

# 2022

PSO Climate Change  
Accountability Report  
UBC Okanagan



THE UNIVERSITY OF BRITISH COLUMBIA  
sustainability

# ACKNOWLEDGEMENT

We begin by acknowledging that UBC's Okanagan campus is located on the unceded territory of the Syilx (Okanagan) peoples and that UBC's activities take place on Indigenous lands throughout British Columbia and beyond.

The Syilx Okanagan people have been here since time immemorial. In September 2005, the Okanagan Nation Alliance officially welcomed UBC to Okanagan territory in a ceremony, *Knaqs npi'ismist*, where UBC signed a Memorandum of Understanding with the Okanagan Nation Alliance. The university works with the Okanagan Nation in the pursuit of campus plans for UBC Okanagan in respectful acknowledgment of the Syilx Okanagan people's stewardship of their territory for thousands of years.

Photography: Hover Collective, Paul Joseph, Margo Yacheshyn



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## EXECUTIVE SUMMARY



UBC Okanagan continues to demonstrate environmental leadership through its policies and plans that target a 65 per cent reduction in operational GHG emissions by 2030 and align with UBC's Climate Emergency Declaration and CleanBC.

In 2022, the campus began implementing the **UBCO Climate Action Plan 2030** (UBCO CAP 2030). This plan establishes targets to reduce operational GHG emissions by 65 per cent from a 2013 baseline and extended emissions by 45 per cent by 2030 and a number of key actions were completed over the past year.

Comparison of 2020/2021 emissions to 2022 is impacted by significant reductions in campus occupancy, teaching and research activities during COVID-19. While campus operational emissions increased by 23 per cent since 2021, this is in part a result of how the campus has returned to more intense use of space, the retention of COVID-19 building operational protocols, and notably, the incremental addition of five new buildings in recent years that account for a 41 per cent of the total building emissions increase since 2019. Despite the increase, the campus remains below its 2013 baseline by 15 per cent.

In 2022, energy demand-side management and supply-side decarbonization was advanced by the **Strategic Energy Management Plan** and **Low Carbon Energy Strategy**. UBC's **LEED® Implementation Guide v4.1** was updated to align with the Provincial LEED® Gold mandate, and to include LEED® credit requirements and guidance tailored to the Okanagan campus. Actions to support climate risk mitigation included completion of a **Multi-Hazards Risk Assessment** which identifies climate risks relative to campus buildings and infrastructure.

Sustainability design principles were incorporated into the design of two major capital projects in 2022. The **Interdisciplinary Collaboration and Innovation (ICI) Building** targets a minimum LEED® Gold Certification and integrates an innovative Earth Tube passive design strategy to reduce heating and cooling loads. Connection to the Low Carbon Energy System

will provide low carbon energy supply to the building. As a result of these design strategies, it is projected that ICI will consume 63 per cent less energy and emit 92 per cent fewer emissions compared to a LEED® baseline facility.

Delivering on the Okanagan campus commitment to community-engaged research, **UBCO Downtown** will provide a collaborative, multi-use space to the community while working to integrate sustainable and technical design measures that meet LEED® Gold requirements and Step 3 of the BC Energy Step Code.

Looking into 2023, guided by an established policy basis, the campus will continue to focus its efforts on climate mitigation, adaptation and resilience.

A **Green Building Plan** will enable stronger alignment between green building policies and the UBCO CAP 2030. The plan will provide guidance for the design and construction of new buildings, renovations and retrofits to achieve a level of performance toward UBCO CAP 2030 targets and net-positive 2050 goal. New policy development will focus on **embodied carbon** reduction opportunities in buildings.

A **Climate Adaptation, Resilience and Biodiversity Strategy** will be completed to provide a guiding framework of actions for the campus that aligns with the provincial government's Climate Preparedness and Adaptation Strategy.

Lastly, recognizing the importance of **community engagement** to advance the UBCO CAP 2030, the campus will continue to reach out to students, faculty and staff to support effective and equitable solutions to reduce individual climate impacts on campus.

### Rob Einarson

Associate Vice-President, Finance and Operations  
*University of British Columbia, Okanagan campus*

## DECLARATION STATEMENT

This PSO Climate Change Accountability Report for the period January 1, 2022 to December 31, 2022 summarizes our greenhouse gas emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2022 to reduce our GHG emissions, and our plans to continue reducing emissions in 2023 and beyond.

By June 30, 2023, UBCO's final 2022 PSO Climate Change Accountability Report will be posted to our website at [sustain.ok.ubc.ca/reports/#CCAR](https://sustain.ok.ubc.ca/reports/#CCAR).



# 2022 Emissions Overview



## GHG EMISSION AND OFFSETS SUMMARY

GHG Emission created in Calendar Year 2022	
Total BioCO <sub>2</sub> e (tCO <sub>2</sub> e)	155
Total Emissions (tCO <sub>2</sub> e)	3,085
Total Offsets (tCO <sub>2</sub> e)	2,930
Adjustments to Offset Required GHG Emissions Reported in Prior Years	
Total Offsets Adjustment (tCO <sub>2</sub> e)	0
Grand Total Offsets for 2022 Reporting Year	
Grand Total Offsets (tCO <sub>2</sub> e) to be Retired for 2022 Reporting Year	2,930
Offset Investment (\$25 per tCO <sub>2</sub> e)	\$73,250

### Retirement of Offsets

In accordance with the requirements of the Climate Change Accountability Act and Carbon Neutral Government Regulation, UBC Okanagan (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2022 calendar year, together with any adjustments reported for past calendar years (if applicable). The Organization hereby agrees that, in exchange for the Ministry of Environment and Climate Change Strategy (the Ministry) ensuring that these offsets are retired on the Organization's behalf, the Organization will pay within 30 days, the associated invoice to be issued by the Ministry in an amount equal to \$25 per tonne of offsets retired on its behalf plus GST.

## GREENHOUSE GAS EMISSIONS

The following GHG emissions have been qualified using the BC government's Clean Government Reporting Tool framework.

**Table 1** provides a breakdown of GHG emissions by source on the Okanagan campus between 2021-2022.

Comparison of 2020/2021 emissions to 2022 is impacted by significant reductions in campus occupancy, teaching and research activities during COVID-19. While campus operational emissions increased by 23 per cent since 2021, this is in part a result of how the campus has returned to more intense use of space, the retention of COVID-19 building operational protocols, and notably, the addition of five new buildings since 2019. The new buildings account for a 14 per cent increase in GSM and 41 per cent of the total increase in building

emissions since 2019. Fleet, paper and fugitive emissions increased with the post-COVID resumption of campus occupancy, operations, teaching and research. Despite the increase, the campus remains below its 2013 baseline by 15 per cent. Actions taken in 2022 to reduce emissions follows this section of the report.

TABLE 1 GHG COMPARISON BY SOURCE BETWEEN 2021-2022

Source	2021 Emissions (tonnes CO <sub>2</sub> e)		2022 Emissions (tonnes CO <sub>2</sub> e)		Changes from 2021 to 2022
Buildings	2,429	97%	2,931	95%	+21% +502 tCO <sub>2</sub> e
Fleet	38	2%	53	1.7%	+39% +15 tCO <sub>2</sub> e
Paper	6	0.2%	14	0.5%	+133% +8 tCO <sub>2</sub> e
Fugitive Emissions	26	1%	87	2.8%	+235% +61 tCO <sub>2</sub> e
<b>Total Emissions *</b>	<b>2,499</b>	<b>100%</b>	<b>3,085</b>	<b>100%</b>	<b>+23% +586 tCO<sub>2</sub>e</b>
<b>Total Offsets</b>	<b>2,295</b>	<b>100%</b>	<b>2,930</b>	<b>100%</b>	<b>+28% +635 tCO<sub>2</sub>e</b>

\* Totals may not sum due to rounding

## CARBON NEUTRAL OFFSETS IN 2022

In accordance with the Clean Government Reporting Tool, and as required by the Climate Change Accountability Act, offsets required to achieve carbon neutrality in 2022 total 2,930 tCO<sub>2</sub>e. As part of UBCO's 2022 GHG emissions profile, 155 tCO<sub>2</sub>e do not require offsets.

# ACTIONS TAKEN IN 2022 TO MINIMIZE EMISSIONS

The following provides an overview and plans reported in the CCAR Actions Form, Part 1.

## A. STATIONARY SOURCES (e.g. buildings, power generation)

The largest source of campus in-scope GHG emissions is attributed to buildings. In 2022, UBCO continued to target building energy efficiency and GHG reduction actions by implementing energy and carbon reduction plans and activities. Despite these efforts, emissions from buildings increased by 21 per cent in part due to the campus returning to more intense use of space, the retention of COVID-19 building operational protocols, and notably, the addition of five new buildings since 2019 that account for 41 per cent of the total increase in building emissions since 2019.

## CLIMATE LEADERSHIP PLANNING AND POLICY IMPLEMENTATION

In the last year, UBCO has continued to develop and implement key energy and carbon reduction policies that align with CleanBC and UBC's Climate Emergency Declaration.

UBCO's first **Climate Action Plan 2030** (UBCO CAP 2030), completed and approved by UBC's Board of Governors in late 2021, has been instrumental to UBCO's climate leadership. The UBCO CAP 2030 establishes ambitious targets to achieve a 65 per cent reduction of operational emissions, and a 45 per cent reduction of extended emissions, by 2030. The plan provides a clear pathway to meet our GHG reduction targets that align with the Paris Agreement target to limit global warming to 1.5 C. The plan further supports the longer-term goal of achieving a net-positive performance in operational energy and carbon by 2050, established by the UBCO Whole Systems Infrastructure Plan (2016).

In 2022, the campus commenced the development of a **UBCO Green Building Plan** to enable stronger alignment between green building policies and the UBCO CAP 2030. Upon completion, the plan will ensure the design and construction of new buildings, renovations and retrofits achieve a level of performance toward UBCO CAP 2030 targets and net-positive 2050 goal.

The campus also began working with UBC Vancouver to develop **embodied carbon policy** to establish a clear pathway to achieve UBCO and UBCV's CAP 2030 embodied carbon reduction targets. A number of projects were completed in 2022 to inform this work, including a **Whole Building Lifecycle Analysis** and a **10 per cent embodied carbon reduction target pilot project** for UBCO's ICI building. The campus is also involved in informing the development of **emerging Whole Building Lifecycle Assessment Guidelines** targeting guidance for design teams.

UBCO also finalized the development of the **UBC LEED® v4.1 Implementation Guide**, which, for the first time, includes guidance specific to the climate, energy and environment on the Okanagan campus. As a key UBCO CAP 2030 action, the guide supports the achievement of operational GHG reduction targets and provides project teams with the UBC-specific direction required to optimize LEED®. The guide identifies credits that are mandatory or expected because of their alignment with UBCO policies.

Finally, key updates were completed in the **UBC Technical Guidelines** that include:

- The creation of **UBCO Building Management Technical Guidelines** that support building energy performance and monitoring; and,
- Updates to ensure new construction is compatible with the **Low Carbon District Energy System**.

## ENERGY INITIATIVES

UBCO continued to implement actions that align with the UBCO CAP 2030 energy and emissions reduction goals. Key plans integral to this process include the **Low Carbon Energy Strategy**, which guides future low carbon district energy system development and investments, and the **Strategic Energy Management Plan (SEMP)**, which provides a suite of demand-side management projects to reduce energy consumption and associated emissions.

- Key studies advanced in the last year, as recommended through the Low Carbon Energy Strategy include:
  - Implementation of Phase 1: boiler installation as recommended through the Geo-Exchange air source heat pump (ASHP) feasibility study;
  - A Thermal Energy Storage (TES) study;
  - The ICI Building four-pipe infrastructure study, which will serve heating and cooling demands of surrounding buildings from the future ICI cluster plant; and,
  - High level concept design for an Upper Innovation Precinct Cluster Plant study, which is being carried out to explore thermal system configurations to meet the demands of two existing and two future residence buildings.
- SEMP projects completed in 2022 are anticipated to reduce energy and emissions by 942,000 kWh, 4,000 GJ and 210 tCO<sub>2</sub>e, annually. Projects include:



UBCO Downtown courtesy of hcma Architecture + Design and Olson Kundig.

- The installation of the occupancy-based demand-controlled ventilation and indoor air quality (IAQ)-based demand-controlled ventilation systems in the Science building;
- Implementation of a study to install an IAQ monitory system in the Engineering, Management and Education (EME) Building;
- A WI-FI ventilation control recalibration; and,
- Initiating night time precooling of the geosystem cooling towers.

The **UBCO Archetype Study**, conducted to inform project-specific performance targets for new buildings based on the Okanagan climate and building archetype, was completed in 2022. This project established Total Energy Use Intensity, Thermal Energy Demand Intensity, and GHG Intensity targets for each building archetype, which have been approved and will be used to inform UBCO's Green Building Plan.

The campus entered into the final year of a three-year partnership with the School of Engineering to develop and implement an **energy monitoring and data management platform**. The platform will provide improved data management, reporting capabilities and analytical tools, which will inform future energy planning projects.

Additionally, the campus continued to supplement a portion of natural gas used by the Central Heating Plant (CHP) –

which provides heating to the campus legacy buildings—with **renewable natural gas (RNG)**. The use of RNG reduced the campus 2022 emissions profile by 153 tCO<sub>2</sub>e. As it is considered carbon neutral, no offsets are required.

## NEW BUILDINGS

Designs for two major capital projects were completed in 2022. With an aim of serving future regional needs, **UBCO Downtown** will expand UBC's presence in Kelowna, while actively working toward meeting LEED® Gold Certification and design compliance with Step 3 of the BC Energy Step Code. A solar wall system is incorporated on the south façade to preheat ventilation air passively during winter months before it is delivered to corridors in the residential tower.

Targeting a minimum LEED® Gold certification the **ICI Building's** final design integrates passive design principles with innovative measures to reduce operational energy and carbon emissions. Among its innovative design strategies, the project incorporates the longest **earth tube system**<sup>1</sup> in Canada and one of the longest in the world to cool and heat air passively. The project also incorporates a high-performance envelope, active heat recovery with heat recovery chiller, efficient lighting design, extensive occupancy and daylight controls. It is projected that the ICI Building will consume 63 per cent less energy and emit 92 per cent fewer emissions compared to a LEED® baseline facility.

<sup>1</sup> Earth tubes passively pre-temper all the ventilation air supplied to the labs and offices via ground heat exchange as it is pulled into a building.

## EXISTING BUILDINGS

In 2022, UBCO completed the implementation of recommended measures identified in the **recommissioning study completed on the Arts Building** and initiated a **recommissioning study on the EME Building**. The measures completed in the Arts Building are anticipated to conserve 31,700 kWh and 260 GJ of energy, reducing emissions by 13.3 tCO<sub>2</sub>e, annually, and the projected savings from the future implementation of the EME study are currently under review. The recommissioning studies were implemented to address the deficiencies in building operations that waste energy, such as increased equipment wear and tear, or decreased occupant comfort.

A **Demand Controlled Ventilation** study was implemented in a number of laboratory spaces within the **Arts and Sciences Centre** and **Charles E. Fipke Centre for Innovative Research**. Proposed measures, including reduced air changes in appropriate zones served and recommissioning new sensors, switches and programming changes, are expected to conserve 508,200 kWh and 2,370 GJ of energy, reducing GHG emissions by 124 tCO<sub>2</sub>e, annually.

## STUDENT RESIDENT BUILDINGS

In 2022, two legacy domestic hot water systems in the Cassiar Residence were replaced with two residential condensing boilers and storage tank systems that have 95 per cent efficiency ratings.

## IT INFRASTRUCTURE ACTIONS

A number of information technology projects designed to streamline efficiencies and reduce energy consumption were completed in 2022, including:

- Ongoing replacement of desktop computers with laptops that are newer and more efficient;
- Upgrading faculty and staff devices from spinning hard drives to solid state drives to reduce waste, power consumption and replacement costs;
- Continuing to phase out desktop towers with docking stations to reduce power consumption;
- Reducing the number of digital screens used for campus messaging and emergency alerts from 28 screens to 18 and replaced 12 older devices with new, energy-efficient models;
- Continuing to include power considerations in all purchasing decisions for new IT equipment and infrastructure. This ensures the equipment draws less power and that less cooling is required to control the ambient temperature of the spaces that house the infrastructure;
- Key departments developing lifecycle plans for all infrastructure. These plans ensure equipment is maintained to perform optimally, and hardware is replaced with improved technologies that support reduced power consumption according to industry best practices;

- Removing iClicker hardware from all the classrooms in support of the iClicker phone/app solution thereby reducing power usage and e-waste;
- Continuing to replace older power distribution units with newer and more efficient models across campus; and,
- Decommissioning several racks of legacy storage systems which drew significantly more power than modern systems.

## B. MOBILE SOURCES (e.g. Fleet vehicles, off-road/ portable equipment)

In 2022, fleet vehicles accounted for 53 tCO<sub>2</sub>e, or two per cent of the campus total emissions. This is a 39 per cent or 15 tCO<sub>2</sub>e increase over 2021. This increase is attributed to the return of on-campus operations and research activities following the COVID-19 pandemic.

Despite the year-over-year increase, actions taken in the last year to support long-term fleet-related emission reductions include:

- Continuing to reduce the campus reliance on fleet vehicles by consolidating off-campus trips, decreasing the number of trips, and encouraging fleet carpooling, walking or cycling;
- Ongoing stewardship of sustainable mobile-fuel combustion by adhering to sustainable fleet procedures, replacing retired fleet vehicles with electric and energy-efficient models, and ongoing training and education to support sustainable fleet use; and,
- Continuing to monitor the effect of remote work/learn on campus fleet vehicle emissions.

## C. PAPER CONSUMPTION

Paper-related emissions accounted for 0.5 per cent of total campus emissions, or 14 tCO<sub>2</sub>e. The return of on-campus working and learning activities in 2022 prompted the increase in paper consumption by over 1,100 packages, which accounted for a 133 per cent or 8 tCO<sub>2</sub>e increase in emissions over the last year.

Despite this year's increase, the campus achieved an 81 per cent emission reduction compared to our 2013 baseline, which was accomplished through ongoing paper reduction activities that include:

- Continuing to promote using Sugar Sheet™, a 100 per cent tree-free product derived from sugarcane processing bi-product, as an alternative to traditional paper through UBCO's preferred supplier;
- Continuing to promote the purchase of 30 per cent or greater post-consumer recycled content paper on the campus procurement website;
- Ongoing use of digital screens and related communications



platforms to share news, activities and events to reduce the reliance on paper-based promotional materials; and,

- Ongoing use of the Find-Me printing option through the PaperCut™ print-tracking software on all campus printers, which delivers reports to clients on print volumes to generate awareness of consumption and promote alternatives to printing. The software also allows users to print from any device on campus, and only releases jobs when the user taps their card at the device within four hours of submission.
  - In 2022, 195,000 pages were submitted to be printed, but not released within the four-hour time period, reducing GHG emissions by 877 kg CO<sub>2</sub>e, saving 2.42 trees.
  - In 2022, there continued to be a significant reduction in sheets of paper printed from pre-COVID-19 levels, down 130 per cent from 2019. This is attributed partly to ongoing reduced levels of people on campus due to hybrid working and learning arrangements, as well as a change in print settings which defaults to double-sided printing, thereby reducing the total number of sheets of paper used.

## D. FUGITIVE EMISSIONS

Hydrofluorocarbon (HFC) emissions accounted for three per cent of total campus emissions, or 87 tCO<sub>2</sub>e. This is a 235 per cent or 61 tCO<sub>2</sub>e increase over 2021 and is attributed to an increase in maintaining older and inefficient refrigerant equipment.

Despite the year-over-year increase, the campus has maintained a reduction trend compared to our 2013 baseline, recording an 83 per cent reduction through actions that include:

- Continuing to centralize cooling loads and install centralized chillers for climate control in our newly constructed and existing facilities, which reduces the amount of equipment requiring refrigerant on campus. In the instance of residences, this measure integrates centralized chillers into the building's HVAC system, in place of installing individual Packaged Terminal Air conditioners (Ptac) units, which reduces a facility's reliance on traditional fossil fuels and refrigerants.
- Continuing to replace inefficient and older equipment, while performing preventative maintenance and upgrades to existing HVAC systems and associated appliances.

# PLANS TO CONTINUE REDUCING EMISSIONS IN 2023 AND BEYOND

This section describes planned actions across buildings, fleet, fugitive emissions, and procurement in the coming years.

## A. STATIONARY SOURCES (e.g., buildings, power generation)

### CLIMATE LEADERSHIP PLANNING AND POLICY IMPLEMENTATION

In the coming year, the university will continue to focus on implementing the UBCO CAP 2030 to reduce operational and extended GHG emissions. A number of actions initiated in 2022 will be completed in 2023, and new phases of plan implementation will begin.

UBCO will also continue to pursue **high performance building targets and policy standards** through the development and implementation of key strategies, including:

- The **UBCO Green Building Plan**, which will ensure the design and construction of new buildings, renovations and retrofits achieve a level of performance that support the UBCO CAP 2030 operational targets, Whole System Infrastructure Plan 2050 Goals and are aligned with applicable UBC plans/policies;
- Working with UBC Vancouver to develop **embodied carbon policy** to establish a clear pathway to achieve UBCO and UBCV's CAP 2030 embodied carbon reduction target;

- The **UBC Whole Building Lifecycle Assessment Guidelines** for design teams that will clarify UBC's requirements for capital projects toward the achievement of the UBCO CAP 2030 embodied carbon reduction target; and,
- The adaptation of **UBC's Climate Ready Building Requirements** for new construction at the Okanagan campus.

### ENERGY INITIATIVES

UBCO will continue to implement subsequent phases of the **Low Carbon Energy Strategy**. Pending funding approval, future studies and projects will include:

- Initiating Phase 2 of Geo-Exchange upgrade project with the installation of the ASHP;
- Completing the TES study;
- Extending the ICI Building four-pipe infrastructure study, which will serve heating and cooling demands of surrounding buildings from the future ICI cluster plant, to investigate alternative, more cost-effective piping systems; and,
- Reviewing the completed high-level concept design for an Upper Innovation Precinct Cluster Plant study, which is being carried out to explore thermal system configurations to meet the demands of two existing and two future residence buildings.





The implementation of projects approved from the new 10-year **Strategic Energy Management Plan** will continue in the coming year. Selected projects include the installation of an ASHP to support the ongoing target to decarbonize the campus; recommissioning of legacy facilities; implementation of the Science Building’s heat recovery study recommendations; optimization of the district energy system’s central plant; and finalizing the installation of the University House’s ASHP. Combined, these projects are estimated to reduce energy use by 6,150 GJ and emissions by 307 tCO<sub>2</sub>e, annually.

UBCO will continue to displace a portion of natural gas used by the CHP, which provides heating to the campus legacy buildings, with **renewable natural gas**. The use of approximately 5,000 GJ of RNG will reduce the campus emissions profile by an estimated 249 tCO<sub>2</sub>e annually as it is considered carbon neutral and requires no offsets.

Additionally, UBCO will continue working to advance and update the **Infrastructure HVAC Asset Management database**, potentially linking it to major capital retrofit projects on campus in the near future. This involves consolidating campus-wide direct digital controls (i.e., building automation systems), physical meters and manual metering points to one location, as well as further developing a meter tree. This project will provide further input into the data analytics platform and asset management module of the **Enterprise Maintenance Management System**. The asset management module, to be adopted in the coming year, will provide a database of campus equipment that lists expected replacement dates in order to plan for equipment renewal and modernization consistent with long-term strategies.

## NEW BUILDINGS PROJECTS

Anticipated to achieve occupancy in 2026, **UBCO Downtown** aims to support future regional needs, while actively working toward meeting LEED® Gold Certification and Step 3 of the BC Energy Step Code. The proposed 100,000 sq. ft building will integrate sustainable measures into the final design while offering the campus community academic, research and residence space. Sustainable measures planned for integration into the final design of UBCO Downtown include a solar wall to supply energy for preheating outdoor air.

The design of the **ICI Building** was guided by collaboration, interdisciplinarity and Indigeneity. Targeting a minimum of LEED® Gold Certification upon completion, ICI’s final operations design integrates passive design principles with the utilization of innovative measures to reduce its operational energy and carbon emission footprint. The 13,185 m<sup>2</sup> building will house state-of-the-art facilities, including wet labs, dry labs, meeting rooms, offices and workstations for graduate students. Teaching spaces will include a 200-seat active-learning lecture hall and 16- to 40-seat classrooms on each floor, while providing dedicated space that brings together researchers, experts, scholars, students and the community to collaboratively investigate and explore solutions to complex societal problems from multiple perspectives. The **Interior Salish Studies and the Bachelor of Nsyilxcn Language Fluency programs** will be offered in dedicated spaces within ICI. The planned Indigenous and community engagement space will provide language labs, a multi-purpose room, collection room, student lounge, Elder’s room and Speaker-In-Residence office(s). This space is immediately adjacent to the 100-seat round community space which will be available for all campus users and incorporates Indigenous design ideas.



Rendering of The Interdisciplinary Collaboration and Innovation (ICI) Building courtesy of hcma Architecture + Design and Kieran Timberlake.



Rendering of The Interdisciplinary Collaboration and Innovation (ICI) Building courtesy of hcma Architecture + Design and Kieran Timberlake.

Future building projects targeting completion in the coming years will comply with UBCO's green building and sustainability policies and guidelines, including:

- An Outdoor Gathering Space that aims to advance Indigenous teachings and learnings through the support of land-based learning, teachings and nature interpretation in the Syilx Okanagan language;
- The Office Modular 2 that will provide additional office space to campus departments; and,
- The new Child Care Facility, co-located with the existing Daycare, will add 37 new childcare spaces to the current 57, a 66 per cent increase. It will also provide unique learning and training opportunities for UBC medical, nursing and psychology students.

## BUILDING RECOMMISSIONING

In the coming year, UBCO will undertake recommissioning studies and projects in the following buildings:

- Recommended measures identified in the EME Building's recommissioning study will be implemented. They will address identified deficiencies in the operation of the building that were wasting energy, increasing equipment wear and tear, or decreasing occupant comfort.
- Within the Science Building, recommendations of a study that looks at recovery of heat from the existing rooftop laboratory exhaust via a glycol runaround heat recovery system, will be implemented.

Finally, UBCO will initiate a night flushing program. Night flushing, or night ventilation, is a passive cooling technique that

utilizes the outdoor diurnal temperature swing and the building's thermal mass to pre-cool a building through increased outdoor airflow at night. This allows radiant cooling to take place during the day when the building is occupied. UBCO is developing a sequence of operation strategies to be implemented in all the academic buildings, where applicable.

## STUDENT RESIDENCE BUILDINGS

In the coming year, the LED light switch-out program will continue to be implemented on a failure-based need.

## IT INFRASTRUCTURE ACTIONS

UBCO will continue to implement projects that support energy reduction, including:

- Replacing desktop computers with laptops and more efficient as part of UBCO's IT Computer Replacement Program;
- Phasing out desktop towers with docking stations to reduce power consumption;
- Applying a phase-in approach to replace stepdown transformer uninterruptible power supply units with power sharing, splice devices; and,
- Installing new storage racks which require considerably less power than the older systems in place before.

## B. MOBILE SOURCES (e.g., fleet vehicles, off-road/portable equipment)

UBCO will continue to implement projects that support emissions reductions from mobile sources in the coming years, including:

- Studying the potential of converting electric golf cart batteries to a more recyclable lithium-ion option.
- Continuing to reduce its reliance on fleet vehicles by consolidating off-campus trips and decreasing the number of trips taken by encouraging fleet carpooling, walking or cycling.
- Continuing to encourage sustainable mobile-fuel combustion by adhering to internal sustainable fleet procedures, replacing retired fleet vehicles with electric and energy-efficient models, and ongoing staff training and education to support sustainable fleet use.

## C. PAPER CONSUMPTION

UBCO will continue to implement projects that support emissions reductions from paper consumption in the coming years, including:

- Continuing to display messaging prompts through the PaperCut™ print-tracking software to increase user awareness about reducing paper consumption behaviours to align with implementation of printing charge increases.
- Continuing to promote the purchase of 30 per cent or greater post-consumer recycled content paper, as well as alternative, tree-free options, including Sugar Sheet™.
- Continuing to increase the use of digital signs and related communications platforms within buildings to share news, activities and events to reduce the reliance on paper-based promotional materials.
- Continuing to invest in improved and more sustainable technologies, which provide better performance with a reduced environmental impact. This includes implementing solutions that digitize fax transmissions (i.e., fax to email) to reduce paper consumption.
- Contemplate introducing additional fees to support convenience printers (i.e., printers that are set up in offices or lab spaces for convenience access, in addition to main fleet printers) to further encourage the use of fleet printing. Fleet printing increases efficiencies by consolidating devices and increasing access to printer capabilities (e.g., colour printing, etc.).

## D. FUGITIVE EMISSIONS

UBCO will continue to implement projects that support emissions reductions from the utilization of HFC sources in the coming years, including:

- Continuing to research and identify alternative refrigerants for those being phased out (i.e., R410a and R134a).
- Continuing to centralize cooling loads from buildings to reduce the amount of equipment requiring refrigerant on campus, where possible.
- Implementing the use of district scale CO<sub>2</sub> heat pumps to replace HVAC equipment, which relies on traditional fossil fuels and refrigerants to heat and cool campus buildings.
- Continuing to replace inefficient and older equipment.
- Conducting preventative maintenance and upgrades to HVAC systems and associated appliances.
- Continuing to replace individual Ptac units in residences, on an as-needed basis.



# CAMPUS EMISSION TRENDS

## COMPARING EMISSIONS TO GROWTH

**Figure 1** shows growth trends and total campus and building GHG emissions between 2007 to 2022. Despite the significant increases in floor area and student enrolment by over 133 and 157 per cent respectively since 2007, total GHG year-to-year emissions changes have remained fairly stable.

In 2022, UBCO reported a year-over-year increase in total emissions by 23 per cent. This is in part a result of how the campus has returned to more intense use of space, the retention of COVID-19 building operational protocols, and notably, the addition of five new buildings since 2019. The new buildings account for a 14 per cent increase in GSM and 41 per cent of the total increase in building emissions since 2019. The campus is

monitoring emissions at the building scale to identify buildings with higher energy demands and emissions from operational loads to support activities such as food services and research in an effort to identify opportunities to reduce emissions.

Another way to demonstrate campus GHG emissions performance that accounts for changes in growth is intensity-based. For example, Figure 2 demonstrates the emissions intensity trend relative to campus growth in floor area from 2007 to 2022. Despite the significant floor area growth, GHG emissions per building gross square meter ( $m^2$ ) dropped from 0.030 in 2007 to 0.018 in 2022, a reduction of 40 per cent.



FIGURE 1 TOTAL GHG EMISSIONS RELATIVE TO GROWTH: 2007-2022

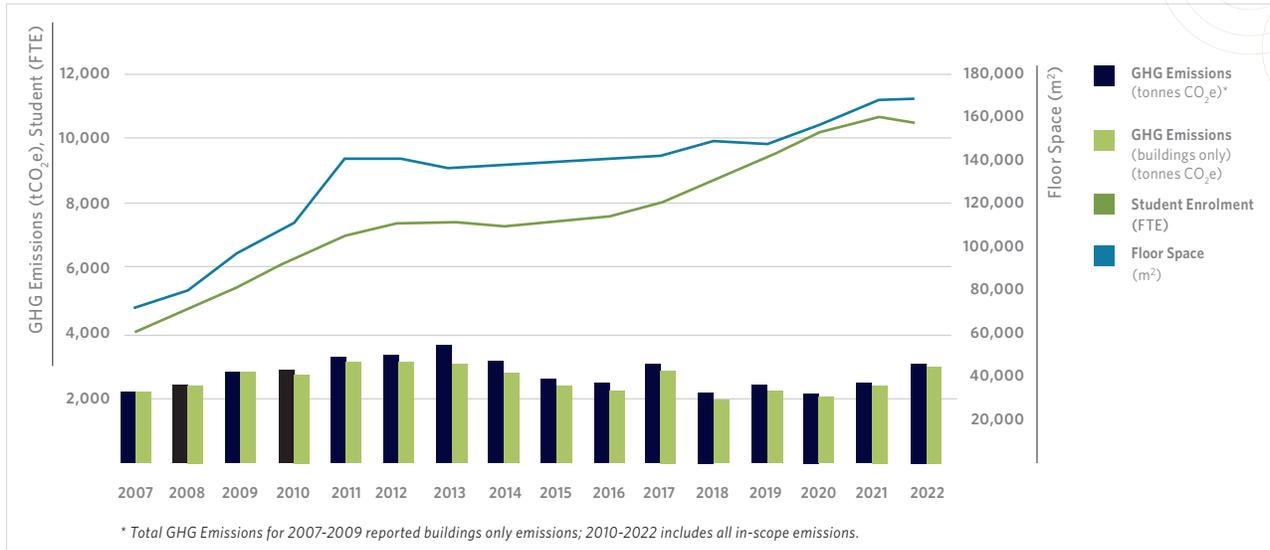
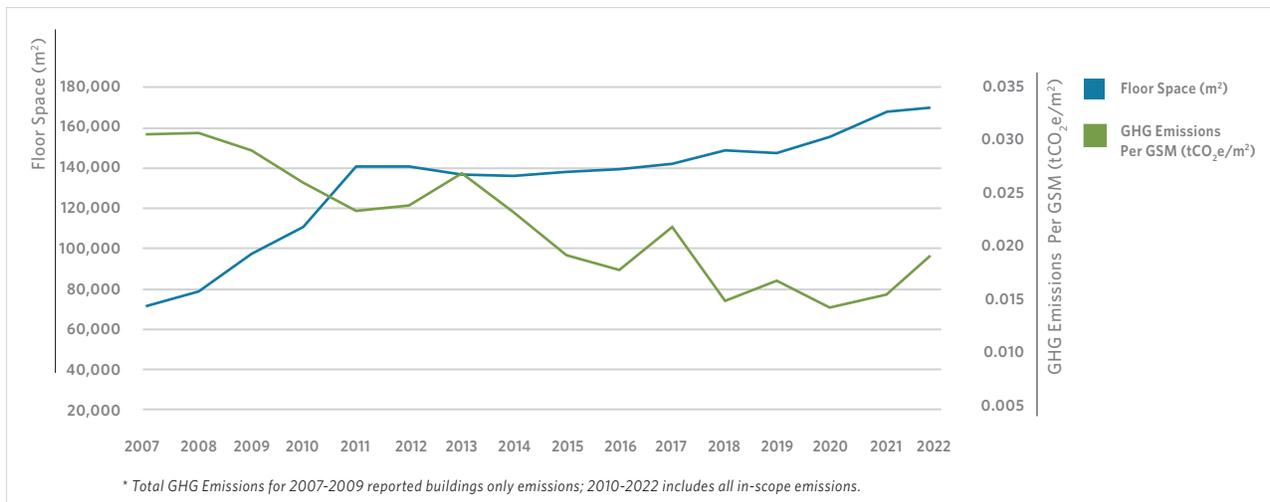


FIGURE 2 GHG EMISSIONS INTENSITY RELATIVE TO BUILDING GSM: 2007-2022



# PUBLIC SECTOR LEADERSHIP

## CLIMATE RISK MANAGEMENT

In 2022, UBCO completed a **Multi-Hazard Risk Assessment**. The objective was to identify risks to campus infrastructure systems and buildings and to evaluate the identified risks to support the development of resilience measures. The Multi-Hazard Risk Assessment supports and aligns with existing campus climate adaptation planning and activities articulated in the UBCO CAP 2030. This includes the UBCO Integrated Rainwater Management Plan (2017), with minimum retention targets based on predicted climate change, and the Whole Systems Infrastructure Plan (WSIP) that incorporates climate sensitivity analysis for energy and carbon reduction measures, landscape, ecology and biodiversity actions. Outcomes of the Multi-Hazard Risk Assessment include a risk register that identifies the highest risks for each infrastructure system and potential actions to investigate as part of a future Phase 2 project.

In parallel, the development of a **UBCO Climate Adaptation, Resilience and Biodiversity Strategy** is underway. The strategy will identify best practices in climate adaptation and prepare the campus for regulatory climate resiliency planning reporting requirements. The strategy is anticipated to identify how the campus' resilience and adaptive capacity to climate change can be optimized; demonstrate best practices in climate adaptation, resilience and biodiversity operational and land use planning and policies; and make recommendations for policy updates and actions to further prepare the campus and its ecological assets against climate risks. The strategy is also expected to identify opportunities for integration of Indigenous knowledge systems while identifying the co-benefits of adaption actions with mitigation strategies identified in the UBCO CAP 2030.

## CLIMATE POLICY IMPLEMENTATION

Following the UBC Board of Governors' endorsement of UBCO's the CAP 2030 in 2021, key stakeholders championed measures to advance the plan's targets to accelerate GHG emission reductions from campus operations and extended (indirect) sources. *Scope 1 and 2 actions, which include campus operations, have been identified in the previous sections of the 2022 CCAR.*

Key recommendations of the **UBCO Transportation Plan** (2021) implemented in 2022 that advance the achievement of UBCO CAP 2030's commuting GHG reduction target include:

- Establishment of a Sustainable Transportation Levy;
- The introduction of the **faculty and staff ProPass** that provides a 50 per cent subsidized monthly pass to transit commuters; and,
- The launch of a **Bike Share e-bike/scooter program** to support active commuting to, from and around campus.

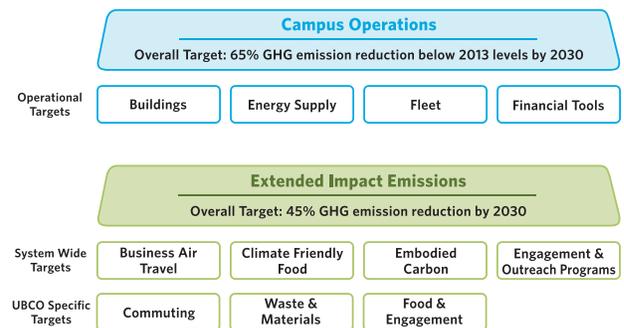
Waste and material actions completed in 2022 to advance the UBCO CAP 2030 waste and materials GHG reduction target include:

- The introduction of four-stream sorting stations—waste, recycling, refundables and composting—in the traditional student residence buildings;
- Composting/dehydrating all organics collected in the Pritchard Dining Hall, which supports zero food waste;
- Eliminating single-use plastics in Pritchard Dining Hall through the use of washable food ware;
- Relaunch of the Green2Go program at UBCO Food Services outlets; and,
- Continuing to send all campus food waste to the Spa Hills Compost facility, which offsets carbon emissions.

Actions implemented that focused on UBCO Food Systems consist of:

- Completing a **UBCO CAP Food GHG Baseline Project Report** and reduction strategies;
- Scaled-up local food procurement through **Land to Table Network Partnerships**; and,
- Offering plant-based options at every food station in Pritchard Dining Hall.

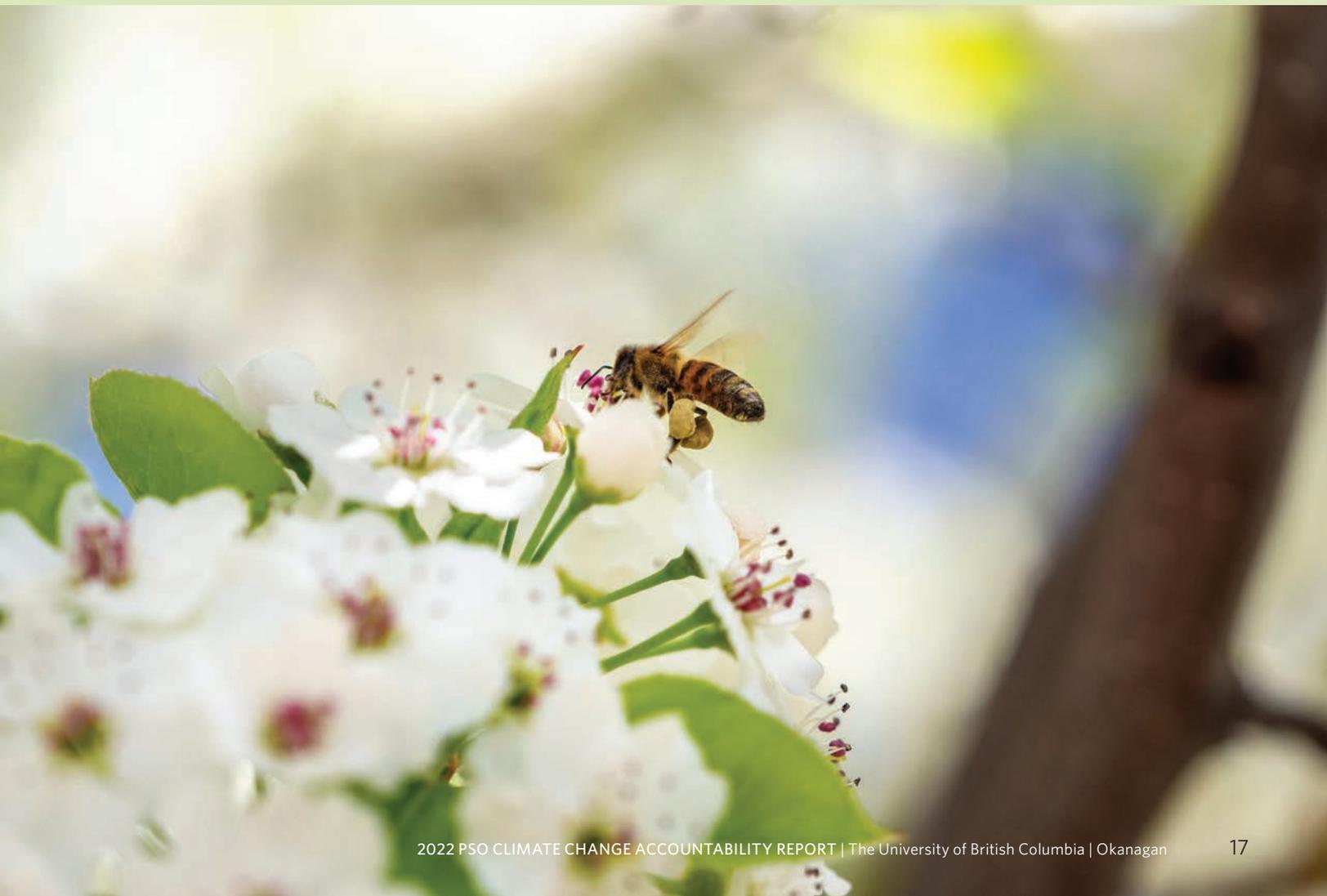
## UBCO CLIMATE ACTION PLAN 2030 TARGETS



## UBC OKANAGAN POLICIES THAT INCORPORATE CLIMATE ADAPTATION

UBC’s Okanagan campus has demonstrated climate leadership through the development and implementation of policies that focus on climate mitigation and adaptation strategies.

Whole Systems Infrastructure Plan (WSIP, 2016)	Integrated Rainwater Management Plan (IRMP, 2017)	Climate Action Plan 2030 (UBCO CAP 2030, 2021)
<p>The UBCO Whole Systems Infrastructure Plan provides a foundation for campus growth and development over the next 20 years and beyond, and addresses energy, carbon, water, landscape, ecology, biodiversity and engagement to ensure that the campus is resilient to future changes in growth, utility rates and climate change.</p>	<p>The UBCO Integrated Rainwater Management Plan provides minimum rainwater retention targets— informed by stormwater modelling that incorporates predicted climate change—to achieve 100 per cent diversion of rainwater from the municipal system. The plan supports resiliency through best practices in green infrastructure and low-impact development while supporting the natural hydrological cycle and achieving important co-benefits to the campus ecology and biodiversity.</p>	<p>The UBCO Climate Action Plan 2030 establishes a course of action to accelerate the reduction of operational emissions by 2030 and identifies measures to reduce emissions in areas of extended impact, including commuting, food, waste and business air travel. The CAP 2030 acknowledges that addressing climate and ecological crises simultaneously is critical to adapt to climate change and sets forth immediate priority areas for adaptation in campus planning and operations.</p>

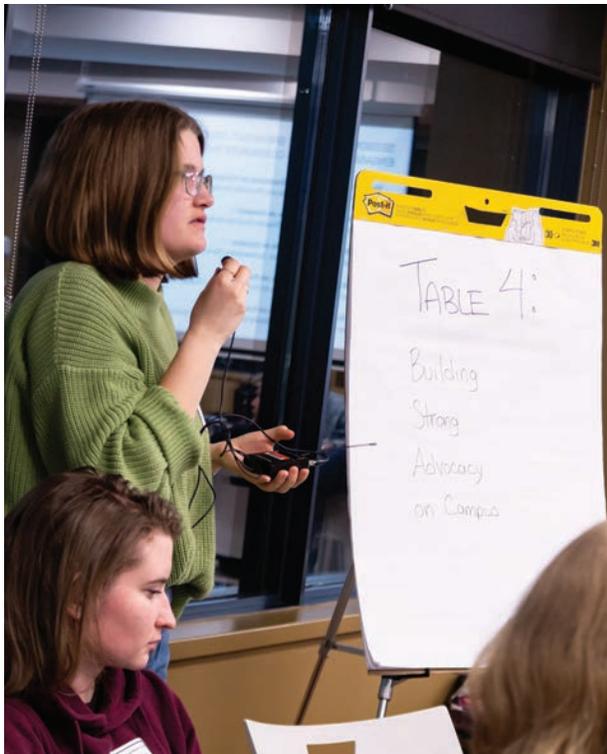


## COLLECTIVE COMMUNITY ENGAGEMENT

Community engagement is at the cornerstone of advancing action on climate change, particularly in the areas of extended impact—such as reducing carbon emissions from commuting, food and waste.

In early 2022, UBCO completed a study to identify how community engagement strategies could be informed by lessons learned during the COVID-19 pandemic. The **Community Engagement Strategies for Climate Change Coming Out of the Pandemic** report recommended that, as communities emerge, we use lessons learned from the pandemic to address gaps in community resilience by integrating more effective ways to engage the community at grassroots and national levels. Specific recommendations included tailoring messages to accommodate different groups within a community; structuring and applying scientific information at the community level using localized scenarios that are understandable and meaningful to the public; and, providing the community with a sense of collectivism that help motivate people to change their behaviours. Key recommendations were considered by UBCO in a series of refreshed community engagement climate programs and activities implemented in 2022.

Arising from the new UBCO CAP 2030, a faculty-led **UBCO Climate Action Plan Implementation engagement working group (CAP-E)** formed and hosted its first **UBCO Teach-In** on



**Climate/Justice** in conjunction with the Worldwide Teach-In. Held virtually, 61 students, faculty and staff shared best practices in community climate action and engagement. The event featured concurrent panels of UBCO faculty members from a variety of disciplines across campus who tackled complex, interconnected climate and justice issues and solutions. A panel of UBCO staff introduced the newly launched CAP 2030 and participants shared views for achieving ambitious and equitable climate change action on campus. More information can be found at: [sustain.ok.ubc.ca/teach-in](https://sustain.ok.ubc.ca/teach-in).

## Extended Emissions (Scope 3) Reduction Activities

UBCO participation in the annual spring and fall **GoByBike Weeks** continued to demonstrate a strong, enduring commitment by students, faculty and staff to use active transportation. This was evident in instances where travel to and from campus and for personal commuting was appropriate. During these hybrid events, 74 riders logged 316 trips, rode over 5,190 km and reduced commuting emissions by 1,125 kgCO<sub>2</sub>e. The campus also hosted **Mode-Shift: A campus commuting** event, which brought awareness to the campus community on alternative transportation options available to move to, around and from campus. These options include the electric bike and scooter programs and a bike rental and service program offered through UBCycles. UBCO faculty and staff ProPASS and UBCO student UPASS programs were also provided, which offer substantial discounts to transit riders.

UBCO also encouraged waste reduction through events that promoted reuse and recycling behaviours. The **Sort It Out: Choose to Reuse** event engaged over 400 community members, provided attendees with material sorting education, distributed 250 reusable travel mugs, and reported that 65 per cent of attendees regularly use a travel mug to reduce waste.

## Direct Emission (Scope 1 and 2) Reduction Activities

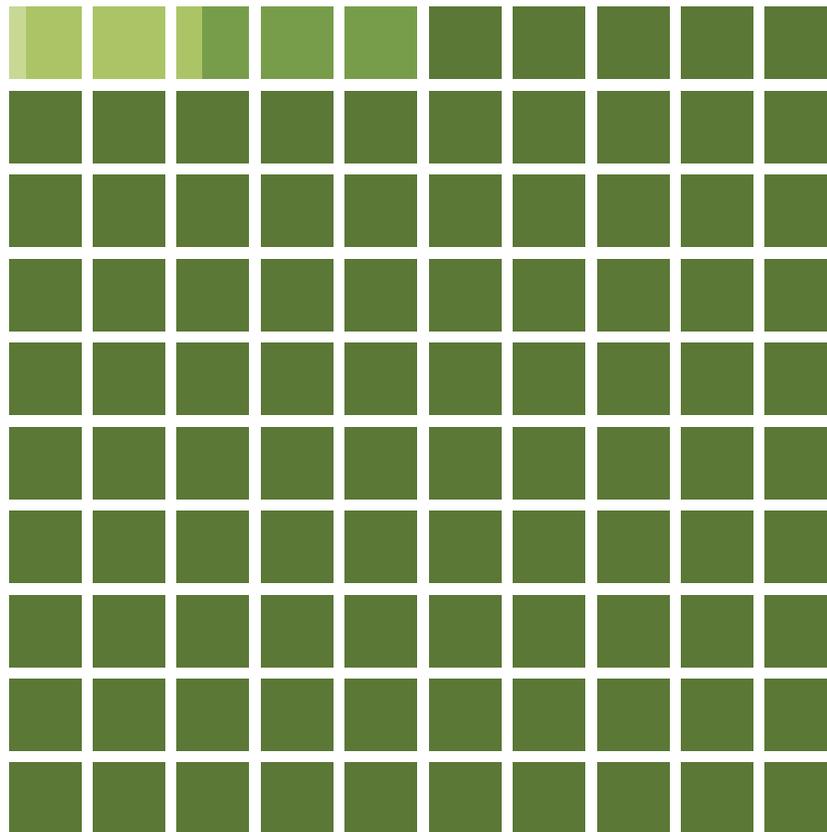
The Power of You, UBCO's signature community engagement program, delivered on campus engagement activities that aligned with the return of on-campus activities. In 2022, the campus initiated the **Power of You: Cozy and Closed** program that encourages energy reduction behaviours. Additional support of this program was implemented through the nightly energy reduction audits completed by key operational departments. Staff turned off or powered down over 2,903 lights and 83 projectors or screens, and closed 93 windows as a direct result of these initiatives.

In the coming year, subject to resources, UBCO will continue to develop and implement collective community engagement programs using an evidence-based strategy to affect high-impact areas that reduce GHG emissions, a key area of focus in the UBCO CAP 2030.

# EMISSIONS PROFILE 2022



## UBC OKANAGAN GREENHOUSE GAS EMISSIONS BY SOURCE FOR THE 2022 CALENDAR YEAR (tCO<sub>2</sub>e\*)



	Buildings 2,931 tCO <sub>2</sub> e	<b>95%</b>
	Fugitive Emissions 87 tCO <sub>2</sub> e	<b>3%</b>
	Fleet 53 tCO <sub>2</sub> e	<b>2%</b>
	Paper 14 tCO <sub>2</sub> e	<b>0.5%</b>

**Total Emissions**  
3,085 tCO<sub>2</sub>e

*Offsets Applied to Become Carbon Neutral in 2022*

*(Generated April 18, 2023) Total offsets required: 2,930.  
Total offset investment: \$73,250.*

*Emissions which do not require offsets: 155.\*\**

*\* Tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.*

*\*\* Under the Carbon Neutral Government Regulation of the Greenhouse Gas Reduction Targets Act, all emissions from the sources listed above must be reported. As outlined in the regulation, some emissions do not require offsets.*



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PSO Climate Change  
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