



University
of Victoria

2016 Carbon Neutral Action Report



Sustainability in action.

May 15, 2017



Executive Summary

UVic emissions totalled 11,470 tonnes of CO₂e in 2016. This represents a 2% increase over 2015 levels and is the first increase in greenhouse gas emissions UVic has observed since the Carbon Neutral Government Regulation came into effect in 2011.

The increase was largely attributed to buildings and systems outside the district energy loop. The district energy loop, which accounted for 62% of all emissions in the UVic portfolio in 2016, typically drives increases or decreases in the UVic greenhouse gas inventory. Building related emission increased by 2 percent, but the district energy loop emissions increased by less than .5 of a percent. Increases were observed in UVic Residences and UVic external properties. Emissions from building back up systems, including UVic diesel generators and heating oil for our district energy system boiler, more than tripled largely as a result of increased generator capacity at the UVic Data Centre.

Similarly, fleet emissions increased by 8 percent and UVic Facilities fleet accounted for approximately 76 percent of the mobile emissions produced in 2016. However, emissions associated with the UVic Facilities fleet decreased between 2015 and 2016. Instead, the increase was a result of consumption from academic research vehicles. In particular, between 2015 and 2016 emissions associated with the largest UVic owned research vessel increased by 71 percent. The use of this vessel fluctuates with research and teaching volume and therefore is expected to change from year to year.

An increase in electricity based greenhouse gas emissions in 2016 was also observed. The cause of the increase was an emission factor change. The factor

increased for the 2016 calendar year because of greater reliance on BC Hydro thermal power generation compared to the previous period in which the emission factor was calculated.

UVic continued its work to reduce emissions in 2016. Construction drawings were finalized for a new District Energy Plant, which is to be completed in 2018, and seven building energy efficiency projects were implemented in the 2016/2017 financial year. UVic upgraded its fleet to include 4 electric vehicles; and UVic's participation in the Energy Wise Network enabled engagement opportunities with the campus community in energy saving initiatives. In conclusion, despite the increase observed, UVic is on track to meet its internal goal of a 30% emission reduction by 2019.

This Carbon Neutral Action Report for the period January 1st to December 31st, 2016 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 2016 and beyond.



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2016 Greenhouse gas emissions

The total greenhouse gas emissions for the University of Victoria are **11,470 tCO₂e** for the 2016 calendar year. Emission categories are outlined in Table 1 below:

REPORTING CATEGORY	2015 tCO ₂ e	2016 tCO ₂ e	%CHANGE
University owned buildings and leased spaces: Natural gas, diesel, and heating fuel	10,061	10,226	2%
University owned buildings and leased spaces: Electricity	684	732	7%
Mobile combustion (Fleet)	333	360	8%
Paper supplies	160	152	-5%
Total	11,238	11,470	2%

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

In 2016, the university observed its first increase in emissions since 2010. Emissions for the district energy systems on campus were stable between 2015 and 2016. This district energy system provided space and hot water heating in 33 buildings across campus and accounted for 63 percent of all UVic emissions in 2016. However, the district energy system accounted for only 13 percent of the increase observed (representing less than a 0.5 percent increase in emissions).

The district energy system provides baseload heating for the Centre for Athletics, Recreation and Special Abilities (CARSA), which is the largest building on campus. UVic took possession of CARSA in 2015, but 2016 was the first full calendar year CARSA was operational. This building is a source of significant energy demand, and affected our emission inventory. The building emitted 70 tonnes of CO₂e to meet domestic hot water demand alone. However, its green features, like the geo-thermal heating system, reduced its emissions footprint.

Nearly 60 percent of the increase observed in 2016 was attributable to buildings outside the district energy loop. For example, sizable increases were observed in UVic Residences and UVic external properties. Emissions from other building related systems, such as those associated with diesel purchases for UVic back-up generators and back up heat for our district energy system boiler, more than tripled. The installation of new generator capacity at the UVic data centre accounted for approximately half of this increase, while the other half was associated with burning of heating fuel that was at the end of its storage life.

Mobile emissions increased by approximately 8 percent in 2016. The increase was not a result of the largest source of mobile emissions, the UVic Facilities Management fleet. The UVic Facilities fleet accounted for approximately 76 percent of mobile emissions produced

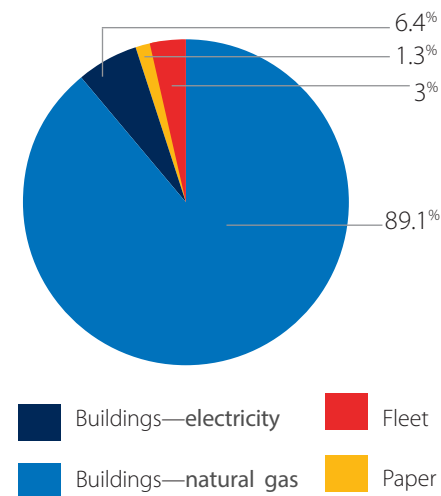


Figure 1: 2015 Greenhouse gas emissions percentage of each reporting category for the University of Victoria

in 2016. However, its emissions decreased between 2015 and 2016. Mobile emissions increased as a result of consumption from academic research vehicles. In particular, between 2015 and 2016 emissions associated with the largest UVic owned research vessel increased by 71 percent. This research vessel accounts for over 60 percent of the total increase in mobile emission in 2016. The use of this vessel fluctuates with research and teaching volume and therefore is expected to change year to year.

An increase in electricity based greenhouse gas emissions in 2016 was also observed. Overall, however, there was no increase in electricity use in the UVic building portfolio. The increase was a result of an approximately 7 percent increase in the emissions factor associated with BC Hydro produced electricity. The emission factor accounts for the emission associated with BC Hydro energy production and transmission. That factor increased for the 2016 calendar year because of greater reliance on BC Hydro thermal power generation compared to the previous period in which the emission factor was calculated.

Paper use continued to decrease in 2016. A 15 percent reduction in paper consumption was observed along with a 5 percent reduction in associated emissions. The greater reduction in paper use versus emissions was a result of the increase in use of virgin paper, which has a higher emission factor than paper containing recycled content, purchased in 2016 relative to 2015.

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

Changes to greenhouse gas emissions and offsets reporting from previous years

Following the public release of the 2015 Carbon Neutral Action Report, it was determined that the 2015 inventory was incomplete. A SMARTTool data load issue occurred in which SMARTTool failed to load data accounting for approximately 530 tonnes of UVic emissions. As a result of an investigation into the SMARTTool loaded consumption going back to 2012, an over report was discovered in the 2012 reporting year. It was also determined that one new BC Hydro electrical account and a new propane account went unreported in 2015. In total, emissions were under reported by 483 tCO₂e in 2015.

Offsets applied to become carbon neutral in 2016

The total greenhouse gas emissions for the University of Victoria in the year 2016 were 11,470 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, 16 tCO₂e emissions resulting from the use of bio-fuels were reported as part of UVic's greenhouse gas emissions profile in 2015. 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 11,454 tCO₂e for 2016. Including the adjustments from previous years, the total Greenhouse gas emissions that the University of Victoria is required to offset for 2016 is 11,937 tCO₂e.

Actions taken to reduce greenhouse gas emissions in 2016

Eight building energy efficiency projects were completed in the 2016/2017 financial year; these included:

- The installation of LED lamps in the McKinnon Gym.
- Building heating and lighting control upgrades to the:
 - McKinnon Building,
 - Petch Building,
 - McPherson Building
 - University Centre Building, and
 - Cunningham Building.
- The campus LED street light upgrade.
- The retrofit of Farquhar auditorium stage lights with LED fixtures and lamps through the Revolving Sustainability Loan Fund.

These 8 projects will prevent an estimated 150 tonnes of emissions from being emitted annually.

The campus shutdown during the Christmas holiday period was again coordinated by the Controls Group within Facilities Management. The heating and lighting schedules reduced starting December 24th and remained as such until January 2nd. As a result, UVic prevented over 32 tonnes of CO₂e emissions from being emitted.

Construction drawings were finalized for a new District Energy Plant, which is to be completed in 2018. This upgrade is expected to mitigate approximately 700 tonnes of CO₂e emissions annually.



UVic made 2 major emission related changes to the UVic Facilities Management fleet in the 2016/2017 financial year. These are the:

- upgrade of the UVic compactor truck, which reduced the number of KM's driven, and therefore emissions produced by the compactor truck.
- purchase of 4 Nissan Leaf cars, which have been retrofitted into tool and material transport vehicles. These vehicles save both energy and money, and will have a notable impact on the facilities gasoline consumption in the 2017 calendar year.

With funding from BC Hydro Power Smart's Energy Wise Network program, the Sustainability Action Team program continued with behavioural change activities involving staff, students and faculty in two categories: Green Offices and Green Labs.

- The UVic 21 Days to Green Your Routine program ran in June of 2016. Over 100 staff members committed to engaging in one new green behaviour for the competition period.
- The Green Labs program continued with the chemistry lab guided group discussions. This program acquired commitments from individual lab users to safely use the setback switches on fume hoods more frequently. The aim of the program was to maintain or increase the use of the low energy mode of the fume hood.

Plans to Continue Reducing Greenhouse Gas Emissions

The University of Victoria will further reduce greenhouse gases in 2017 will be through the following activities:

- Complete of a lighting controls upgrade in the McPherson Library.
- Install variable speed drives to more effectively meet ventilation demands in the University Centre.
- Recommission heating and control systems in the Fine Arts and Visual Arts buildings.
- Conduct a LED lighting retrofit in the Fine Arts and Visual Arts buildings, and the McPherson Library.
- Continue to engage faculty, staff and students with behavioural change initiatives and energy saving programs.
- Continue the implementation of the UVic district energy system upgrade.
- Implement projects through the UVic Revolving Sustainability Loan Fund.
- Upgrade the campus walkway/pathway lamps to LED.

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

