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 tCO2e	2014 tCO2e	% 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.

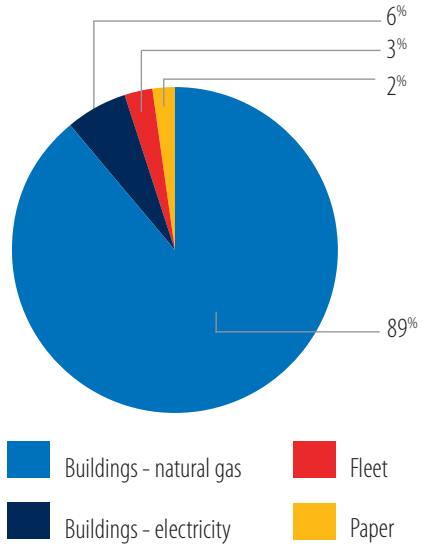


Figure 1: 2014 Greenhouse gas emissions percentage of each reporting category for the University of Victoria

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.

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

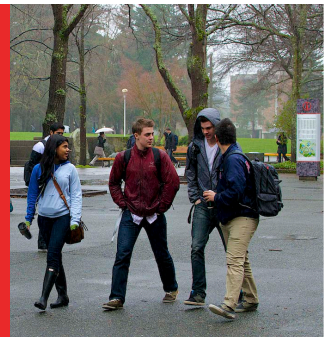
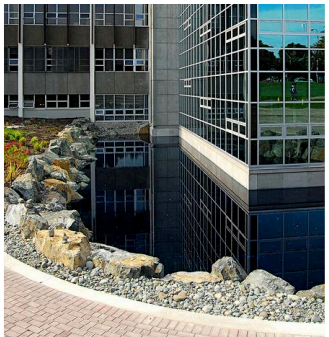
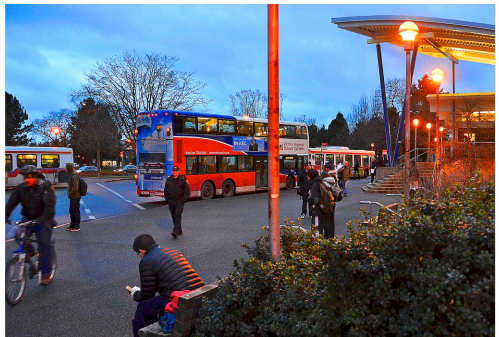
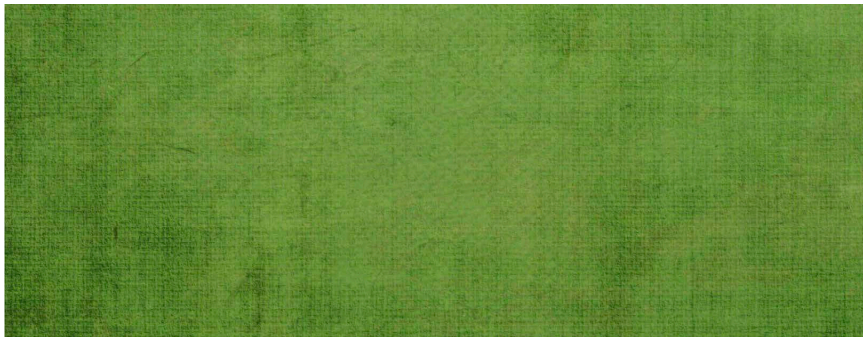
- Ninety percent of Phase 2 of the BC Hydro Continuous Optimization program was complete as of December 2014. Phase 2 involves 39 projects in six academic buildings on campus, including a boiler upgrade in the Fraser building. The projects included, but were not limited to, upgrading interior and exterior 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 (CNCP) 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.

photos: John Holland

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:

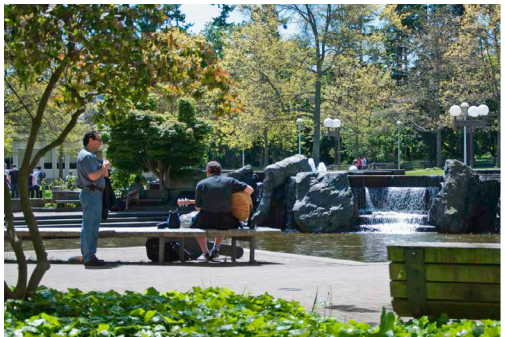
- Completing phase 2 and implementing phase 3 of the BC Hydro Continuous Optimization program. This program stage utilizes the continued assistance of engineering consultants to train internal Facilities Management Department employees to monitor and optimize the consumption patterns of campus buildings 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.

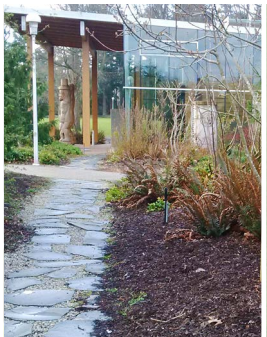
The University of Victoria aims to reach the goals set by the 2007 British Columbia Greenhouse Gas Reduction Target Act; however, in order to achieve a 33 percent total reduction of greenhouse gas emissions by 2020, major capital projects such as the following would need to be undertaken:

- 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