UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

CANADA'S GREEN UNIVERSITY™


# 2012 Carbon Neutral Action Report

Plans and Actions Taken to Reduce Greenhouse Gas Emissions at the University of Northern British Columbia

# Table of Contents

# Executive Summary

The University of Northern British Columbia completed its bioenergy heating plant in March 2011. This is the first university owned and operated facility in Canada to use bioenergy from waste wood products to heat campus buildings. Since that time, and after resolving some unanticipated challenges, 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 bio-energy plant, which is pursuing LEED Platinum certification, uses innovative technology to convert bark, branches, sawdust and leftover wood products from nearby mills into a highly efficient means of heating campus buildings, is reducing greenhouse gas emissions at the university by 3,500-4,000 tonnes annually. That is the equivalent of taking 1,000 cars off the road every year. To date, the Bio-Energy plant has reduced greenhouse gas emissions at UNBC by over 5,800 tonnes of $CO_2e$.

The heating plant is one component of the university's bio-energy program plan to help meet its current and future energy needs, as well as contributing to research and development, training, education and the development of bio-energy projects and demonstration opportunities for northern communities. UNBC received $15.7 million from the federal and provincial governments for its biomass gasification system, and $5 million from both governments for upgrades to campus heating equipment. We are encouraged by the success of this component of our energy plan and feel our supporting partners would be impressed with the outcome.

In 2007, UNBC announced a commitment to be Canada's Green University™. In many ways, this decision fit perfectly with UNBC's existing culture; the proportion of environmental teaching and research is amongst the highest in Canada, the campus is a showpiece for energy-efficiency, the University attracts students and employees who value the natural environment, and the northern BC region is one of Canada's richest in natural resources. Building off these strengths UNBC has begun to integrate teaching, research, operations and community engagement through a variety of sustainability programs and projects, including a series of bio-energy and energy efficiency projects, a comprehensive recycling program and a Green Fund set up to provide seed grants to sustainability projects initiated by students, staff and faculty.

In 2012 UNBC established a $250,000 revolving fund for energy efficiency projects. The fund is utilized to cover capital costs and the money is repaid by the savings obtained through the energy savings.

Moving forward UNBC will strive to be Canada's Green University by further reducing greenhouse gas emissions, supporting renewable energy research and development, and implementing sustainable practices whenever possible.

Eileen Bray
Vice President, Administration and Finance

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

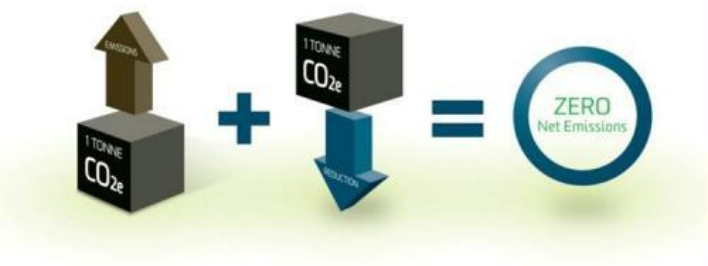
# 2012 Greenhouse Gas Emissions

In 2012, UNBC produced a total of 2,167 tonnes of $CO_2e$ from non-renewable sources; this represents a 39.33% reduction from 2011 emissions. Even more, UNBC achieved reductions of 62% since the start of the Bio-Energy program and Carbon Neutrality in 2010. 3,506 tonnes of emissions generated in 2012 have been tracked from biomass use, but offsets are not required on these emissions. The $CO_2$ released to the atmosphere during combustion of biomass is the same quantity that had been absorbed from the atmosphere during plant growth. For this reason, biomass is often considered carbon neutral and the Intergovernmental Panel on Climate Change (IPCC) *Guidelines for National Greenhouse Gas Inventories* specify the separate reporting of $CO_2$ emissions from biomass combustion.

The emissions listed above are from sources covered by the Greenhouse Gas Reductions Act. It has been estimated that stationary fugitive emissions do not comprise more than 0.01% of UNBC's total emissions and an ongoing effort to collect or estimate emissions from this source would be disproportionately onerous. For this reason, emissions from fugitive emissions have been deemed out-of-scope and have not been included in UNBC's total greenhouse gas emissions profile.

# Offsets Applied to Become Carbon Neutral in 2012

In order to become carbon neutral for 2012, UNBC purchased a total of 2167 emissions offsets worth a total of $54,175. This purchase was based on estimated consumption figures. As noted earlier there were emissions from biomass use (hog fuel) that were accounted for but do not require offsets to be purchased. Also, as required by section 5 of the Carbon Neutral Government Regulation, 0.78 tonnes of $CO_2e$, resulting from the bio-fuel included in gasoline and diesel purchased, were reported as part of our greenhouse gas profile in 2012. However, these emissions, as well as those accounted for biomass use, did not require offsets as they are out-of-scope under section 4(2)(c) of the carbon neutral Government Regulations.




Credit: Pacific carbon Trust

# Emission Reduction Activities

## Actions Taken to Reduce Greenhouse Gas Emissions in 2012

During 2012, UNBC participated in a wide range of initiatives to reduce greenhouse gas emissions on our campuses. These initiatives included:

- Energy Projects:
  - *Quesnel River Research Center Lighting*- Replaced T12 fluorescent lighting with T8.
  - *Enhanced Forestry Lab Cold Storage Lighting*- Replaced T12 fluorescent lighting with T8.
  - *Canfor Theatre Lighting*- Revisit the lighting provision for the lecture space.
  - *Warehouse Lighting*- Replace MH high bay fixtures in warehouse.
  - *Northern Sport Center Soccer Fields Lighting*- Replaced MH fixtures with impact resistant LED.
  - *Air Handling Coil Cleaning*- Nalco coil cleaning initiative.
  - *Northern Undergraduate Student Centre Event Space Lighting*- Replaced incandescent lighting with LED.
  - *Common Area Residence Lighting*- Replaced T12 fluorescent lighting in residences with T8.
  - *Terrace Lighting*- Replaced T12 fluorescent lighting with T8.
  - *Lecture Theatres*- Replaced incandescent lighting with LED.

Energy retrofits at the Northern Sport Centre

*These energy projects generated annual electricity savings equivalent to 654,785 kWh*. This reduces our $CO_2e$ emissions by 16.37 tonnes.

- Expanding UNBC's video conferencing capabilities including the purchase of new portable video conference equipment.
- Purchasing an Electric Vehicle (Nissan Leaf) in partnership with the City of Prince George, Northern Health, and the Fraser-Fort George Regional District.

- Making use of an electric car charging station in the Prince George campus, and made plans to purchase and install two more during 2013.
- Hosting a weekly Farmers' Market on campus organized by our students, with the collaboration of faculty and staff.
- Our Carbon Neutral Sub-Committee, in its second year since its creation, has been working to establish reduction goals and identify reduction projects.
- Developing energy baselines for its main and regional campus, and is now ready to develop energy baselines for each individual building.
- Organizing a student energy challenge at the campus residences.
- During bike to work week 2012, UNBC was the organization in Prince George with the largest number of participants.
- Increasing the number of webcast presentation on campus, reducing the number of people needing to drive.

A group of UNBC faculty, students, and staff who participated in Bike to Work week 2012.

- Assessing the feasibility of different renewable energy projects with potential for development at our campuses.

Dr. George Iwama, UNBC's President, hosting his monthly sustainability and energy discussion group "Green Coffee with George".

- Developing a plan to improve our compost program at the PG campus, including a research study where the volume of organic waste generated at the student residences was calculated.
- Hosting the "Experimenting with Sustainability at UNBC" workshop, in which UNBC faculty discussed the opportunities and challenges of teaching about sustainability from the perspective of different academic disciplines.
- Expanding the recycling and compost programs at the Terrace Campus.
- Dr. George Iwama, UNBC's President, held a monthly "Energy and Sustainability" discussion group to which any member of the UNBC community could attend. This monthly event provided a great opportunity for members of our community to have a conversation with our President about the present and future of energy and sustainability at UNBC and Northern BC.

# Plans to Continue Reducing Greenhouse Gas Emissions 2013-2015

Over the next three years, UNBC will continue to reduce greenhouse gas emissions by focusing on the following key areas: a) operating the bio-energy plant at maximum capacity through the year, keeping shutdowns to a minimum, b) metering energy consumption and sustainability performance measurements, c) operational enhancements and retrofits, d) behavioral change education focused on energy conservation and greenhouse gas reduction and e) seeking emerging opportunities to replace fossil fuel with on-site renewable energy sources. Specific projects include:

- Purchasing six electric trucks (Mighty E-Trucks), to be used by parking services and facilities for their operations.
- Assessing the feasibility of wind, solar and other renewable energy sources for use on campus.
- Continuing to enforce the idle-free Policy to address carbon emissions and air quality issues.
- Increase the participation in the car pooling program.
- Expand our current compost program to include the student residences.
- Investigate the opportunities surrounding greenhouse gas reduction projects outside of our inventory (create our own offsets instead of purchasing all required for neutrality from PCT).
- Investigate heat recovery options from waste water and sewage from campus.
- Increase our efforts in terms of behavioral campaigns to promote different pro-environmental behaviors, especially in the areas of waste management, transportation and energy consumption.
- Sustainable Communities Demonstration Project: This project will create a low temperature district heating network connecting the EFL, Residences and Daycare with the existing wood pellet heating system. By incorporating local renewable energy into the built environment (student residence buildings) it touches directly on the student experience at UNBC while providing ongoing fuel cost savings. This will increase the utilization of the existing wood pellet heating system, while peak load and back-up heat will be provided from the Bioenergy facility.

UNBC will continue to build upon its campus infrastructure and bio-energy projects to be a showpiece for renewable energy technology. We will use sustainability and carbon reduction projects as a platform for applied research and education that will directly benefit northern communities.

# Actions to Reduce Provincial Emissions and Improve Sustainability

At UNBC we try and encourage greenhouse gas reductions whenever possible. At times these reductions fall outside of our own GHG inventory and act to reduce provincial emissions as a whole. These activities include:

- Starting a project through which UNBC students deliver climate change education to grade 10 high school students, thus increasing the level of environmental literacy of youth in our region.
- Encouraging car-pooling to and from campus.
- Engaging in negotiations to establish a U-pass (bus pass) for faculty and staff (one already in place for undergraduate and graduate students).
- Organizing a Farmers' Market on campus. Students, staff and faculty can now shop and eat locally without transportation to and from the downtown market. At the same time, the University Farmers' Market provides education to our community about the seasonality of products that can be grown and consumed in our region, reducing our dependency on products that have a carbon intensive supply chain.

University Farmers' Market in action!

- Representation from UNBC on PG Air. A local committee dealing with air quality issues in Prince George. Many co-benefits with greenhouse gas reductions are apparent.
- Educating those outside the UNBC community on climate change and greenhouse gas reductions including working with the Stellat'en First Nation on carbon reductions, running a Continuing Studies course on GHG project development and working with Barkerville to measure and reduce the historic site's carbon footprint.