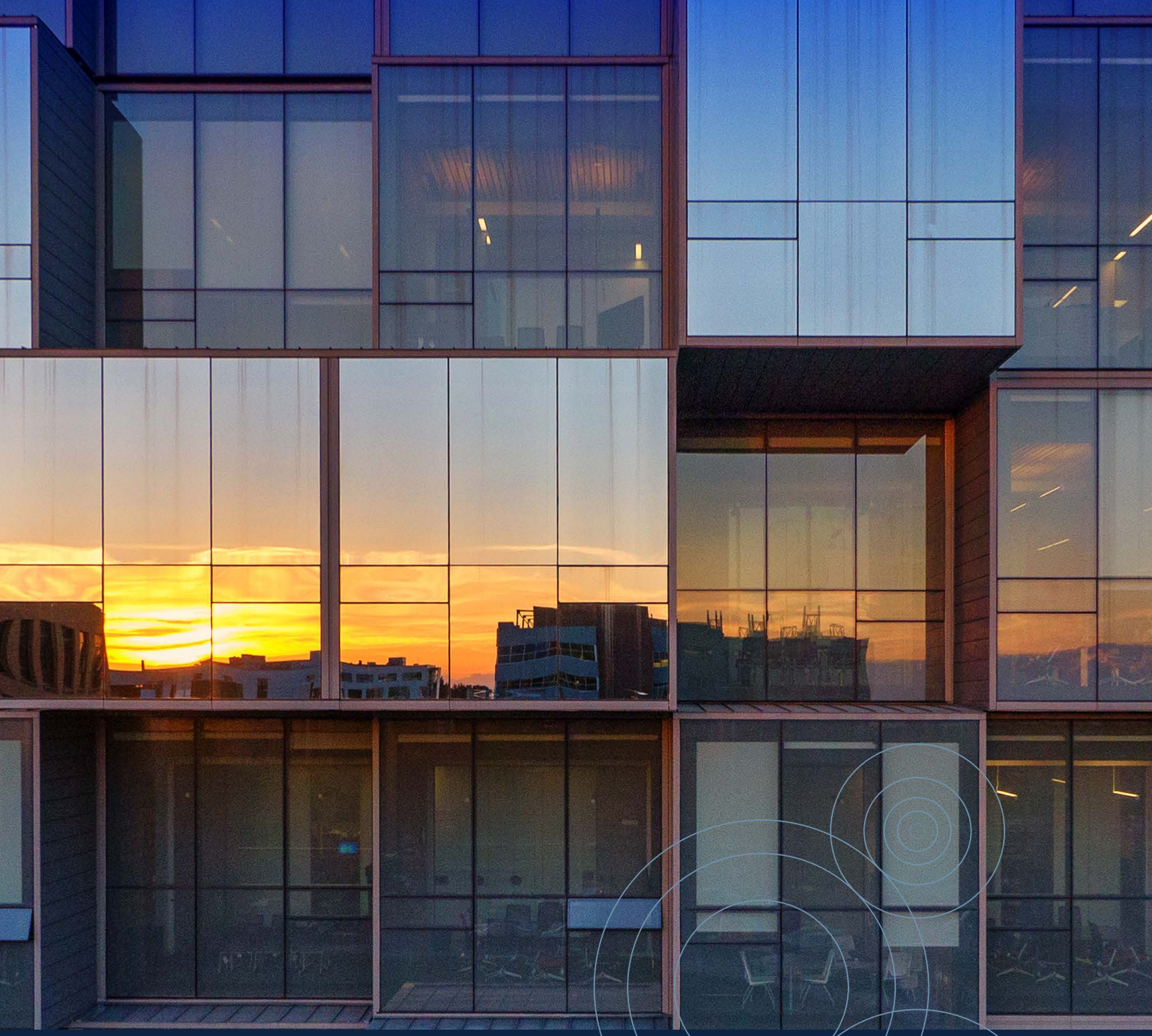


2014 CARBON NEUTRAL ACTION REPORT

MAY 30, 2015

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA
sustainability

TABLE OF CONTENTS

EXECUTIVE SUMMARY

As a rapidly growing, research-intensive institution, the University of British Columbia (UBC) is working on finding innovative ways to reduce greenhouse gas (GHG) emissions and conserve energy. Our efforts focus on both energy conservation and efficiency, driven by the need to manage operational costs and the urgent need to mitigate climate change.

In 2014, UBC continued to deliver on our bold climate action commitments, reducing offsettable GHG emissions at our Vancouver and Okanagan campuses by 19 per cent against a 2007 baseline, despite a 15 per cent increase in floor space and a 24 per cent increase in student enrollment. Relative to student enrolment, we have reduced GHG emissions per full-time equivalent (FTE) student by 35 per cent compared to 2007 levels.

As the majority of UBC's emissions come from buildings, our climate performance has been largely achieved through integrating renewables into and increasing energy efficiency of district energy systems, re-commissioning existing buildings, designing and constructing new green buildings and delivering behaviour change programs focused on energy conservation.

UBC's Vancouver campus key achievements include the second full year of thermal operation of our Bioenergy Research and Demonstration Facility (BRDF), completing over half of our Academic District Energy System steam to hot water conversion project, and continuing to roll out our Continuous Optimization program to re-commission all major buildings on campus, in partnership with BC Hydro. Continuing to advance green buildings, in 2014, UBC's Vancouver campus achieved two LEED Gold certifications for the BRDF and Earth Sciences Building and four REAP Gold certifications for Academy, Dahlia & Magnolia, Mews and YU residential buildings. UBC's Building Operations department was also awarded Canada's first E3 Platinum Certification for excellence in sustainable fleet management. Following extensive community engagement, the 20-year Sustainability Strategy was completed and approved, which outlines a framework for next generation sustainability across teaching, learning, research, partnerships, operations and infrastructure, and the community.

At UBC's Okanagan campus, key achievements include continued optimization of the campus geo-exchange district energy system, implementation of the Building Optimization Program in partnership with FortisBC, and delivery of behavior change initiatives toward energy conservation. Combined, these activities have contributed to reduced absolute carbon emissions and utility cost savings. Moving forward, the campus will complete implementation of the Building Optimization Program and define our future development through the Okanagan Campus Plan update. Demonstrating our commitment to sustainability and fiscally responsible development, we are taking a whole systems approach to planning in order to optimize the campus' sustainability resources (energy, water, waste), facilities infrastructure and ecosystems planning. We view this approach as a key prerequisite to UBC Okanagan's long-term sustainability roadmap that will define our continued actions to support climate stewardship, resiliency, and the overall health and wellbeing of our campus community.

We are pleased to share key highlights of our climate action initiatives implemented in 2014.

MICHAEL WHITE
Associate Vice-President
Campus and Community Planning
The University of British Columbia

CURTIS MORCOM
Acting Associate Vice-President
Finance and Operations
The University of British Columbia – Okanagan Campus

EMISSIONS OVERVIEW

The University of British Columbia's 2014 Carbon Neutral Action Report contains our 2014 GHG emissions profile, offsets purchased, actions taken in 2014 to reduce emissions and plans to continue reducing emissions in 2015 and beyond.

Following the emissions overview section, a detailed implementation report provides additional information on emissions and actions taken to reduce emissions for UBC's Vancouver and Okanagan campuses.

ABOUT UBC

The University of British Columbia (UBC) is a global centre for research and teaching, consistently ranked among the top 40 universities in the world. Our two main campuses — the Vancouver campus and the Okanagan campus — attract and educate more than 58,000 students from 140 countries and employ over 15,000 staff and faculty. UBC's Vancouver campus is home to a vibrant, sustainable residential community of some 20,000 students, faculty, staff and other residents, and UBC's Okanagan campus is home to 1,700 students.

SUSTAINABILITY PLANS AND PUBLICATIONS

UBC's Vancouver campus sustainability plans and reports, including annual GHG Inventories, Carbon Neutral Action Reports, and Annual Sustainability Reports are available at http://sustain.ubc.ca/our-commitment/plans-policies-reports. UBC's Okanagan campus Carbon Neutral Action Reports and SHIFT Sustainability Reports are available at http://sustain.ok.ubc.ca/reports.html.

EMISSIONS AND OFFSETS SUMMARY

2014 Emissions

Under the Greenhouse Gas Reductions Target Act, UBC has been required to report and offset its emissions since 2010, including emissions from all properties owned and leased by UBC and its subsidiaries. Table 1 shows UBC's total GHG emissions and offsets purchased in addition to any adjustments made to previously reported figures.

Table 1: 2014 Total UBC Emissions and Offsets Summary

	UBC Vancouver[1]	UBC Okanagan	UBC Total
GHG Emissions Created in Calendar Year 2014 (tCO_2e)			
Total Emissions	68,432	3,125	71,557
Total Emissions for Offsets	51,883	3,123	55,006
Adjustments to GHG Emissions Reported in Previous Years (tCO_2e)			
Total Emissions	-51[2]	3	-48
Total Emissions for Offsets	-2[3]	3	1
Total Emissions for Offset for the 2014 Reporting Year (tCO_2e)			
Total Emissions for Offsets	51,881	3,126	55,007

1 Including UBC Properties Trust and off-campus properties.
2 Reflects changes to 2010-2013 years due to updates in BC's Global Warming Potential of Greenhouse Gases to reflect the 2007 values from the IPCC's Fourth Assessment Report. Does not affect offsets.
3 Adjustments made in the 2014 reporting period to 2012 offsets corrected off-campus properties in which UBC reported emissions although the leases had expired.

A summary of emissions attributed to UBC's campuses and off-campus units is provided in Table 2 and Figure 1. When emissions from off-campus properties are included, total offsettable emissions amounted to 55,006 tCO_2e in 2014. Biogenic emissions, which are carbon dioxide emissions from biomass, renewable natural gas and biofuels, amount to 16,551 tCO_2e but are not required to be offset, only reported. Including biogenic emissions, UBC's 2014 total emissions amounted to 71,557 tCO_2e.

Table 2: UBC Total 2014 Emissions

Location	2014 Emissions (tCO_2e)
UBC's Vancouver campus[1]	47,814
UBC's Okanagan campus	3,123
Off-campus properties	2,047
UBC Properties Trust	2,021
Total Offsettable Emissions	55,006
Emissions not required to be offset[2]	16,551
UBC Vancouver Biogenic Emissions	*16,550*
UBC Okanagan Biogenic Emissions	*1*
Total Emissions	71,557

1 May not sum to total due to rounding.
2 Biogenic emissions ($BioCO_2$) from biomass, renewable natural gas and biofuels are not required to be offset due to their renewable source. Methane (CH_4) and Nitrous Oxide (N_2O) emissions from those sources are required to be offset and are included in offset amount.

Figure 1: UBC 2014 Offsettable Emissions by Location

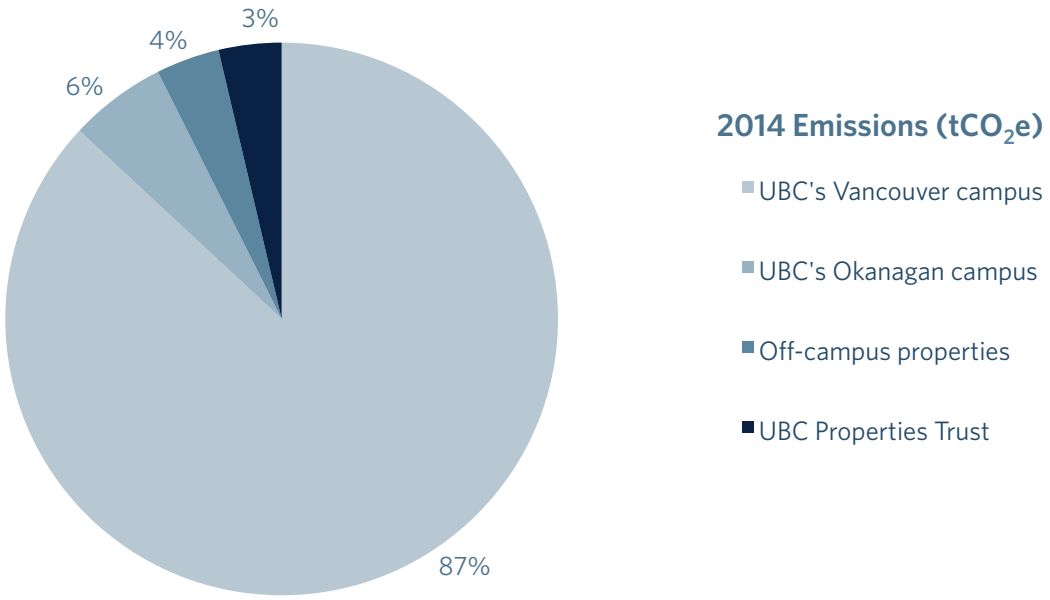


Table 3 shows the 2014 offsettable emissions for UBC's two main campuses along with key performance indicators.

Table 3: 2014 Offsettable Emissions for UBC's Vancouver and Okanagan Campuses

Key Performance Indicator	Vancouver Campus[1]	Okanagan Campus
GHG Emissions (tonnes CO_2e)	47,814	3,123
Floor Space (square meters)	1,429,847	135,957
Staff and Faculty Employees (FTE)	12,398	1,106
Student Enrolment (FTE)	44,388	7,282
GHG Emissions per Student (tonnes CO_2e/FTE)	1.08	0.43
GHG Emissions per Square Metre (tonnes CO_2e/m^2)	0.033	0.023

[1] *Excluding UBC Properties Trust and off-campus properties*

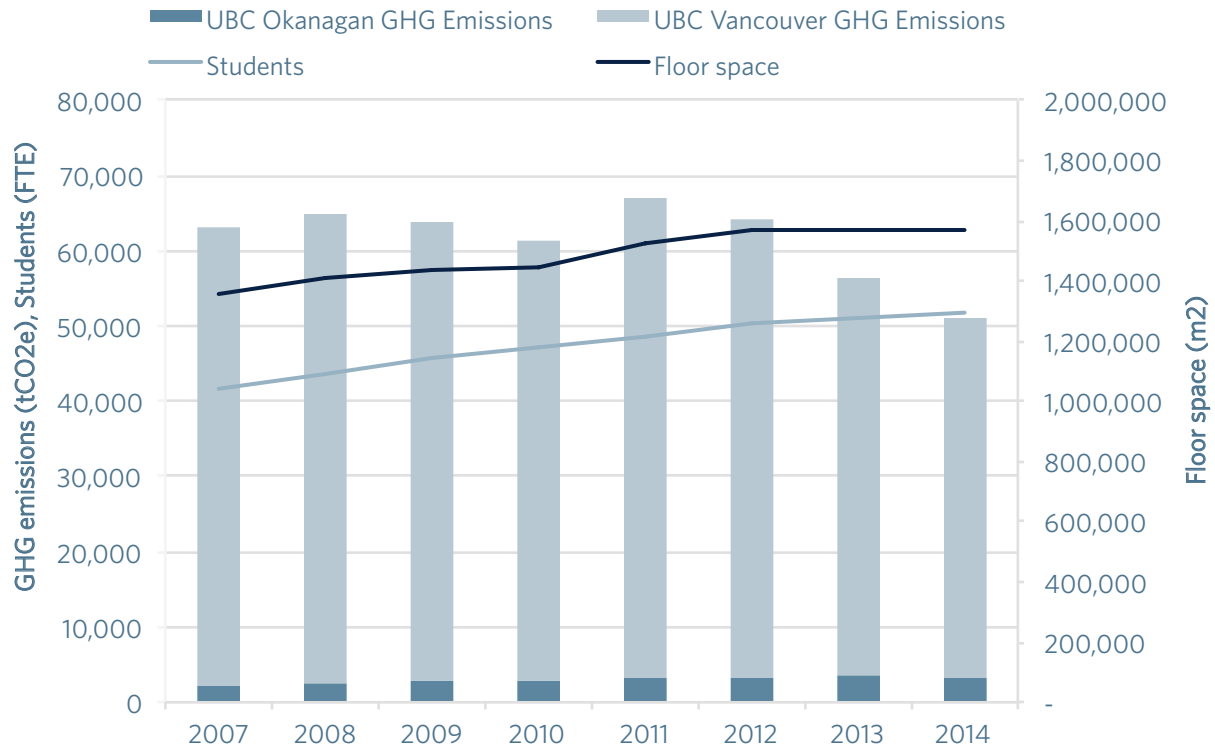
Comparison to 2007 Baseline

UBC tracks and reports our absolute and relative emissions for each campus against a 2007 baseline to measure and demonstrate performance against our Climate Action Plan targets. Despite significant campus growth in floor space and student enrolment, UBC has maintained a decrease in emissions per capita, as shown in Figure 2.

In 2014, UBC's Vancouver and Okanagan campuses reduced offsettable GHG emissions by 19 per cent against a 2007 baseline, despite a 15 per cent increase in floor space and 24 per cent increase in student enrollment. Since 2007, we have reduced GHG emissions by 35 per cent per FTE student.

Figure 2 outlines the change in offsettable emissions for the Vancouver and Okanagan campuses since the 2007 baseline year, along with indicators of UBC campus growth. Student enrolment increased by 10,000 FTE students from 2007 to 2014 while floor space increased by 210,000 square metres.

Figure 2: UBC Offsettable Emissions and Growth, Vancouver and Okanagan campus, 2007 to 2014



PART A

UBC Vancouver Campus Emission Details

SECTION CONTENTS

VANCOUVER CAMPUS SUMMARY

UBC's Vancouver campus made significant progress this past year towards achieving the Vancouver Climate Action Plan's aggressive GHG reduction targets. In 2014, UBC's Vancouver Campus offsettable emissions decreased 22 per cent from 2007 levels, despite an 11 per cent increase in building floor space and an 18 per cent increase in student enrolment. Per capita, we have reduced emissions 34 per cent per FTE student since 2007. Key achievements made towards implementing the three core projects of our Climate Action Plan include:

- UBC's Bioenergy Research and Demonstration Facility, a pioneering campus as a living lab project, completed its second full year of operation, generating clean thermal energy from renewable biomass to produce 16 per cent of total campus steam production, significantly reducing natural gas use on campus and eliminating 11 per cent of campus GHG emissions compared to 2007 levels.

- Over half of the five-year Academic District Energy System steam to hot water conversion project is now complete, including the start of construction of the new Campus Energy Centre, which will replace the campus' aging steam plant. When complete, the $88 million project will connect 130 buildings to the more efficient hot water district energy system, reducing emissions by 22 per cent and saving $5.5 million a year in operational costs.

- The Continuous Optimization "Building Tune-Up" program is retro-commissioning over 70 buildings, targeted to reduce emissions in institutional buildings by 10 per cent combined with behaviour change programs. Implementation is completed in 17 laboratory buildings, another 24 buildings will commence implementation in 2015, and a further 27 buildings have completed investigation with implementation to commence in 2016.

UBC's Climate Action Plan projects are forecasted to achieve the targeted 33 per cent emissions reduction compared to 2007 levels in 2016. In 2015, work will commence on updating UBC Vancouver's Climate Action Plan for 2015-2020 to identify additional actions and measures to advance towards the 2020 target to reduce emissions 67 per cent compared to 2007 levels.

As part of the Community Energy and Emissions Plan for UBC's residential neighborhoods, UBC completed feasibility studies and selected a utility partner to develop and operate a Neighborhood District Energy System to

provide low-carbon thermal energy for UBC's Vancouver campus residential neighborhoods. This system, which has received approval from the BC Utilities Commission, will eventually capture waste heat from TRIUMF as a low carbon thermal energy source to serve UBC's residential neighbourhoods.

Continuing to advance green buildings on campus, in 2014, UBC's Vancouver campus achieved two LEED Gold certifications for the Bioenergy Research and Demonstration Facility and Earth Sciences Building and four REAP Gold certifications for Academy, Dahlia & Magnolia, Mews and YU residential buildings. UBC's Building Operations department was also awarded Canada's first E3 Platinum Certification for excellence in sustainable fleet management.

In addition to large scale infrastructure changes, we continue to engage our campus community to reduce emissions. In 2014, key engagement activities included the fourth annual Aim to Sustain competition, a three week energy conservation competition in two main student residences, and the third annual Shut the Sash energy conservation competition engaging researchers to save energy in labs. UBC also expanded the Green Labs Program and Sustainability Coordinator program to further reduce the environmental impact of our research laboratories.

Another key achievement for 2014 was the completion of a 20-year Sustainability Strategy for next generation sustainability at UBC's Vancouver campus, across teaching, learning, research, partnerships, operations and infrastructure, and the community.

We are pleased to share with you some of the highlights of our climate action initiatives that were implemented in 2014.

MICHAEL WHITE
Associate Vice-President
Campus and Community Planning
The University of British Columbia

CLIMATE ACTION AT UBC VANCOUVER

OVERVIEW AND HISTORY

In 2010, UBC announced our Vancouver Campus Climate Action Plan, committing to aggressive reduction targets for GHG emissions – 33 per cent reduction by 2015, 67 per cent by 2020, and 100 per cent reduction by 2050, compared to 2007 levels. In 2015, work will commence on updating UBC Vancouver's Climate Action Plan for 2015-2020 to identify additional actions and measures to advance towards our aggressive targets.

To track progress towards achieving our GHG targets, UBC produces an annual Carbon Neutral Action Report which includes a detailed analysis and discussion of our GHG Inventory. In 2013, UBC and the University Neighborhoods Association (UNA) completed a Community Energy and Emissions Plan that identifies actions to reduce emissions from UBC's residential community.

UBC's Energy Management Plan is designed to maintain energy savings and identify further electricity and natural gas conservation opportunities and efficiencies. This plan reviews the current status of energy use and operating costs, sets targets, assesses opportunities, and identifies priority energy conservation initiatives. UBC has implemented an Energy Policy for Classrooms and Offices that outlines standards for heating, cooling, ventilation, lighting, IT and other equipment. The policy provides guidelines for reducing energy use, while maintaining comfort of building occupants.

For more information about climate action at UBC, read the award-winning AASHE Case Study on Implementing UBC's Climate Action Plan. For additional details on UBC's sustainability plans, initiatives, and other performance reports, please visit the Plans and Reports section of our website and refer to our full UBC Annual Sustainability Report.

2014 GREENHOUSE GAS EMISSIONS

UBC's Vancouver campus educates over 50,000 students, employs over 12,000 staff and faculty, and is home to a campus residential population of some 20,000 students, staff, faculty and other residents. With an institutional footprint of 402 hectares, UBC's Vancouver campus is home to 335 institutional buildings owned by UBC, totalling more than 1.4 million square metres (15.4 million square feet).

In 2014, total offsettable GHG emissions for UBC's Vancouver campus amounted to 47,814 tCO_2e. Since 97 per cent of these emissions come from Vancouver campus core and ancillary buildings, with 73 per cent of the total occurring at the campus steam plant, key actions focus on optimizing our district energy systems (through integrating renewables and increasing energy efficiency), re-commissioning existing buildings, designing and constructing new green buildings and delivering behaviour change programs focused on energy conservation.

It was estimated that fugitive emissions of refrigerant gases comprise less than one per cent of UBC's Vancouver campus total emissions and collecting data to estimate these emissions would be disproportionately onerous. For this reason, emissions from this source have been deemed out of scope and have not been included in UBC's Vancouver campus GHG emissions profile.

EMISSIONS IN GREATER DETAIL

The Climate Action Plan GHG reduction targets apply to emissions from core and ancillary buildings, TRIUMF, fleet and paper. The UBC Vancouver Campus GHG Inventory, which comprises these elements, has been compiled each year since 2006. In 2014, the offsettable Vancouver Campus emissions amounted to 47,814 tCO_2e. A detailed breakdown of the campus emission sources is provided in *Table 1*.

Table 1: UBC's Vancouver Campus Offsettable Emissions, 2014

Source	2007 Emissions (tCO_2e)[1]	2014 Emissions (tCO_2e)[1]	Percent of 2014 campus emissions[1]
UBC Vancouver Campus - Core Buildings[2]	46,478	33,748	71%
Steam (natural gas and light fuel oil)	*40,106*	*27,521*	*58%*
Natural gas (direct burn)	*3,515*	*4,278*	*9%*
Electricity	*2,856*	*1,591*	*3%*
Biomass facility[3]	*N/A*	*343*	*0.7%*
Renewable Natural Gas[4]	*N/A*	*16*	*0.03%*
UBC Vancouver Campus – Ancillary buildings[5]	11,405	12,322	26%
Steam (natural gas and light fuel oil)	*7,311*	*7, 464*	*16%*
Natural gas (direct burn)	*3,108*	*4,238*	*9%*
Electricity	*986*	*530*	*1.1%*
Biomass facility[3]	*N/A*	*90*	*0.2%*
TRIUMF[6]	222	119	0.2%
Total Building Emissions	58,105	46,189	97%
Fleet	1, 973	1,118	2.3%
Paper	1, 003	506	1.1%
Total Vancouver Campus Offsettable Emissions	61, 082	47,814	100%

[1] May not sum to total due to rounding.
[2] Core buildings comprise academic and administrative buildings.
[3] UBC is required to offset the CH_4 and N_2O portions of biomass combustion. In addition, the Bioenergy Research and Demonstration Facility (BRDF) burns a small amount of natural gas. The BRDF began operating in 2012.
[4] UBC is required to offset the CH_4 and N_2O portions of renewable natural gas.
[5] Ancillary buildings include student housing, conference, athletics and parking facilities.
[6] Although TRIUMF is a joint venture with other universities, it has historically been included in the UBC Vancouver Campus inventory since it is located on campus. UBC accounts for 1/11th of emissions from TRIUMF.

Under the Greenhouse Gas Reductions Target Act, UBC has been required to report and offset its emissions since 2010, including emissions from all properties owned and leased by UBC and its subsidiaries. A summary of the emissions attributed to different off-campus units of UBC is provided in *Table 2*.

Table 2: Off-Campus Property Offsettable Emissions, 2014

Source	2014 Emissions (tCO_2e)[1]
UBC Properties Trust - Owned Buildings & Paper[2]	2,021
UBC Robson Square Campus	174
Other Off-Campus Properties[3]	1,697
Joint Ventures with other universities[4]	176
Great Northern Way Campus	*151*
Bamfield Marine Sciences Centre	*25*
Total Off-Campus Property Emissions	4,069

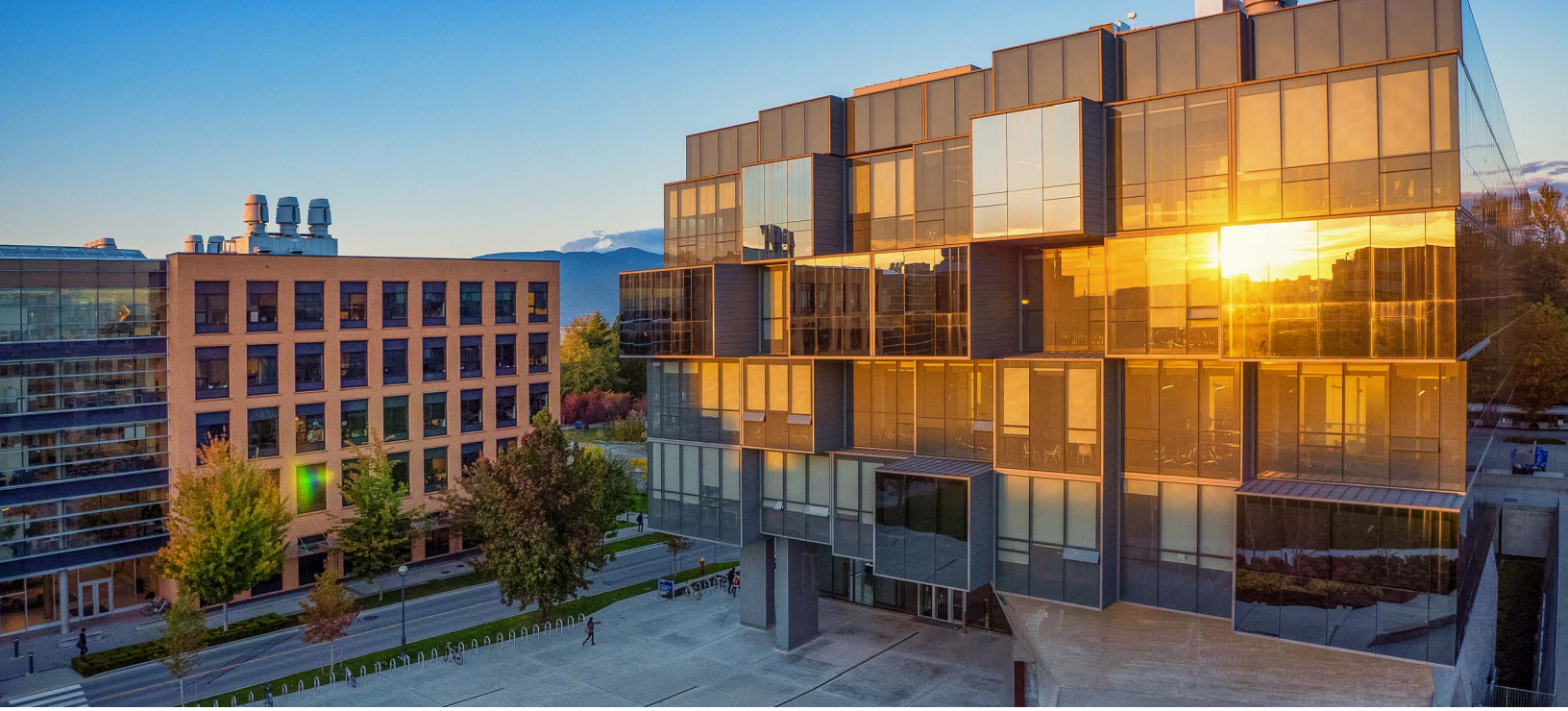
[1] May not sum to total due to rounding.
[2] UBC Properties Trust, a company wholly owned by UBC, owns several residential buildings that are rented to staff, faculty and students, as well as space leased to retail and commercial tenants on campus.
[3] Other off-campus properties include 7 UBC-owned buildings and 13 leased spaces throughout the province.
[4] Although TRIUMF is a joint venture with other universities, it has historically been included in the UBC Vancouver Campus inventory and is thus not included in this table.

Going beyond provincial requirements, the annual UBC Vancouver Campus GHG Inventory also quantifies several categories of optional or Scope 3 emissions (*Table 3*). These emissions are not required to be offset. UBC's Climate Action Plan includes strategies for reducing Scope 3 emissions related to commuting, business travel, procurement and food.

Table 3: UBC's Vancouver Campus Scope 3 Emissions, 2014

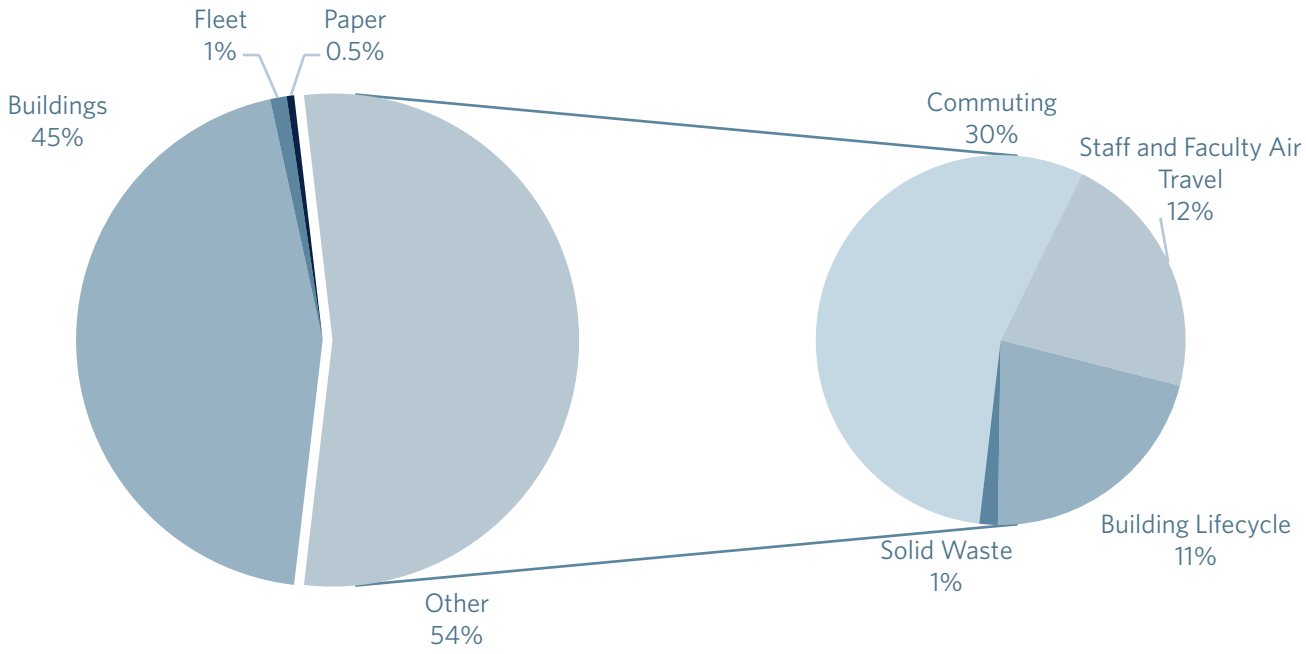
Source	2007 Emissions (tCO_2e)	2014 Emissions (tCO_2e)
Commuting	28,880	30,726
Staff and Faculty Air Travel	13,600[1]	12,048[2]
Building Lifecycle	10,190	11,796
Solid Waste[3]	1,930	893[4]

[1] Not calculated in 2007; the value from 2006 is provided.
[2] Emission factors for air travel changed in 2013 resulting in significantly reduced emissions.
[3] Solid waste includes operational waste sent to landfill or incinerated.
[4] Emission factors for solid waste changed in 2013 resulting in significantly reduced emissions.



The combined emissions from commuting, business travel, building lifecycle and solid waste (*Table 3*) were approximately equal to the offsettable Vancouver Campus emissions (*Table 1*) in 2014. Figure 1 shows the relative proportions of the various emission categories for the UBC Vancouver campus.

Figure 1: UBC's Vancouver Campus Total Emissions by Scope (Scope 1, 2 & 3), 2014



COMPARISON TO BASELINE YEAR

Scope 1 and 2 Emissions

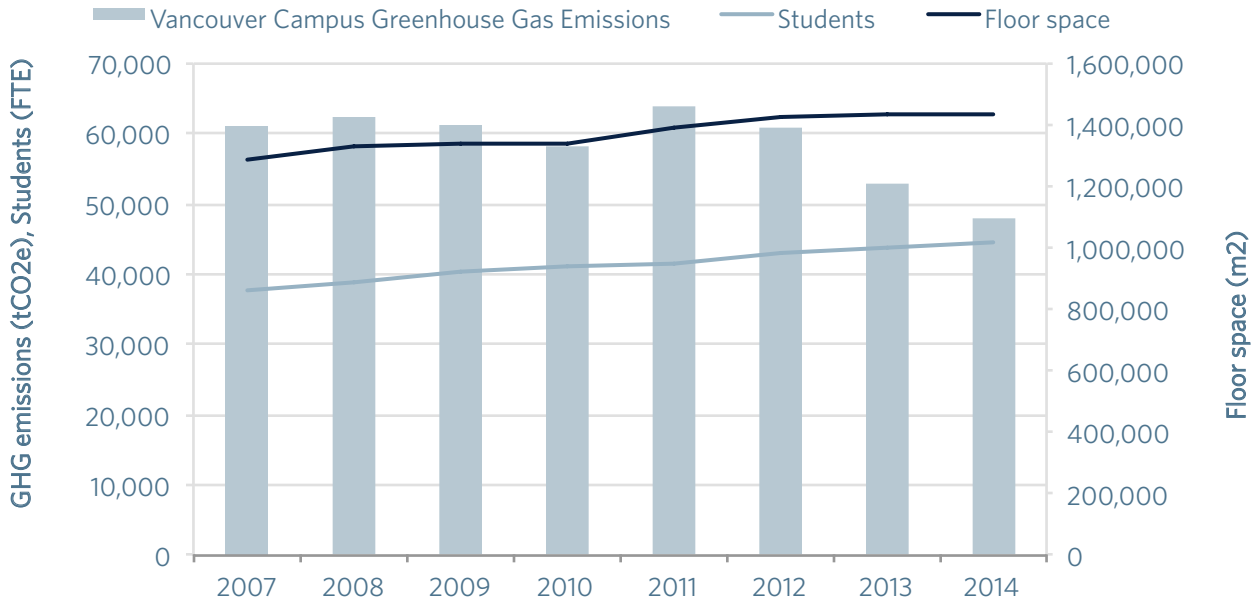
From 2007 to 2014, UBC's Vancouver Campus offsettable emissions decreased 22 per cent, despite an 11 per cent increase in building floor space and an 18 per cent increase in student enrolment. The emissions from campus buildings along with fleet and paper amounted to 1.08 tCO_2e per full-time equivalent student in 2014, a 34 per cent decrease in emissions per student since 2007. UBC's Vancouver Campus building floor space increased by over 145,000 square metres between 2007 and 2014, with several older buildings demolished to make way for construction of new buildings.

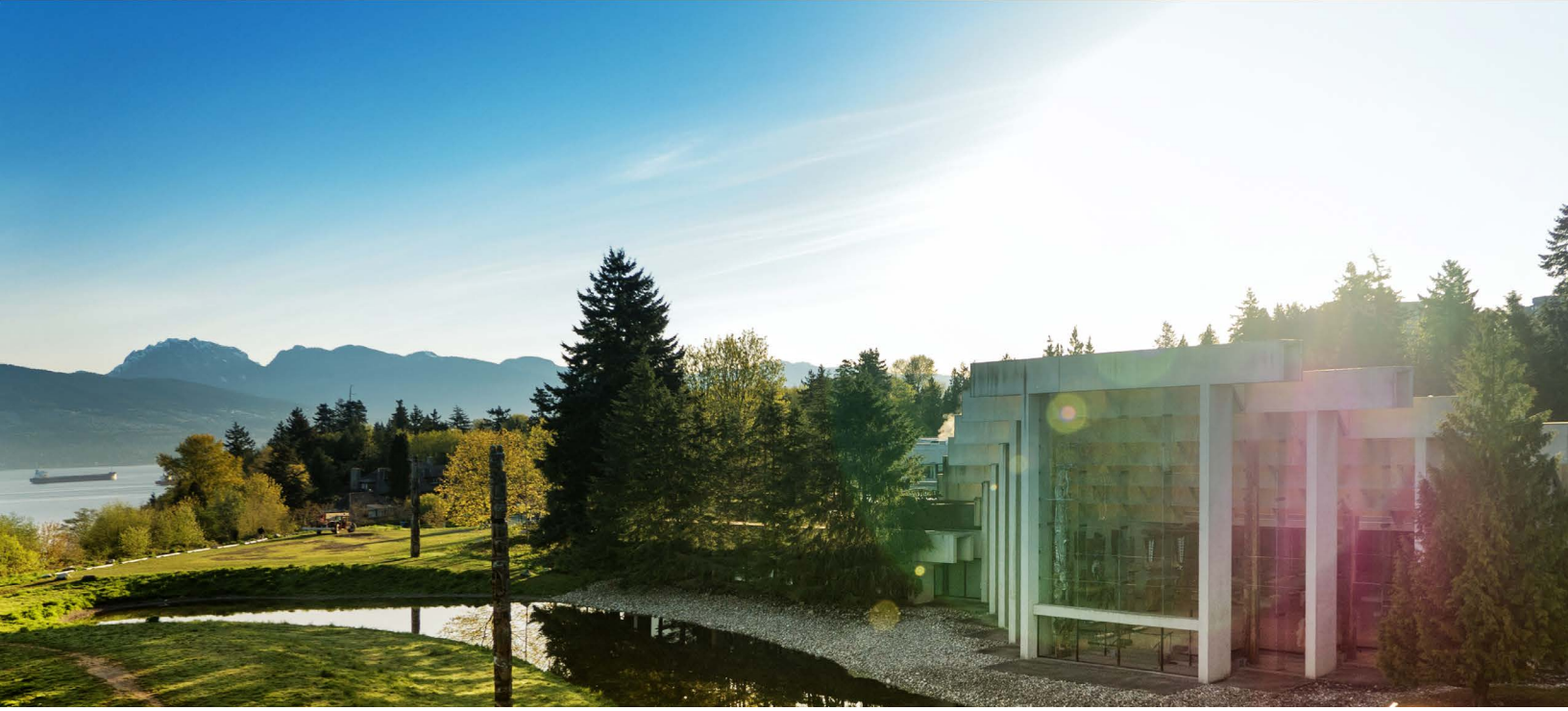
Table 4 and *Figure 2* outline the change in campus emissions since the 2007 baseline year, along with indicators of UBC Vancouver campus growth. Student enrolment increased by over 6,500 full-time equivalent (FTE) students from 2007 to 2014 while faculty and staff remained the same.

Table 4: UBC's Vancouver Campus Offsettable Emissions Compared to 2007 Baseline

Key Performance Indicator	2007	2014	Change from 2007 to 2014
GHG Emissions (tonnes CO_2e)	61,082	47,814	-22%
Staff and Faculty Employees (FTE)	12,461	12,398	-1%
Student Enrolment (FTE)	37,589	44,388	+18%
GHG Emissions per Student (tonnes CO_2e/FTE)	1.62	1.08	-34%
Floor Space (square meters)	1,284,462	1,429,847	+11%
GHG Emissions per square meter (tonnes CO_2e/m^2)	0.048	0.033	-30%

Figure 2: UBC's Vancouver Campus Offsettable Emissions and Growth, 2007 to 2014





Scope 3 Emissions

UBC's Vancouver Campus Scope 3 emissions (*Table 3*) can also be evaluated in the context of indicators of growth in population and floor space (*Table 4* and *Figure 2*).

While total commuting emissions increased from 2007 to 2014, student, staff and faculty population increased at a greater rate, resulting in a three per cent decrease in commuting emissions per capita. This decrease is primarily due to a shift in mode share; trips by single-occupancy vehicles and carpools decreased while trips by transit increased from 2007 to 2014.

Air travel emissions are affected by changes in employee population and travel patterns. The current focus is on developing a more accurate methodology for tracking the associated emissions[1]. Building lifecycle emissions are proportional to campus floor space, which increased from 2007 to 2014. Solid waste emissions decreased from 2007 to 2014 despite the increase in campus population during that time. This is a result of the change in emission factor and a decrease in the total amount of operational waste disposed to the landfill or incinerated during that time.

UBC's Climate Action Plan includes strategies for reducing Scope 3 emissions related to commuting, business travel, procurement and food. For additional details on targets, performance and actions, please refer to the full UBC Annual Sustainability Report.

[1] *Calculations for air travel emissions are currently approximate as only half of flights are booked through agencies that can track mileage for UBC. The emissions associated with tracked flights are pro-rated by total expenditure on flights to include an estimate of emissions associated with flights booked personally.*

OFFSETS APPLIED TO BECOME CARBON NEUTRAL IN 2014

As required by provincial regulation, UBC purchased a total of 51,881 tonnes of offsets for UBC's Vancouver Campus, Properties Trust and off-campus properties to become carbon neutral for 2014, including adjustments to previous years (see *Tables 5* and *6*).

In alignment with international reporting requirements, biogenic emissions ($BioCO_2$) which are carbon dioxide emissions from biomass, renewable natural gas (RNG) and biofuels, are not required to be offset due to their renewable sources but still must be reported. The main source of $BioCO_2$ at UBC's Vancouver campus is from the BRDF which consumes biomass in its thermal process and RNG in its cogeneration process. In addition, a portion of the vehicle fuel consumed by UBC contains renewable content, as mandated by BC's Renewable and Low Carbon Fuel Requirements Regulation. Total UBC Vancouver $BioCO_2$ emissions amounted to 16,549 tCO_2e in 2014. Including $BioCO_2$ emissions, total emissions for the UBC Vancouver Campus, Properties Trust and off-campus properties amount to 68,432 tCO_2e in 2014 (see *Table 5*). Methane and nitrous oxide emissions from these sources are required to be offset and are included within the offsettable emissions.

Table 5: Total 2014 Emissions for UBC's Vancouver campus and off-campus properties

Location	2014 Emissions (tCO_2e)
UBC's Vancouver campus	47,814
Off-campus properties	2,048
UBC Properties Trust	2,021
Total offsettable emissions	**51,883**
Emissions not required to be offset	16,549
Biomass CO_2 emissions	*13,862*
RNG CO_2 emissions	*2,631*
Biofuel CO_2 emissions	*56*
Total emissions including biomass	**68,432**

CHANGES TO PREVIOUS EMISSIONS AND OFFSETS REPORTING

UBC over-reported in 2012 and this year received two tonnes of offset credit. BC's Global Warming Potentials (GWP) for Greenhouse Gases were updated in parallel with the implementation of updates by the United Nations Framework Convention on Climate Change for national inventory reporting. BC's GWP values reflect the 2007 standards from the IPCC's Fourth Assessment Report which affected UBC's emissions reported in 2010, 2011, 2012 and 2013, but not offsets. The corrected emissions for the combined UBC's Vancouver Campus, Properties Trust and off-campus properties are summarized in Table 6 below.

Table 6: Corrections to 2010-2013 Emissions

Category	Reported Emissions (tCO_2e)	Corrected Emissions (tCO_2e)	Additional offsets purchased (tCO_2e)
Total 2010 offsettable emissions	61,649	61,639[1]	
Total 2010 emissions	61,712[1]	61,703	
Total 2011 offsettable emissions	67,767	67,755[2]	
Total 2011 emissions	67,813	67,801	
Total 2012 offsettable emissions	64,809	64,796[3]	-2
Total 2012 emissions	66,828	66,815	
Total 2013 offsettable emissions	56,801	56,785[4]	
Total 2013 emissions	71,289	71,272	
Total Additional Offsets Purchased			-2

[1] Includes a reduction of 9 tCO_2e due to updates to BC's Global Warming Potentials of Greenhouse Gases.
[2] Includes a reduction of 12 tCO_2e due to updates to BC's Global Warming Potentials of Greenhouse Gases.
[3] Includes a reduction of 11 tCO_2e due to updates to BC's Global Warming Potential of Greenhouse Gases and a reduction of 2 offsets due to payment for expired leases.
[4] Includes a reduction of 17 tCO_2e due to updates to BC's Global Warming Potentials of Greenhouse Gases.

ACTIONS TO REDUCE EMISSIONS

In 2014, we made significant progress on implementing the three core projects of our Vancouver Campus Climate Action Plan, which will together achieve our aggressive GHG reduction targets of 33 per cent reduction in emissions by 2015 compared to 2007 levels.

- INVESTING IN LOW CARBON, RENEWABLE AND ALTERNATIVE ENERGY SOURCES

  UBC's Bioenergy Research and Demonstration Facility, a pioneering campus as a living lab project, completed the second full year of operation, generating heat from renewable biomass and electricity from Renewable Natural Gas (RNG). In 2014, the facility converted 8,250 tonnes of renewable biomass (wood waste) to produce over 16 per cent of total campus steam production, significantly reducing natural gas use on campus and eliminating 11 per cent of campus GHG emissions compared to 2007 levels. In 2014, to further optimize the facility, UBC has completed a project that allows dual fuel supply to the engine, using either Biomass Syngas or RNG. In just five months in 2014, the cogeneration engine has already provided three per cent of annual electricity consumption and reduced electrical demand by two megawatts. The facility has also provided faculty, staff, students and private sector partners the opportunity to study, test, teach and apply lessons learned at the facility.

- INVESTING IN INNOVATIVE AND EFFICIENT ENERGY GENERATION AND DISTRIBUTION PROJECTS

  Over half of the five-year Academic District Energy System steam to hot water conversion project is now complete, including the start of construction of the new 60 megawatt thermal Campus Energy Centre, which will become operational in 2015 to replace the campus' aging steam boiler plant. Construction is completed on Phase 5, which has connected an additional 25 buildings (117,000 square metres) to the district energy system. When complete, the $88 million project will replace 14 km of aging steam system piping infrastructure and connect a total of 130 buildings (800,000 square metres of building floor space) to the more efficient district energy system, reducing emissions by 22 per cent and saving $5.5 million a year in operational costs.

- TUNING UP OUR EXISTING BUILDINGS TO OPTIMIZE PERFORMANCE

  We are continuing to implement our "Building Tune Up" program to conserve energy and increase efficiency in over 70 major buildings across campus. In 2013, implementation was completed for 17 energy-intensive laboratory buildings in Phase 1, including completion of over 100 Energy Conservation Measures. Another 24 buildings will commence implementation in 2015, followed by a further 27 buildings that are already investigated. Overall, the program is targeted to reduce emissions in core buildings by 10 per cent in combination with behavior change programs and in-house reduction measures.

For a full report on UBC's sustainability and climate action plans, initiatives and performance, please refer to our comprehensive Annual Sustainability Reports, available online.

UBC VANCOUVER: ACTIONS SURVEY

2014 CARBON NEUTRAL ACTION REPORT (CNAR) - PART 2 ACTIONS SURVEY

ORGANIZATION NAME

University of British Columbia – Vancouver Campus

ACTIONS TAKEN TO REDUCE EMISSIONS

1) Stationary Fuel Combustion, Electricity (Buildings): Indicate which actions were taken in 2014:

Survey Question	Response
Performed energy retrofits on existing buildings	Yes
Built or are building new LEED Gold or other "Green" buildings	Yes
Undertook an evaluation of overall building energy use	Yes

Please list any other actions taken to reduce emissions from Buildings:

The Continuous Optimization "Building Tune-Up" program is retro-commissioning over 70 buildings, targeted to reduce emissions in core buildings by 10 per cent combined with behaviour change programs. Implementation is completed in 17 laboratory buildings, another 24 buildings will commence implementation in 2015, and a further 27 buildings have completed investigation with implementation to commence in 2016.

As of 2013/14, UBC had a total of 23 LEED* projects on campus (8 certified, 15 registered) and 27 REAP** projects on campus (20 certified, 7 registered).

**All new construction and major renovations for institutional buildings at UBC must achieve a minimum of LEED Gold certification.*

***UBC's Residential Environmental Assessment Program (REAP) is a comprehensive, UBC-specific green building rating system for mandatory application to all residential construction on campus. All new residential buildings at UBC must achieve a minimum of REAP Gold certification.*

2) Mobile Fleet Combustion (Fleet and other vehicles): Indicate which actions were taken in 2014:

Survey Question	Response
Do you have a fleet?	Yes
Replaced existing vehicles with more fuel efficient vehicles (gas/diesel)	Yes
Replaced existing vehicles with hybrid or electric vehicles	Yes
Reduced the overall number of fleet vehicles	Yes
Took steps to drive less than last year	Yes

Please list any other actions taken to reduce emission from fleet:

In 2014, UBC's Building Operations department, which operates the central campus fleet of 240 vehicles, received Canada's first E3 (Energy, Environment, Excellence) Platinum Certification for sustainable fleet management. Several steps have been taken to better the performance of the fleet:

- Adopted a green fleet plan
- Implemented better tracking and analysis of fleet data, including data on fuel use
- Replaced vehicles when due for replacement, to minimize repair costs and fuel use
- "Right-sized" the fleet in all vehicle classes (light, medium and heavy duty), by choosing smaller, more efficient vehicles suited to the task
- Trained staff on fuel management and fuel-efficient driving practices
- Purchased electric bikes with detachable trailers, used by trades staff on campus
- Integrated alternative fuel infrastructure including B5 biofuel, electric vehicle charging stations, and a CNG fueling station.

Between 2011 and 2013, Building Operations cut GHG emissions in its' fleet by 217 tonnes, or 25 per cent, and increased average fuel efficiency by 16 per cent. More information on fleet initiatives is available online at: http://www.buildingoperations.ubc.ca/sustainability/fleet/.

UBC has 18 electric vehicle charging stations on campus, enabled through the Provincial Community Charging Infrastructure Fund, including 10 stations at the University Services Building to power the campus fleet and 8 stations at Thunderbird Parkade available for faculty, staff, and the general public to use free of charge.

Sustainable fleet management strategic goals, objectives, and performance metrics were also incorporated into department-level Sustainability Frameworks developed in 2013 for key operational departments on campus, including Building Operations and Student Housing and Hospitality Services.

3) Supplies (Paper): Indicate which actions were taken in 2014:

Survey Question	Response
Used less paper than previous year	No
Used only 100% recycled paper	No
Used some recycled paper	Yes
Used alternate source paper (Bamboo, hemp, etc.)	Yes

Please list any other actions taken to reduce emissions from paper use:

Since our 1999 baseline, UBC has reduced paper consumption by a total of 70 per cent per capita. In 2014, 79 per cent of total paper purchases contained 30 per cent post-consumer recycled (PCR) content or better, an increase of 8 per cent from 2013. As well, UBC tripled its purchases of wheat paper, a forest-free paper alternative that uses waste wheat straw instead of wood fiber. Although the paper purchased contained higher recycled content and forest-free paper, UBC increased its paper consumption in 2014 by 5 per cent from 2013 levels.

UBC's preferred paper supplier, OfficeMax Grand and Toy, offers a broader offering of PCR stock at better pricing, including more competitively priced 30-100 per cent PCR content paper as well as Wheat Sheet paper.

As part of UBC's Payment and Procurement Services (PPS) Sustainability Framework, PPS has set the target to eliminate the use of virgin paper and promote a minimum of 50 per cent PCR content and alternative fiber for paper purchases on campus.

4) Explain how you plan to continue minimizing emissions in 2015 and future years:

UBC's Vancouver campus will continue to implement the core Climate Action Plan projects, including continued optimization of major campus buildings, completion of the 5-year steam to hot water conversion project and continued optimization of the Bioenergy Research and Demonstration Facility. UBC's Climate Action Plan projects are forecasted to achieve the targeted 33 per cent emissions reduction compared to 2007 levels in 2016. In 2015, work will commence on updating UBC Vancouver's Climate Action Plan for 2015-2020 to identify additional actions and measures to advance towards its aggressive targets.

Energy & Water Services is targeting to reduce electricity consumption by 4GWh/yr and Natural Gas consumption by 20,000GJ/yr until 2020 in order to achieve UBC's 2020 GHG reduction target (67 per cent below 2007 levels). This will be achieved through the following demand-side initiatives:

- Complete re-commissioning of all major buildings on campus
- Complete re-commissioning of all energy intensive laboratory space on campus
- Identifying and implementing further heat recovery projects

On the energy supply side, UBC will be seeking additional renewable energy sources for the Academic District Energy System, needed to offset 300,000GJ of Natural Gas and achieve UBC's GHG reduction targets.

For additional details, please refer to UBC's Sustainability Plans and Annual Reports: http://sustain.ubc.ca/our-commitment/strategic-plans-policies-reports/.

ACTIONS TO PROMOTE SUSTAINABILITY AND CONSERVATION – OPTIONAL

The following are actions that fall outside the scope of the Carbon Neutral Government Regulation, but which many organizations still undertake and may wish to report on. This section is optional for reporting.

Business Travel & Virtual Meeting Technology

Survey Question	Response
Created a low-carbon travel policy or travel reduction goal (Low-carbon: Lowest emission of greenhouse gases per kilometre per passenger)	No
Installed web-conferencing software (e.g., Live Meeting, Elluminate, etc.)	Yes
Made desktop web-cameras available to staff	No
Encourage alternative travel to meetings (e.g., bicycles, public transit, walking)	Yes
Encourage carpooling to meetings	Yes

Education and Awareness

Survey Question	Response
Have created Green, Sustainability, Energy Conservation, or Climate Action Teams	Yes
Provided resources and/or dedicated staff to support these teams	Yes
Provided behaviour change education/training for these teams (e.g., community-based social marketing)	Yes
Established a sustainability/green awards or recognition program	Yes
Support green professional development (e.g., workshops, conferences, training)	Yes

Planning for Climate Change

Survey Question	Response
Have assessed whether extreme weather events and/or long term changes in climate will affect our organization's business areas	Yes
Long term changes in climate have been incorporated into our organization's decision making	Yes

Staff Awareness and Education

Survey Question	Response
Provided education to staff about the science of climate change	Yes
Provided education to staff about the conservation of water, energy, and raw materials	Yes
Provided green tips on staff website or in newsletters	Yes

Alternate Work/Commuting Options

Survey Question	Response
Allow for telework/working from home	Yes
Staff have the option of a compressed work week	Yes
Commuting by foot, bicycle, carpool or public transit is encouraged	Yes
Shower or locker facilities are provided for staff/students who commute by foot or by bicycle	Yes
Secure bicycle storage is provided	Yes

Other Sustainability Actions

Survey Question	Response
Establish a water conservation strategy which includes a plan or policy for replacing water fixtures with efficient models	Yes
Put in place a potable water management strategy to reduce potable water demand of building-level uses such as cooling tower equipment, toilet fixtures, etc. and landscape features	Yes
Have put in place an operations policy to facilitate the reduction and diversion of building occupant waste from landfills or incineration facilities	Yes
Have implemented a hazardous waste reduction and disposal strategy (Hazardous Waste: E.g., electronics including computer parts and monitors, batteries, paints, fluorescent bulbs)	Yes
Have incorporated minimum recycled content standards into procurement policy for consumable, non-paper supplies (e.g., writing instruments, binders, toner cartridges, etc.)	No
Established green standards for goods that are replaced infrequently and/or may require capital funds to purchase (e.g., office furniture, carpeting, etc.)	No
Incorporated lifecycle costing into new construction or renovations	Yes
Please list and other sustainability actions you wish to report not included in the previous list. For additional details on UBC's sustainability initiatives, goals, and performance please refer to UBC's Annual Sustainability Reports online at: http://sustain.ubc.ca/our-commitment/plans-policies-reports	

PART B

UBC Okanagan Campus Emission Details

SECTION CONTENTS

OKANAGAN CAMPUS SUMMARY

2014 represented a year of review for UBC's Okanagan campus. Having more than doubled student enrolment and nearly tripled campus floor space since 2005, it was a year where our commitment to sustainable development and continuous improvement in performance was demonstrated by an absolute reduction in emissions.

Combined project funding of over $300,000 secured by the campus through the BC Provincial Government's Carbon Neutral Capital Program and partnership with FortisBC, formed the basis of our carbon emission reduction activities in 2014 as detailed in this report.

Looking ahead, UBC is updating its Okanagan Campus Plan to address future campus development needs. Demonstrating our commitment to sustainability and fiscally responsible development, we are taking a whole systems approach to planning in order to optimize the campus' sustainability resources (energy, water, waste), facilities infrastructure and ecosystems planning.

We view this approach as a key prerequisite to UBC Okanagan's long-term sustainability roadmap that will define our continued actions to support climate stewardship, resiliency, and the overall health and wellbeing of our campus community.

C. MORCOM
Acting Associate Vice-President
Finance and Operations
The University of British Columbia - Okanagan Campus

EMISSIONS OVERVIEW

2014 GREENHOUSE GAS EMISSIONS

The following greenhouse gas (GHG) emissions have been quantified using the B.C. Provincial Government's SMARTTool Reporting Framework.

Table 1: GHG Comparison by Source between 2013 - 2014

Source	2013 Emissions (tonnes CO_2e)	2014 Emissions (tonnes CO_2e)	Change from 2013 to 2014
Buildings	3017.4 (83.1%)	2746 (87.9%)	-8.99%
Fleet	35 (1%)	42 (1.3%)	+20%
Paper	73.5 (2.0%)	69 (2.2%)	-6.12%
Fugitive	504 (13.9%)	268 (8.6%)	-46.83%
Total Emissions	3,630	3,125	-13.91%
Total Offsettable emissions	3,629	3,123	-13.94%

**Individual amounts may not sum exactly due to rounding.*

Fugitive Emissions

In 2014, in-scope HFCs were 268 tCO_2e, approximately 8.6 per cent of the campus' total emissions portfolio. While in-scope fugitive emissions decreased by 236 tCO_2e in 2014 as compared to 2013, it should be noted that 2013 levels were inflated due to an uncommon chiller failure that year.

Carbon Neutral Offsets in 2014

In accordance with the campus SMARTTool[1] reporting, offsets required to achieve carbon neutrality in 2014 total 3,123 tCO_2e. As part of the Okanagan campus' 2014 GHG emissions profile 1 tCO_2e does not require offsets.

Changes to Greenhouse Gas Emissions and Offsets Reporting from Previous Years

Following the public release of the 2013 Carbon Neutral Action Overview Report, it was determined that the total emissions and offsets applied for buildings (leased-space) required adjustment. For 2013 calendar year offsets were under reported by 3 tCO_2e.

1 Protocols established in the 2014 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions.

EMISSIONS REDUCTION ACTIVITIES

ACTIONS TAKEN TO REDUCE GREENHOUSE GAS EMISSIONS IN 2014

The following provides an overview of actions and plans reported in the CNAR Actions Form.

A. Stationary Fuel Combustion, Electricity (Buildings)

The largest source of in-scope GHG emissions on campus derive from buildings. Absolute stationary building emissions decreased by 271 tCO_2e or 9 per cent, compared to the 2013 reporting year, which demonstrates a continued reduction trend from 2012 figures.

Relative GHG emissions per square meter has improved by 14 per cent over last year, and by 34 per cent compared to 2007, despite a 90 per cent increase in square meter since 2007.

New energy efficient campus facilities, continued optimization of campus legacy facilities and the district energy system (DES) and the promotion of energy conservation actions among building occupants are among contributing factors toward performance improvements in this area.

ACTIONS:

- First full year of operation of new high efficiency condensing boiler in the Central Heating Plant which projected 145 tCO_2e reduction per year.
- Implemented domestic hot water upgrade projects in two original academic facilities anticipated to reduce carbon emissions by *40 tCO_2e per year.
- Implementation of twenty-two Energy Conservation Measures (ECMs) in three original academic facilities under the Building Optimization Program, projected to save *43 tCO_2e per year.
- Incorporated sustainability considerations into deferred maintenance and routine capital project decisions to achieve energy and carbon savings.
- Conducted lighting retrofits and upgrades across campus.
- Fostered energy-reduction behaviour change among staff to support energy efficient actions such as turning off lights and alternatives to space heating devices.

**Emissions savings based on 2014 emission factors for natural gas consumption by buildings, as illustrated in Table 1: Stationary Fuel Combustion (p. 12) of the 2014 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions*

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

In 2014, fleet accounted for 42 tCO_2e, or 1.3 per cent of total campus emissions, up by 7 tCO_2e, largely due to a reclassification of heavy-duty vehicle fuel efficiency factors. Although there was an increase in fleet emissions from 2013, the campus has achieved a 33 per cent absolute reduction in fleet emissions since 2010.

ACTIONS:

- Replaced legacy gas golf carts with new electric models, resulting in one gas golf cart remaining in fleet inventory planned for replacement with electric in 2015.
- Completed an inventory control program for custodial supplies to centralize orders to reduce 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.
- Implemented 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.

C. Supplies (Paper)

In 2014, emissions from paper accounted for 69 tCO_2e, or 2.2 per cent of total in-scope campus emissions. While emissions from office paper have increased since 2010, comparison between 2013 and 2014 demonstrates a 6.1 per cent absolute reduction in GHG emissions attributed to this source.

ACTIONS:

- Audited print fleet to identify areas for improved energy efficiencies which supported a reduction of individual devices connected to the campus network and associated space intensification of devices
- Established default duplexing of all student print jobs.
- Preliminary work undertaken to implement PaperCut™ print tracking software to track, report and encourage the reduction of paper consumption by users.
- Continued to promote the purchase of 30 per cent at minimum or greater post-consumer recycled content paper.
- Continued to ensure wheat sheet paper is available to order from the custom list as an alternative source to tree-derived paper.
- Implemented high efficiency digital signs and related communications platforms to share campus news, activities and events to reduce the reliance on paper-based promotional materials.

PLANS TO CONTINUE REDUCING GREENHOUSE GAS EMISSIONS 2015-2016

A. Stationary Fuel Combustion, Electricity (Buildings)

- Complete implementation phase of building optimization program in 2015 in two remaining legacy buildings. An anticipated *145 tCO_2e annual reduction is projected for 2015 projects.
- Develop proposals to convert gas-fired hot water tanks in a legacy academic facility to heat pumps for domestic hot water use.
- Implement a proposal for chiller replacements in two legacy academic buildings.
- Re-commission and balance air, water and controls in one building per year.
- Continue to implement sub-metering and BMS enhancements for better measurement of energy consumption and conservation planning, including peak demand.
- Complete auditing of campus lighting systems to baseline to inform future lighting upgrades in buildings and parking lots.
- Focus on Okanagan Campus Plan update implementation with Whole Systems Infrastructure Plan as the main component.

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

- Continue replacement of any remaining legacy gas golf carts with new electric models for an electric-only fleet by 2016.
- Continue the 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.
- Continue to encouraging fleet carpooling, walking or cycling, and consolidating off-campus trips to reduce operational reliance on fleet vehicles.
- Launch Okanagan Car Share Co-op on campus to provide flexible and affordable alternative transportation options, reducing needs for multiple single-occupant/owner vehicles on campus, and decreasing dependence on fossil fuels.

C. Supplies (Paper)

- Complete the full implementation of PaperCut™ print tracking software to provide reporting to clients on printing. volumes to generate awareness and promote alternatives to printing.
- Xerox fleet enhancement.
- Continue to promote the purchase of 30 per cent at minimum or greater post-consumer recycled content paper.
- Continue to ensure wheat sheet paper is available to order from the custom list as an alternative source to tree-derived paper.
- Continue to implement and increase digital signs and related communications platforms to share news, activities and events to reduce the reliance on paper-based promotional materials.
- Increase replacement of desktop computers with laptops and more efficient devices as part of IT, Media & Classroom Services Computer Replacement Program.

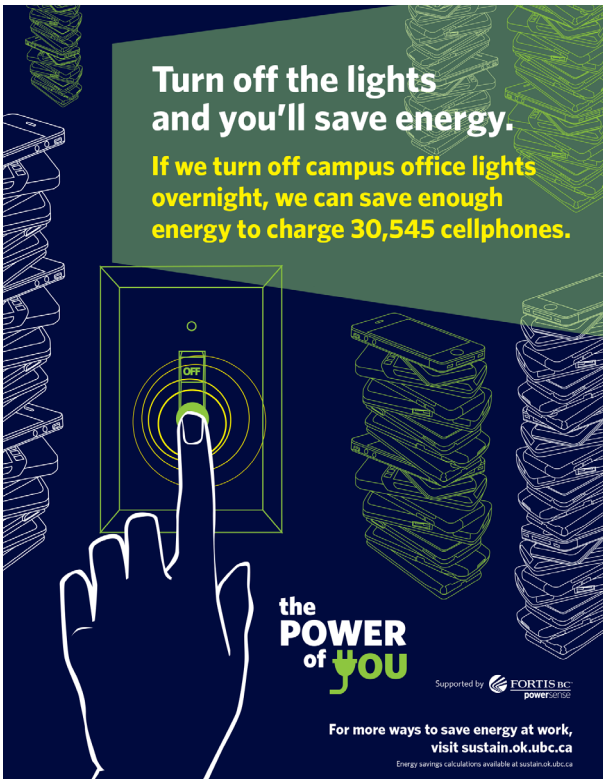
ABOVE AND BEYOND:
Promoting a Culture of Sustainability

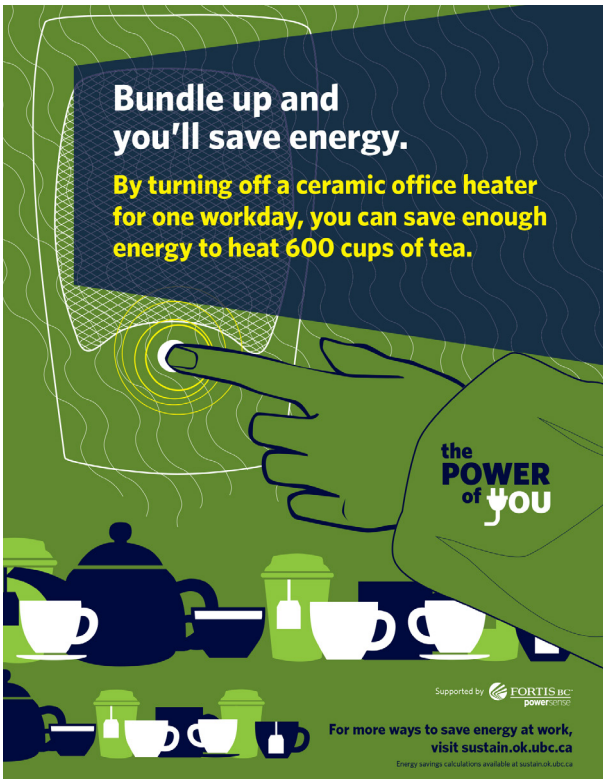
ENERGY CONSERVATION PHILOSOPHY & PRACTICES

The Power of You

It is well-established that promoting and supporting behaviours that impact energy use can have as much or greater impact on energy savings than implementing physical retrofits alone. Founded on community based social marketing principles, in 2014, UBC Okanagan's Power of You energy conservation behaviour change program continued to provide education to staff, faculty and students with an aim to foster, promote, and assess the impact of voluntary actions to conserve energy and reduce carbon emissions. The program was made possible through $5,000 in sponsorship cash contributions and $4,000 in-kind items secured from FortisBC, in addition to the time of community ambassadors, responsible for the provision of education and support to UBC staff, faculty and students at the Power of You outreach activities and events.

In 2014, a range of educational activities took place, including Ugly Sweater Day in support the World Wildlife Fund Canada's National Sweater Day; a Focus on Labs energy reduction campaign; and a one-hour no-power challenge in support of Earth Hour. Volunteer teams were trained and deployed to lead various initiatives across the campus, helping to promote the ability of individual actions to generate collective impact. Reported use of energy conservation tools increased from 16 per cent to 53 per cent.





Departments Take the Lead to Reduce Campus Energy Consumption

In 2014, key operational departments demonstrated strong leadership in energy conservation on campus, predicated on observations of lights-on after hours in unoccupied spaces.

Based on a staff-led audit to monitor and identify areas on campus where energy efficient behaviour of building occupants could be improved, 888 lights, 18 windows and 9 projectors were turned off or closed at night. Voluntary actions and leadership to conserve energy on campus by UBC Okanagan staff demonstrate proactivity toward sustainability engagement efforts.

The Building Optimization Program

The Building Optimization Program, a partnership between UBC Okanagan and FortisBC, strategizes energy reduction in legacy academic buildings through technical retrofits and controls commissioning. In 2014, twenty-two Energy Conservation Measures (ECMs) were implemented throughout three legacy academic buildings. Collectively, the ECMs undertaken anticipate an annual reduction of 438,369 kWh and 835 GJ. This translates to a savings of 42.61 tCO_2e per year, with total energy savings more than $29,000 per year. Total sponsorship secured from FortisBC to run the three year program amounts to nearly $200,000, required to fund energy management system software, energy audits of legacy academic buildings and gas meter upgrades.

ACTIONS TO SUPPORT SUSTAINABILITY PERFORMANCE

Campus Irrigation Project

In 2014, the campus initiated an irrigation upgrade project that anticipates significant improvements in irrigation efficiency and water conservation and associated costs. The initial phase of this three year program focused on auditing existing systems and identifying deficiencies related to distribution uniformity, water savings and maintenance. Initial recommended actions will prioritize zones; install water meters by zone, and transition from spray to drip irrigation.

Lighting Upgrades and Rebates

Multiple interior and exterior lighting upgrade projects were conducted in 2014, which received nearly $8,000 in FortisBC rebates. Lighting upgrades included removing ballasted pot lights and disconnecting T-12 fluorescents and installing LED bulbs and wallpacs.

Biannual Campus Waste Audit

The campus conducted its fourth biannual waste audit in 2014 on three different waste streams - garbage, recycling, and organic waste (compost).

A day's worth of waste from twelve different academic buildings and areas on campus was collected for assessment. Twenty-one student and staff volunteers outfitted in protective gear and equipment were engaged in the audit. All waste was physically or visually sorted into five categories - recycling, returnable, compost, garbage, and other - with fourteen sub-categories indicating material type (i.e. cardboard, tin, glass, etc.). 8,377 litres of garbage, 3,304 litres of recycling, and 54 litres of organic waste was audited, resulting in an amalgamated 11,736 litres of waste audited.

The recycling and compost audits generally revealed satisfactory recycling and composting compliance. 71 per cent recyclable contents were placed in the recycling stream and 89 per cent compostable contents were placed in the compost stream. Recommendations called for consistent and improved waste stream signage, increased education about diversion of disposable cups from the waste stream, and research of composting systems that can accommodate organic waste, disposable coffee cups and foodware.

Bigbelly Smart Waste and Recycling Systems

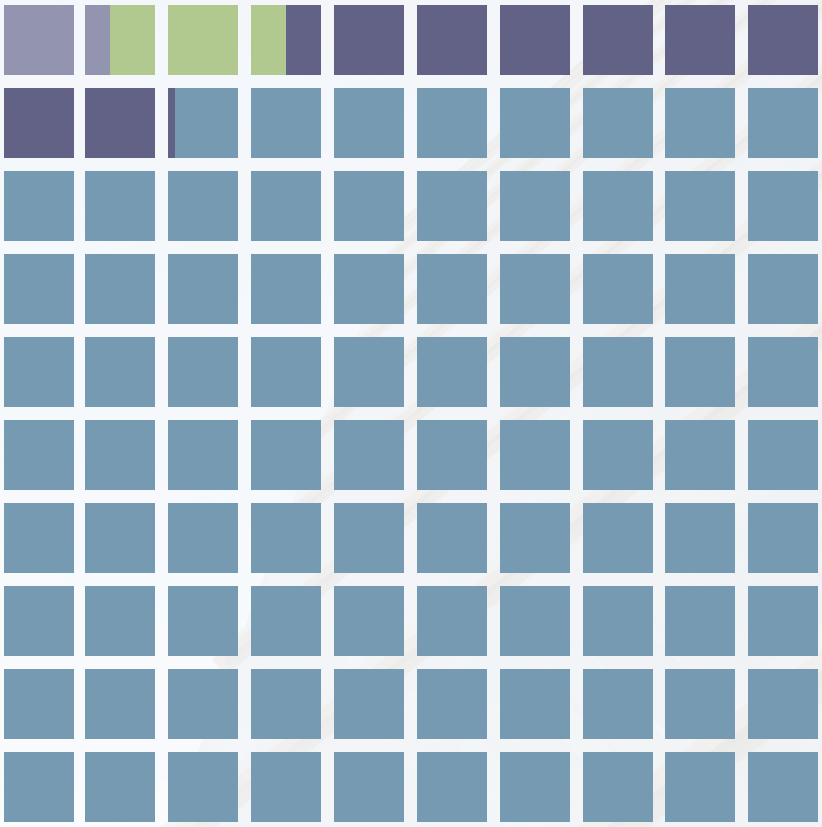
UBC's Okanagan campus piloted alternative waste and recycling platforms to achieve the University's ambitious sustainability goals. The University identified the need for a waste disposal solution that is easy to service, encourages litter reduction, diverts recycling into a separate waste stream, and saves staff labour.

To meet project needs, with an award of Carbon Neutral Capital Program Funding secured by the campus from the BC Provincial Government, the campus selected the Bigbelly Smart Waste and Recycling System. The solar-powered compactors are dual-stream waste stations (trash and recycling) within a single unit, leveraging renewable solar energy and information technology to help realize efficiency gains. Installation of seven Bigbelly stations on campus in 2014 anticipates annual GHG savings of 20 tCO_2e.

Campus Community Engagement

The campus continues to support student engagement in sustainability projects that yield benefit to campus planning and operations and student learning. Examples of projects undertaken by engineering students in 2014 include a campus district energy system and plant operational study, electrical energy and sustainability co-op study and a sustainable community project. Key outputs from the district energy and electrical study have been subsequently applied to a campus-scale sustainable infrastructure planning exercise, planned for completion in 2015.

GHG EMISSIONS BY SOURCE



The following greenhouse gas emissions have been quantified using the BC Provincial Government's SMARTTool Reporting Framework.

1.3% 42	Mobile (fleet and other mobile equipment)
2.2% 69	Supplies (Paper)
8.6% 268	Fugitive (Refrigerants)
87.9% 2,746	Stationary (Building Heating and Generators) and Electricity

TOTAL EMISSIONS: 3,125

OFFSETS APPLIED TO BECOME CARBON NEUTRAL IN 2014

(Generated March 30/2015 3:14 p.m.)

Total offsets required: 3,123. Total offset investment: $78,075.
Emissions which do not require offsets: 1. **

* Tonnes of carbon dioxide equivalent (tCO_2e) 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 OKANAGAN: ACTIONS SURVEY

ORGANIZATION NAME

University of British Columbia - Okanagan Campus

ACTIONS TAKEN TO REDUCE EMISSIONS

1) Stationary Fuel Combustion, Electricity (Buildings): Indicate which actions were taken in 2014:

Survey Question	Response
Performed energy retrofits on existing buildings	Yes
Built or are building new LEED Gold or other "Green" buildings	No
Undertook an evaluation of overall building energy use	Yes

Please list any other actions taken to reduce emissions from Buildings:

- Implemented domestic hot water upgrade projects in the CCS and Administration buildings.
- Conducted energy retrofits under the Building Optimization Program in the CCS, Arts, Science, Library, and Administration buildings.
- Incorporated sustainability considerations into deferred maintenance and routine capital projects to realize energy and carbon savings.
- Conducted lighting retrofits and upgrades across campus.
- Fostered energy-reduction behavior change among staff to support energy efficient actions such as turning off lights and closing windows when not required.

2) Mobile Fleet Combustion (Fleet and other vehicles): Indicate which actions were taken in 2014:

Survey Question	Response
Do you have a fleet?	Yes
Replaced existing vehicles with more fuel efficient vehicles (gas/diesel)	No
Replaced existing vehicles with hybrid or electric vehicles	Yes
Reduced the overall number of fleet vehicles	No
Took steps to drive less than last year	Yes

Please list any other actions taken to reduce emission from fleet:

- Reduced gas golf cart fleet by two, resulting in one gas golf cart remaining in fleet inventory planned for replacement with an electric model in 2015.
- Completed analysis on an inventory control program for custodial supplies to reduce off-campus trips and implement centralized orders.
- 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.
- Implemented 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.

3) Supplies (Paper): Indicate which actions were taken in 2014:

Survey Question	Response
Used less paper than previous year	Yes
Used only 100% recycled paper	No
Used some recycled paper	Yes
Used alternate source paper (Bamboo, hemp, etc.)	Yes

Please list any other actions taken to reduce emissions from paper use:

- Duplexing (printer-settings set to double side) for student print jobs.
- Fleet analysis to reduce paper consumption.
- Preliminary work conducted to enable PaperCut™ print tracking software.
- Continued to promote minimum 30 per cent or greater post-consumer recycled content paper.
- Ensured wheat sheet paper is available to order from the custom list as an alternative source to tree-derived paper.
- Implemented digital signs and related communications platforms to share campus news, activities and events to reduce the reliance on paper-based promotional materials.

(4) Explain how you plan to continue minimizing emissions in 2015 and future years:

- Complete implementation phase of Building Optimization Program in Administration and Science buildings.
- Develop proposals to convert gas-fired hot water tanks in the Science building to heat pumps for domestic hot water use.
- Develop proposal for chiller replacements in the Administration and Arts buildings.
- Re-commission and balance air, water and controls in one building per year.
- Replace the Administration building's gas meter and add electrical sub-panel metering for the Sunshine Café.
- Install meters on main FortisBC electrical meters to measure campus consumption and peak demand in real-time.
- Audit campus lighting systems to capture baseline data required to inform upgrades and continue to conduct lighting upgrades inside buildings, as well as in parking lots.
- Implement whole systems planning actions.
- Install irrigation water meters and flow sensors for the entire irrigation system under Phase 2 of the campus' irrigation project.
- Continue replacement of any remaining legacy gas golf carts with new electric models for an electric-only fleet.
- Continue the stewardship of sustainable mobile 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.
- Continue to encourage fleet carpooling, walking or cycling, and consolidating off-campus trips to reduce reliance on fleet vehicles.
- Enable the use of PaperCutTM print tracking software to provide reporting to clients on printing volumes to generate awareness and promote alternatives to printing.
- Xerox fleet enhancement.
- Continue to implement and increase digital signs and related communications platforms to share news, activities and events to reduce the reliance on paper-based promotional materials.
- Continue to promote the purchase of at minimum 30 per cent or greater post-consumer recycled content paper.
- Continue to ensure that wheat sheep paper is available to order from the custom list as an alternative source to tree-derived paper.
- Increase replacement of desktop computers with laptops and more efficient devices as part of IT, Media & Classroom Services Computer Replacement Program.

ACTIONS TO PROMOTE SUSTAINABILITY AND CONSERVATION – OPTIONAL

The following are actions that fall outside the scope of the Carbon Neutral Government Regulation, but which many organizations still undertake and may wish to report on. This section is optional for reporting.

Business Travel & Virtual Meeting Technology

Survey Question	Response
Created a low-carbon travel policy or travel reduction goal (Low-carbon: Lowest emission of greenhouse gases per kilometre per passenger)	No
Installed web-conferencing software (e.g., Live Meeting, Elluminate, etc.)	Yes
Made desktop web-cameras available to staff	No
Encourage alternative travel to meetings (e.g., bicycles, public transit, walking)	Yes
Encourage carpooling to meetings	Yes

Education and Awareness

Survey Question	Response
Have created Green, Sustainability, Energy Conservation, or Climate Action Teams	Yes
Provided resources and/or dedicated staff to support these teams	Yes
Provided behaviour change education/training for these teams (e.g., community-based social marketing)	Yes
Established a sustainability/green awards or recognition program	Yes
Support green professional development (e.g., workshops, conferences, training)	Yes

Planning for Climate Change

Survey Question	Response
Have assessed whether extreme weather events and/or long term changes in climate will affect our organization's business areas	Yes
Long term changes in climate have been incorporated into our organization's decision making	Yes

Staff Awareness and Education

Survey Question	Response
Provided education to staff about the science of climate change	Yes
Provided education to staff about the conservation of water, energy, and raw materials	Yes
Provided green tips on staff website or in newsletters	Yes

Alternate Work/Commuting Options

Survey Question	Response
Allow for telework/working from home	Yes
Staff have the option of a compressed work week	Yes
Commuting by foot, bicycle, carpool or public transit is encouraged	Yes
Shower or locker facilities are provided for staff/students who commute by foot or by bicycle	Yes
Secure bicycle storage is provided	Yes

Other Sustainability Actions

Survey Question	Response
Establish a water conservation strategy which includes a plan or policy for replacing water fixtures with efficient models	Yes
Put in place a potable water management strategy to reduce potable water demand of building-level uses such as cooling tower equipment, toilet fixtures, etc. and landscape features	Yes
Have put in place an operations policy to facilitate the reduction and diversion of building occupant waste from landfills or incineration facilities	Yes
Have implemented a hazardous waste reduction and disposal strategy (Hazardous Waste: E.g., electronics including computer parts and monitors, batteries, paints, fluorescent bulbs)	Yes
Have incorporated minimum recycled content standards into procurement policy for consumable, non-paper supplies (e.g., writing instruments, binders, toner cartridges, etc.)	Yes
Established green standards for goods that are replaced infrequently and/or may require capital funds to purchase (e.g., office furniture, carpeting, etc.)	No
Incorporated lifecycle costing into new construction or renovations	Yes
Please list and other sustainability actions you wish to report not included in the previous list. Please refer to UBC Okanagan's 2014 Carbon Neutral Action Overview Report.	

ENVISIONING A SUSTAINABLE FUTURE

UBC is a recognized leader in sustainability. The UBC Okanagan campus has developed sustainability initiatives and commitments that support and advance UBC's sustainability goals.

The Okanagan Sustainability Office, Campus Planning and Development was established to help deliver on UBC's sustainability commitments. We aspire to foster leadership across the campus to broaden the impact of sustainability.

Provincially mandated greenhouse gas reporting and Carbon Neutral Action Reporting for the campus are the responsibility of the UBC Okanagan Sustainability Office, Campus Planning and Development. The 2014 Carbon Neutral Action Overview Report contributes to UBC reporting submitted to the Climate Action Secretariat by providing high-level overview of the actions taken by the campus to reduce carbon emissions.

Acknowledgements
Many individuals have contributed to the development of this report. Their commitment to sustainability, collaboration and achievements has been instrumental to the advancement of the campus' collective sustainability goals and we thank them for their contributions.

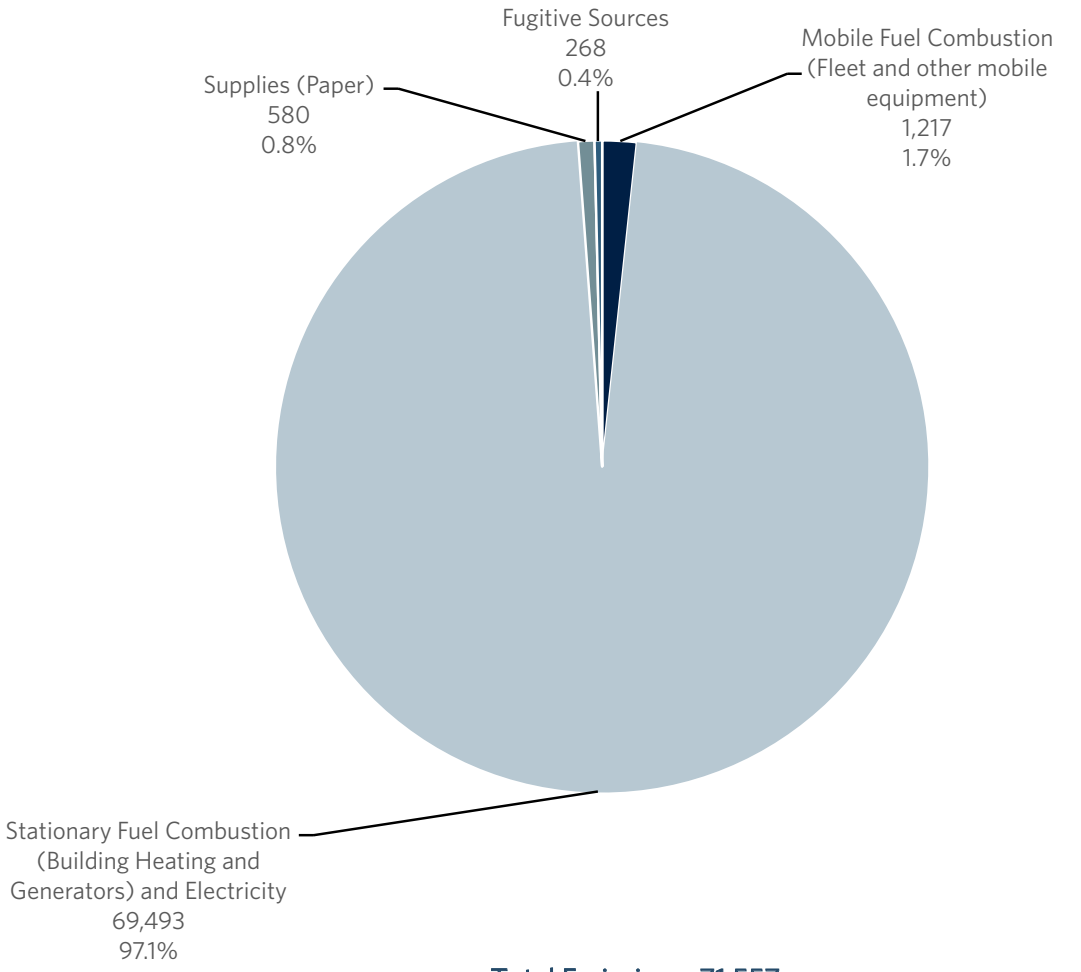
Roger Bizzotto, *Associate Director, Facilities Management*
Martin Gibb, Manager, *Engineering and Utilities Services*
Colin Richardson, Manager, *Energy Systems*
Derek Mahoney, *Acting Manager, Landscape and Contract Services*
Robert Buonomo, *Coordinator, Facilities Service Workers*
Alan Prout, *Coordinator, Facilities Service Assistants*
Bill Dreaper, *Coordinator, Electricians*
Don Thompson, *Deputy Chief Information Officer, IT, Media & Classroom Services*
Steve Rosco, *Senior Manager, IT Infrastructure*
Aaron Heck, *Senior Manager, IT Client Services*
Payment and Procurement Services team

Prepared by
Leanne Bilodeau, *Associate Director, Sustainability Operations*
Alisa Jannink, *Advisor, Sustainability, Okanagan Sustainability Office, Campus Planning and Development*
Support from: JoAnn Rennick Brown, *Assistant to the Director, Campus Planning and Development*
Designer: Margo Yacheshyn, *University Relations*
Contributing Photographers: Darren Handschuh, Patty Wellborn, Margo Yacheshyn

PART C

Emissions Source Report

UNIVERSITY OF BRITISH COLUMBIA GREENHOUSE GAS EMISSIONS BY SOURCE FOR THE 2014 CALENDAR YEAR (tCO_2e*)



Offsets Applied to Become Carbon Neutral in 2014 (Generated May 15, 2015 12:07 PM)

Total offsets required: **55,006**. Total offset investment: **$1,375,150**.

Emissions which do not require offsets: **16,551** **

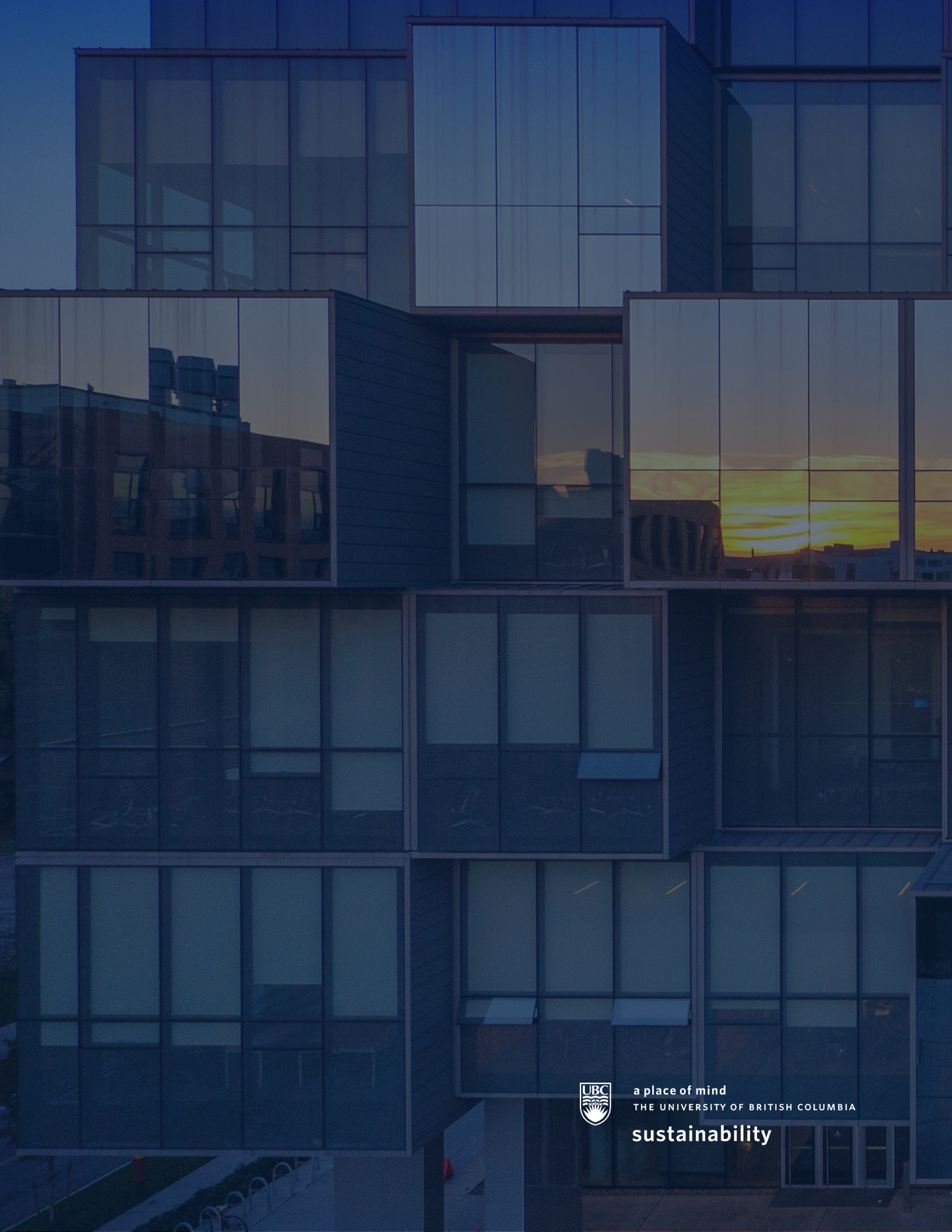
**Tonnes of carbon dioxide equivalent (tCO_2e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.*

*** 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.*

PHOTO CREDITS

Cover, end page and pages 2, 3, 9, 14, 16: Hover Collective
Page 5: http://www.ubc.ca/our-campuses/okanagan/

UBC Okanagan photo credits, see Page 40.



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA
sustainability