

University of Victoria | 2014 Carbon Neutral Action Report



University
of Victoria



Sustainability in action.



May 29, 2015



Executive Summary

At the University of Victoria, our efforts in reducing greenhouse gas emissions and in advancing sustainability resulted in significant progress in 2014.

Greenhouse gas emission levels decreased 11.8 percent in 2014 when compared to 2013. This reduction is a result of our many on-campus initiatives and activities, such as the BC Hydro Continuous Optimization and the Sustainability Action Team programs. Also in 2014, a geothermal system was installed to provide both heating and cooling for our new Centre for Athletics and Special Abilities (CARSA) building with financial assistance from the Carbon Neutral Capital Program (CNCP) of the Ministry of Advanced Education. CARSA opened in May 2015 and is targeted to meet the LEED Gold building certification standard.

Our efforts to reduce greenhouse gas emissions and foster sustainability are also demonstrated through the renewal and approval in June 2014 of our Sustainability Action Plan: Campus Operations 2014 – 2019. Our Plan vision is to integrate sustainability practices and a culture of shared responsibility into all areas of our operations and services, while educating, inspiring and motivating students, staff, faculty and community members in the same practices.

In order to continue the trend of energy reduction and conservation into 2015 and beyond, the University will complete on-going building retrofit projects in partnerships and support with BC Hydro, Fortis BC, and the CNCP, and work with the campus community through behavioural change programs in offices, laboratories, and student residences. However, to reach the 2020 emission reduction target of 33 percent, our university needs to complete large scale projects, such as upgrading the heating plant boilers in our campus energy system. These activities and proposed projects contribute to the emission reductions referenced in this report and the planning for future energy initiatives.

This Carbon Neutral Action Report for the period January 1st to December 31st, 2014 summarizes our emissions profile, the amount of offsets purchased to reach net zero emissions, the actions we have undertaken to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2015 and beyond.

Kristi Simpson

Associate Vice-President, Financial Planning and Operations
University of Victoria

2014 Greenhouse gas emissions

The total greenhouse gas emissions for the University of Victoria are 11,564 tCO₂e for the 2014 calendar year. Emission categories are outlined in Table 1 below:

REPORTING CATEGORY	2013 tCO ₂ e	2014 tCO ₂ e	% CHANGE
University owned buildings and leased spaces: Natural Gas ¹	11,562.9	10,349.0	-10.5%
University owned buildings and leased spaces: Electricity ²	1,006.3	689.9	-31.5%
Mobile combustion (Fleet)	333.9	321.6	-3.7%
Paper supplies ³	201.8	203.2	0.7%
Total	13,104.9	11,563.7	-11.8%

Table 1. Greenhouse gas emissions for the University of Victoria.

The primary source of greenhouse gas emissions at the University of Victoria derives from the energy systems in buildings on campus, which are powered primarily by natural gas. Specifically, 74 percent of the natural gas greenhouse gas emissions are emitted from the district energy system used for space and hot water heating in 32 buildings across the campus.

In 2014, the university's natural gas greenhouse gas emissions have been reduced by 10.5 percent as compared to 2013 values. This reduction in natural gas emissions is primarily due to energy retrofits on building heating systems and increased energy conservation practices. It was also influenced by the fact that there was a decrease in the number of heating degree days.

Electricity based greenhouse gas emissions are down 31.5 percent in 2014 largely due to the change in the emission factor for hydroelectricity purchased in 2014 as compared to 2013 values. Building energy retrofits and energy conservation practices also contributed to the reductions.

Mobile combustion greenhouse gas emissions have decreased by 3.7 percent in 2014. This reduction is due to a decrease in the amount of fuel used in university fleet vehicles.

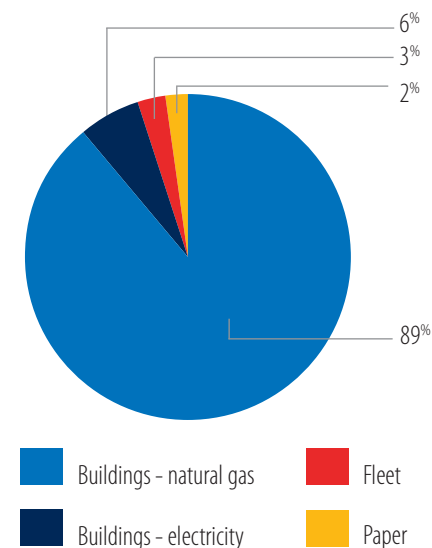


Figure 1: 2014 Greenhouse gas emissions percentage of each reporting category for the University of Victoria

Paper use has decreased campus wide, even with the emissions related to paper supplies increasing by 0.7 percent. This increase is due to a higher use of wheat paper that the supplier had classified as zero percent post-consumer content; however, the university will work to ensure that all future wheat paper purchased are appropriately classified as 80 to 100 percent post-consumer content.

Figure 1 above shows that natural gas accounts for 89 percent of the total emissions, while electricity accounts for 6 percent. Emissions associated with fleet vehicles and paper purchases comprise the remainder.

¹ Value includes an adjustment for natural gas used at the Vancouver Island Technology Park (VITP) building complex (leased space) that was under reported in 2013 and 2012.

² The emission factor for hydroelectricity purchased in 2014 from BC Hydro was down from 2013. Hydroelectricity use in 2014 resulted in 2.8 kgCO₂e/GJ, whereas it resulted in 4 kgCO₂e/GJ in 2013.

³ Value includes an adjustment for purchased paper supplies that was under reported in 2013 and 2012.

Changes to greenhouse gas emissions and offsets reporting from previous years

Following the public release of the 2013 Carbon Neutral Action Report, it was determined that the total emissions were under reported by 30 tCO₂e in 2012 and 341 tCO₂e in 2013 for natural gas and paper supplies. The changes from previous years also include updates of the emission factors applied in SMARTtool. The updated 2012 and 2013 value differences for emissions will be applied against the 2014 emissions offset purchase.

Reporting methodology and practices have been modified to provide greater assurance that prior year changes to greenhouse gas emissions and offsets reporting measures will be limited in future Carbon Neutral Action Reports.



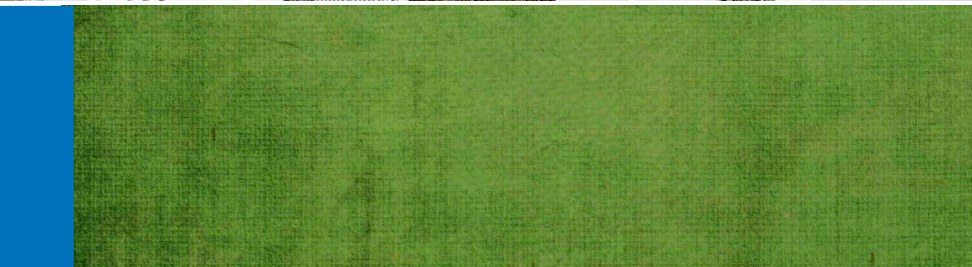
Offsets applied to become carbon neutral in 2014

The total greenhouse gas emissions for the University of Victoria in the year 2014 are 11,564 tCO₂e which includes all properties owned by the university on and off campus, and properties leased from other entities for university business.

This total excludes fugitive emissions as it was estimated that stationary fugitive emissions from cooling do not comprise more than one percent of the University of Victoria's total emissions and an ongoing effort to collect or estimate emissions from this source would be disproportionately onerous. For this reason, emissions from this source have been deemed out-of-scope and have not been included in the University of Victoria's total greenhouse gas emissions profile.

As required by Section 5 of the Carbon Neutral Government Regulation, 12 tCO₂e emissions resulting from the use of bio-fuels were reported as part of our greenhouse gas emissions profile in 2014. However, they were not offset as they are out-of-scope under Section 4(2) of the Carbon Neutral Government Regulation.

The total offset purchase includes 11,552 tCO₂e for 2014, along with adjustments from reporting for previous years. As a result, the total Greenhouse gas emissions that the University of Victoria is required to offset for 2014 is 11,928 tCO₂e.



totem photo: John Holland

Emission reduction activities

The University of Victoria's commitment to sustainability and greenhouse gas reductions is part of a comprehensive institutional effort and is guided by our Sustainability Action Plan: Campus Operations

2014 – 2019. The university strives to integrate sustainability into teaching, research, campus operations and community partnerships. This approach allows us to find synergies across disciplines and departments to assist in advancing campus sustainability and climate action throughout the institution.

Actions taken to reduce greenhouse gas emissions in 2014

- Ninety percent of Phase 2 of the BC Hydro Continuous Optimization program was complete as of December 2014. Phase 2 involves 39 projects in six academic buildings on campus, including a boiler upgrade in the Fraser building. The projects included, but were not limited to, upgrading interior and exterior lighting, domestic hot water heating, space heating and cooling, HVAC control systems and plug loads. The estimated energy savings for these projects is 775,000 kWh of electricity and 3,792,000 ekWh of natural gas, which translates into approximately 700 tCO₂e.
- With financial assistance from BC Hydro, the university conducted a detailed energy study for phase 3 of the Continuous Optimization program. This report recommended more energy conservation retrofits and upgrades similar to phases 1 and 2 for five additional buildings, including the McPherson library and the University Centre buildings. Implementation of phase 3 commenced in early 2015.
- With financial support from the Carbon Neutral Capital Program (CNCPP) of the Ministry of Advanced Education in 2014, a geothermal system was installed to provide both heating and cooling for our new

Centre for Athletics and Special Abilities (CARSA). CARSA is targeted to meet the LEED Gold building standard and opened in May 2015.

- With funding from BC Hydro Power Smart's Workplace Conservation Awareness program, the Sustainability Action Team program continued with behavioural change activities involving staff, students and faculty in three categories: Green Office, Green Lab, and Green Residence.

The Green Office program involved staff from three buildings in 2014 (five buildings participated in 2013, and 10 buildings participated between 2011 and 2012). Building occupants were provided with basic information on how to conserve energy and reduce waste in the workplace. For over a period of two months, building staff teams competed with teams from other buildings by committing to specific sustainable behaviours, such as turning off the lights and commuting to campus by walking, cycling or transit.

The Green Lab program involved a combination of fume hood energy conservation and user safety in the Bob Wright Centre. Chemistry lab users were encouraged to use the setback switches on fume hoods more frequently. Energy savings for this pilot program were equivalent to the energy use of five single family dwellings for one year.

The Green Residence pilot program commenced in September 2014. This student volunteer initiative fostered sustainability leadership and mentorship in campus residential buildings.

- The Revolving Sustainability Fund (RSF), which provides financing for electricity, natural gas and water use reduction projects that demonstrate cost savings to the university, continues to provide funding for projects that would not have otherwise been completed under normal budget scenarios. A proposal for updating interior and exterior lighting in the Student Union Building was approved in 2014. Implementation for this RSF project may commence in the 2015–16 financial year.



Plans to continue reducing greenhouse gas emissions

The University of Victoria is committed to achieving progress on our electricity and greenhouse gas emissions reduction goals. The Sustainability Action Plan: Campus Operations 2014 – 2019 provides a framework for these energy conservation goals as well as on other strategic topics related to energy consumption that requires attention over the next five years and beyond. Specifically, our Sustainability Action Plan's energy mission is to maintain a campus that fosters an energy conservation culture that utilizes innovative technologies and promotes occupant engagement to continually improve building performance, as well as providing a comfortable learning and work environment. In addition, the campus Integrated Energy Master Plan identifies key energy opportunities, plans and budgets for conservation projects and to provide for sustainable energy usage monitoring.

The University of Victoria's priorities to further reduce greenhouse gases in 2015 will be through the following activities:

- Completing phase 2 and implementing phase 3 of the BC Hydro Continuous Optimization program. This program stage utilizes the continued assistance of engineering consultants to train internal Facilities Management Department employees to monitor and optimize the consumption patterns of campus buildings in phases 1 and 2. This will reinforce the reduced energy use in those buildings over its lifespan.
- Upgrading interior and exterior lighting in the Student Union Building (SUB).
- Conducting energy studies on the Fine Arts and Visual Arts buildings.
- Continuing to engage faculty, staff and students with behavioural change initiatives and programs, such as expanding our Green Teams program.

The University of Victoria aims to reach the goals set by the 2007 British Columbia Greenhouse Gas Reduction Target Act; however, in order to achieve a 33 percent total reduction of greenhouse gas emissions by 2020, major capital projects such as the following would need to be undertaken:

- Replacing an older boiler in the district heating system with a new, modern, and energy efficient boiler plant. Greenhouse gas emissions reduced are estimated at 1,100 tCO₂e annually.
- Installing a new rooftop solar system to heat domestic and pool water, and a heat recovery system within the McKinnon building. Natural gas savings are estimated at 212,500 ekWh.
- Installing new hot water boosters in four campus buildings to limit the use of the district heating system during the shoulder seasons. Natural gas savings are estimated at 635,833 ekWh.
- Upgrading boilers, located in buildings, not connected to the main campus district heating system.
- Replacing Cobra high pressure sodium (HPS) campus exterior lighting to light-emitting diode (LED) lamps in some parking, walkway and street areas. Electricity savings are estimated at 165,111 kWh.
- Replacing tower lights with LED lamps in the Centennial Stadium lighting towers. Electricity savings are estimated at 21,160 kWh.
- Installing energy use improvements (HVAC and controls) in the University Club building. An energy study has been completed.
- Installing a waste heat recovery system designed to capture heat emitted from the EDC2 (Enterprise Data Centre) building.

Many of the above projects have significant capital costs and therefore the university's ability to proceed with them and ultimately achieve the 2020 greenhouse gas emissions goal will be impacted by available funding.

pumpkin photo: Elise Pullar



For additional information on sustainability, along with greenhouse gas reporting and energy initiatives at the University of Victoria, please see our website at

uvic.ca/sustainability

2014 Carbon Neutral Action Report (CNAR)

- Part 2 ACTIONS

Organization Name

University of Victoria

Actions Taken to Reduce Emissions

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

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 Green Office program involved staff from three buildings in 2014. Building occupants were provided with basic information on how to conserve energy and reduce waste in the workplace. For over a period of two months, building staff teams competed with teams from other buildings by committing to specific sustainable behaviours, such as turning off the lights and commuting to campus by walking, cycling or transit.

The Green Lab program involved a combination of fume hood energy conservation and user safety in the Bob Wright Centre. Chemistry lab users were encouraged to use the setback switches on fume hoods more frequently. Energy savings for this pilot program were equivalent to the energy use of 5 single family dwellings for one year.

The Green Residence pilot program commenced in September 2014. This student volunteer initiative fostered sustainability leadership and mentorship in campus residential buildings.

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

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

No

Reduced the overall number of fleet vehicles

Yes

Took steps to drive less than last year

No

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

Based on the data observed in the 2013 GHG inventory, the Office of Campus Planning and Sustainability staff engaged with the managers in UVic Facilities and in Campus Security, who manages a sub-section of the campus fleet, with the information.

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

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:

UVic continues to promote the use of electronic data management tools on campus. This includes, promoting the distribution of course materials electronically, using electronic business forms such as invoices to inter-departmental billings and T4 slips, providing executives with tablet computers and promoting the use of laptops, which also has energy reduction implications. UVic promotes the use of shared drives within all departments and is currently in the process of upgrading its Sharepoint Software, which will increase the ability of staff to share information electronically across departments.

UVic is now using wheat paper. UVic Printing Services has effectively transitioned to this paper supply, which should effectively lower our carbon footprint per ream in 2015 and beyond.

UVic continues to set employee and student computers to print double sided by default.

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Actions Taken to Reduce Emissions - continued

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

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Completing phase 2 and implementing phase 3 of the BC Hydro Continuous Optimization program.

This program stage utilizes the continued assistance of engineering consultants to train internal Facilities Management Department employees to monitor and optimize the consumption patterns of campus buildings in phases 1 and 2. This will reinforce the reduced energy use in those buildings over its lifespan.

Upgrading interior and exterior lighting in the Student Union Building (SUB).

Conducting energy studies on the Fine Arts and Visual Arts buildings.

Continuing to engage faculty, staff and students with behavioural change initiatives and programs, such as expanding our Green Teams program.

The University of Victoria aims to reach the goals set by the 2007 British Columbia Greenhouse Gas Reduction Target Act; however, in order to achieve a 33 percent total reduction of greenhouse gas emissions by 2020, major capital projects such as the following would need to be undertaken:

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Upgrading boilers, located in buildings, not connected to the main campus district heating system.

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Installing a waste heat recovery system designed to capture heat emitted from the EDC2 (Enterprise Data Centre) building.

Many of the above projects have significant capital costs and therefore the university's ability to proceed with them and ultimately achieve the 2020 greenhouse gas emissions goal will be impacted by available funding.

If you wish to list any other "sustainability actions" outside of buildings, fleet, paper and travel check "yes". This reporting is optional.

Yes

Actions to Promote Sustainability and Conservation - OptionalThe 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 TravelCreated a low-carbon travel policy or travel reduction goal (Low-carbon: Lowest emission of greenhouse gases per kilometre per passenger)

No

Virtual Meeting TechnologyInstalled web-conferencing software (e.g., Live Meeting, Elluminate, etc.)

Yes

Made desktop web-cameras available to staff

Yes

Encourage alternative travel to meetings (e.g., bicycles, public transit, walking)

Yes

Encourage carpooling to meetings

Yes

Education and AwarenessHave 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 Have assessed whether extreme weather events and/or long term changes in climate will affect our organization's business areas

No

Long term changes in climate have been incorporated into our organization's decision making.

No

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Actions to Promote Sustainability and Conservation - Optional (continued)

Staff Awareness and Education 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 Allow for telework/working from home

Yes

Staff have the option of a compressed work week

No

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 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.)**

Yes

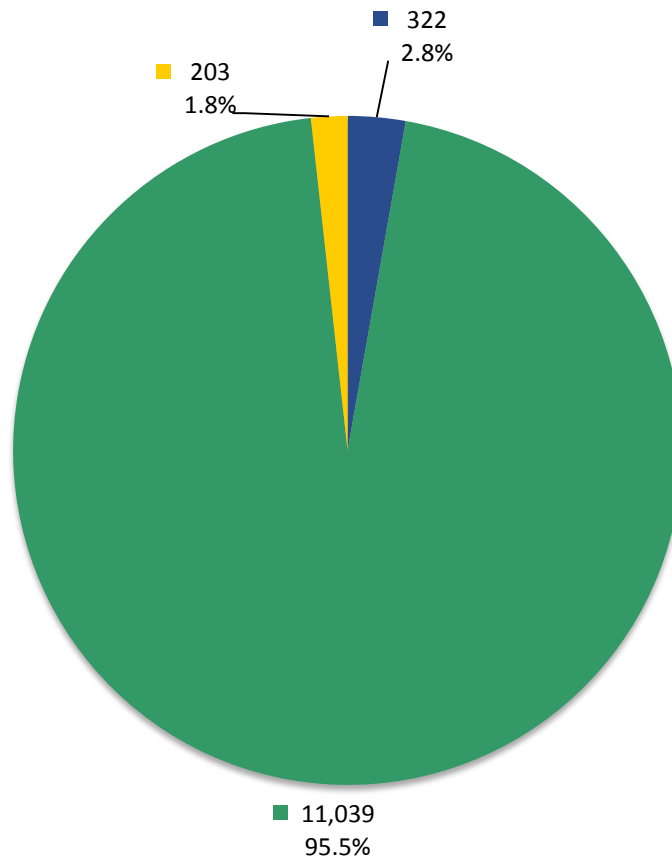
Incorporated lifecycle costing into new construction or renovations

Yes

**Please list and other sustainability actions you wish to report not included in the
previous list.**

In early October of 2014 UVic held its first Sustainability Week, which included more than 14 different events on campus. Each day had a different theme, Monday-Energy, Tuesday- Waste reduction, Wednesday-Transportation, Thursday-Engagement, Friday-Food. This series of events raised the profile of Sustainability at UVic within the critical first 6 weeks of the Fall term.

**University of Victoria
Greenhouse Gas Emissions by Source
for the 2014 Calendar Year (tCO₂e*)**



Total Emissions: 11,564

- Mobile Fuel Combustion (Fleet and other mobile equipment)
- Stationary Fuel Combustion (Building Heating and Generators) and Electricity
- Supplies (Paper)

Offsets Applied to Become Carbon Neutral in 2014 (Generated June 23, 2015 4:52 PM)

Total offsets required: **11,552**. Total offset investment: **\$288,800**. Emissions which do not require offsets: **12** **

*Tonnes of carbon dioxide equivalent (tCO₂e) 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.