



# 2020

climate change accountability report  
ubc okanagan



THE UNIVERSITY OF BRITISH COLUMBIA  
Okanagan Campus



## EXECUTIVE SUMMARY



UBC Okanagan's commitment to climate and environmental leadership continued in 2020 throughout UBC's Coronavirus (COVID-19) response. Campus operations emissions decreased by 11 per cent (271 tCO<sub>2</sub>e), in part due to remote working and learning. In addition, reduced campus occupancy provided the opportunity for

continued implementation of projects to optimize building and energy supply systems.

Over the last year, the campus continued the construction of new buildings designed to meet progressive energy and environmental performance targets. This was made possible because of staff and contractor's strict adherence to safe work practices and social distancing in accordance with provincial and health authority directives. The Net-Zero Energy-Ready award-winning Skeena Residence - a 220-unit building completed in 2020 - is on track to be the first Passive House certified university dormitory in Canada. Completion of this project and several other smaller projects in 2020 increased campus floor area by approximately five per cent.

Construction of the Nechako Residence and Commons Block continued in 2020 and is on schedule for completion in mid-2021. The mixed-use facility targeting LEED® Gold certification will house 220-units, a 450-seat dining hall and 24-hour social amenities. Schematic design of the Interdisciplinary Collaboration and Innovation (ICI) building began, targeting LEED® Gold certification as a minimum. Given the UBC Board of Governor's endorsement of the President's Climate Emergency Declaration and sustainability priorities in late 2019, staff will integrate the goal to reduce the carbon footprint of the building and its operations, as well as to identify cost-effective measures that reduce both embodied and operational carbon through the design development process.

In the coming year, the campus will continue existing activities to reduce energy and carbon emissions, and will complete a new campus plan - the Climate Action Plan 2030 (CAP2030) - to define a path to reduce carbon emissions, with targets and actions to achieve them. Critical to the CAP2030, implementation of an updated 10-Year Strategic Energy Management Plan and a new Low Carbon Energy Strategy will address energy demand and supply side decarbonization. It is anticipated that alignment and implementation of this work over the long-term will enable the campus to grow sustainably toward the achievement of its goal of net-positive performance in operational energy and carbon by 2050.

Rob Einarson

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

## DECLARATION STATEMENT

This Climate Change Accountability Report for the period January 1, 2020 to December 31, 2020, summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2020 to reduce our greenhouse gas emissions, and our plans to continue reducing emissions in 2021 and beyond.



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# 2020 EMISSIONS OVERVIEW

## GHG EMISSION AND OFFSETS

GHG Emission created in Calendar Year 2020	
Total Emissions (tCO <sub>2</sub> e)	2,151
Total BioCO <sub>2</sub>	5
Total Offsets (tCO <sub>2</sub> e)	2,146
Adjustments to Offset Required GHG Emissions Reported in Prior Years	
Total Offsets Adjustment (tCO <sub>2</sub> e)	262
Grand Total Offsets for 2020 Reporting Year	
Grand Total Offsets (tCO <sub>2</sub> e) to be Retired for 2020 Reporting Year	2,408
Offset Investment (\$25 per tCO <sub>2</sub> e)	\$60,200

## 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 2020 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 greenhouse gas (GHG) emissions have been qualified using the BC Provincial Government's Clean Government Reporting Tool reporting framework.

Table 1 provides a breakdown of campus GHG emissions by source. Of note, there was an 11 per cent reduction in total GHG emissions from 2019 to 2020, which will reduce UBCO's carbon offset liability by \$6,725 (excl. tax). The majority of this reduction is a result of a 216 tCO<sub>2</sub>e decrease in building emissions. Reduced building occupancy during the pandemic and the ongoing implementation of energy and carbon reduction measures contributed to this reduction. Projects of note include the ongoing optimization of the Low District Energy System (LDES) and continued implementation of recommissioning projects in multiple buildings. Specific measures implemented to reduce emissions over the previous year are detailed in the 'Actions Taken in 2020 to Minimize Emissions' section of this report.

table 1 GHG COMPARISON BY SOURCE BETWEEN 2019-2020

Source	2019 Emissions (tonnes CO <sub>2</sub> e)		2020 Emissions (tonnes CO <sub>2</sub> e)		Changes from 2019 to 2020
Buildings	2,240	92%	2,024	94%	-10%
Fleet	64	3%	49	2.3%	-23%
Paper	55	2%	10	0.5%	-81%
Fugitive Emissions	65	3%	68	3.2%	+5%
Total Emissions *	2,422	100%	2,151	100%	-11%
Total Offsettable Emissions	2,415	100%	2,146	100%	-11%

\* *May not sum due to rounding*

## CARBON NEUTRAL OFFSETS IN 2020

In accordance with the campus Clean Government Reporting Tool, and as required by the Climate Change Accountability Act (CCAA), offsets required to achieve carbon neutrality in 2020 total 2,408 tCO<sub>2</sub>e. This figure includes offsets required for 2020 in the amount of 2,146 tCO<sub>2</sub>e, plus the offsets owing for 2019, a total of 262 tCO<sub>2</sub>e. As part of the Okanagan campus' 2020 GHG emissions profile, 5 tCO<sub>2</sub>e do not require offsets.

# EMISSION REDUCTION ACTIVITIES

## ACTIONS TAKEN IN 2020 TO MINIMIZE EMISSIONS

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

### A. Stationary Fuel Combustion Electricity (Buildings)

The largest source of in-scope GHG emissions is from buildings. In 2020, UBC Okanagan continued to target building energy efficiency and GHG reduction actions by implementing energy and carbon reduction plans and activities. These measures, as well as reduced campus occupancy, contributed to a 10 per cent, or 216 tCO<sub>2</sub>e, reduction in building emissions.

#### CLIMATE LEADERSHIP PLANNING & ENERGY MANAGEMENT

In 2020, UBC Okanagan undertook a number of actions in response to UBC's Climate Emergency Declaration. The campus continued to develop its first Climate Action Plan 2030 (CAP2030), which will identify where the campus needs to focus its efforts and resources to enable the campus community, infrastructure, and buildings to address and respond to climate change. The breadth and scope of the plan will focus on reducing direct operational emissions, as well as indirect extended impact areas such as transportation, food and air travel.

A number of key initiatives were advanced in 2020 that inform the CAP2030's energy and carbon reduction strategies and proposed targets. Phase 3 of the Low Carbon Energy Strategy, which guides future low carbon district energy system development and investments, was completed. This included the design of high-lift heat pumps and thermal storage adjacent to the geo-exchange building. Pending approved funding, this measure will displace natural gas use and provide servicing to a cluster plant in or near the future Interdisciplinary Collaboration and Innovation (ICI) building, which will serve surrounding buildings.

The new 10-year Strategic Energy Management Plan (SEMP), was completed in 2020. The SEMP provides a suite of demand-side management projects to reduce energy consumption and associated emissions. It is estimated that implementation of initial projects identified in the SEMP, pursuant to funding, will reduce annual energy consumption by 882,700 kWh and 11,260 GJ, reducing emissions by 564 tCO<sub>2</sub>e.

UBC Okanagan also entered into a three-year partnership with the campus' School of Engineering faculty to develop a data analytics platform. This project aims to produce an intelligent data-driven energy monitoring and management system for micro-communities using statistical and advanced data analysis methods. While this platform is being finalized, a utility tracking tool that uses advanced programming language was developed to track overall campus utility consumption (e.g., electricity, natural gas, water, sewer), and building-level consumption at the monthly, quarterly, and annual interval.

Additionally, key departments have been 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 in one location, as well as further developing a meter tree. This project will provide further input to the Data Analytics platform the campus has been developing with the School of Engineering.

#### NEW BUILDINGS

Despite the global COVID-19 pandemic, UBC Okanagan completed the construction of Skeena Residence, on track to become the first Passive House certified university dormitory facility in Canada. Early certification steps included an air tightness test (AHC), recorded as 0.08, exceeding the target of 0.6 AHC

required for certification. Additionally, the campus completed a 537 m<sup>2</sup> research greenhouse, the Plant Growth Facility and two administration facilities — the Office Modular 1 and Facilities Management trailer — both of which are supplied by electrical heat from air-source heat pumps. Demand-controlled ventilation combined with heat recovery ventilators will reduce their electricity demands.

The Okanagan campus continued to build the Nechako Residence and Commons Block, a mixed-use facility that will help meet the demand for on-campus student housing by supplying 220-resident units, along with 24-hour social amenities, and a 450-seat dining facility. The facility, which is targeting mid-2021 completion and LEED® Gold certification, will be the latest building to be connected to the district energy system, which provides the campus with a lower carbon energy supply.

Finally, the campus commenced the design phase of the new Interdisciplinary Collaboration and Innovation (ICI) building that will target, at minimum, LEED® Gold certification. The academic facility will be designed to foster interdisciplinary knowledge and support collaborative, team-based learning and innovative approaches to teaching, while contributing to the campus' sustainable development.



## EXISTING BUILDINGS

### Academic Building Upgrades

The implementation of a multi-year demand-controlled ventilation program to improve control ventilation rates of laboratory spaces and standardize programming for occupancy continued within the Science building. Upon completion, measures are expected to reduce laboratory energy use by 317,100 kWh and 4,950 GJ, decreasing emission by 250 tCO<sub>2</sub>e annually.

### Occupancy System Upgrades

The campus completed a WI-FI upgrade to improve individual occupancy monitoring through the building automation system (BAS). The BAS assesses occupancy information and responds to changes in occupancy by adjusting air handling equipment operation, conserving energy and reducing associated emissions.

### Building Recommissioning Projects & Studies

The campus completed recommissioning projects on building HVAC systems with a focus on calibrating the carbon dioxide sensors. These sensors provide occupants with good indoor air quality by increasing ventilation rates on demand. Recalibration of sensors ensures ventilation rates do not exceed requirements, thereby reducing energy costs and consumption.

Recommissioning studies were conducted on three buildings in the last year – Engineering, Management and Education; Reichwald Health Sciences Centre; and, Upper Campus Health. The combined results of the proposed projects identified in the studies are anticipated to conserve 567,076 kWh and 2,497 GJ of energy annually, reducing carbon emission by approximately 124 tCO<sub>2</sub>e per year.

### Lighting Upgrades

Lighting upgrade work to switch to LED lights in academic and administration buildings continued over the last year. Efforts are projected to conserve 250,000 kWh of electricity annually.

## DISTRICT ENERGY SYSTEM (DES) UPGRADES

In 2020, the following campus district energy system upgrades and expansion projects were completed:

- Implemented the low temperature district energy system (LDES) low flow pump project to reduce energy consumption and extend the life of the pumps used to circulate water through the low LDES loop. The campus replaced the 125hp pumps with a 15hp pump, which will improve the geothermal heat extraction effectiveness during shoulder seasons and reduce energy consumption by 30,000 kWh annually.
- Completed a portion of the Science building conversion project to a low temperature heating system, which will reduce the building's reliance on natural gas for its HVAC needs.

## STUDENT RESIDENCE BUILDINGS

### Operational Efficiency Projects

An HVAC upgrade was completed on the Monashee Residence in 2020. This included replacement of the make-up air system with energy recovery ventilators and the installation of centralized Variable Refrigerant Flow (VRF) system to replace all individual unit packaged terminal air-conditioning (Ptac) equipment. The VRF system provides a more efficient heating and cooling system and decarbonizes the building's main heat source by using a heat pump rather than gas-fired equipment.

### Lighting Upgrades

Staff continued to complete the LED light switch-out program on a failure-based process over the last year to reduce electricity consumption.

## DEPARTMENT ACTIONS

Key departments have also implemented a number of projects that support energy reduction at the campus level, including:

- Ongoing replacement of desktop computers with laptops and more efficient devices;
- Upgrading staff and faculty devices from spinning hard drives to solid state drives (SSD), reducing waste, power consumption and replacement costs;
- Continuing to replace older power distribution units (PDUs) with newer and more efficient models across campus. These devices distribute electric power to racks of computers and networking equipment located in campus data centres and building communication rooms. PDUs containing high-efficiency transformers are two per cent to three per cent more efficient overall compared to PDUs with generic lower-efficiency transformers. Also, several step-down transformer uninterruptible power supply (UPS) units were replaced with power sharing, splice devices. These devices are more efficient, less noisy and generate less heat, therefore requiring less cooling power; and,
- Adjusting computer lab schedules in response to the pandemic, which were previously configured to power down at midnight and power on at 6am during the campus' routine building closure window each day. These parameters were removed to enable access to computers around the clock to support students studying in different time zones and maximize availability of software to complete course requirements remotely (through remote labs service). These adjustments were offset by the reduction in power consumption required by on-campus computing equipment. Remote work resulted in a significant number of devices powered off in preparation for long-term period of non-use.

## B. Mobile Fuel Combustion (Standard and Non-Standard Fleet)

In 2020, fleet vehicles accounted for 49 tCO<sub>2</sub>e, or two per cent of the campus' total emissions. This is 15 tCO<sub>2</sub>e lower than 2019. The retirement of two research fleet vehicles, as well as an overall reduction in fleet vehicle use due to reduced campus operations in 2020, contributed to this reduction.

### ACTIONS:

- Two faculty research vehicles were removed from the campus' fleet inventory.
  - Continued to implement measures to reduce reliance on fleet vehicles and divert the number of trips taken by encouraging fleet carpooling, walking or cycling, as well as consolidating off-campus trips.
  - Continued stewardship of sustainable, mobile-fuel combustion through adherence to sustainable fleet procedures, replacement of retired fleet vehicles with electric and energy-efficient models, and ongoing training and education to support sustainable fleet use.
  - While video conferencing software was available to the campus pre-pandemic, additional web-conferencing options were introduced in the last year to support working and learning from home. These options included a UBC Zoom license and the introduction of Microsoft Teams.
  - Future review of work/learn from home options are currently being reviewed as a potential measure to support the reduction of campus-level emissions produced from commuting, which is a target currently under review as part of the development of the Climate Action Plan 2030 (CAP2030).
- Ongoing use of the Find-Me printing option through the PaperCut™ print-tracking software on all campus printers for students, staff and faculty. The software provides a platform that delivers reports to clients on printing volumes, generating awareness of printing consumption, and promoting 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 2020, 232,000 pages were submitted to be printed, but not released within the four-hour time period, thereby, reducing GHG emissions by 7,901 kg and saving 2.18 trees.
    - There was also a significant reduction in page impressions and vastly reduced on-campus staff and student numbers in 2020 due to the pandemic. Consequently, comparison to 2019 print volumes are unavailable.
  - Continued 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 developed lifecycle plans for all infrastructure to ensure equipment is maintained to perform optimally, and hardware is replaced with improved technologies that support reduced power consumption according to industry best practices.

## C. Supplies (Paper)

Remote working and learning in 2020 resulted in a significant reduction in paper purchases and use. Emissions from paper accounted for 10 tCO<sub>2</sub>e, or 0.5 per cent of total in-scope campus emissions in 2020, an 81 per cent reduction from 2019.

### ACTIONS:

- Continued to offer Sugar Sheet™, a 100 per cent tree-free product derived from sugarcane processing bi-product, as an alternative to traditional paper through the campus' preferred supplier.
  - Continued to promote the purchase of 30 per cent or greater post-consumer recycled content paper.
  - Continued 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.
- Individual packaged terminal air-conditioner (Ptac) units were replaced by a centralized Variable Refrigerant Flow (VRF) system in the Monashee Residence building. The VRF system provides a more efficient heating and cooling system and decarbonizes the buildings main heat source by using a heat pump rather than gas-fired equipment.
  - Conducted preventative maintenance and upgrades to HVAC system and associated appliances located in academic and residence buildings including the Gymnasium, University Centre and Purcell Residence.
  - The completed Skeena Residence's design includes the use of centralized chillers for climate control instead of individual Ptac units, reducing the reliance on traditional fossil fuels and refrigerants.

## D. Fugitive Emissions

Hydrofluorocarbon (HFC) emissions accounted for three per cent of total campus emissions, or 68 tCO<sub>2</sub>e. This is a five per cent increase in emissions over 2019, largely due to equipment repair. Despite this increase, regular maintenance and replacement of older and inefficient refrigerant equipment has kept campus fugitive emissions low over the past four years.

### ACTIONS:



## PLANS TO CONTINUE REDUCING EMISSIONS IN 2021 AND BEYOND

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

### A. Buildings

#### ACADEMIC AND ADMINISTRATION BUILDINGS

##### Climate Leadership Planning and Energy Management

The Okanagan campus will complete the development of the Climate Action Plan 2030 (CAP2030) in 2021. A number of quick start action items identified through the CAP2030 planning process have been initiated in 2021. These projects support the reduction of campus operational energy and emissions in support of the CAP2030's emerging longer-term targets.

The development of project-specific performance targets for new buildings based on the Okanagan climate and building archetype is underway. This project will establish Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI), and Greenhouse Gas Intensity (GHGI) targets for each archetype, as well as ECM bundles, costing and financial analysis.

Additionally, the development of a LEED® V4.1 implementation scorecard and relevant guidance specific to the Okanagan campus will be completed in 2021. This project will provide direction for LEED® implementation in new campus buildings to ensure Okanagan's climate, energy and environmental characteristics are reflected.

The campus will continue to bring sustainable action, awareness and education to the UBC Okanagan community via virtual and, where possible, on-site behavioral change and engagement programs. Initiatives will be designed to impact energy and carbon reduction and support the proposed scope 1, 2 and 3 targets currently under development in the CAP2030.

The campus will also continue to implement subsequent phases of the Low Carbon Energy Strategy, which identifies a path to decarbonization of the central plant, recommends projects that will reduce energy demand, connects existing buildings to central energy supply district energy system, and supports the advancement of the campus' long-term goals and emerging CAP2030 targets.

The implementation of projects approved from the new 10-year Strategic Energy Management Plan (SEMP) that were delayed due to the global pandemic will commence in the coming year. Project bundles selected include: ventilation demand-reduction, recommissioning, and energy conservation projects to be completed in the Science, Fipke and Arts & Sciences buildings. The SEMP implementation supports the advancement of the campus' long-term goals and CAP2030's proposed energy reduction targets.

The campus will enter into the second year of a three-year partnership with the campus' School of Engineering faculty to develop and implement a data analytics platform. Upon completion, the platform will provide improved data management, reporting capabilities and analytical tools, informing future energy planning projects.

##### New Building Projects

The Nechako Residence and Commons Block, currently under construction, is on schedule to achieve a mid-2021 completion. The facility is targeting LEED® Gold Certification and will be connected to the campus' district energy system which provides a lower carbon energy supply.



The campus will continue with the design phase of an Interdisciplinary Collaboration and Innovation (ICI) building in 2021. Targeting a minimum LEED® Gold certification, this academic facility will be designed to foster interdisciplinary knowledge and support collaborative, team based learning and innovative approaches to teaching.

Additional 2021 and future building projects, include:

- Completion of the Innovation Precinct 1 renovation to provide interdisciplinary research space to faculty and students in early 2021;
- Future renovation of the University House;
- Planning for the development of the downtown Kelowna UBC Okanagan site; and,
- Planning for the future development of an outdoor gathering space, an athletics field house, and a second childcare expansion.

##### Building Recommissioning

Ongoing building upgrade projects will include the recommissioning of HVAC Systems with a focus on cold weather operation. Ongoing control sequencing upgrades and additional measures will be undertaken to avoid an increase of natural gas consumption by building management systems during colder than expected weather.

Implementation of recommissioning study recommendations in the following facilities will support energy and emission reductions in the coming year:



- Deployment of measures from the Arts Building study to address deficiencies in the operation of the building that are wasting energy, increasing equipment wear and tear or decreasing occupant comfort are anticipated to save 58,900 kWh and 130 GJ of energy and reduce carbon emissions by 7 tCO<sub>2</sub>e annually.
- The Engineering, Management and Education building's projects are projected to conserve 494,665 kWh and 233 GJ of energy, reducing carbon emissions by 11.6 tCO<sub>2</sub>e per year.
- The Reichwald Health Sciences Centre's projects are projected to result in annual savings of 4,717 kWh and 1,958 GJ in energy and a reduction of carbon emissions by 97 tCO<sub>2</sub>e.
- The Upper Campus Health building measures are projected to save 8,794 kWh and 176 GJ in energy, reducing carbon emissions by 8.8 tCO<sub>2</sub>e annually.

## STUDENT RESIDENT BUILDINGS

Key departments will continue to implement the LED light switch-out program on failure-based need.

## DEPARTMENTAL ACTIONS

In addition, key departments will continue to implement projects that support energy reduction at the campus level, including:

- Replacement of desktop computers with laptops and more efficient devices as part of UBC Okanagan's IT Computer Replacement Program;
- Phasing out desktop towers with docking stations to reduce power consumption; and,
- Applying a phase-in approach to conduct ongoing program upgrades to replace step-down transformer uninterruptible power supply (UPS) units with power sharing, splice devices.

## B. Mobile Fleet Combustion (Standard and Non-Standard Fleet)

- A new 2021 Ford 150 Hybrid truck will be purchased for operational fleet use in the coming year.
- Continue to implement measures to reduce reliance on fleet vehicles and divert the number of trips taken by encouraging fleet carpooling, walking or cycling, as well as consolidating off-campus trips.
- Continue stewardship of sustainable mobile-fuel combustion through adherence to internal sustainable fleet procedures, replacement of retired fleet vehicles with electric and energy efficient models, as well as ongoing training and education to support sustainable fleet use.

## C. Supplies (Paper)

- Implement awareness messaging prompts through the PaperCut™ print-tracking software to increase user awareness about reducing paper consumption behaviors to align with implementation of printing charge increases.

- Continue 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™.
- Continue 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.
- Continue 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 (fax to email) to reduce paper consumption.
- Contemplate the introduction of additional fees to support convenience printers (i.e., printers that are setup in offices or lab spaces for convenience access, in addition to main fleet printers) in an effort to further encourage use of fleet printing and efficiencies gained through consolidation of devices and increased access to printer capabilities (e.g., colour printing, etc.).

## D. Fugitive Emissions

- The campus will be centralizing additional cooling loads, reducing the amount of equipment requiring refrigerant on campus.
- A review will be undertaken to implement 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.
- Continue to replace inefficient and older equipment and conduct preventative maintenance and upgrades to HVAC systems and associated appliances.
- The final design of the Nechako Residence and Commons Block will include the use of centralized chillers for climate control instead of individual Ptc units within individual residences, reducing the facility's reliance on traditional fossil fuel and refrigerants.



# CAMPUS EMISSION TRENDS

## COMPARING EMISSIONS TO GROWTH

Figure 1 shows trends in campus growth and absolute campus and building emissions from 2007 to 2020. Despite the increase in both floor area and student enrollment by over 100 per cent since 2007, absolute GHG emissions have remained fairly stable. Similarly, GHG emissions from buildings alone have dropped by seven per cent since 2007. Contributing factors consist of continued implementation of efficiency measures to improve building energy performance, including connection to low carbon district energy systems. Programs implemented over the previous year, which include HVAC recommissioning projects to

improve building operational system responses to cold weather, are outlined in the 'Actions Taken in 2020 to Minimize Emissions' section of this report.

Another way to demonstrate campus GHG emissions performance that account 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 2020. Despite the significant floor area growth of 116 per cent, GHG emissions per building gross square meter ( $m^2$ ) dropped from 0.030 in 2007 to 0.014 in 2020, a reduction of 54 per cent.

figure 1 ABSOLUTE GHG EMISSIONS RELATIVE TO GROWTH: 2007-2020

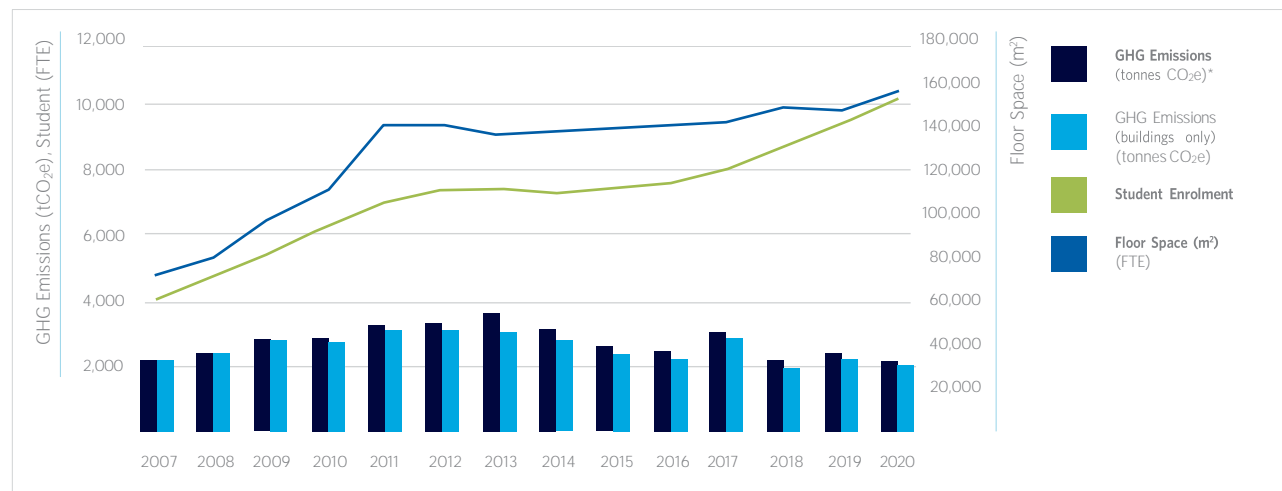
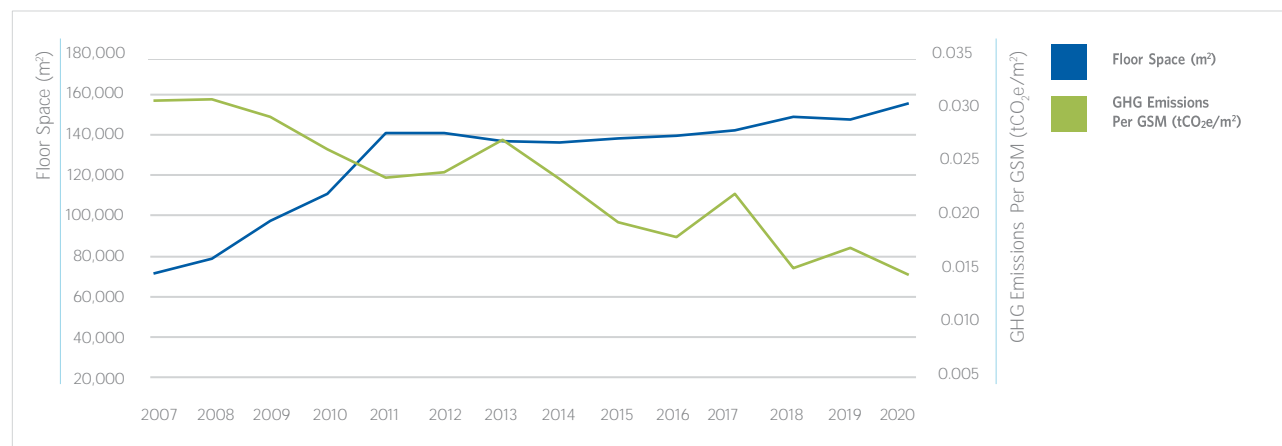


figure 2 GHG EMISSIONS INTENSITY RELATIVE TO BUILDING GSM: 2007-2020



# ABOVE AND BEYOND

## UBC'S ENDURING CLIMATE LEADERSHIP IN 2020

### Climate Emergency Declaration and Action

UBC's Climate Emergency Declaration provides a clear mandate for UBC to accelerate action towards emission reduction, and to go beyond operations to influence extended emissions from areas, such as commuting and air travel. These are areas in which the campus can have an impact as individuals and as an institution by actively participating in shifting behaviors and choices, and to advocate for innovation and leadership on climate action.

Despite challenges in 2020, the campus continued to deliver on a number of strategic priorities, including our response to the Climate Emergency. While the CCAR highlights UBCO's actions and plans to reduce operational emissions, the campus also moved ahead with the development of its first Climate Action Plan (CAP2030). An important component of this process is the development of the UBCO Transportation Plan, which provides direction to shift towards more sustainable modes of travel to support ongoing campus growth and reduce commuting emissions.

### Virtual Community Engagement

In 2020, the pandemic response resulted in a number of changes to behaviors with environmental impacts. The reduction in commuting, travel, and building occupancy presented the campus with the opportunity to adapt its communications and engagement programs, and to encourage the potential for enduring change going forward. UBCO's behavior change

program, The Power of You, shifted from on-campus to on-line, focusing on sustainable modes of transportation to support active transportation and commuting in future.

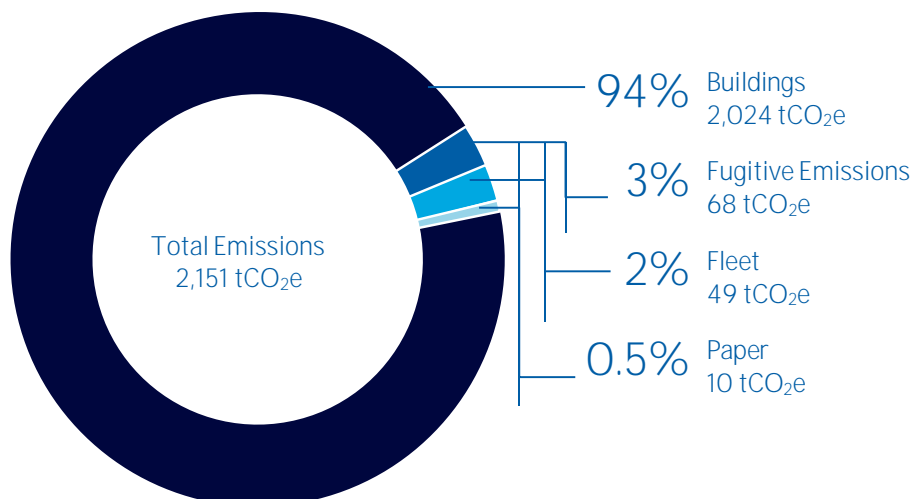
Engagement activities over the past year, included wrap-up of a Green Labs Shut the Sash Challenge and Awards Celebration engaging over 40 undergraduate students. Virtual cycling webinars were offered to promote road sense awareness and education to support active transportation and commuting, the participation of staff, faculty and students was welcomed.

Campus-wide actions taken by key operational departments in 2020 (pre-pandemic) in response to the established Power of You Lights Out and Power Down campaigns involved a staff-led audit across academic and administration buildings. As a direct result of the nightly audits, over 3,750 lights and 17 projectors/screens were turned off or powered down, and 118 windows were closed at night. Since the initiation of these voluntary audits in 2015, dedicated staff members have turned off or powered down 30,683 lights and 502 projectors/screens and closed 3,053 windows, contributing to campus energy conservation efforts.

In the coming year, subject to resources, the campus will re-align its existing behavior change program with the emerging CAP2030. A new climate change awareness and education strategy is envisioned to support achievement of the emerging CAP2030 targets focused on reducing Scope 1, 2 and 3 emissions.

## EMISSIONS PROFILE 2020

### UBC OKANAGAN GREENHOUSE GAS EMISSIONS BY SOURCE FOR THE 2020 CALENDAR YEAR (tCO<sub>2</sub>e\*)



(Generated April 8, 2021) Total offsets required: 2,146. Total offset investment: \$53,650.

Emissions which do not require offsets: 5.\*\*

\* 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.



# UBC ACTIONS SURVEY

CLIMATE CHANGE ACCOUNTABILITY REPORT SURVEY - PART 1 / UBC OKANAGAN CAMPUS

## A. STATIONARY SOURCES (E.G. BUILDINGS, POWER GENERATORS): FUEL COMBUSTION, ELECTRICITY USE, FUGITIVE EMISSIONS.

Actions taken by your organization in 2020 to support emissions reductions from buildings.

a) Do you have a strategy to reduce emissions from stationary sources? (Y/N) Yes

b) Whether you have a strategy or not, briefly describe your organization's plans to continue reducing emissions from stationary sources:

I. Over the medium-term term (1-5 years)

Refer to the *Plans to Continue Reducing Emissions in 2027 and Beyond* section of the 2020 CCAR.

II. Over the long term (6-10 years)

Refer to the *Plans to Continue Reducing Emissions in 2027 and Beyond* section of the 2020 CCAR.

c) Please describe your strategy's goals (if any) related to building retrofits.

As part of the ongoing SEMP, recommissioning studies were conducted on the following three buildings in the past year: Engineering, Management and Education; Reichwald Health Sciences Centre; and Upper Campus Health, with a focus improving efficiencies and reducing energy consumption and associated emissions. The combined results of completed projects identified in the studies are anticipated to conserve up to 567,076 kWh and 2,497 GJ of energy, reducing carbon emission by approximately 124 tCO<sub>2</sub>e annually.

d) What percentage on average of your building portfolio is retrofitted each year?

Minor retrofits(e.g., low cost, easy to implement measures including caulking, lighting, adding roof insulation, etc.)(%)	10%
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Major retrofits (e.g., replacing windows and doors, equipment replacement such as boilers, etc.)(%)	5%
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Deep retrofits (e.g., replacing roof, replacing the heating, ventilation and air-conditioning system with a renewable technology like a ground-source heat pump, etc.)(%)	2%
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e) Do you keep records of refrigerant gases category and refilling volumes? (Y/N) Yes

I. If yes, have you quantified and reported the associated emissions? Yes

# UBC ACTIONS SURVEY

## CLIMATE CHANGE ACCOUNTABILITY REPORT SURVEY - PART 1 / UBC OKANAGAN CAMPUS

### f) What, if any, mitigation approaches have been considered? Please describe.

Refer to the *Actions Taken in 2020 to Minimize Emissions* and *Plans to Continue Reducing Emissions in 2027 and Beyond* sections of the 2020 CCAR.

### g) How many newly constructed buildings received at least LEED Gold certification in 2020? 0

### h) How many newly constructed buildings did not receive LEED Gold certification? 2

#### i. Please explain why LEED Gold certification was not obtained for those new buildings.

The Commons building was completed in 2019 and is currently undergoing *LEED®* certification. Skeena Residence was completed in August 2020 and will not be applying for *LEED®* certification, instead it is undergoing the process to achieve Passive House Classic certification, equivalent to Step 4 of the BC Energy Step Code.

#### i) Other actions? Please describe briefly.

Continued construction of Nechako Residence and Commons Block, a 220-unit and mixed-use facility targeted to achieve *LEED®* Gold certification upon completion. The campus commenced with the design phase of the Interdisciplinary Collaboration and Innovation (ICI) facility that will be targeting *LEED®* Gold certification upon completion.

## B. MOBILE SOURCES (E.G. VEHICLES, OFF-ROAD/PORTABLE EQUIPMENT): FUEL COMBUSTION.

Actions taken by your organization in 2020 to support emissions reductions from mobile sources.

### a) Do you have a strategy to reduce emissions from mobile sources? (Y/N) Yes

### b) Whether you have a strategy or not, briefly describe your organization's plans to continue reducing emissions from mobile sources:

#### i. Over the medium-term term (1-5 years)

Refer to the *Plans to Continue Reducing Emissions in 2027 and Beyond* section of the 2020 CCAR.

The vehicle replacement process at the Okanagan campus process identifies that fossil fuel powered vehicles will be replaced with an EV or Hybrid at end-of-life, where available.

# UBC ACTIONS SURVEY

CLIMATE CHANGE ACCOUNTABILITY REPORT SURVEY - PART 1 / UBC OKANAGAN CAMPUS

- c) How many electric vehicle charging stations (Level 2 and 3) does your organization have as of December 31, 2020?

level 2	12
level 3	0

- d) Please briefly describe any other related actions (e.g. charging station feasibility studies, electrical panel upgrades, etc.)

None completed in 2020. The twelve existing Level 2 EV charging stations are available for use by the Okanagan campus constituents and extended community. The campus will be installing a thirteenth Level 2 charging station in Lot F, adjacent to the new Nechako Residence and Commons Block in 2021.

- e) Please indicate the number of the vehicles in the following vehicle classes that are in your current fleet by fuel type and vehicle category:

	Batter Electric	Plug-In Electric Hybrid	Hybrid Electric Vehicle	Fuel Cell Electric Vehicle	Natural Gas or Propane	Gas	Diesel
Light duty vehicles (LDVs)	0	0	2	0	0	1	0
Light duty trucks (LDTs)	0	0	1	0	0	13	0
Heavy duty vehicles (HDVs)	0	0	0	0	0	3	3

- f) If, in the above table, you indicated that your organization's fleet includes vehicles that use Gas, do any of these vehicles use E100? (Y/N) No

- g) If, in the above table, you indicated that your organization's fleet includes vehicles that use Diesel, do any of these vehicles use B100? (Y/N) No

- h) If your organization purchased gas or diesel vehicles in 2020, can you briefly explain why vehicles from the other categories were not chosen?

The one operational vehicle purchased was a hybrid light-duty SUV, no full gas or diesel reliant vehicles were purchased in 2020.



# UBC ACTIONS SURVEY

CLIMATE CHANGE ACCOUNTABILITY REPORT SURVEY - PART 1 / UBC OKANAGAN CAMPUS

## C. PROCUREMENT SOURCES (E.G. PAPER SUPPLIES)

Actions taken by your organization in 2020 to support emissions reductions from paper supplies.

### a) Briefly describe your organization's plans to continue reducing emissions from paper use:

#### I. Over the medium term (1-5 years)

Refer to the *Plans to Continue Reducing Emissions in 2027 and Beyond* section of the 2020 CCAR.

#### II. Over the long term (6-10 years)

Refer to the *Plans to Continue Reducing Emissions in 2027 and Beyond* section of the 2020 CCAR.

b) Do you have an awareness campaign focused on reducing office paper use (Y/N) Yes

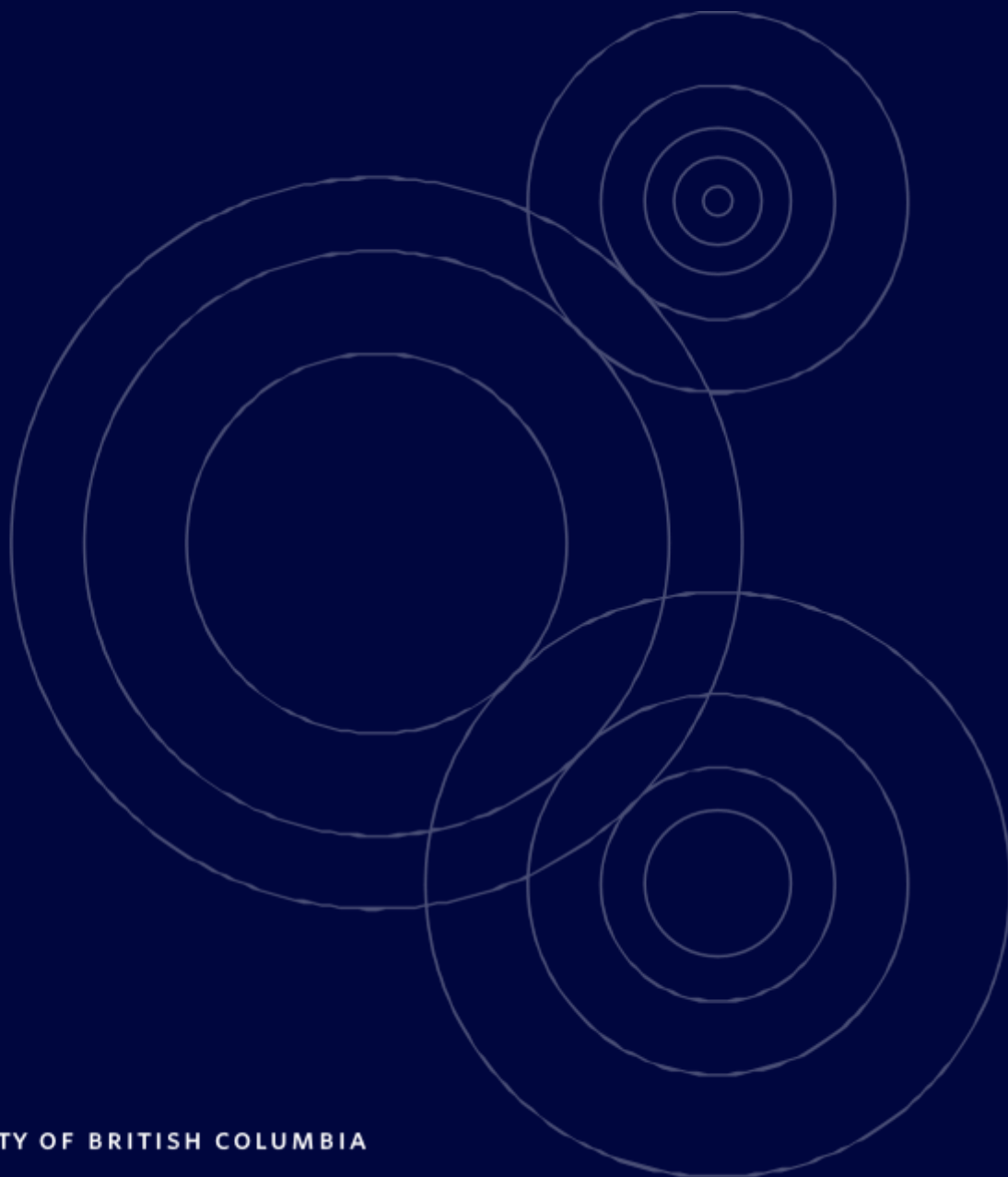
c) Has your organization purchased alternate source paper (bamboo, hemp, wheat, etc.) Yes

### d) Are there any other actions your organization took in 2020? Please specify:

Refer to the *Actions Taken in 2020 to Minimize Emissions* section of the 2020 CCAR.

# 2020

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