



COLLEGES &
INSTITUTES
CANADA

This project was undertaken with the financial support
of the Government of Canada.
Ce projet a été réalisé avec l'appui financier
du gouvernement du Canada.

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SUSTAINABLE
DEVELOPMENT
GOALS



Campus Living Labs: Innovative Collaborations for Net Zero

A Best Practices Guide for Canadian Colleges and Institutes

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Introduction



Dawson College students prepare for a day of wetland construction for their Campus Living Labs Demonstration Project.

College and Institutes Canada's (CICan) ImpAct-Climate initiative raises awareness about greenhouse gases and encourages behaviour change to reduce emissions in the college and institute sector.

We connect and mobilize college and institute leaders, sharing the knowledge, skills, and tools needed to combat climate change and its impacts. By using the United Nations' Sustainable Development Goals (SDGs) as a framework for collaboration, we give colleges and institutes the opportunity to work together towards a common goal, to learn from each other, and maximize the impact of Canada's largest post-secondary network.

This project is inspired by SDG 13 Climate Action and has three pillars:



Awareness-Raising



Green Buildings & Indigenous Land Stewardship Approaches



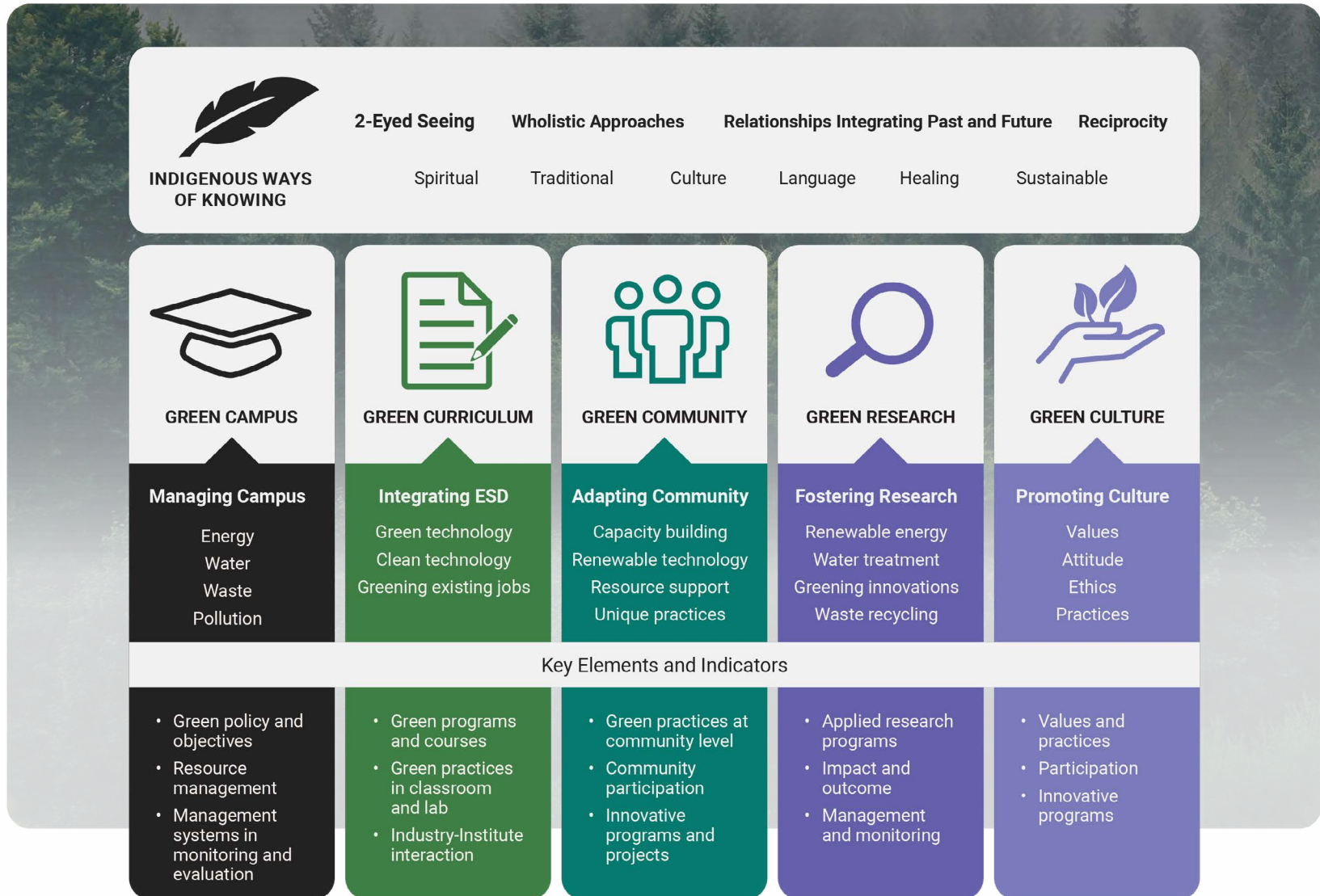
Campus Living Labs Demonstration Projects

Turning Campuses Into Living Labs

Pillar 3 invites colleges and institutes across the country to submit projects to turn their campuses into living demonstration projects. That means integrating applied research and teaching with campus planning, infrastructure, operations, and community development in a way that maximizes the impact of sustainability projects. In other words, Campus Living Labs exemplify the comprehensive approach proposed in UNESCO-UNEVOC's Greening Technical and Vocational Education and Training framework, as modified by CICan.

UNESCO-UNEVOC

Greening TVET in Canada



Pillar 3 consists of three cohorts of 10 college and institute projects each, for a total of 30 Campus Living Labs over three years. Each project is funded up to \$70,000.

The projects consist of 2 parts:

1. A greenhouse gas (GHG) reducing activity that falls under at least one of the targeted themes (Indigenous Approaches, Food, Waste, Transportation, and Green Buildings and Land Stewardship); and
2. An awareness-raising strategy that conveys the project's activities of GHG reductions to campus members and surrounding communities where appropriate.



Vanier College's Demonstration Project converted campus lawn into meadows, forests, and naturalized areas to store campus GHGs as well support biodiversity.



An Opportunity Where None Was Previously Available

The projects are an important mechanism for raising climate awareness. This is important because climate education is still lacking with around 43% of Canadians failing to answer basic climate change knowledge questions correctly (p. 7 Lakehead University, 2019). Equally important, the projects support innovative approaches where participants said they could not previously find the support for the type of project they wanted to implement. In fact, most of the living lab participants reported that without the Campus Living Labs Demonstration Projects funding, their project in its entirety or major components would never have materialized as there was no funding available to support it.

This report summarizes and highlights best practices of the first cohort that ran from June 2022 to March 2023. As each cohort comes to complete their project, their case studies will update this best-practices report until all 30 demonstration project summaries are included and salient points are added to the findings.

The report will be updated annually until the final version is made available in fall 2025.

We hope this report and the versions to come will inspire greenhouse gas reductions and awareness-raising and provide a practical path forward for college and institute executive leadership, sustainability staff, and potential funders alike.

ImpAct–Climate is a 5–year pan–Canadian project delivered by Colleges and Institutes Canada and funded by Environment and Climate Change Canada.

About Colleges and Institutes Canada

Colleges and Institutes Canada (CICan) is the national and international voice of Canada’s largest post-secondary education network. It advocates, builds capacity, and drives knowledge to strengthen Canada’s publicly supported colleges, institutes, CÉGEPs, and polytechnics. With more than 95% of Canadians living within 50 km of a member institution, and thanks to its extensive reach around the globe, CICan works to future-proof communities in Canada and abroad.

We respectfully acknowledge that CICan’s offices in Ottawa are located on the traditional and unceded territory of the Algonquin Anishinaabe Nation.



Context

Climate change is known as a “wicked problem” due to its inherent complexity. It impacts all aspects of life on earth and calls on everyone to contribute solutions. Furthermore, the problem is compounded by the difficulty in “communicating climate-change knowledge to the public and that knowledge of climate change does not always translate to human behaviour” (Sun, Jiazhe & Yang, Kaizhong, 2016).

Currently, climate change is destabilizing our environmental and socio-economic landscapes. That means fundamental cultural and economic shifts must occur to sufficiently address it. As impacts and challenges arise more severely and more regularly, citizens around the world must work together, share knowledge, gain green skills, and react in real-time.

Adaptability, flexibility, creativity, and collaboration are key to the college and institute sector moving towards net-zero.

Solutions can be anchored in community collaboration or address a high-level operational approach. Or, in many scenarios, combine both for a robust and fundamental change to the way colleges and institutes manage different aspects of their campuses.

All CIGan programs are guided by the UN SDGs and empower colleges and institutes, their students, and their partners to act on pressing social and environmental issues, including SDG 13 Climate Action.



CIGan is proud to support college and institute climate action through the Campus Living Lab projects highlighted in this report. We hope this report will inspire more meaningful action.

Students at Collège de Bois-de-Boulogne monitor the growth of hydroponic plants.

Cohort 1 Projects

Proportional Contribution to each SDG



What is a Campus Living Lab?

01 **Campus Living Labs Are Flexible.** Funding is provided with few restrictions to allow for creative approaches and ideas.

02 **Campus Living Labs Are Creative.** Projects can use grassroots community approaches, high-level organizational approaches, or a mix of the two.

03 **Campus Living Labs Are Places For Learning.** Projects provide a venue for peer and community mentorship where sustainability experts can share knowledge to help each other overcome roadblocks.

04 **Campus Living Labs Are Collaborative.** Successful projects bring together people within and beyond the campus community, including Indigenous communities.

05 **Campus Living Labs Blend Action And Awareness.** Projects focus on reducing campus greenhouse gases in a particular area while also increasing general awareness and equipping participants with new professional and personal skills.

Summary

A | Project Implementation

Project Themes

In the first year, a total of 10 projects were funded touching on all 5 themes, with most projects incorporating 2-3 themes. The complete thematic breakdown is as follows:

	Cambrian College	Canadore College	Collège de Bois-de-Boulogne	College of the Rockies	Conestoga College	Dawson College	Georgian College	Mohawk College	NorQuest College	Vanier College
Waste				1	2		2		2	
Indigenous Knowledge	1	1								
Green Buildings & Land	2	2	2	3		2		1		1
Transportation	3					1				
Food		1	1	2	1		1		1	2

*(Numbers indicate priority ranking identified by the college or institute. Canadore College identified two first priority areas in their project on Indigenous food security).



Canadore College's Angela Proudfoot co-launches the Grow Pods as a means to provide a climate resilient approach to food sovereignty for northern Indigenous communities.

A Focus On Food Security

Food insecurity is at a staggering 18.5% in the 10 provinces (nearly 25% of all children) (University of Toronto, 2023) and much higher in territories like Nunavut where the current rate is around 60% (Food Banks Canada, January 2023). It's no surprise that the majority of the Campus Living Labs explored local production of healthful affordable food.

- With most projects (7 of 10) incorporating an element of food, these projects aimed to not only reduce GHGs associated with campus food, but also aimed to reduce poverty, make nutritious food, available and accessible, and provide education to students, staff, and faculty on how we can feed ourselves through various self-sufficient, resilient approaches.

As a proud signatory and lead chair of the pan-Canadian SDG Accord, CIGan supports its members in implementing projects and programs that instill multiple SDGs within their framework, providing a wholistic approach to address SDG 2 Zero Hunger, SDG 3 Good Health and Well-being, SDG 11 Sustainable Cities and Communities, SDG 12 Responsible Consumption and Production, and SDG 13 Climate Action.

Weaving in Indigenous Knowledge

While Indigenous Knowledge was one of the five themes, the inclusion of Indigenous communities and their viewpoints and approaches were strongly encouraged among all project participants. Many were able to incorporate this important element.



For Georgian College's project, a wide range of departments and campus and community rightsholders worked together to determine underlying factors limiting local food sustainability.

Project Implementation Challenges

Participants encountered challenges in project implementation that were typical of any project.

1. Supply chain delays affected purchasing of systems, hiring professionals, or moving supplies on campus.
2. Weather impeded project timelines. Snow was the most prevalent environmental hindrance to sourcing locally harvested materials or conducting outdoor work.
3. Key rightsholders were often unavailable or inaccessible. Due to some campuses being so large or spread out, some colleges and institutes struggled to locate and establish relationships with their players in a timely way, which further delayed project timelines. Another project suffered due to a key rightsholder suffering a major accident.

Overall, all projects were implemented successfully, even if it meant some aspects of the projects extended beyond the March 2023 deadline.

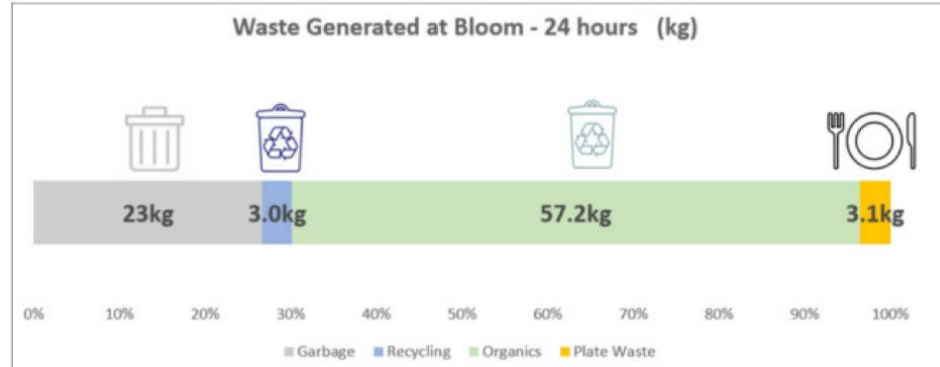
B | GHG REDUCTION

Combined, Cohort 1 projects reduced their campus GHGs by at least **11,000 CO2E KG**.

Despite being generally successful in reducing GHGs, many did find targets were challenging to reach and – even more challenging – to find proper data to measure and quantify GHGs and their reductions. In this regard, more resources and support would have been helpful, but a complete campus carbon assessment would be the foremost way members could support these types of projects.

- Participants found the peer knowledge-sharing within the “Community of Practice” approach useful in supporting learning, especially in developing the capacity for measuring GHGs.

Altogether, in cohort 1, six of the ten projects were able to approximately measure their GHGs in carbon dioxide equivalents (CO2e). Together they reduced their GHGs for a combined 11,020 CO2e kg or approximately 11 tonnes of Co2e.



Both Canadore College and Conestoga College calculated the GHGs associated with waste and food and were able to significantly reduce associated GHGs through their projects.

ImpAct Climate Campus Living Lab Project

Total Offset of



Produce supplied to Culinary:
90.5 kg CO2e



Using an off grid grow pod:
1668.70 kg CO2e



Produce from consultancy with Indigenous Communities:
11 kg CO2e



Composting trimmings through Lomi (powered by solar):
71.02 kg CO2e

Grand Total Offset



1841.22 kg CO2e
Equivalent to 4,570 miles driven by a passenger vehicle (EPA, 2023)



Without natural pollinators occurring in hydroponic systems, Collège de Bois-de-Boulogne students and staff must pollinate the flowers themselves using paintbrushes.



NorQuest College reduced GHGs associated with food waste as well as food production by creating free delicious, nutritious meals out of “rescued food”.

GHG Reduction Highlights

- Conestoga College reduced their GHGs associated with plastic packaging for food to zero when they switched to reusable food containers and cut the emissions from their restaurant’s average dish from 1.5 CO₂e kg to 1.2 CO₂e kg (a reduction of about 20%).
- Dawson College’s project has physically and administratively permanently shaped the college with their constructed raised wetland offsetting carbon and filtering/diverting rain run-off. The project further inspires from a climate change adaptation and cosmetic viewpoint in addition to GHG reductions.
- Mohawk College is using their project data to engage their senior leadership in meaningful conversation that aims to inform ambitious GHG reductions once cost-savings and carbon accounting potential are mapped out.
- Cambrian College used this opportunity to mix traditional and new communication approaches when they wired their sacred four-season cedar-construct to telecommunications technology, allowing for students in Sudbury to learn directly from elders elsewhere in Canada (such as Nunavut) eliminating GHGs from travel.
- The aquaponic infrastructure, co-designed by the Collège de Bois-de-Boulogne is predicted to grow 760kg of fruits, vegetables and fish products for consumption a year, which the College will disperse throughout the college and local community via an intermediary of local food security organizations, providing up to 500 families in need a month with fresh, healthful, locally grown food.
- Vanier College focused on shifting landscaping practices to turn their grounds into a carbon sink rather than a carbon source by creating large no-mow zones, planting trees, flowers, and other pollinator plants, as well as expanding food gardens.



Appetizers

Warm Cheese Dip

Leeks, Onion Sambal, Grilled Focaccia

Fried Calamari

Preserved Lemon Aioli, Chilies

Cured Trout

Roasted Beets, Orange, Garlic Labneh, Soft Herbs

Entrees

Pan Roasted Chicken

Smoked Carrots, Miso Hummus, Pecans, Ranchovy

Grilled Pork Chop

Oyster Mushrooms, Celery Root, Watercress

Seared Salmon

Turnip Noodles Cacio e Pepe

Goat Cheese Tortellini

Sweet Peas, White Chocolate, Hazelnuts

Dessert

Chocolate Bouchon

Milk Crumb, Cinnamon Stick Ice Cream

Vanilla Panna Cotta

Rhubarb, Dark Chocolate, Pistachio

2-Course \$30 3-Course \$33

Bloom has a goal to reduce our GHG emissions.



Contributes smallest amount of greenhouse gas



Contributes a moderate amount of greenhouse gas



Contributes a high amount of greenhouse gas

GHG Reduction Challenges

Some projects ran into issues reducing GHGs, but mostly the issues were in calculating the embodied carbon in their projects and calculating reductions once the projects were implemented. In some cases, projects won't truly be able to provide GHG reduction values until later dates (e.g. after trees have matured).

Highlights

- College of the Rockies and Conestoga College both faced difficulties in accurately calculating how much GHGs are embodied in different foods and therefore how much GHGs were reduced when switching to more locally sourced or plant-based alternatives. They both managed to find online ways to calculate their GHGs in the end.
- Since reliable measures of carbon sequestration from land management practices are still being developed, Vanier College created their own TreeTag app. Upon its launch in the fall of 2023 it will be used to track tree growth and care, and eventually provide reliable offsetting data for the Vanier campus and beyond.

Conestoga College's menu told Bloom Restaurant patrons which meals were low-carbon, medium, and high emitters.

C | Awareness Raising

In total, more than **624,000** interactions occurred in awareness-raising.

The projects were very successful in meeting their awareness-raising objectives through a variety of interactions that included in-person (presentations, events, markets, tours, signage) and online (social media, news sites, newsletters, apps).

- While the social and traditional media numbers are high, it is important to emphasize that in-person engagements were especially meaningful, creating the opportunity for deeper learning and overall wider community to grow and adapt new broad-based approaches.

Awareness-raising was also successful among project leads and their staff, with the following results:

95%

found they learned something new regarding GHGs and climate change;

95%

gained new professional skills as they relate to climate change;

100%

felt engaged in climate action

In some cases, participants reported feeling “fired up” and inspired to continue with the work, which is a positive finding when dealing with a topic that can often lead to apathy and despair. These projects may help sustainability staff and other staff working on these projects feel:

- Reinvigorated and more hopeful
- Their work and messaging is being received by a wider audience
- Optimistic that senior leaders, other departments and the community at large will engage on climate action
- Campus populations have obtained new green skills



College of the Rockies explained the circular economy of composting, fertilizing, growing, and eating food all on campus as an elegant way to reduce campus GHGs both regarding waste and food.



Collège de Bois-de-Boulogne students share what they have learned about aquaponics and how it can provide food security and sustainability.

Highlights

- Collège de Bois-de-Boulogne supported about a dozen student GHG awareness projects directed toward children and students of day camp, primary and secondary schools, and the college to help them better understand the importance of reducing greenhouse gas emissions. This demonstration project was also presented to the community in a student documentary film.
- College of the Rockies project implementers saw a 28% increase in awareness in how diverting organics from landfill to composting can reduce GHGs associated with waste. Prior to the ImpAct-Climate project funding, College of the Rockies had first conceived of this project without awareness-raising as part of their composting program, which would have drastically reduced the impact and success of trickle-down composting initiatives.
- NorQuest College changed the conversation when it comes to food waste, serving meals made of “rescued food”. 100% of all students who left comments found the meals made from rescued food to be delicious and at least 70% of all students engaged through their project learned how the impact and magnitude of food waste in Canada is having a real contribution to GHGs. Furthermore, 75% of all students thought that food rescue is a good way to address GHGs, the other 25% think it’s “probably” a good way.
- Dawson College, with having such high visibility with their project and so many students sign up to manually labour a wetland into existence, has created an eco-landscape course that specifically mimics the project implemented in the living labs after the students provided rave reviews.
- Georgian College’s awareness-raising extended far beyond its campus’s border, and they have created a path for their campus and community beyond its grounds to reduce food-related GHGs thanks to their awareness-raising approach.
- Canadore College’s awareness-raising extended past campus news sources with articles in the Globe and Mail, CTV, and numerous northern, Indigenous, and industry online news sources. They provided a virtual tour so that anyone anywhere could “walk” the grow pods themselves.



Vanier College's tea cart was very popular as people drank locally grown herb-infused tea and learned about the benefits of leaving meadows to succeed instead of continuing with CO2-intensive lawncare.

Awareness-Raising Challenges:

Climate change is difficult to communicate, thus it's no surprise that some projects ran into issues around awareness-raising which may have impeded their reach in awareness-raising or depth of knowledge they wanted to impart.



Mohawk College students interact with building energy data.

Highlights

1. Conestoga College was not granted access to install cafeteria digital screens for posting CO₂e emissions of different menu items, thus they took a different approach using QR codes and they benefited from the physicality of their reusable container program and its visible depots to help foster patron engagement and start the conversation. Having the GHG icons on the menu created an opportunity for hospitality student-staff to discuss the GHG impact of menu choice with patrons. Postcards and QR codes with further information were provided for patrons that were especially interested in the project.
2. Mohawk College was challenged with how to convert technical data on building energy consumptions and GHG emissions into meaningful metrics and information to share with the larger population on an easily accessible, dynamic display. They used incentives (cookies, daily draws for sustainability kits), interactive elements (trivia and feedback questions) to draw attention, foster conversation, and deepen understanding among passersby.
3. Vanier College gave themselves ambitious awareness-raising targets. They succeeded in reaching a wide audience by combining conventional outreach measures (social media, newsletters, websites, etc) with some innovative strategies that mean the momentum for awareness-raising carries on long past the project deadline: 1) integrating land-based learning into course content as the grounds quickly became popular with instructors as an outdoor learning area; 2) hosting a “tea cart” at campus events, which provided free herbal tea harvested from their gardens – people would learn about greenspace initiative while they sipped; 3) placing new permanent signage surrounding the no-mow zones and gardens; 4) joining in an intercollegiate network with local and international reach (the Campus Biodiversity Network); and 5) designing an app with widespread potential uses (TreeTag) .
4. Georgian College’s unique and rightsholder-dependent project required meaningful, concrete, and widespread engagement across campus with all of their food and climate action experts, as well as beyond their college boundaries. Their solutions included town halls, food-based climate action games for people of all ages, launching a diverse working group, and a climate action game exhibition to further promote and draw in potential community members with interest in the project.

D | Lessons Learned

Best Practices for Turning Your Campus into a Living Lab

There are many positive takeaways from the Campus Living Labs Demonstration Projects as well as areas to improve upon. The following are key lessons learned by which we encourage our members to develop their framework for hosting their own Campus Living Labs:

- Funding and supporting unique projects that don't fit into typical guidelines opens the door to creative and wholistic solutions.
- Incorporating community awareness-raising in climate projects means people learning from the projects can practice the changes in their own lives, compounding project success.
- Supporting project flexibility wherever possible means new projects and ideas have the space to succeed instead of stall out when problems arise.
- Funding with flexibility in allowing funding to cover administrative costs, materials, staffing, and multi-category areas means needs can be easily met, leaving resources open to focus on project implementation.
- Measuring impact and completing your campus carbon footprinting may be the difference between being able to calculate the GHG reductions of a project and not.
- Supporting peer mentorship through CIGan or your own College allows all types of expertise to help propel the project.
- Have things always been a certain way? Trying things differently and having a conversation about it can help shift institutional cultures.
- Improving Indigenous engagement ensures there are opportunities for Indigenous rightsholders to participate and be heard as Indigenous approaches are key in climate solutions.
- Starting a conversation creates the space and opportunity through events and inclusive projects for conversations between all campus members to unfold.
- Reimagining campus life helps your students, staff, and faculty envision and experience a different way of doing things.
- Making shared resources accessible and sharing information and ideas means starting halfway instead of at the beginning.

- Investing in community sustains sustainability. When people work together on climate projects they grow hope together, which fosters momentum and action forward.
- Solutions need to come from top-down and bottom-up in order to sufficiently shift our current approaches. Don't underestimate the power of a grassroots initiative-based project, but also don't shy away from more technical and high-level operations-based projects.



Summary

These lessons learned provide a useful framework for colleges and institutes to turn their own campuses into Living Labs. Projects are most successful when leads have access to data, interdepartmental cooperation, and funding and project flexibility. Furthermore, there is a real need for education, and flexibility in implementing innovative ideas and projects in order to engender profound, long-term, effective learning.

Projects that include Indigenous partners and integrate Indigenous approaches will also better address climate change, implementing successful, long-term sustainable climate solutions (Paris Agreement to the United Nations Framework Convention on Climate Change, 2015).

Overall, projects that take a wholistic approach and integrate a wider participation base run into some additional challenges with more moving pieces overall, however, the potential for reach and success is bigger and also may inspire greater future action, invigorating all who participate, creating a true culture shift.



Cambrian College's 4-Season Outdoor Learning Space constructed of cedar promotes a low-carbon classroom that also serves as a sacred space.

E | What's Next?

Summary

Project participants either had long-term goals in mind when they designed their project, or thanks to the success of the project, will be able to continue the work or find new avenues through which the work they started can continue, demonstrating the value and on-going added value these projects deliver.

The Campus Living Labs Demonstration Projects are successful both as timebound projects raising awareness and reducing GHGs, as well as laying a foundation for longevity, with additional initiatives to either further the work, or provide a springboard for new initiatives.

The projects, despite their rapid implementation, have already contributed to a cultural and/or operational shift. Participant feedback describes the ripple effects, showing that the impacts, and individual change resulting from the projects, represent behavioral change that should extend beyond the projects.

Highlights – Continuing the Initiative

1. Canadore College's solar-powered grow pods are a permanent fixture on campus and will continue to expand and support the development of food sovereignty among Indigenous communities in the north and on campus and work with new partners for increased success.
2. Cambrian College's year-round outdoor Indigenous learning space is a permanent fixture that will provide a sacred space to gather and learn for both in-person and virtual hosting.
3. College of the Rockies is keen to continue supporting the project's initiatives beyond the Demonstration Project phase and will most likely evolve to implement more and similar initiatives, while continuing to address campus waste and whenever possible, contribute to fresh veggies for their campus kitchens.
4. The construction of the Collège de Bois-de-Boulogne's aquaponics infrastructure will finalize with additional support of the ministère de l'Économie, de l'Innovation et de l'Énergie du Québec financial support and will allow food production and distribution past the project timeline and inspire expansion on this project, as well as new initiatives, while feeding families facing food insecurity.



Vanier College will continue to offer food and flowers from their garden to raise awareness of their no-mow zones.

5. Conestoga College will continue to expand their food waste reduction program as well as continue to inform patrons about their GHG impacts from food choices. Numerous organizations have taken an interest in their approach to educating the public about their food carbon footprint.
6. Dawson College's project continues in full operation as a bioretention wetland, processing rooftop rainfall, naturally expanding (from 120 plants to 880 plants 1 year later). Student volunteers enjoyed building the wetland so much that an additional eco-landscaping course has been created to meet demand. Dawson has received the excellence level for CEGEP Vert Certification and the bioretention/raised wetland national demonstration project received a special mention at the ceremony. Dawson is also launching a second project born from the success of their Campus Living Labs Demonstration Project.
7. Georgian College will continue to educate everyone that steps foot on the campus, even visitors, through their dashboard, their app, and their game in development means that people of all ages, even off campus, can continue to learn how their food choices impact their GHG emissions.
8. Mohawk College's project, the most unique in that it was using existing Facilities monitoring equipment to create a baseline for future reductions in building operations, will continue the work they started, using their findings to engage senior leadership around GHG emissions and energy use.
9. NorQuest College will continue to create affordable and healthy meals from rescued food, but have also found inspiration from this project to tackle more low-tech solutions, such as potentially having planters occupy largely empty parking lots in summer to help abate some of the heat island effect from concrete, which will reduce GHGs produced as a result of air conditioning.
10. Vanier College considered it crucial to include biodiversity as part of its overarching GHG reduction strategy since proper ecosystem functioning increases carbon sequestration. Through their gardens, food and tea production, no-mow zones, and pond, education will continue to be the heart of Vanier's GHG reduction strategy, having expanded the gardening technician position from part to full-time and promoted the integration of the Campus Biodiversity Network platform for nature observations into courses. The TreeTag app, will launch this fall with a planned tree planting on campus of 55 canopy trees, in partnership with La Société de verdissement du Montréal métropolitain, who has expressed interest in using it to track their plantings across the greater region of Montreal.



College of the Rockies composting program is now a permanent fixture after their participation in the Campus Living Labs.

Moving Forward



A Canadore College student worker assesses plant growth in the Demonstration Project Grow Pods



The College of the Rockies team in front of the living wall before they replaced tropical indoor plants with hydroponically grown vegetables for eating locally

Reducing greenhouse gases requires urgent collective action. Campus Living Labs highlight the importance of collaboration, flexibility, and meaningful communication and engagement. The projects demonstrate that integrating applied research, and teaching with campus planning, infrastructure, operations, and community development with meaningful communication and engagement maximizes the impact of sustainability projects. We believe this blueprint today provides a map to our net-zero future.

The Paris Agreement affirms the importance of education, training, public awareness, public participation, public access to information and cooperation at all levels in order for us to engage in successful and meaningful climate action.



The College of the Rockies' biodigester that creates the compost used for growing the lettuces.

Canada's colleges and institutes make up the largest post-secondary network in the country. With nearly 700 locations, their collective engagement goes a long way. They ensure that learners and workers are better equipped to face the challenges of the future.

What begins on campus must find its way into our communities and into our daily lives. By starting the conversation and engaging directly with their students, staff, faculty, and senior leadership, colleges and institutes are proving to be leaders in Canada in our collective journey to net zero, supporting a larger cultural shift that expands beyond anyone of our own campus borders.

We hope this report and the versions to come will inspire and provide a practical path forward for college and institute greenhouse gas reduction and awareness raising for executive leadership, sustainability staff, and communities alike.

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Appendix A



Cohort 1 Projects 10 Campus Living Lab Demonstration Projects

Student Narcisse Waie Hassan and Office of Sustainability Jenn de Vera select donated aquatic plants for the Dawson College raised wetland project.

Cambrian College

(Cohort 1: 2022–2023)

4-SEASON OUTDOOR INDIGENOUS LEARNING SPACE

LOCATION: Cambrian College, Sudbury, Ontario

PROJECT LEAD: Bradie Granger

PROJECT DESCRIPTION:

Cambrian College's Demonstration Project involves taking land-based learning outside with a year-round, four-season Indigenous Learning Space. The space was designed to teach individuals about sustainability, along with many other topics, through an Indigenous lens of ways of knowing, being and doing. The space was constructed using meaningful materials that were sourced from the area, such as cedar. The space was created to replace a conventional classroom, providing year-round sustainable space that has less embodied and operational carbon than typical college rooms.

The Learning Space already engages in awareness-raising as sustainability is indivisible from Indigenous Approaches. Given its position in the Sacred Arbor, and its use,



engagement regarding the space and its applications are easy to convey, especially given the longevity of the structure. Another way in which the space reduces campus emissions, is by providing IT tools for elders to teleteach thanks to internet and videoconferencing capability wired into the space, which means elders from Nunavut, for example, do not have to make the long journey down to Sudbury and students still benefit from their teachings.



Canadore College (Cohort 1: 2022–2023)

SOLAR-POWERED GROW PODS

LOCATION: Canadore College, North Bay, Ontario

PROJECT LEAD: Jesse Russell

PROJECT DESCRIPTION:

Canadore College project overall goal was to introduce opportunities for sustainable production that can help improve health outcomes for the local remote and Indigenous communities. Project leads, therefore, focused on using climate resistant sustainable technologies (solar power) to displace the use of fossil fuels with a goal to help create food sovereignty for rural and Indigenous communities. Produce in remote Indigenous communities is scarce, overpriced and lacks quality. For accurate metrics, project leads hired a consultant from the Moose Cree First Nation who polled their community to gather feedback from residents and create a list of needs. The data collected helped to inform the 2023 phase of growth.

Based on that plan, the project leads arranged testing of the nutritive failure of produce grown hydroponically versus in soil to ensure all project goals could be met GHGs

were reduced through a number of ways including reductions in GHGs associated with:

1. Transportation of food: fossil-fuel transported food that requires refrigeration is replaced with locally grown food;
2. Conventional energy used to grow food: fossil fueled approaches such as grid-based greenhouses or outdoor crops maintained by diesel or gasoline-fueled industrial equipment replaced by solar-powered grow pods, also a reduction in water usage as hydroponics as much as 10 times less water.
3. Fertilizer, pesticides and other crop treatments that emit GHGs (e.g. methane or nitrous oxide): crop care is replaced by less intensive means and are more contained, reducing need for chemical enhancement.



College Of The Rockies (Cohort 1: 2022–2023)

COMPOSTING FOOD WASTE TO HELP SUPPORT FOOD GROWTH ON CAMPUS

LOCATION: College of the Rockies, Cranbrook, British Columbia

PROJECT LEAD: Sophie Larsen

PROJECT DESCRIPTION:

The project aimed to reduce the campus carbon footprint using a circular economy approach. The amount of organic waste composted on campus was increased two-fold and opened organics collection campus-wide. The compost was then used to grow food on site, the food was then consumed in the cafeteria and through the Professional Cook program. The team used various communication methods to support behavioural change in students and employees. These communications including educational messages regarding use of the newly installed composting bins, compost best practices, and GHG footprints.

The problem facing the College was that its industrial composter was underutilized. This meant that all staff and student organic waste was treated as garbage and sent



to the landfill resulting in higher greenhouse gases from anerobic decomposition (vs aerobic composting). This was due to a number of different factors including uncertainty in best practices and hesitation to open organic waste collection campus-wide without adequate messaging, staffing capacity, and oversight. A secondary problem was that all produce procured by the College's cafeteria and culinary program is purchased from large distributors and shipped vast distances from field to plate. One of the many successes of the project included creating a context by which students, staff, and faculty could imagine a food system that is more self-reliant and autonomous.



Collège de Bois-de-Boulogne (Cohort 1: 2022-2023)

LOCAL AND CLIMATE-FRIENDLY FOOD SECURITY

LOCATION: Collège de Bois-de-Boulogne, Montreal, Quebec

PROJECT LEAD: Chantale Nunes

PROJECT DESCRIPTION:

The project started as a pilot to build a campus educational aquaponics facility as part of a broad educational approach involving multiple teachers, programs and students. It also builds on the experience gained from the Automated Aquaponics Microecosystem (AAM) project already developed at the facility in 2020-2022.

In addition to approaches already developed around the educational aquaponics facility, awareness-raising activities were carried out at the Bois-de-Boulogne Day Camps and among CÉGEP students, staff and the general public.

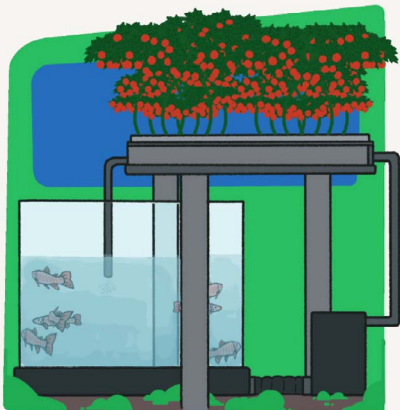
In addition to awareness-raising, the project puts technology at the service of the community, while reducing the environmental footprint of agriculture. Aquaponics is a closed-circuit food production system creating a symbiosis between fish farming (raising fish) and hydroponics (growing plants in aqueous solution). It creates an environment where fish, bacteria, and plants work together. This technique makes it possible to



produce several crops at the same time in a sustainable environment all year round.

THE MAIN GOALS OF THE PROJECT ARE:

- Democratize urban food production and feed food insecure families;
- Distribute food that promotes the adoption of a healthy and responsible diet; and
- Stimulate learning and awareness with an innovative approach.



Conestoga College (Cohort 1: 2022-2023)

LOW-CARBON DINING WITH INGREDIENTS, PACKAGING, AND WASTE

LOCATION: Conestoga College, Kitchener, Ontario

PROJECT LEAD: Nicole Detlor & Stephen Thomson

PROJECT DESCRIPTION:

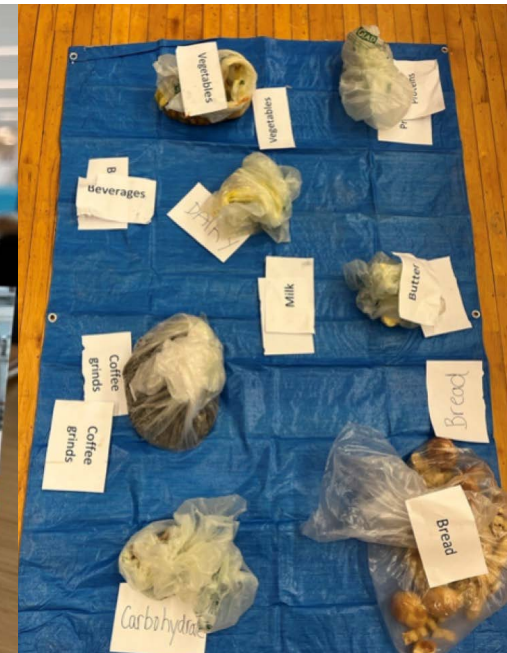
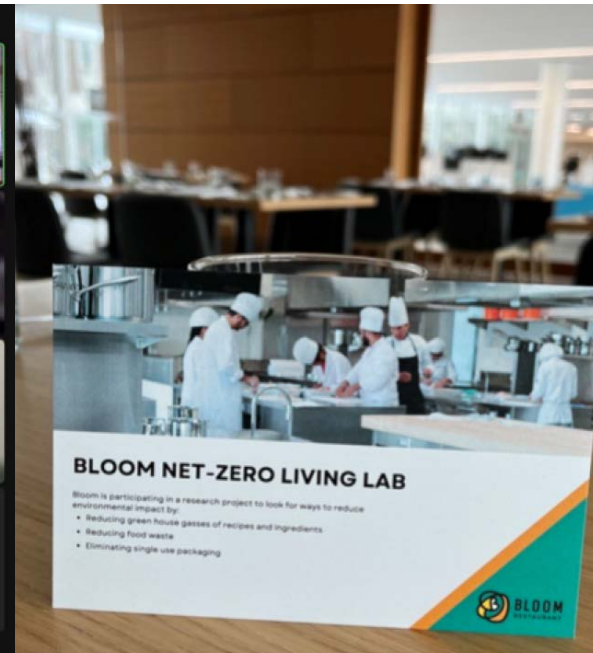
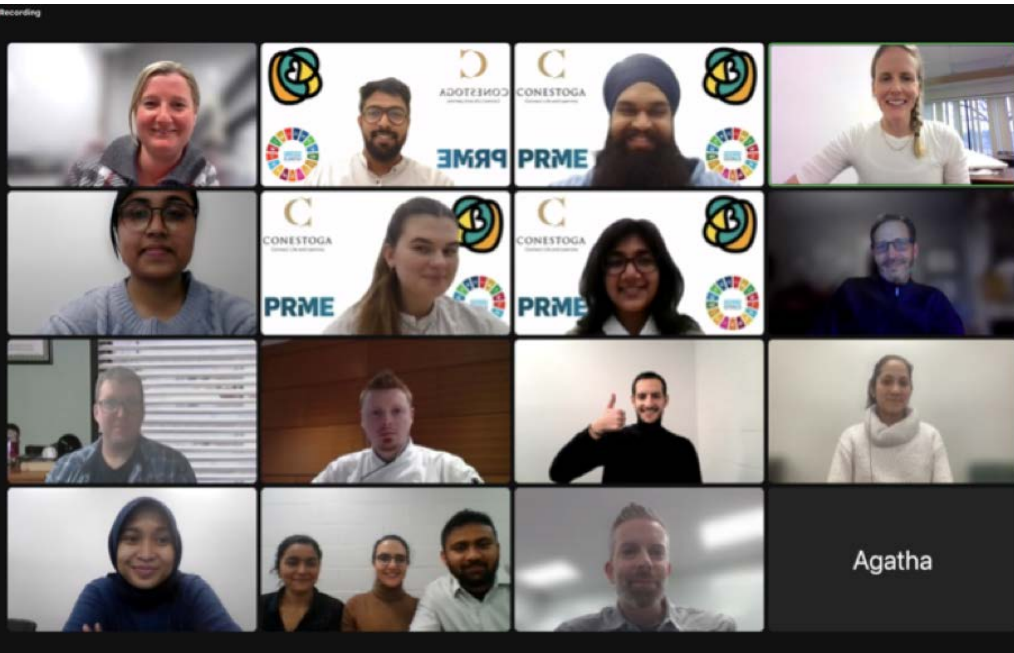
The project focused on reducing the environmental impact of the College's campus Bloom restaurant through eliminating single-use packaging for take away items, reducing food and solid waste from restaurant operations, and understanding the GHG impact of the ingredients used in each dish.

The project contributes to the SDGs 9 (collaborating with innovative packaging companies), 12 (communicating to restaurant customers the GHG impact of each plate to make informed decisions), and 13 (finding ways to reduce GHG - waste/ ingredients/packaging).



Solutions for each specific problem included:

1. Eliminating Single-Use Packaging – investigating and implementing returnable or compostable packaging for take-away;
2. Food Waste – Conducting two food waste audits to provide Bloom with information to reduce waste and improve waste diversion; and
3. GHG Impact of Food Ingredients – Developing a model to calculate the GHGs of the menu items, communicating those GHG values to customers, and researching



Dawson College

(Cohort 1: 2022–2023)

RAISED WETLAND CONSTRUCTION

LOCATION: Dawson College, Montreal, Quebec.

PROJECT LEAD: Chris Adam

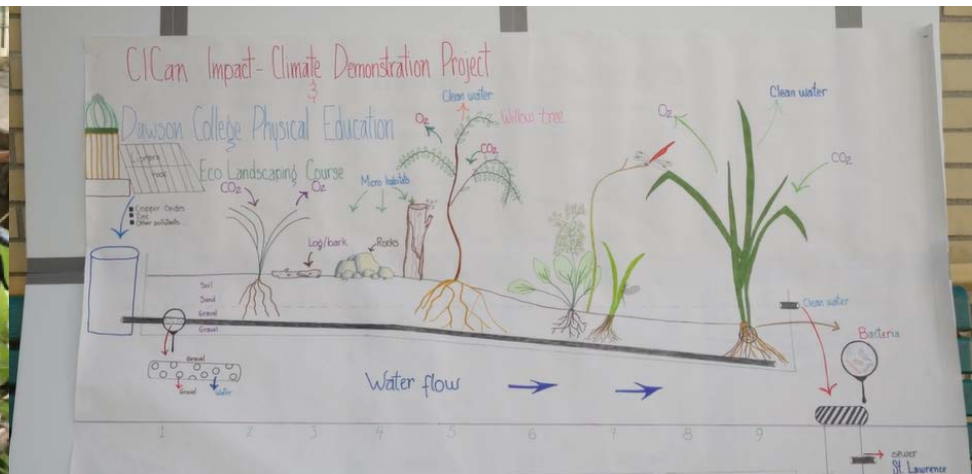
PROJECT DESCRIPTION:

Dawson's project aimed to offset the transportation-related GHG emissions from Phys. Ed. class activities through the creation of a raised wetland. In order to address the issue, the project lead had to create a database and interface of Dawson's 187 Phys. Ed. courses, reaching 4,500 students/semester. After that, they identified the GHG emissions of every class (transportation, cooking fuels, food, campfires, lodging, waste), the number of trees needed to offset GHGs, contact hours in Nature, and SDGs touched upon per course. As part of awareness-raising, this information was made available to students during registration.

As a result, on-going GHG footprints and SDG information are now available for all 187 classes. Data can be used by programs to create emission reduction strategies and creative student-driven offsetting methods. A new Phys. Ed. eco-landscaping class was held on site to demonstrate positive action linking the SDG's while reducing GHGs and ensuing climate impacts. Students participated in the creation of the raised wetland on pavement which not only offsets transportation and class activity-based GHGs, but also filters rooftop water, increases biodiversity, and reduces the heat island.



In order to reduce water permeation through Dawson's old stone walls, its heritage buildings were paved many years ago, resulting in water dripping from copper rooftops flowing directly toward storm sewers. Wanting to showcase a nature-based solution to trapping some of this water and letting it return to the landscape and atmosphere, the project also strives to increase biodiversity – working off another Dawson project – the Peace Garden. In construction, students moved 20 tons of material and created a bioretention area through which the water would flow and plants could use the water and perhaps help remove copper oxides from the rooftop rainfall. Nine 8 x 4 ft “cells” were created with layers of gravel, sand, and soil to act as natural filter and 120 native woody and non-woody plants planted in the soil. An internal piping system moves the runoff from the college library roof into the raised wetland that was created by the students. The project will continue to absorb GHGs as the plants and trees grow in size.



Georgian College (Cohort 1: 2022–2023)

BUILDING A CLIMATE DASHBOARD AND CARBON COUNTER

LOCATION: Georgian College, Barrie, Ontario

PROJECT LEADS: Shaun Alfonso and Irena Pozgaj-Jones

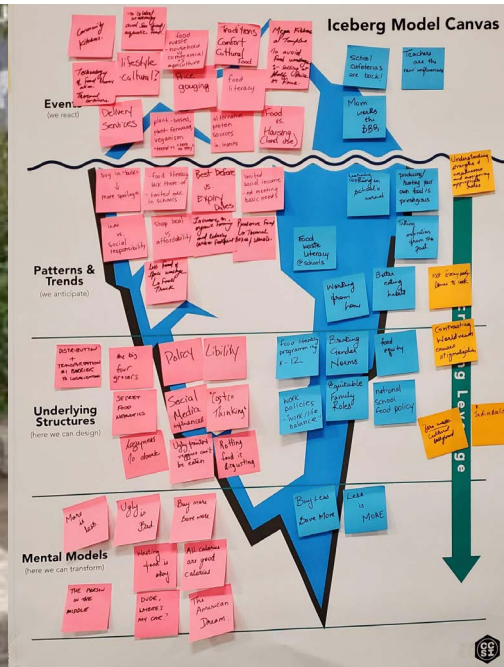
PROJECT DESCRIPTION:

Georgian College’s Climate Action Lab and Hospitality Tourism and Recreation department have partnered to address and lower food-related emissions through sustainability measures such as localizing ingredients, reducing food waste, composting, urban farming, reducing/reusing plastics and more. The lab is collaborating with students and community members to develop an emissions dashboard and carbon counter to track, expand, and scale these climate action initiatives in the region, contributing to the achievement of several UN SDGs. The Climate Action Community Impact Lab is focused on exploring how we might raise awareness of food-related



sustainability initiatives on campus and reduce emissions resulting from delivering Georgian’s Hospitality, Tourism and Recreation (HTR) programs. The HTR department has already implemented several climate action measures. However, the results and emissions data of these actions are not being widely tracked or adopted within the broader institution and campus community.

The ImpAct-Climate project supported the Community Impact Lab expanding the approach to tracking and quantifying food-related emissions data as part of an initiative to bring awareness and ultimate adoption of climate solutions on campus.



Mohawk College (Cohort 1: 2022–2023)

BUILDING ENERGY METERING AND DISPLAY

LOCATION: Mohawk College, Hamilton, Ontario

PROJECT LEAD: Mariano Arriaga

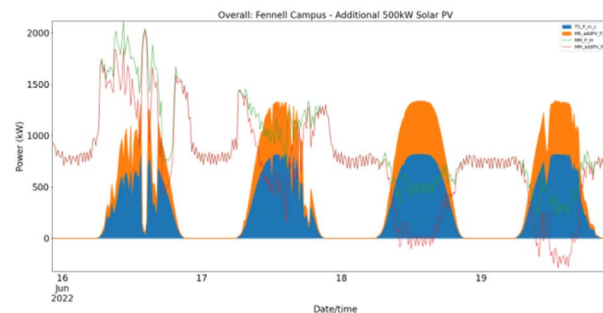
PROJECT DESCRIPTION:

The project's aim was to support future planning and bring awareness to the importance of net-zero transformations. Colleges have a unique opportunity to understand their energy consumption and equip decision-makers, staff, and students with the propensity to imagine alternative solutions and their impact to achieve a low and/or zero-emission campus. Mohawk's project aimed to capitalize on this opportunity by developing an energy visualization and awareness tool, and supporting outreach campaign, to help the College community understand and relate to the energy consumption and GHG emissions of buildings throughout campus.

The challenge with undertaking a project related to campus energy data monitoring is the complexity of communicating and visually representing energy consumption, GHG emissions, and innovative technologies in a digestible way for non-experts. At Mohawk



College, an overall disconnect was identified between the strides made in reducing its building GHG emissions and the College community's knowledge and awareness of these efforts. Through this Campus Living Labs Demonstration Project, these challenges were addressed using a combination of technical and outreach/communications components. The technical component included analyzing and synthesizing technical energy meter data and relating it to physical landmarks that the College community is familiar with, such as buildings and renewable energy sources across the campus. The outreach/communications component visually showcased this synthesized data through the strategies and technologies being deployed at Mohawk College to achieve a net-zero future.



Norquest College (Cohort 1: 2022–2023)

RESCUING FOOD FOR INCREASED FOOD SECURITY

LOCATION: NorQuest College, Edmonton, Alberta

PROJECT LEAD: Kristie O’Neill

PROJECT DESCRIPTION:

The project uses rescued food ingredients to deliver delicious and free-of-charge chef-prepared meals and snacks to NorQuest College’s students. Food rescue involves eating safe to eat, nutritious, and tasty food items that would otherwise have been thrown away. Food waste is an important issue to tackle given that, “Globally, if food waste could be represented as its own country, it would be the third largest greenhouse gas emitter, behind China and the United States” (UNEP 2022).

In order to communicate the problem of food waste and the value of food rescue to NorQuesters, Green Café’s project launch involved providing hot snacks at NorQuest College’s annual Road Hockey Tournament. After this event, members of the project team visited classrooms and student centres weekly to explain the project and invite students to try meals and snacks. In the spring, an enthusiastic discussion of Green



Café was held at a college-wide speakers series featuring the president, members of city staff, and college staff and faculty. Not only did the project stop a substantial amount of food waste from entering landfill that would produce methane, but the project also fed food insecure students. Lastly, Norquest’s project and awareness-raising helped change the conversation around food scraps or “ugly” food, and that a lot of food waste could still be part of a nutritious meals, fostering resilience and a deeper understanding and connection to our finite resources.



Vanier College (Cohort 1: 2022–2023)

NO-MOW ZONES, GARDENS TO SUPPORT FOOD, TREES, AND BIODIVERSITY

LOCATION: Vanier College, Montreal, Quebec

PROJECT LEAD: Arianne Duchesne replaced by Heather Elliott in February, 2023

PROJECT DESCRIPTION:

This project consisted of a multi-disciplinary team approach aiming to amplify the potential of campus greenspace as both a tool for carbon sequestration and habitat for urban biodiversity and as a unique pedagogical resource. Project participants worked at three levels: using the gardens as a teaching tool; the Vanier-lead Campus Biodiversity Network (CBN) to promote engagement with campus biodiversity; and an in-house app, TreeTag, to track the growth and carbon sequestration of trees on campus and coordinate their care with internal and external services. Through this project, Vanier turned a problem into an opportunity: although a beautiful greenspace, the Vanier campus was managed through conventional approaches that largely contribute to campus GHG emissions, rather than reduce them.

Through this project, project leads pivoted Vanier's approach to landscape management in order to turn the grounds into a sink rather than a source of GHG. Furthermore,



they leveraged the gardens and campus biodiversity to address the eco-anxiety and disengagement that can result from the overwhelming issue that we collectively face: climate change. Instead, by having this hands-on experience, the project supports lifelong emission-reductions through food skills and stewardship of the natural world. Because of the flexibility provided by the ImpAct-Climate approach, Vanier was able to accomplish two things they could never before achieve:

1. Allow students to participate in garden maintenance and food processing year-round, giving them practical and meaningful experience; and
2. Thread together previously siloed initiatives that together create an educational and participatory approach to GHG reductions.



