

2013 Carbon Neutral Action Report



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Overview

UNBC is a student-centered research-intensive university, uniquely Northern and personal in character, and responsive to the regions we serve. We are located in one of the world's most magnificent natural settings, but one that is becoming a major center of resource extraction with its concomitant environmental degradation. The confluence of natural setting, resource extraction, and environmental degradation has allowed UNBC to emerge naturally as a small but powerful leader in teaching and researching the full scope of human-environment interaction, and putting what we learn into practice to achieve sustainability.

To celebrate our strengths relating to sustainability and continue to plan for the future, UNBC adopted in 2007 the trademark Canada's Green University. In doing so, we developed a vision to:

- become a sustainable campus;
- engender a 'spirit of sustainability' in the UNBC community;
- serve as a model of sustainability for communities and organizations in Northern British Columbia; and
- become a national and international leader in sustainability teaching and research.

One important component of UNBC's sustainability mandate relates to carbon neutrality, and it is an area where we have shown great leadership. In March 2011, UNBC commissioned a bioenergy heating plant – the first university owned and operated facility in Canada to use bioenergy from waste wood to heat campus buildings. The plant exceeded its target of 85% natural gas offset in its first year of operation. It brings the school great pride to foster a renewable energy priority for our community.

The Bioenergy Plant is one component of the university's plan to help meet its current and future energy needs, as well as contributing to research and development, training, education and demonstration opportunities for northern communities. In 2011 UNBC developed an Energy Policy outlining energy and fossil fuel reduction targets. To help in meeting these targets, UNBC established a \$250,000 revolving fund for energy efficiency projects. The fund is utilized to cover the capital costs of energy projects and the loan is repaid by the cost savings obtained through the energy savings.

On the academic front, the proportion of environmental teaching and research at UNBC is amongst the highest in Canada. UNBC has begun to integrate teaching, research, operations and community engagement through a variety of sustainability programs and projects, including a comprehensive recycling program and a Green Fund set up to provide seed grants to sustainability projects initiated by students, staff and faculty.

The benefit of our sustainability initiatives are far reaching, and relate to our institutional impact on the environment, the expertise we develop and share, and the influence we have on the personal and professional lives of our faculty, staff and students. We recently celebrated our 10,000th graduate, and our hope is they will all take constructive and active roles in addressing the challenges and opportunities of the 21st century. We will continue working towards our mission for sustainability in the North and beyond as Canada's Green University™.

Emissions and Offsets Summary

UNBC GHG Emissions and Offsets for 2013 (TCO2E)	
GHG Emissions created in calendar year 2013	
Total Emissions	5,299
Total Emissions for Offsets	1,978
Adjustments to GHG Emissions Reported in Previous Years	
Total Emissions	-2,796
Total Emissions for Offsets	130
Credit owing from PCT at end of 2012 reporting year	
Credit Owing	\$0
Total Emissions for Offsets for the 2013 Reporting Year (from Offset Invoice):	2,108

	MAY 30 2014
Signature	Date
Eileen Bray	VP Administration + Finance
Name (please print)	Title UNBC

2013 Greenhouse Gas Emissions

In 2013 UNBC generated a total of 5,214 tonnes of Scope 1 carbon emissions, 98.4% of which were associated with energy consumption in the form of bioenergy, fossil fuels, and electricity. Figure 1 summarizes the greenhouse gas emissions related to energy, mobile fuel, and paper consumption.

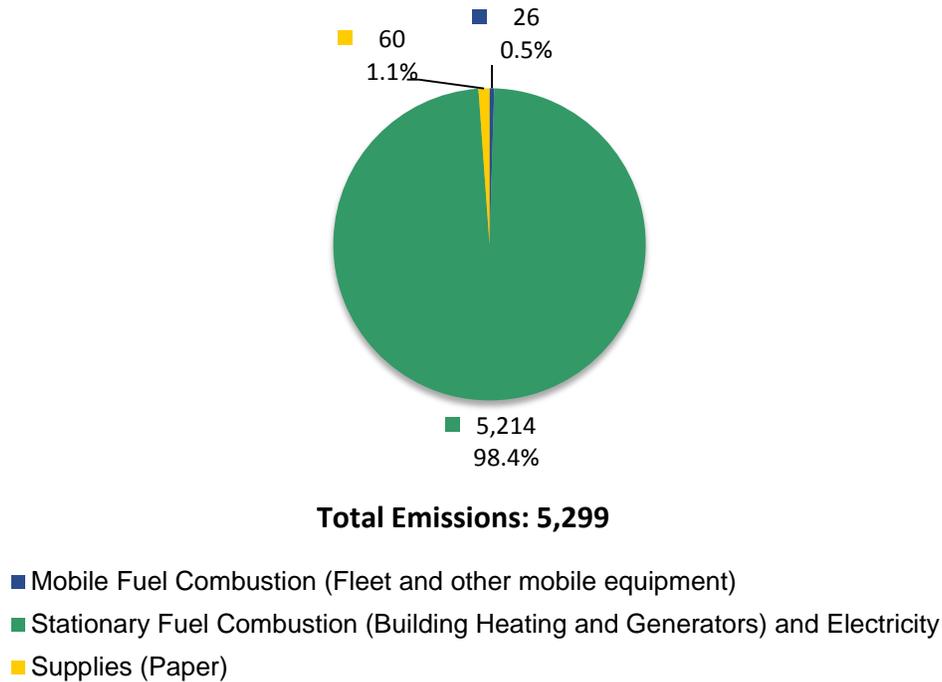


Figure 1 - UNBC Greenhouse Gas Emissions by Source

A 65.4% reduction in Carbon offsets has been achieved since 2010 primarily due to the start-up of the Bioenergy Plant on the Prince George Campus. The Bioenergy plant gasifies wood waste to produce approximately 70% of UNBC’s total heat requirements, which was previously supplied by combusting natural gas. The majority of the emissions resulting from the gasification of wood are considered biogenic and do not require the purchase of offsets. This year 63.6% of the emissions associated with building heating were biogenic.

Compared to 2012, UNBC observed a 10.4% reduction in carbon emissions that require the purchase of offsets. This reduction was primarily driven by the electricity emissions factor being reduced by 40%.

Operational Changes in 2013

During 2013, a number of projects and initiatives were undertaken at UNBC to reduce the carbon emissions associated with fuel combustion, purchased electricity, and the mobile fleet.

Stationary Fuel Combustion

UNBC’s carbon emissions requiring offsets are extremely sensitive to the operation of the Bioenergy Plant since natural gas is used during system downtimes. Due to an emergency shut-down of the

Bioenergy Plant in December 2013, a spike in natural gas consumption was observed, contributing to a 2% increase in stationary combustion offset emissions. During the shut-down, an access door was installed on the oxidizer such that the bioenergy system will not need to be shut down and cooled to perform similar emergency maintenance in the future. This will minimize system downtime, and therefore reduce the amount of natural gas used by the back-up boilers.

In May 2013, low-flow showerheads were installed in the Residences where hot water is supplied by two natural gas boilers. This is anticipated to save up to 1,400 GJ in natural gas annually.

Electricity Consumption

Incremental carbon emission reductions have been seen over the past several years due to the successes of the Energy Manager program funded by BC Hydro. The primary focus of the Energy Manager has been to reduce electricity use through the implementation of projects, taking advantage of BC Hydro programs and incentives. Over the past 3 calendar years projects totaling 1.2 GWh of annual electricity savings have been implemented ranging from lighting retrofits to HVAC optimization. These projects resulted in a 2.8% reduction in electricity consumption compared to 2012.

In 2013 a number of projects were completed including interior and exterior lighting retrofits, daylight harvesting, and an HVAC optimization at a regional research facility. Several large projects were initiated in 2013 and will be implemented in 2014/15: the first phase of the BC Hydro tune-up program Continuous Optimization (C.Op); and the Medical Humidifier Upgrade. The first phase of C.Op which will be implemented by March 2015, is focused on four buildings on the Prince George Campus and is expected to save 950,000 kWh in electricity and 11,000 GJ in heat annually. The Medical Humidifier project will see the current electric steam humidifier replaced with a high pressure atomization system that is expected to save 500,000 kWh in electricity and 100 GJ in heat annually.

Mobile Fleet

In March 2013, UNBC purchased six used 100% electric Might-E-Trucks from UBC to supplement or replace several gasoline-consuming vehicles. Four of the six trucks are being driven by the Facilities Department, one truck is being driven by the Enhanced Forestry Lab, and one truck serves Security and Parking. Security and Parking reduced fuel purchases by 70% compared to last year. Facilities did not observe a reduction in fuel consumption since the electric vehicles were used to expand the fleet, and thus served to avoid the purchase of new internal combustion vehicles.

Actions to Reduce Provincial Emissions and Improve Sustainability

UNBC has been involved in a number of initiatives to promote sustainability and emissions reductions that fall outside the reporting scope defined by the Greenhouse Gas Reduction Targets Act, ranging from infrastructure improvements, to community and student engagement.

Infrastructure Improvements

In 2013, UNBC installed biking infrastructure to encourage cycling to campus. Two covered bike shelters and a bike repair stand were strategically installed near busy entrances and in view of security cameras. To further promote active commuting, lockers were installed outside of one of the two shower facilities. In addition to participating in the province-wide Bike to Work Week, UNBC organized a Bike to School Week in September 2013 to encourage year-round biking by students, staff and faculty.

To support electric vehicles on campus, UNBC installed two new electric vehicle charging stations in Parking Lot B. These stations offer priority parking with free charging to anyone visiting the campus. UNBC also encourages car-pooling by providing discounted parking rates and reserved parking spots to those sharing rides to campus.

Student Engagement

The Prince George Public Interest Research Group (PGPIRG) has a great presence at UNBC, bringing together students, staff and faculty to foster a culture of sustainability. PGPIRG is a student-funded public interest and research group that facilitates student-led initiatives on campus such as the Borrow-a-Mug program, campus composting, learning gardens, the Good Food Box program, and a Meatless Mondays campaign.

Due to Prince George's climate, geography and the climbing costs of fuel, the question of what is on our plates and how it gets there is a popular topic of discussion at UNBC. UNBC continues to run a weekly Farmer's Market every Tuesday during the fall and winter semesters, where local foods and artisanal products are highlighted. A Campus Food Strategy Group (CFSG) was developed to collaborate with our food service provider to support local, sustainable, healthy and accessible food options for students, faculty and staff.

Community Engagement

UNBC offers many programs to engage the public on sustainable initiatives and topics. In 2013 over 400 visitors toured the Bioenergy Plant where the benefits of using local, renewable, and low carbon emission fuel are highlighted.

In May 2013, a field course was offered where Environmental Engineering students from UNBC, Power Engineering students from Confederation College, and Westbank First Nations representatives spent two weeks in Austria learning how to design bioenergy systems. The Environmental Engineering students then completed prefeasibility studies on bioenergy and district heating systems for a number of small communities and organizations in northern British Columbia.

UNBC continues to offer environmental programming to local youth through outreach programs and summer camps. UNBC regularly partners with School District 57 High Schools to facilitate Green Outreach presentations and discussions about climate change and environmental issues. Each summer, UNBC runs eight one-week long Active Minds summer camps for kids ages 6 and older where sustainability, energy, and climate change modules are taught to encourage a life-long interest in environmental topics.

Summary

As Canada's Green University™, the University of Northern British Columbia is committed to "green" and sustainable activities in every aspect of our operations. Using energy efficiently and employing clean, renewable energy has reduced carbon emissions at UNBC by 65.4% since 2010. UNBC will continue to minimize our environmental impact by reducing energy consumption through energy efficiency projects, student engagement, and awareness campaigns; and showcasing renewable and efficient energy systems that are of particular interest to northern and remote communities.