. natural gas, propane) for comfort heating or other applications
- Mobile Combustion: from the combustion of fossil fuels (e.g. gasoline, diesel) used in the operation of vehicles

Emissions were calculated using specific emissions factors. Applied emission factors and calculation method are outlined in [Appendix Ia](#).

Scope 2 Emissions:

Also referred to as indirect emissions, resulting from the consumption of purchased electricity generated upstream from Fleming College. Emissions were calculated by applying an emissions factor. Applied emission factors and calculation method are outlined in [Appendix I](#).

Scope 3 Emissions:

Indirect emissions not covered in scope 2. Fleming College's scope 3 emissions capture paper usage and emissions originating from landfilled waste. Emissions related to staff/student commuting were excluded due to the low confidence in the accuracy of emission estimates and the lack of data for the baseline year.

Flemings Main Sources of Greenhouse Gas Emissions 2017/2018

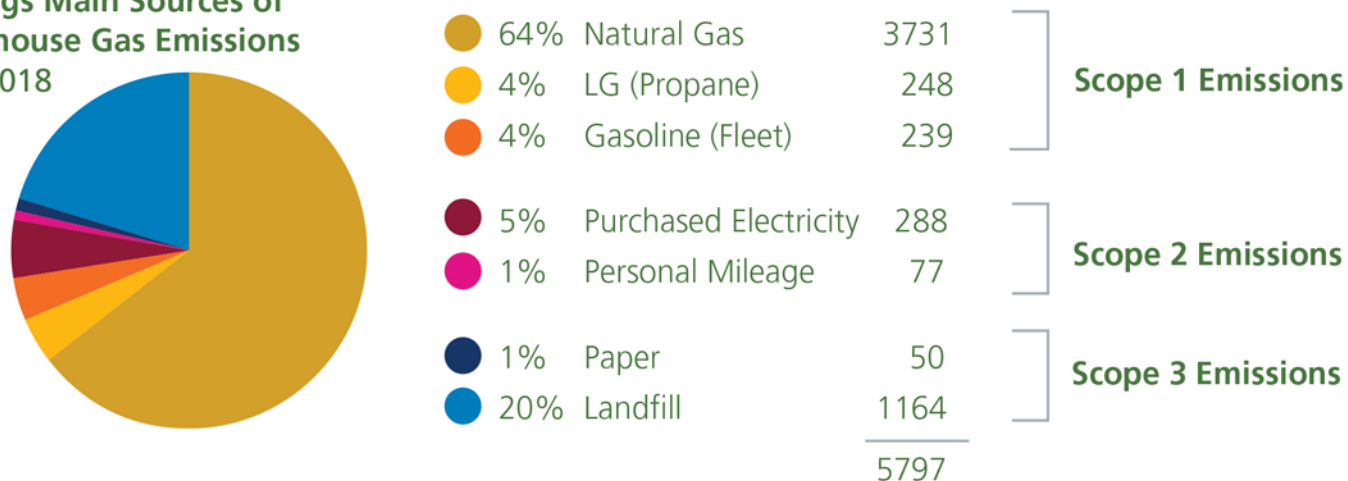


Figure 1: Breakdown of GHG emission sources at Fleming College in 2017/18.

The college's emissions are expressed in two ways:

- 1) Total emissions
- 2) Emissions by weighted campus user

The weighted campus user calculation is a metric used by STARS (Sustainability Tracking Assessment Rating System) and differs from total emissions generated, as it controls for enrollment and staffing increases. Since 2013, the college has tracked energy use and has reduced our GHG emissions by weighted campus user against a 10% reduction target. The College has reported our GHG emissions each year (Scope 1, Scope 2 and some Scope 3) and publicly reported our progress against our target of 1.01 [eMTCO₂/user] weighted campus user; achieving this target in 16/17. For Scope 1 and 2, we have reduced our weighted campus user emissions from .91 to .81 (Scope 1 and 2), equating to a 10% reduction from 2013 to 2017/2018.

Table 1: Greenhouse Gas Emissions per Weighted Campus User.

Fiscal Year	Weighted Campus User	Scope 1 & 2	Scope 1, 2 and 3
2012/13	5063.9	0.91119244	1.123318
2015/16	4993.45	0.85666761	1.119362
2016/17	5515.375	0.82777224	1.01647
2017/18	5561.225	0.81038425	1.04237

Fleming College's GHG inventory is aligned with the following standards:

- The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard, revised edition (2004); World Resources Institute and World Business Council for Sustainable Development
- ISO 14064-1:2006, Greenhouse Gases Part I – Specifications with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.

3 GHG Reduction Targets to 2050

Fleming College's greenhouse gas reduction goals are aligned with provincial and federal long-term targets:

- Up to 30% GHG reduction from baseline year by 2030
- 80% GHG reduction from baseline year by 2050

Baseline Year Identification:

While the province uses 1990 as baseline year, Fleming College has adapted the 2012/13 fiscal year as baseline, which is the year of our first Sustainability Plan and the year Fleming College started reporting on its GHG emissions. In addition, the lack of data for 1990 would not allow us to obtain accurate emission estimates.

Table 2: Breakdown of baseline year emissions by scope and outline of target emission levels.

Baseline Year Emissions (t CO ₂ e)		
Emission Type	GHG Emissions	Percentage Emissions
Scope 1	3,287	57.8%
Scope 2	1,327	23.3%
Scope 3	1,074	18.9%
Other Sources	0	0.0%
Total Emissions	5,688	
Target Emissions Level 2030	3,982	Up to 30% Reduction
Target Emissions Reduction 2030 from Baseline Year	1,706	
Target Emissions Level 2050	1,138	80% Reduction
Target Emissions Reduction 2050 from Baseline Year	4,550	

GHG Emissions 2012/13 - 2017/18 and Target Emissions

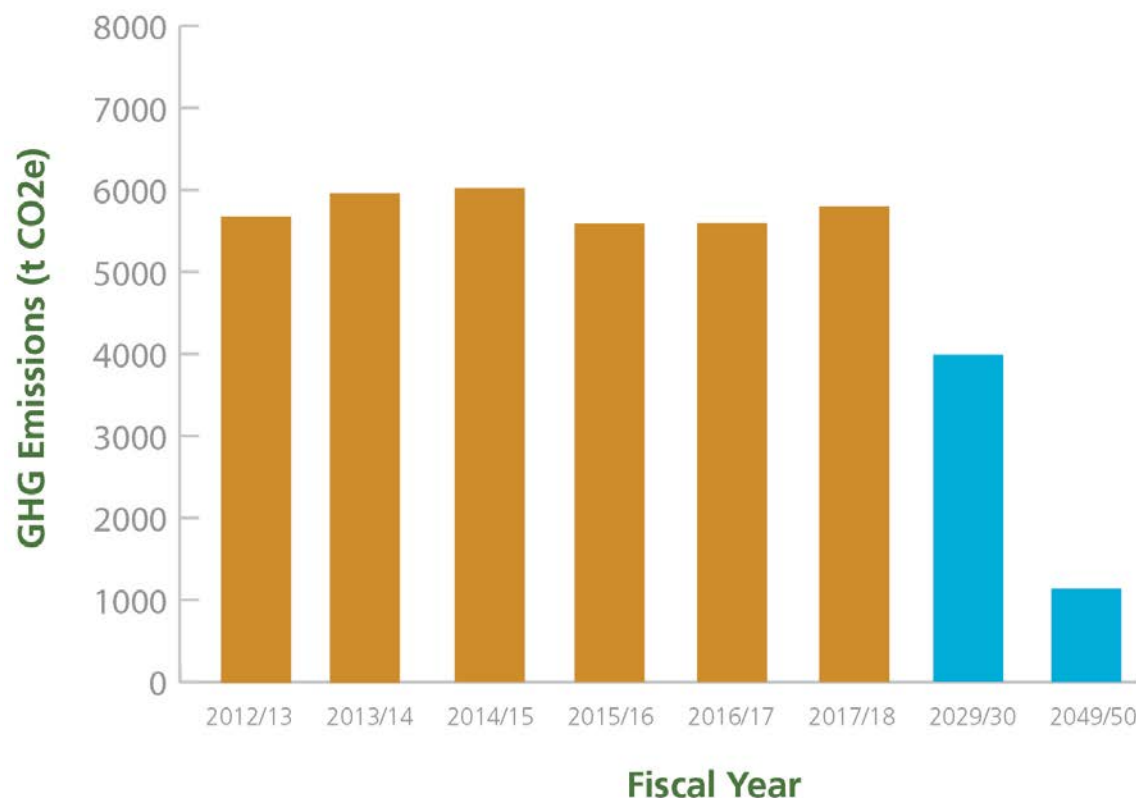


Figure 2: College-wide total GHG emissions (scope 1, 2, 3) between 2012/13 and 2017/18 and target emission levels for 2030 and 2050

4 Emission Reduction Strategies

Emission reduction strategies were developed which detail the path to the GHG emission reduction goals in 2030 and 2050. The following two subsections outline the action items for the two milestone years.

4.1 Emission Reduction Strategies to 2030

An additional emission reduction of 20.8%* of total emissions, from the baseline year, will be achieved by focusing on reductions of natural gas usage, contributing to provincial reduction targets and the federal target of -30%. Natural gas is the main contributor to Fleming College's total GHG emissions and a reduction of this commodity has a higher emission impact compared to purchase electricity. The planned strategies are listed in the table below, further strategies will be pursued to 2030.

Table 3: Breakdown of Planned Emission Reduction Strategies to 2030 including Projected Emission Reductions and Total Strategy Cost

Completed Projects/ Planned Strategies	Total Strategy Cost (\$)	Projected Emission Reduction by 2030 (tCO ² e)	Additional Proposed Strategies	Projected Emission Reduction by 2030 (tCO ² e)	Total Strategy Cost (\$)
A Wing – West, North and East Siding	1,300,000	95.5			
GGRP – HVAC, Lighting and Windows Retrofits, BAS, alternative energy (wind)	6,671,144	414			
			Renewables and Battery Storage	142.6	1,400,000
			Security Electric Vehicle & Electric Golf Cart Fleet	6.11	95,000
			100kW Wind Turbine Sutherland	51.6	230,000
			25 kW Wind Turbine Frost	12.9	80,000
			KTTC Solar	20.6	225,000
			SIF Geo-Centre Solar Expansion	10.33	115,000
			Frost Pathology Wing Solar 40kW	10.33	115,000
			Frost Arboriculture Solar 80kW	20.6	225,000
			Frost Main Building (2 X 50kW)	25.8	280,000
Replacement of AC units (LR chiller)	50,000	1			
Organics Diversion	200,000	370			
Total	8,221,144	880.5*		300.87*	2,765,000

Total GHG Emission reduction $(880.5^* + 300.87^*) = 1181.37(\text{tCO}_2\text{e})$

$1181(\text{tCO}_2\text{e})/5688(\text{tCO}_2\text{e}) = 20.8\%$ reduction*

4.2 Emission Reduction Strategies to 2050

The emission reduction target of 80% from baseline will be pursued by 2050.

3369 t CO² could be reduced from baseline of 5688 t CO² in addition to 2030 emission reduction of 1181 t CO² (this does not consider emission reductions already achieved since baseline year – 82 t in 2016/17)

Table 4: Breakdown of Emission Reduction Strategies to 2050 including Projected Emission Reductions and Total Strategy Cost.

Proposed Strategies	Projected Emission Reduction by 2050 (tCO ² e)	Total Strategy Cost (\$)
Additional – new technologies, alternative transportation, fuel switching and carbon offsets (e.g. Frost Campus Arboretum, land management etc.)	3369	TBD
Total	3369	TBD

5 Progress Monitoring and Reporting Mechanisms

The college will continue to collect Scope, 1, 2 and 3 GHG emissions, report annually to college stakeholders and publish on the Office of Sustainability public website.

Waste Management at Fleming College

Introduction

In 2016, the Ontario government passed the Waste Free Ontario Act which is designed around the idea of a circular economy. The legislation is accompanied by a strategy which lays out Ontario's vision for the circular economy and goals of a waste-free Ontario with zero greenhouse gas emissions from the waste sector. The waste sector is responsible for 6% of total greenhouse gas emissions in Ontario [NIR 1990-2004]. At Fleming College, landfilled waste accounts for approximately 19% of the college's total greenhouse gas emissions (Fig. 1), ranking as third largest contributor to Fleming College's total GHG emissions.

2012/13	5688	987	17.4%
2013/14	5973	1047	17.5%
2014/15	6023	1239	20.6%
2015/16	5589	1171	21.0%
2016/17	5606	923	16.5%
2017/18	5797	1164	20.1%

Figure 3: The percentage contribution of landfilled waste to Fleming College's total GHG emissions since 2012/13 baseline year.

Waste Management Strategy

Fleming College's waste management mandate adheres to the 3Rs hierarchy: reduce, reuse and recycle, which ranks our environmental actions based on greatest positive impact on the environment, setting waste reduction as priority, followed by reuse, recycle and then final disposal.

Recognizing that education and awareness are essential to changing traditional views about waste, influencing lifestyle choices and supporting efforts to reduce, reuse and recycle waste, focus will be placed on educational outreach.

In-depth knowledge of our waste streams and evaluation of the key performance indicators will be gained by conducting internal waste audits on a regular basis (minimum one audit annually), in addition to the audits performed by the service provider. The waste audits will be conducted according to the standards outlined by the Recycling Council of Ontario [RCO 2015] and comply with the requirements outlined in O. Reg 102/94 and 103/94 [Ontario EPA 1994a and 1994b].

Key Performance Indicators to measure our success in waste management are as follows:

- Waste Diversion Rate [%]
- Capture Rate [%]
- Annual Waste Reduction [kg/weighted campus user]
- Annual Reduction of Non-Divertible Plastics [kg/weighted campus user]

In compliance with O. Reg 102/94, a waste reduction work plan will be prepared and updated annually and distributed to the college community.

Fleming College's waste management strategies and targets are outlined below:

Strategies:

- Develop an education and outreach plan, to be implemented every term
- Conduct regular detailed waste audits, minimum one annually
- Create a waste reduction work plan, to be updated annually and shared with college community
- Reduce overall amount of waste and non-divertible plastic generated and improve diversion and capture rate
- Reduce greenhouse gas emissions from landfilled waste

Metrics:

- Waste Diversion Rate: 70% (average across all campuses)
- Capture Rate: 70%
- Waste Reduction: 20% (per weighted campus user)
- Reduction of Non-Divertible Plastics: 30% (per weighted campus user)

Terminology:

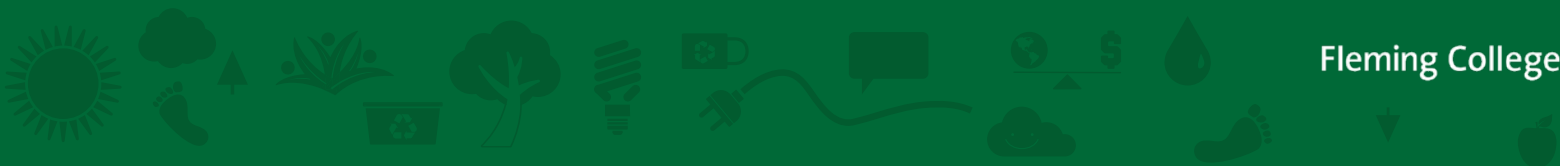
Waste: includes divertible and non-divertible material

Stream: Classification of waste material based on method of disposition and /or material type (e.g. garbage stream, mixed fibre recycling stream, cardboard etc.)

Diversion Rate: The proportion by mass of all waste diverted from disposal to the total mass of all waste material generated

Capture Rate: The proportion of all divertible waste, which is successfully diverted from disposal to the total mass of all divertible waste generated

Reduction Rate: Per unit reduction; The amount of waste (landfilled, divertible or specific waste category) reduced per unit, compared to last year's waste generated per unit.



References

Intergovernmental Panel on Climate Change. (2014). *Climate Change Synthesis Report 2014* (Rep.).

Intergovernmental Panel on Climate Change. (2018). *Global warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (Rep. No. SR1.5).

National Inventory Report (1990-2004): Greenhouse Gas Sources and Sinks in Canada, Part 3, Environment and Climate Change Canada. should be moved above Ontario Environmental Protection Act (1994a): Ontario Regulation 102/94, Waste Audits and Waste Reduction Work Plans

National Inventory Report (1990-2017): Greenhouse Gas Sources and Sinks in Canada, Part 3, Environment and Climate Change Canada.

Ontario Environmental Protection Act (1994a): Ontario Regulation 102/94, Waste Audits and Waste Reduction Work Plans.

Ontario Environmental Protection Act (1994b): Ontario Regulation 103/94: Industrial, commercial and Institutional Source Separation Programs.

Recycling Council of Ontario (2015): Waste Auditor Training Handbook, version 7.1 and Standard Waste Audit Method

Appendix 1a GHG inventory: Calculations and Emission Factors

Emission factors used for calculations of GHG emissions:

Fiscal Year	Scope 1				Scope 2	Scope 3	
	Natural Gas	Propane	Gasoline	Synthetic Fertilizer	Electricity	Landfilled Waste	Uncoated Freesheet 100% recycled
	g CO ₂ e/m ³	g CO ₂ e/litre	g CO ₂ e/litre	g CO ₂ e/kg	g CO ₂ e/kWh	MT CO ₂ e/t	kg CO ₂ e/kg
2012/13	1,898	303	2,299	8,037	94	3.417165215	1.76
2013/14	1,898	303	2,299	8,037	77	3.417165215	1.76
2014/15	1,898	303	2,299	8,037	77	3.417165215	1.76
2015/16	1,898	303	2,299	8,037	77	3.417165215	1.76
2016/17	1,898	303	2,299	8,037	77	3.417165215	1.76
2017/18	1,898	1515	2,307	8,037	20	3.417165215	1.76

Global Warming Potential:

GHG	100-year GWP	Source
CO ₂	1	IPCC AR5
CH ₄	28	IPCC AR5
N ₂ O	265	IPCC AR5
CO ₂ e	N/A	N/A

References – Emission Factors:

		Reference	Comment
Scope 1	Natural Gas	NIR 2014 Part 2; p. 183-184 ; http://www.publications.gc.ca/site/eng/9.506002/publication.html	All emission factors updated: NIR 2019 Part 3: p. 25-26; https://www.canada.ca/en/environnement-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html
	Propane	NIR 2014 Part 2; p. 62 ; http://www.publications.gc.ca/site/eng/9.506002/publication.html	
	Diesel Fuel	NIR 2014 Part 2; p. 185	
	Gasoline	NIR 2014 Part 2; p. 188; LDGVs Tier 0-2; http://www.energy.gov.on.ca/en/fuel-prices/ for fuel price	Tier 0 (1980-1995); Tier 1 (1994-2003); Tier 2 (2004-2012) definition may be wrong. See Notes: http://www.epa.gov/otaq/standards/light-duty/tiers0-1-ldstds.htm . http://www.energy.gov.on.ca/en/fuel-prices/ to convert gas charge to litres, using average southern Ontario price.
Scope 2	Electricity	NIR 2014 Part 3; p. 75	Electricity factor at consumption
Scope 3	Landfill Waste	Waste Management for CH ₄ emissions; Environment Canada, GHG Calculator for Waste Management (Tool) for Waste Collection and Transportation, Landfill Heavy Equipment, Energy Use at Waste Management Facilities.	
	Uncoated Freesheet 100% Recycled	Environmental Paper Network Paper Calculator 3.2. http://calculator.environmentalpaper.org/home . Accessed May, 2016.	Environmental impact estimates were made using the Environmental Paper Network Paper Calculator Version 3.2. For more information visit www.paper-calculator.org .



Calculations:

Natural Gas: Natural Gas [m³] * Emissions Factor / 1,000,000

LG (Propane): Propane [liters] * Emissions Factor / 1,000,000

Gasoline: Gasoline [liters] * Emissions Factor / 1,000,000

Electricity: Electricity [kWh] * Emissions Factor / 1,000,000

Landfilled Waste: Waste [tonnes] * Emissions Factor

Paper: Paper [kg] * Emissions Factor / 1,000

Appendix 2 Five Year Plan Results

2013-2018

5 Year Plan Sustainability Goals

Goal 1: Increase awareness and understanding of sustainability

Goal 2: Incorporate sustainability into the student experience

Goal 3: Reduce negative environmental impacts of Fleming

Goal 4: Improve the well-being of Fleming students, staff, and the communities we serve

Goal 5: Collaborate on sustainability initiatives

2013-2018

5 Year Plan Sustainability Results Reached

Across All Campuses:

- ✓ *Energy reduced 15%
- ✓ Water reduced by 10%
- ✓ *Waste reduced by 10%
- ✓ Paper reduced by 30%
- ✓ 50% of students using sustainable transport
- ✓ GHG Emissions (Scope 1 and 2) reduced by 10%
- ✓ Achieved STARS Silver rating

*targets met in 16/17 (however, due to construction/enrollment increases in 17/18 targets unmet)

5 Year Plan Goals:

- ✓ 3 awareness surveys conducted
- ✓ +6 outreach awareness vehicles annually
- ✓ 55.65% of students graduating from programs with a Sustainability Learning Outcome
- ✓ 89% of diplomas have sustainability learning outcome
- ✓ 3+ internal partnerships annually
- ✓ 6+ external partnerships annually
- ✓ Use of sound business analyses – Waste strategy, waste diversion, GGRP proposal submitted and funded

2017-2018 Annual Report <https://flemingcollege.ca/PDF/Sustainability/2017-18-Fleming-College-Annual-Sustainability-Report-accessible-version-final.pdf>



