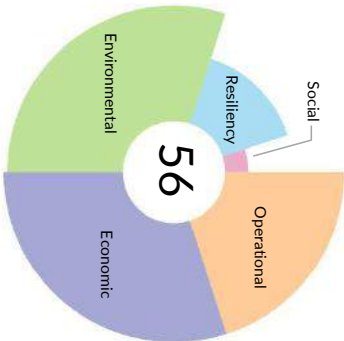
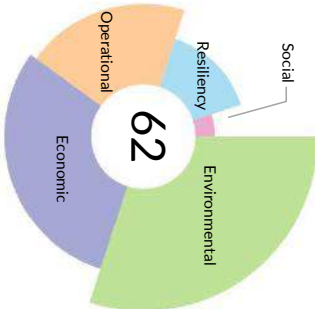
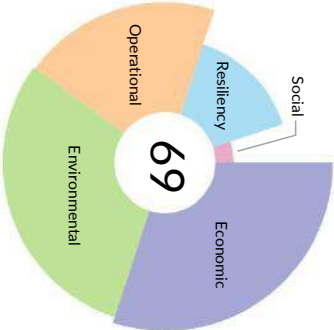


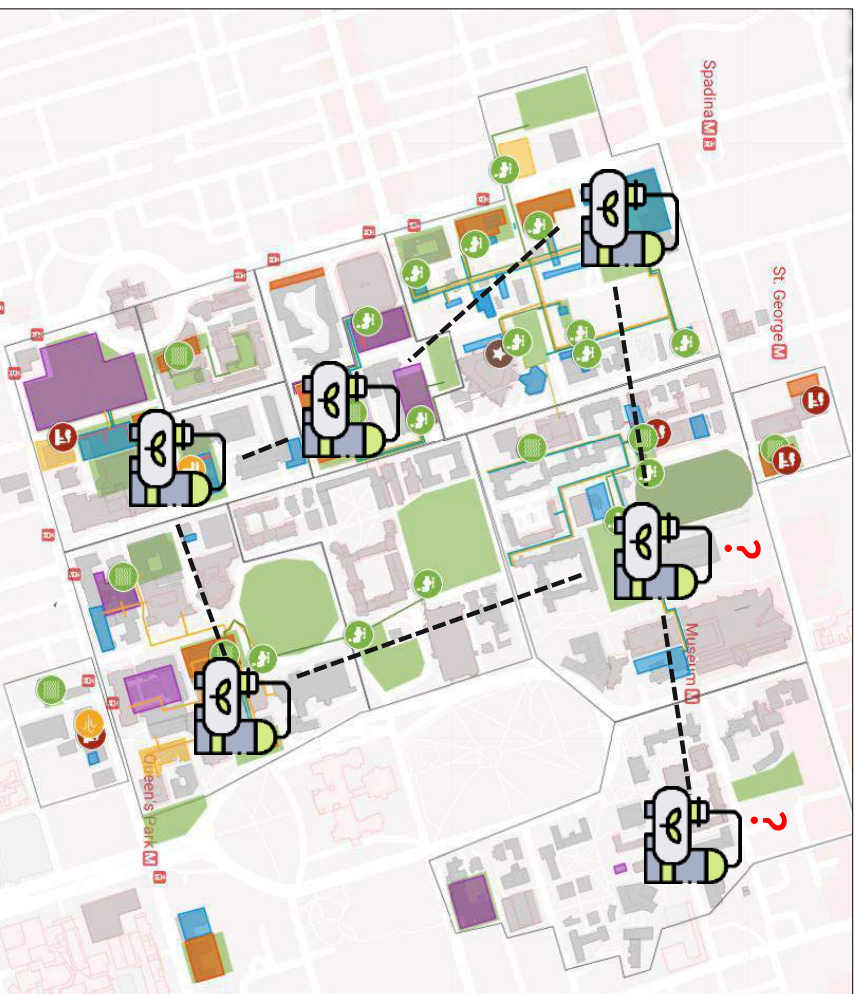
EVALUATION MATRIX

Category Weighting	Category	Criteria	Weighted Score		
30% 15% 20% 5% 30%	Environmental	Decarbonization, efficiency, environmental impact	Alternative #1	Alternative #2	Alternative #3
	Resiliency	Flexibility, and future proofing, space	18	21	15
	Operational	Digitization, operation, compatibility	12	9	9
	Social	Human impact, campus, culture	18	14	15
	Economic	Capital, O&M, Risk	3	3	3
Total			19	15	15
			69	62	56



Note: Weighted score are shown as rounded numbers

RECOMMENDED ALTERNATIVE: FUTURE RESILIENCY OPTION NODAL GSHP, CENTRAL STEAM AND HW DISTRIBUTION



HIGHLIGHTS

Thermal:

- 4 nodal plants are established, with connections to Central plant
- Eliminate steam
- Renewal of central plant with low carbon or electric technology

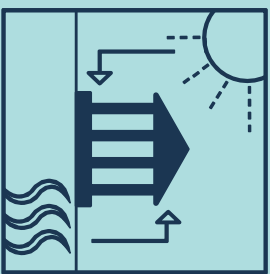
Electrical:

- Establish 3 or 4 interconnect switch stations
- Multiple Toronto Hydro feeds to significantly increase reliability

Carbon:

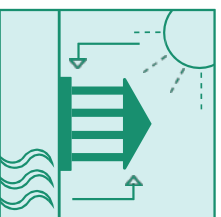
- Role out of Carbon and Energy “Budget” for each project
- Significant increase in on site renewable energy, in partnership with our faculty and researchers
- Use of large off-site Solar Farm to provide carbon neutrality

Detailed Net Zero Campus Masterplan to be published in early 2021

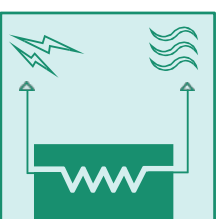


Project Highlights

Our Net Zero Campus
Plan have over 150
Projects across our
Campus



PRODUCE



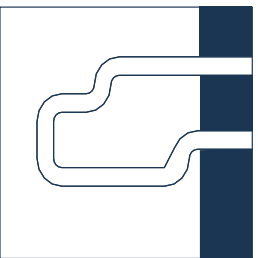
DISTRIBUTE



CONSUME

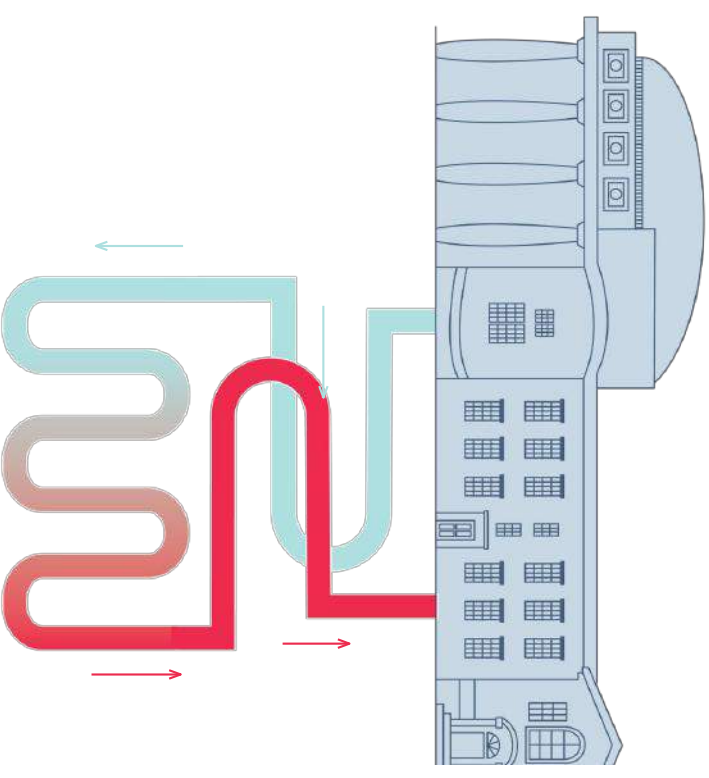


Produce: Clean Energy & Carbon Capture



Geoexchange

Provides a sustainable, low-carbon, source of heating and cooling

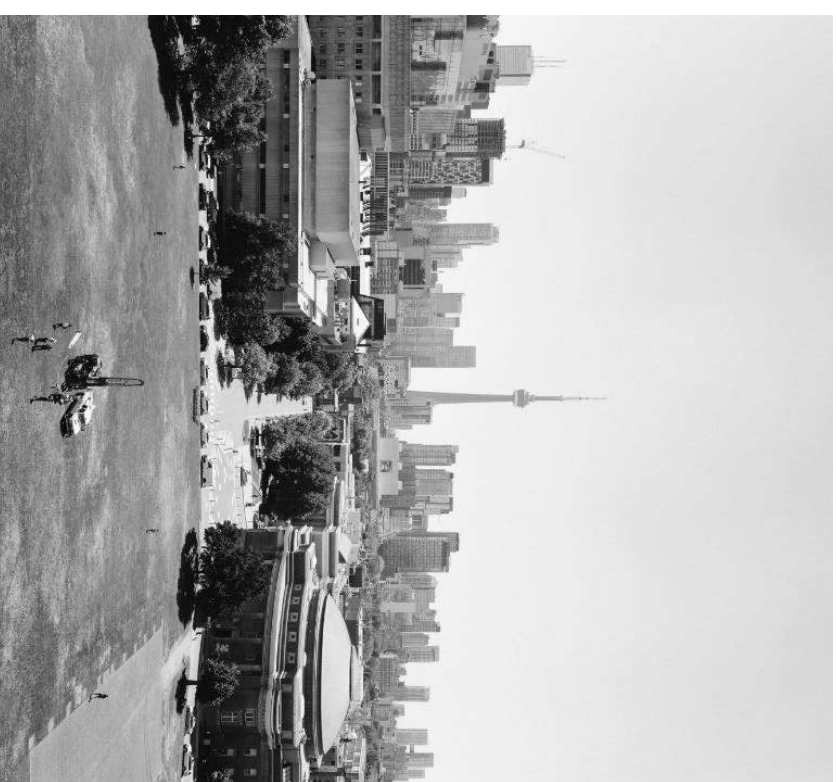
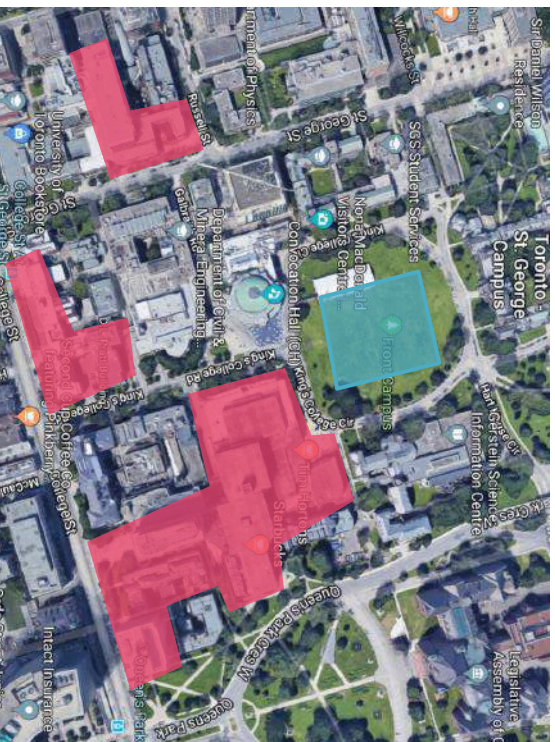


- Results in on-going reduced maintenance and utility expenditures
- Allows for Living Lab and Experiential Learning opportunities for students



Produce: Clean Energy & Carbon Capture

- Proposed King's College Circle Georexchange represents over 25% of our total 2030 reduction target
- It is projected to providing heating to the following buildings: MSB, CCBR, Leslie Dan Pharmacy, Fitzgerald, Wallberg, Pratt, BCIT, Snow Melt



Total Target GHG Reduction from KCC Georexchange =

15,000

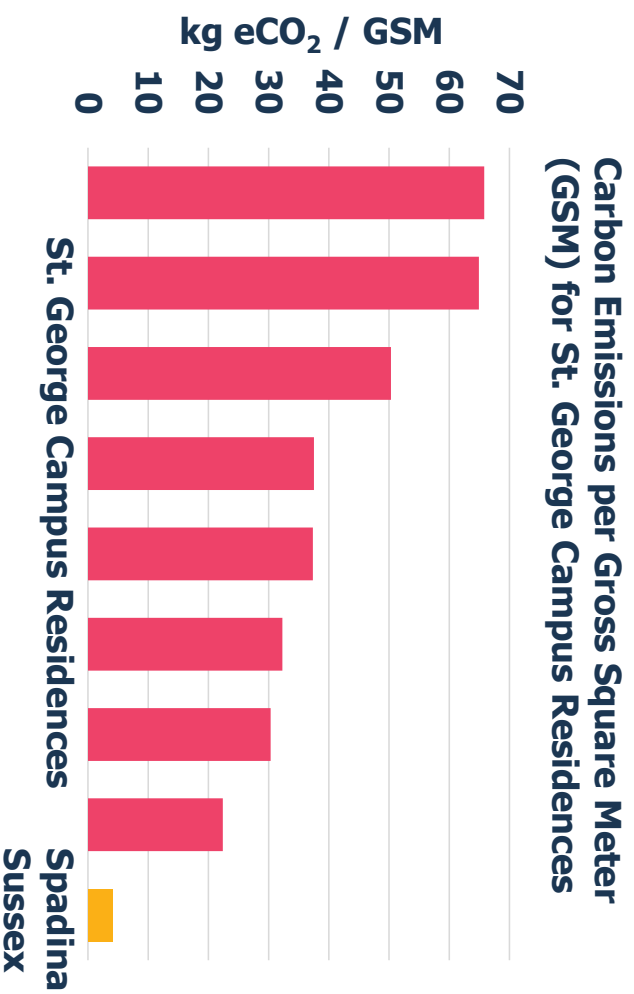
Tonnes eCO₂/year



Consume: Reduced Consumption

St. George New Spadina Sussex Residence

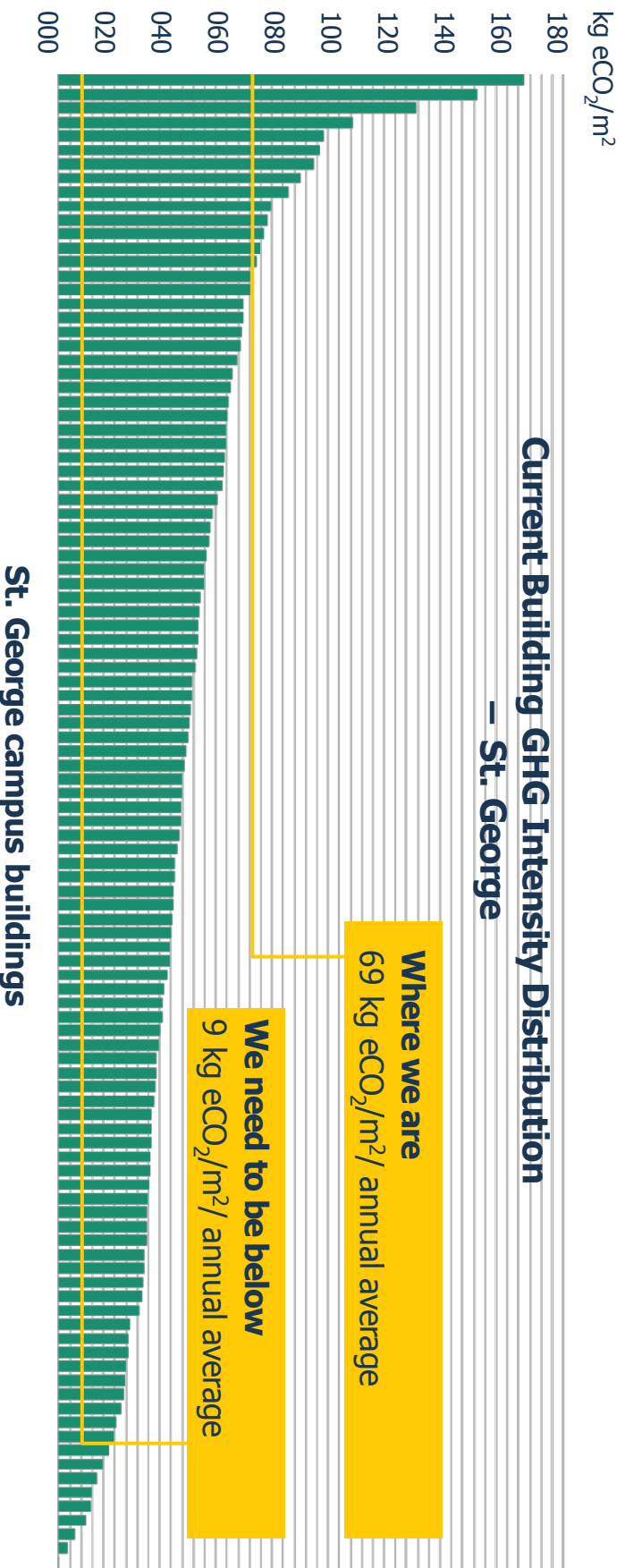
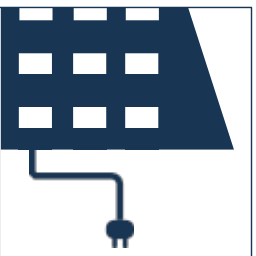
- The Spadina Sussex residence will be tied into a geoexchange system, making it one of the lowest carbon emitting residences on campus





Consume: Reduced Consumption

- We need to invest in energy reductions at the building and system level





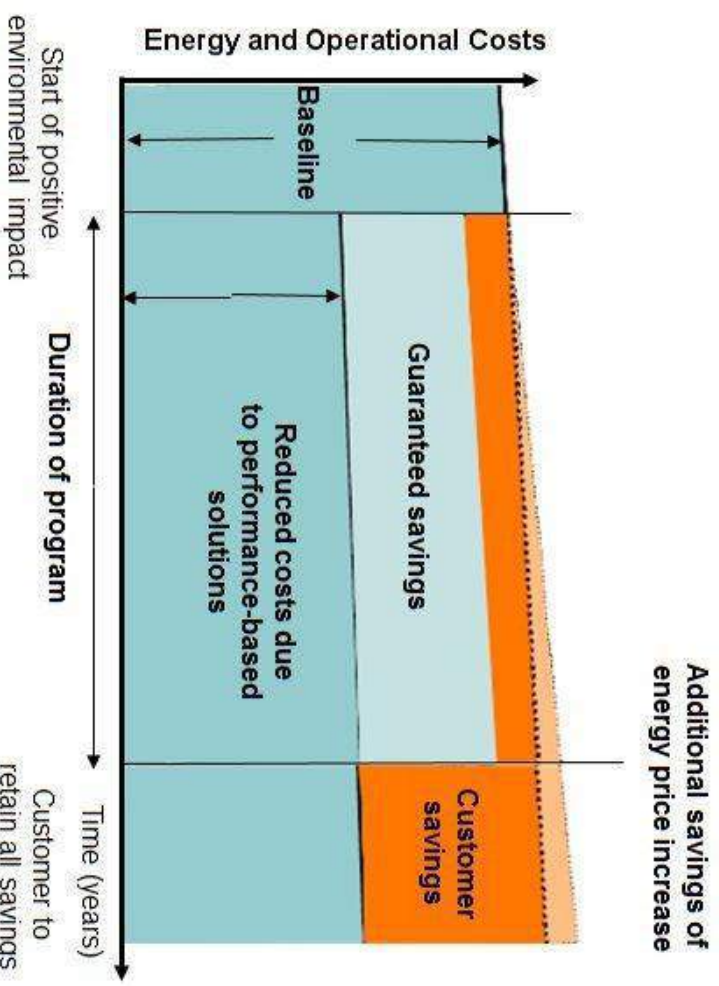
Reduced Consumption

What we are doing about our existing building stock

- **Internal U of T U-ESCO model** A team of internal energy managers, engineers, and other building science experts will leverage our existing **green revolving fund** to collaboratively develop deep-dive energy conservation projects

Total Target GHG
Reduction from
Building
Optimization =

6,620
Tonnes eCO₂/ year

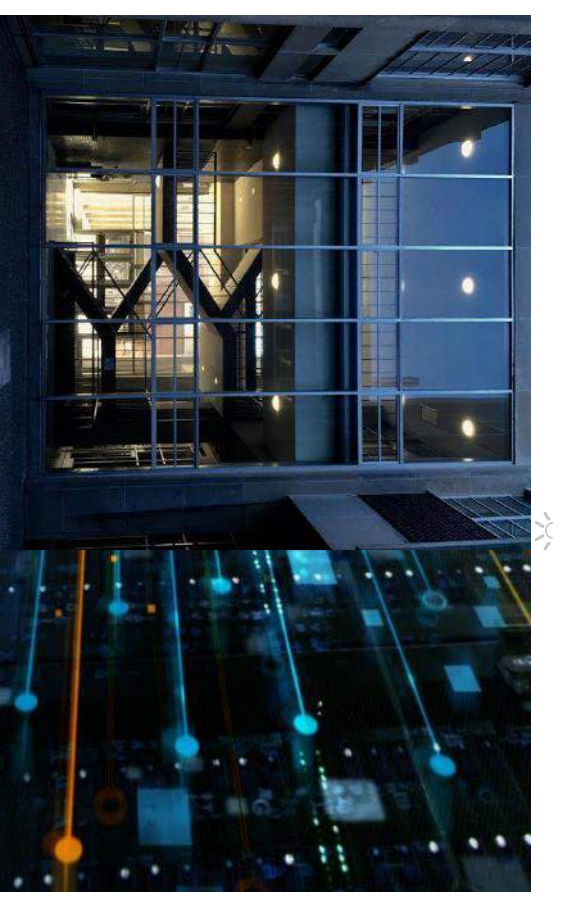




Consume: Reduced Consumption

St. George: Heat Recovery

- A renovation of the IT Centre in presents the opportunity to install a heat pump that will cool the IT Room and capture the heat generated and redistribute it to the building.
- Targeted to reduce emissions by over 700 tonnes eCO₂



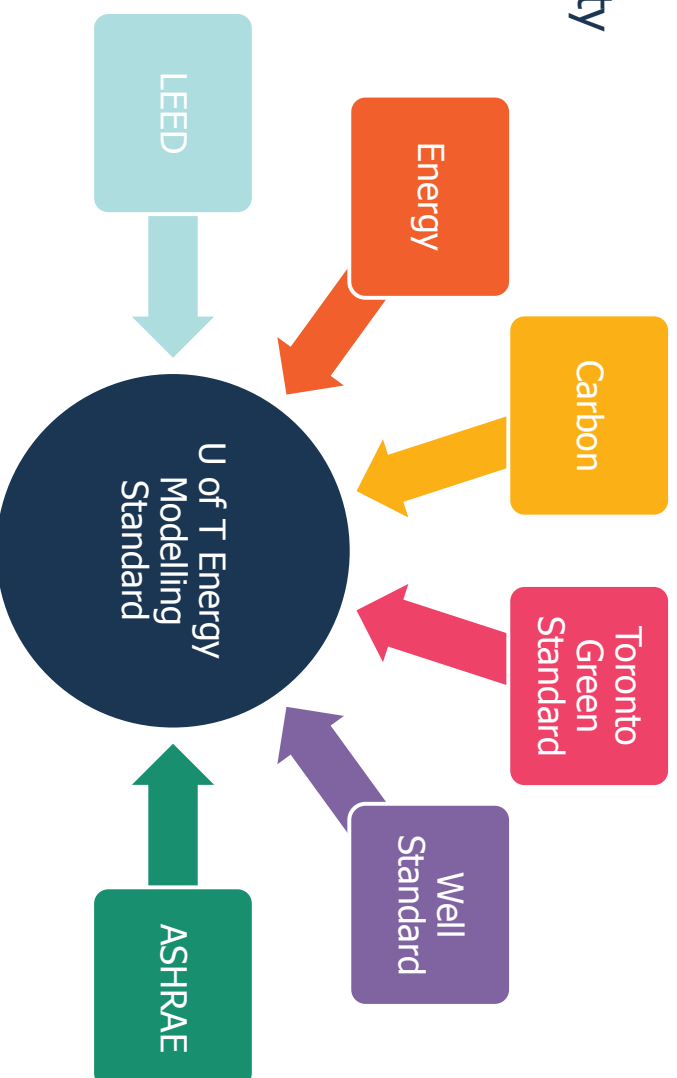


Consume: Reduced Consumption

Enhancing Building Energy Performance Design Standards

- New building energy performance standard for Fall 2019
- The new standard will ensure advanced energy, carbon, wellbeing, and sustainability performance

Target GHG Avoidance from Designing to New Performance Standards =
8,325
Tonnes eCO₂ / year



Fostering Opportunities & Partnerships

Green Will Initiative with the City of Toronto

- Aligned with the best practices presented by C40 and the City's Better Buildings Partnership
- U of T as a partner will move buildings through six key stages towards achieving net-zero:

- 1 Benchmarking
- 2 Audit
- 3 Retrofit Capital Planning
- 4 Strategic Energy Management & Continuous Improvement
- 5 Deep Carbon Retrofits
- 6 Achieving Net Zero Emissions



Partnerships & Engagement Highlights



UTSG
Sustainability Office

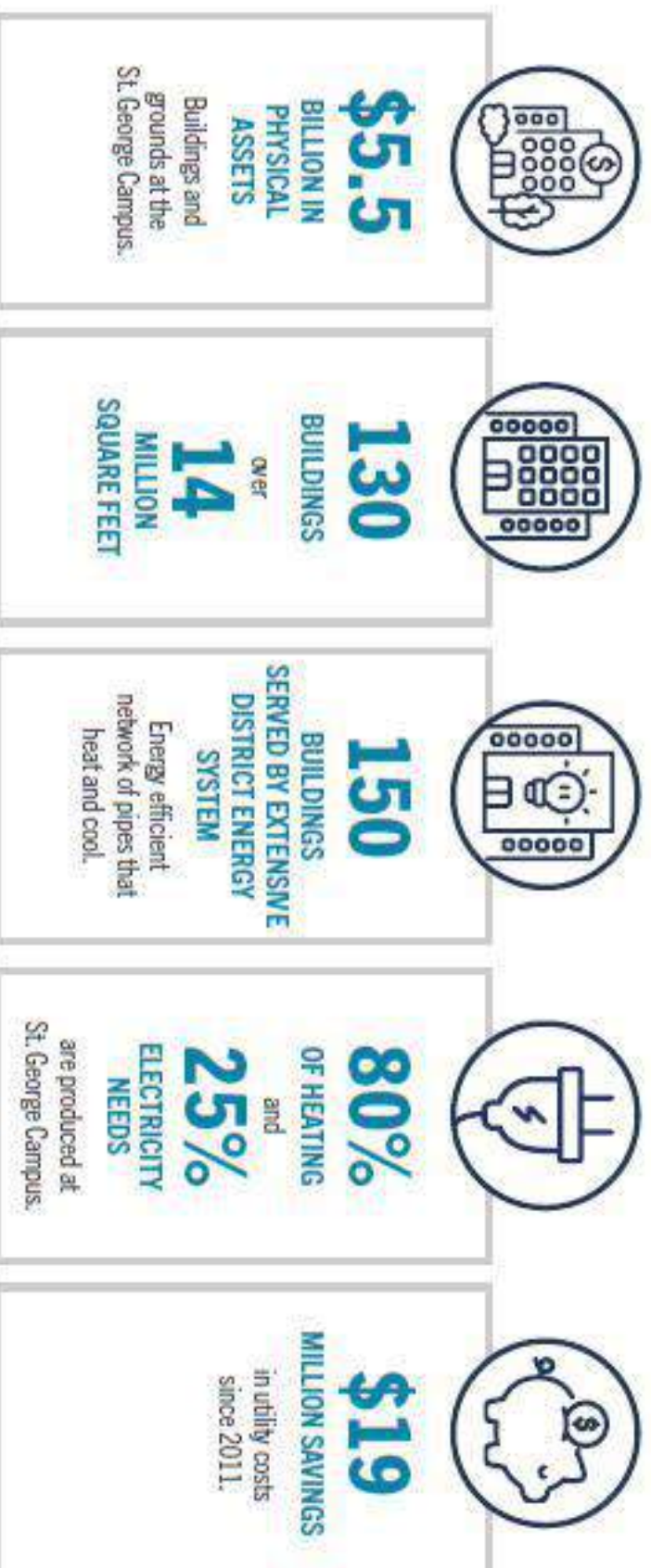


uoft.me/sustainability

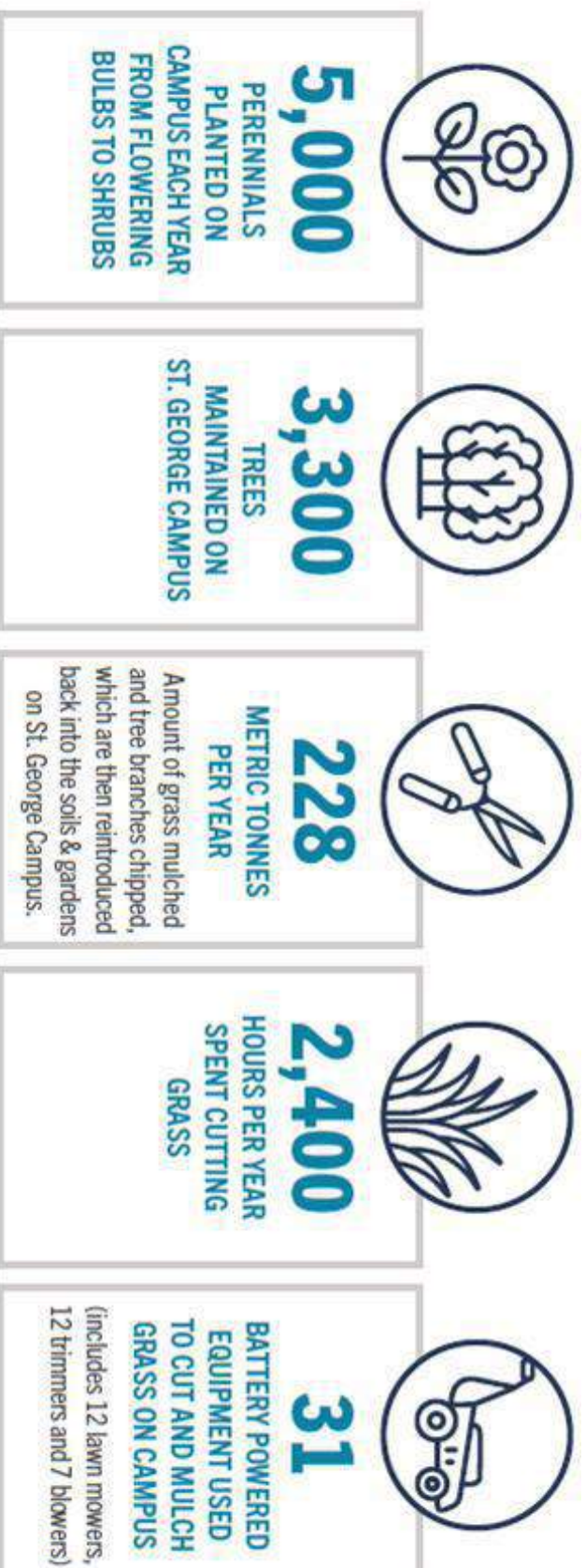
About the Sustainability Office

Founded in November 2004, The Sustainability Office, St. George Campus, is embedded within Facilities and Services', Office of the COO, Property Services & Sustainability (the Sustainability Operations Unit of Operations, Real Estate & Partnerships (including energy & utility management & operators), and part of the 600 strong stewardship team that cares for;

130 buildings (including 80 heritage buildings) plus central steam plant supplying another 150 buildings including Federated Colleges, the ROM and Gardiner Museum.



As well as 180 acres of Green Infrastructure including:

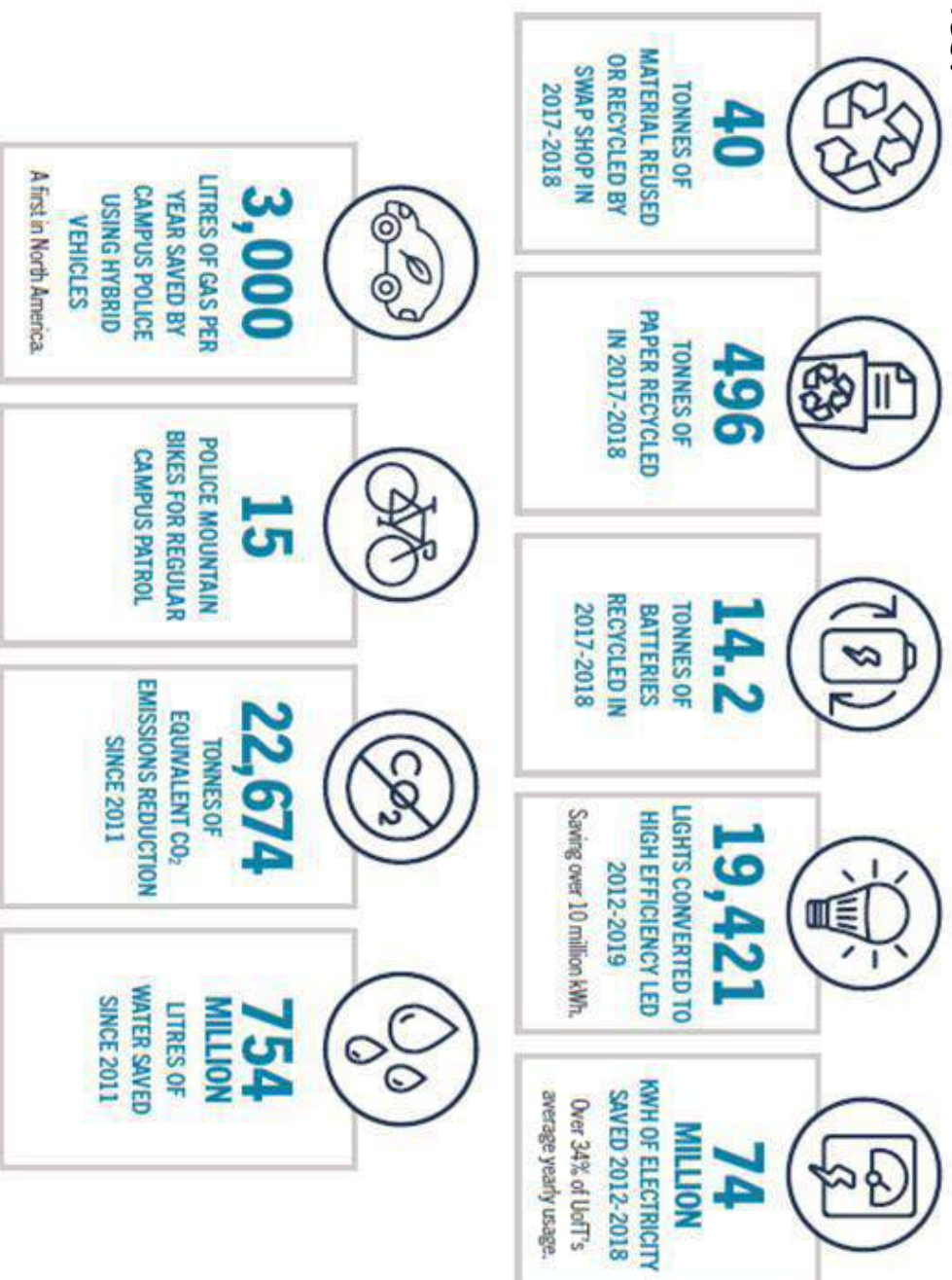


The Stewardship activities of our Natural Capital, provide Ecosystem services and support:

- a. Human wellbeing (ie. sense of connection, resilience to stress, urban heat, extreme wind & flood mitigation)
- b. Biodiversity (eg. Pollinator Habitat)
- c. Safe Haven and beauty for visiting and surrounding community members

F & S are the staff that consider the wellbeing of the campus community & visitors on a daily & long-term basis, making the Sustainability Office & partnering colleagues, uniquely positioned to cross-pollinate, test & incubate complex ideas among diverse stakeholders & establish continuity planning over short & long- term timeframes.

The Sustainable Office with Operations unit colleagues, also oversees development of guidelines for resource conservation standards, initiatives, processes, engagement activities & plans with some of the following outcomes:



Some Sustainable Stewardship & Operations Awards & Certifications

- U of T Named **Greenest Employers** for 7th time



- **LEED certified buildings:** There are now 4 Leadership in Energy and Environmental Design (LEED) certified buildings at U of T, St. George Campus including the St. George Exam Centre.



- The St. George campus caretaking team has been awarded a Cleaning Industry Management Standard – **Green Building certification with honours**. This means that the campus has demonstrated its commitment to delivering green cleaning services.



Partnerships & Engagement: Sustainability Office



Concierge of Sustainability Services for Office of the COO
Property Services & Sustainability
Facilities & Services

2019- Strategic Plan established 5 key priorities:



- **Services**
- **Communications & Resources**
- **Programs**
- **Applied Research & Innovation Activities**
- **Professional Development & Employment**



Services

Educate, Inspire & Connect!

We are change leaders who develop & promote an inclusive culture of sustainability & sustainable stewardship with staff, students, faculty, alumni & community partners

We act as a resource hub for sustainable best practices through various channels, engagement programs, initiatives, partnerships & events

We operate at the intersection of campus communities, departments & operations to;

- Offer guidance, resources, facilitation & expertise
- cultivate collaboration & leverage resources
- identify common goals & opportunities for innovation
- consult with stakeholders & decision makers to establish optimal conditions to prioritize sustainability
- remove barriers to wider adoption of best practices that support & align with U of T sustainability goals



Sustainability Office

As a resource to the St. George campus, we educate, inspire and connect.



Leadership and community engagement

We showcase our campus's sustainability features through tours and inspire people with ideas to bring back to their communities!



Living And Working On A Sustainable Campus

We celebrate the environmental community on campus at our annual Green Gala. web.mcgill.ca/gca



Energy On Campus

Through The Bridge, we encourage staff, students and faculty to reduce their eco-footprint on campus. Find out more web.mcgill.ca/bridge



U of T Green Spaces To Explore

web.mcgill.ca/green_spaces



Waste And Materials Management

We partner with Our Crafty at Heart House to offer Regular Cycles, recycled art projects and more.



Education, Research and Innovation

We work to bridge the gap between University operations and academics by participating in campus-wide and opportunities for students. Students work on projects around waste, water and more.



Natural And Built Environment

Green and nature spaces are great for our mental health! Look for our Green Map, videos and U of T Green Spaces Tour! web.mcgill.ca/teach

Communications & Resources

Select Publications

**U of T's Low-Carbon Action Plan
is available online:
uoft.me/LowCarbon19**



Sustainability Yearbook
Greener News
Facilities & Services Strategic Plan

Select Resources

Bespoke Building Energy Performance Standard
Sustainable Events Guide
Youtube channel modules & videos
Clothing Swap Guide
Bottle Refilling Station Map

Under Development

Web Portal & Integrated Dashboard overhaul
Net Zero Campus Masterplan
Natural Capital Study
Sustainable Communications Guide
Sustainable Procurement Guide
Sustainable Labs Guide

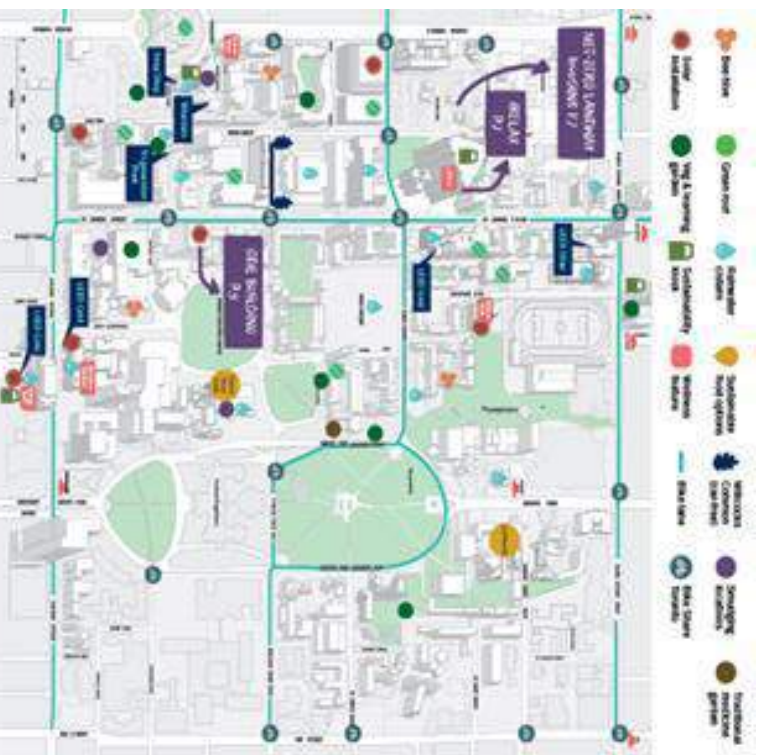


uoft.me/sustainability



Sustainable Stewardship Programs

Fostering Leadership & Excellence



Current Stewardship Programs (updated & to be relaunched in 2021)

Green Courses
Green Residence
Green Offices
Green Ambassadors
Green Gala
Campus Leadership Award (Green Ribbon)

Programs Under Development (to be launched in 2021)

Sustainable Energy Management
Sustainable Labs
Sustainable Events
Air Travel Emission Mitigation Initiative
Biodigester-to-Energy
Edible Campus

Toward Zero Waste uoft.me/sustainability



- Scale and decentralized nature of U of T means building & mobilizing networks to contribute to institutional goals
- Recognizing potential impact of individual and collective action (campus leaders)

Sustainable Stewardship Applied Research & Innovation

Partnering with our campus & community experts toward a Net Positive Campus Economy

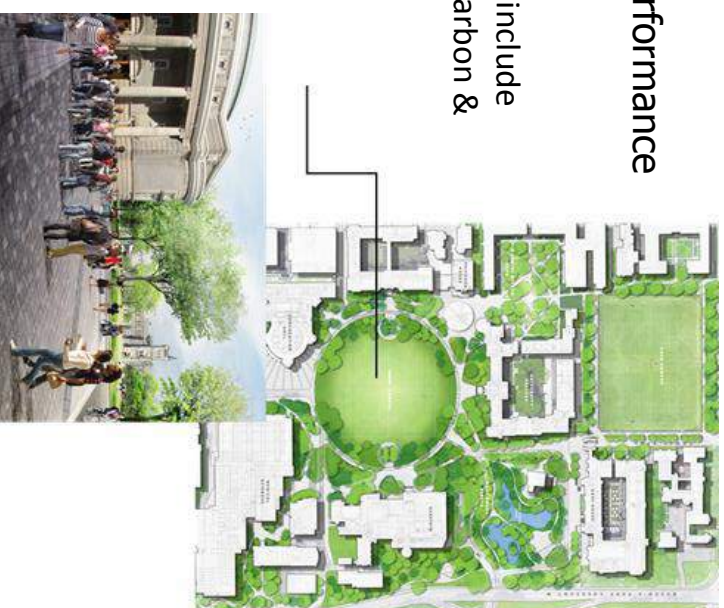
Some Activities Under Development

Pilot, test, evaluate, monitor new Tri-Campus Building Performance Standard for New Construction & Renovation projects

Energy Efficiency & EHS prioritized, pursue opportunities to develop include bespoke principles for health & wellbeing, procurement, embodied carbon & carbon budget framework for next iteration

Expansion of GeoExchange System Technology

Largest Urban field will demonstrate opportunities to use existing technologies & infrastructure in novel, hybrid model of centralized & decentralized nodes which enable deep retrofits of older, heritage buildings & replicable, scalable opportunities for skills & economic development on campus, and beyond. Research will evaluate implementation, GHG reductions, many co-benefits, as well as involve campus & community partners & experts in stakeholder engagement, sustainability feature interpretation & place-keeping.



Explore opportunities to avoid & reduce waste, GHGs by evaluating all campus resources (inputs/outputs), reuse viable materials, & redirect on campus where possible to meet needs resourcefully & sustainably

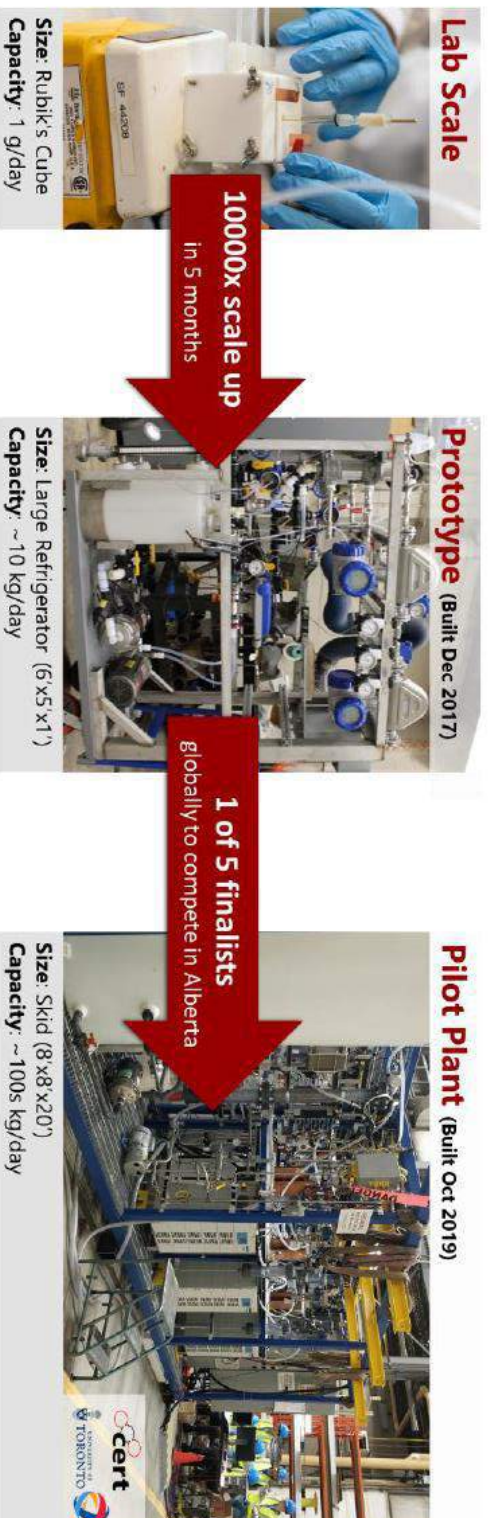


Clean Energy & Carbon Capture

Carbon Capture, Sequestration and Use: Collaborating with Our Innovative Researchers

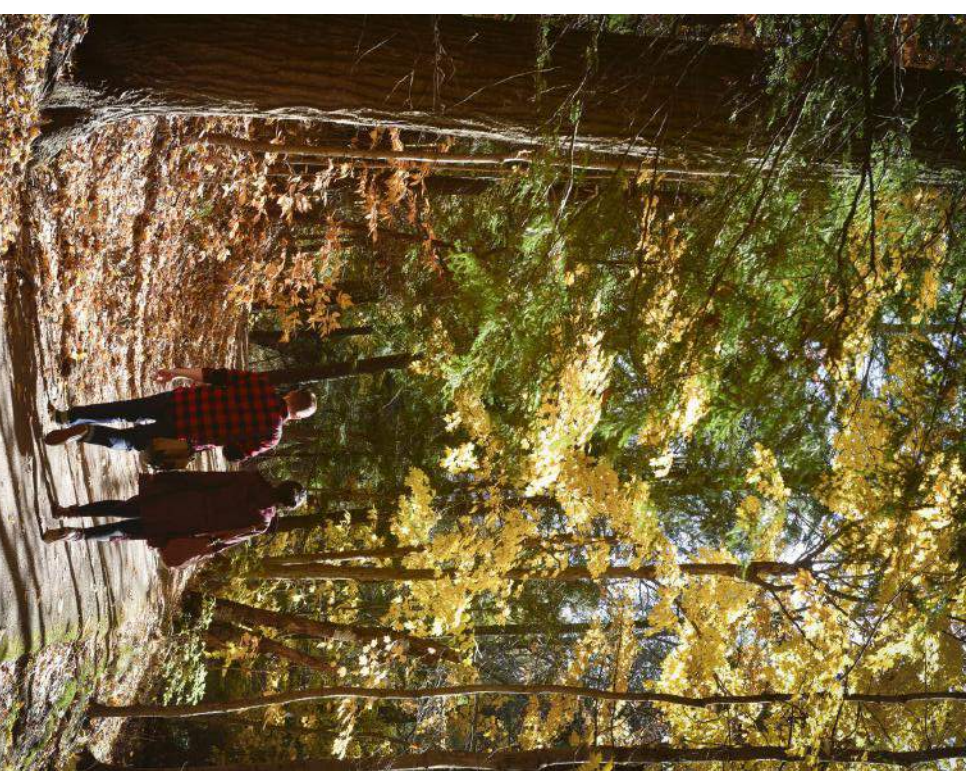
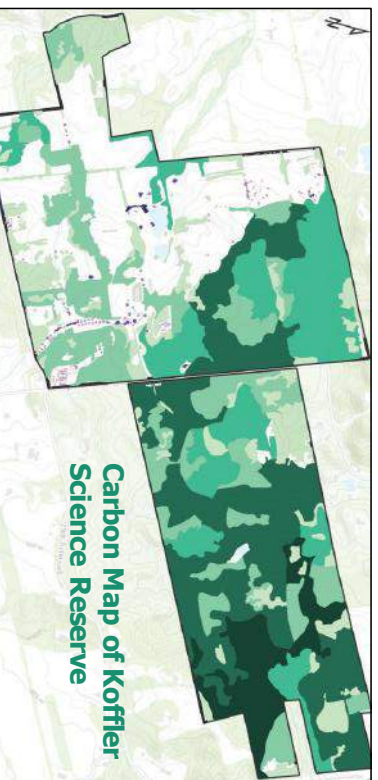
Examples of teams we are working with:

- Carbon Electrocatalytic Recycling Toronto (CERT) team are developing and scaling a system to capture carbon that uses solar-powered electricity to process water and CO₂ into valuable ethylene and ethanol feedstocks
- CERT is one of five finalist in the international Carbon X prize. In 2021 the CERT unit will be coming home to our St. George Campus



U of T Trees: Carbon Stock & Sequestration

- Working with U of T forestry & biodiversity experts, students & community partners to understand our natural capital & networks in order to ensure optimal health, protection, management & renewal
- U of T forestry researchers calculated that trees on all U of T properties continue to capture an additional 5,260 tonnes of CO₂ annually



CO₂ Captured by Trees on U of T Urban Properties=

1,097

Tonnes eCO₂ / year

Fostering Innovative Solutions

Campus as a Living Lab & Experiential Learning

- Campus as a Living Lab (CLL) brings faculty members, students, staff, and external partners together to collaborate on developing sustainability projects that combine operational and academic activities.
- The Sustainability Office work with approx. 100 students per year through Work Study, Internships, Practicums & since 2015 have undertaken;
 - 10 Multi-Disciplinary Capstone projects
 - 12 Living Lab projects (in course)
 - 5 Living Lab projects (independent)



Fostering Innovative Solutions

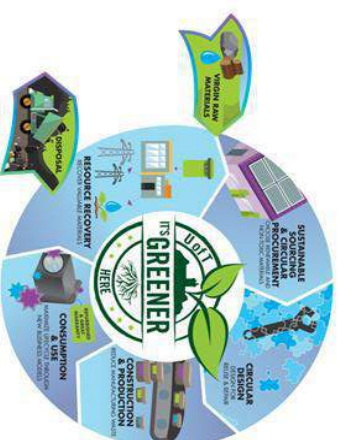
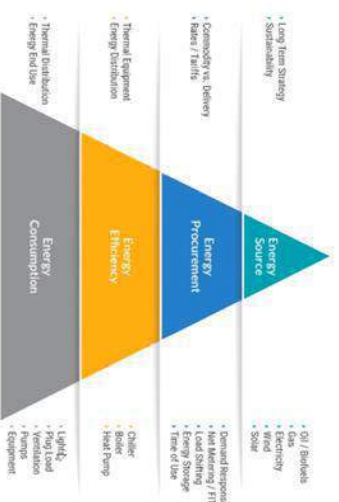
Current Campus as a Living Lab & Research Projects underway include:

Sustainable Labs Stewardship program

- to optimize performance of labs, equipment, resources management

Zero Waste Campus plan

- to establish reuse framework & steadily increase diversion



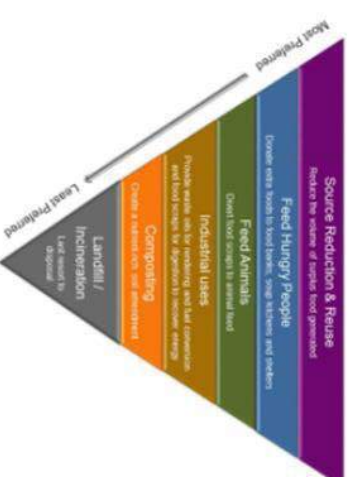
Edible Campus Stewardship program

- to support food growing, green infrastructure & biodiversity initiatives



Biodigester-to-Energy turn-key program

- to reduce ghgs, food waste & produce carbon neutral energy



Employment & Professional Development

Work Study Students & Internships

Over 50 undergrad & graduate students from over 40 disciplines have worked for the Sustainability Office in past 5 year

Students worked on communication, media, program evaluation & research assignments, & acted as Sustainability Office outreach & engagement representatives for a variety of programs, campaigns & events.

Some Benefits to Students

- learn to determine pathway & feasibility for change within large systems with a systems-thinking approach
- Direct experience with U of T operations, venues, processes stakeholders
- Opportunity to experience & contribute to development of sustainable programs &/or crafting protocols
- Influence U of T campus culture so as to empower actors to prioritize sustainability & stewardship best practices



Green Ambassadors

Sustainability Leadership programming for over 75 staff & faculty in past 5 years

Energy Management, Modeling & Benchmarking
LEED & RetSCREEN training for
monitoring, auditing, forecasting & evaluation

Some Benefits to Staff & Faculty

- Build community of practice; develop leadership skills to organize collective action & best practices in sustainable stewardship
- Learn new perspectives, insights, goals on sustainability, resilience & climate change

Sustainability Office: 2019 Experiential Learning

- Provided over **1,500** employment/practicum hours for students

Supervised and supported:

3 Practicum students

- x1 MEd OISE student on investigation of sustainability training options for SO to develop, access, and deploy a Employee Engagement strategy
- x2 Masters of Information students on website/sustainable operations information architecture and gamification of outreach engagement messaging

2 Living Lab course projects

- Event stakeholder survey strategy to inform broader SO Sustainable Events strategy consultations with key U of T event stakeholders
- Sustainable event waste strategy for Centre for International Students

8+ other student research & engagement projects

- From PhDs researching Energy & GHG modeling to first year engineering students exploring waste bin labelling as a means to 'improve the student experience', our team has the privilege to learn from, collaborate with & promote student-led activities such as the Sustainable Health Care Competition organized by Emerging Leaders in Environmentally Sustainable Healthcare.



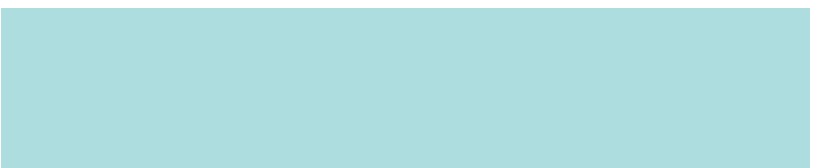
Opportunities Ahead

- Co-promotion (sustainability & climate action related projects, initiatives, events, research, people)
- Help us amplify sustainability initiatives, events, people, projects and achievements through various communications channels including ours at uoft.me/sustainability
- Contribute stories, case studies, research, programming ideas, & events to highlight in Yearbook & St. George Campus Sustainability Stories to be published online in 2021
- Help us identify champions and initiatives, nominate Leaders in Sustainable Stewardship to be recognized in CECCS Event Series in January (nomination launch to be announced in November)
- Advise or participate in consultations on Sustainability & Resilience Strategic planning & program development
- Join Green Ambassadors group and/or let us know if any of your alumni, students or faculty would be willing to participate in development of programming (ie. make presentation or make research or resources available) or help us improve our programs (ie. including identifying expertise in faculties & departments who would be interested to develop tools such as footprint calculators or life-cycle analysis, evaluation & benchmark models)
- Sign-up to receive our Greener News monthly newsletter
- Let us know how we can support your sustainability efforts, communications and help promote achievements by email: sustainability@utoronto.ca

Questions

Web: uft.me/sustainability

Email: Sustainability@utoronto.ca



@SustainableUofT

