2015 Carbon Neutral Action Report

LANGARA COLLEGE

May 2016

Langara.

THE COLLEGE OF HIGHER LEARNING.

Introduction

At Langara College, we are deeply committed to being part of a sustainable society. We understand that the world's resources are finite and need to be used conservatively and wisely. We know that our choices, both big and small, impact our world and future generations. As part of the College's commitment to reducing Green House Gas (GHG) Emissions, an Environmental Responsibility Policy was established in June 2001. The purpose of the board governance policy is as follows:

> To provide direction to the College regarding the creation of learning and working environments characterized by social responsibility, the Board is committed to:
>
> - protecting and enhancing the environment for future generations, and
> - using and managing its own physical environment more sustainably

In addition, Langara was leading the way when it established a policy to have any new building constructed to be minimum LEED® Gold before it was required by the City of Vancouver. Today, Langara has three LEED Gold Certified buildings, with a fourth almost complete. When our new Science & Technology (S&T) Building opens in the fall of 2016, over 40% of the campus will be constructed to LEED Gold standard.

As an educational institution, we have a responsibility to lead initiatives that positively contribute to our community. Our goal is to foster, and provide leadership to create more environmentally sound, socially just, and economically vibrant communities. As part of the College's Academic Plan, we are making it a priority to:

- Create and strengthen programming that encompasses the cross-disciplinary nature of sustainability
- Advocate and model sustainable practices
- Build sustainable partnerships with employers, community partners, and alumni

Langara College has been working at reducing greenhouse gases and increasing sustainability for many years. These efforts included internal changes and polices as well as external incentive programs developed by BC Hydro, Office of Energy Efficiency, Natural Resources Canada, and the Association of Canadian Community Colleges. Langara has been actively monitoring and managing energy and GHGs of its facilities for over 15 years including updating our Energy Management Action Plan through the Canadian GHG Challenge Registry annually until it was closed in 2011. In 1999 the College was recognized by that program as a Gold Champion Level Reporter.

Since 2010, along with all BC public sector organizations (PSOs), as mandated under the Greenhouse Gas Reduction Targets Act, Langara has been reporting their annual GHG Emissions and investing in offsets to achieve net-zero emissions. The College is proud of its commitment and successes related to our GHG reduction effort; we will continue to increase environmental, financial, and social sustainability at Langara, in our city, and in our world.

Declaration Statement:

This Carbon Neutral Action Report for the period January 1st, 2015 to December 31st, 2015 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2015 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2016 and beyond.

By June 30, 2016 Langara's latest Carbon Neutral Action Report will be posted to our website at http://www.langara.bc.ca/about-langara/sustainability/initiatives/carbon-neutral.html.

Emissions and Offset Summary Table:

Langara College GHG Emissions[1] and Offsets for 2015 (tCO_2e[2])	
GHG's created in Calendar Year 2015	
Total Emissions (tCO_2e)	1,189
Total Offsets (tCO_2e)	1,189
Adjustments to GHG's Reported in Prior Years	
Total Emissions (tCO_2e)	3
Total Offsets (tCO_2e)	3
Total Emissions for Offset for the 2015 Reporting Year	
Total Offsets (tCO_2e)	1,192

Retirement of Offsets:

In accordance with the requirements of the Greenhouse Gas Reduction Targets Act and Carbon Neutral Government Regulation, Langara College (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2015 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment ensuring that these offsets are retired on the Organization's behalf, the Organization will pay the associated invoice to be issued by the Ministry in an amount equal to $25 per tonne of offsets retired on its behalf plus GST.

Executive sign-off:

Dr. Lane Trotter
President & CEO

31/05/16
Date

[1] Emissions are calculated as per Ministry of Environment, *2014 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions* (Victoria, BC: November 2014).
[2] Tonnes of Carbon Dioxide Equivalent as a standard measurement for GHGs by multiplying each gas' emissions by its global warming potential (GWP).

Overview:

The total emission offsets applied to become carbon neutral in 2015 was 1,192 tCO2e (includes a correction of three tonnes from previous years). As indicated in the chart below, 90% of Langara's tracked emissions are from building energy use.

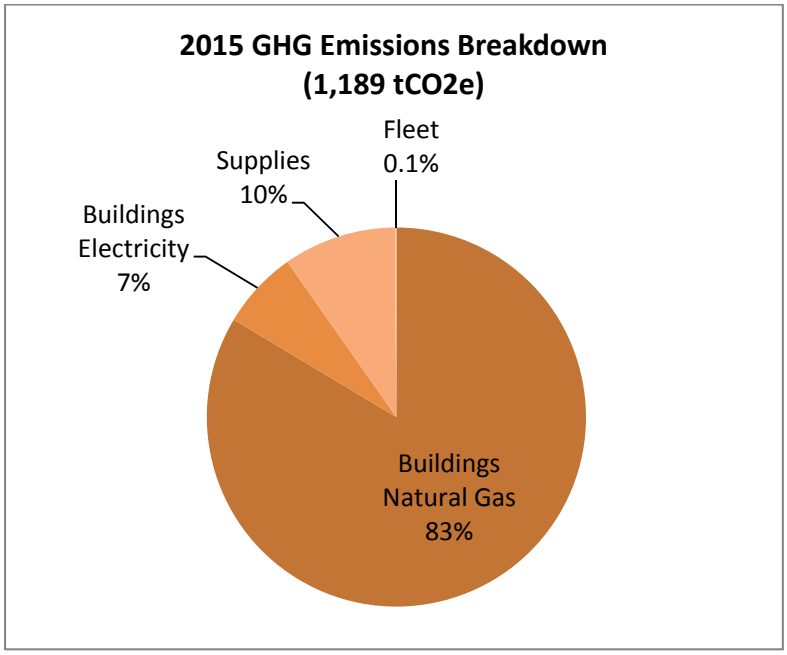


Figure 1: 2015 Emissions Breakdown

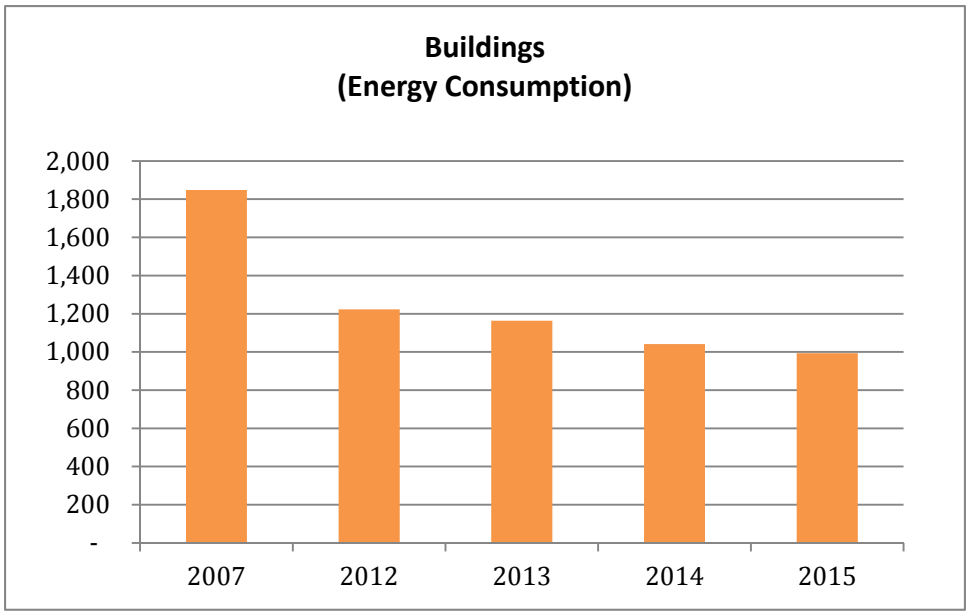
Langara College's GHG emissions for the mandatory reporting categories are summarized in the table below and shown in comparison to the past year, in addition to 2007, the Ministry base-year for GHG target reduction.

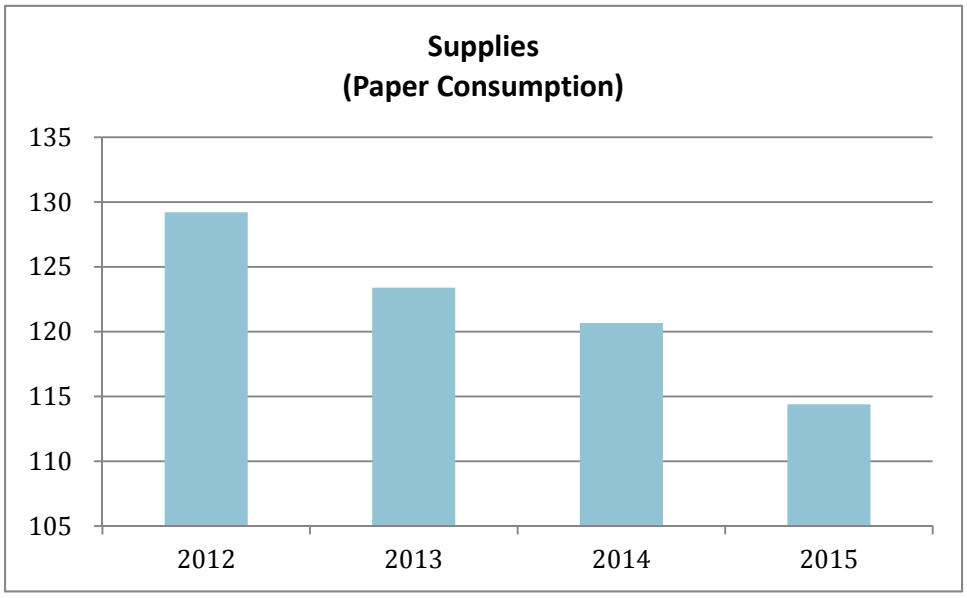
Table 1: 2014 Emissions Breakdown Compared to Last Year and Base Year

	2015 GHG Emissions (tCO_2e)	2015 Results Compared to 2014	2015 Results Compared to 2007 Baseline
Buildings – Natural Gas	994	5% Decrease	46% Decrease
Buildings – Electricity	79	2% Decrease	54% Decrease
Supplies - Paper	114	5% Decrease	Not Available
Fleet	1.5	Less than 0.1%	Less than 0.1%
Total	1,189	**11%** Decrease	**51%** Decrease

As required by the *Greenhouse Gas Reduction Targets Act* and *Carbon Neutral Government Regulation*, the results shown above are based on absolute emissions and have not been corrected for the impact of weather conditions.

The graphs below show the trend in GHG emissions compared to the base period year of 2007 and the previous three reporting years. As you can see in the graph and summarized in the previous chart, our emissions from buildings have decreased by almost 50% compared to 2007. Also, our paper usage has been decreasing as a general trend.





Emission Reduction Activities 2015

As shown in the 2015 Emissions Breakdown Chart (p.4), 90% of the emissions from Langara's operations are related to Buildings energy usage. Emissions reduction activities related to buildings energy usage are planned and tracked using our current *Three Year Strategic Energy Management Plan 2014/15 – 2016/17*; our plan focuses on five key areas: Policy, Operations & Maintenance, Engagement & Awareness, Green Renewal, and Green Buildings. Initiatives and projects carried out in 2015 are summarized below.

Policy

- Drafted an Indoor Air Temperature Policy, discussion and feedback in progress.

Operations & Maintenance

- Timely repair of failed speed drives.
- Additional gas metering of heating plant, and planning for additional metering.
- Ongoing monitoring, targeting and reporting (MT&R) of buildings' energy use, including adjustments for construction.
- Optimized schedules on campus – see success story on the following page.
- Engagement and training operators related to new controls and new technology on campus.

Engagement & Awareness

- "Knowledge is Power" - Langara Energy Fair Event - Highlighted many Sustainability activities on campus, including the recycling program, student "City Studio" projects, and Fine Arts screen prints and button sales towards a student bursary. The Energy Fair displayed a timeline – "Building a Legacy of Energy Efficiency", summarizing the commitment and successes over the years – see timeline on following pages.
- Staff Plug Load Audit over winter break, included space heater inventory and collection, review of systems in areas with space heaters, addressing issues where possible and testing of energy efficient, radiant space heater option in various areas.

Green Renewal

- Completed Phase 2 of our new Central Heating Plant project. This project was initiated to minimize maintenance cost related to servicing and operating multiple heating plants on campus (an additional heating plant was required for our new Science and Technology Building), to address risks associated with the eventual failure of our current (40+ year old, end of life) central heating plant, and to increase overall energy efficiency. The heating plant is designed to connect to a future Low Carbon Energy District Energy Source planned for the Cambie Corridor, which in time, could significantly reduce our GHG emissions.
- Library lighting upgrade to LED, continued investigation, finalized scope, project mockups. Replacement will be complete in early 2016.
- Green IT – thin client desktop and server virtualization continued at Langara this year. This three year initiative will reduce campus IT electrical usage by approximately 80%.

Green Buildings

- Construction of new LEED Gold Science & Technology Building, including participation in BC Hydro New Construction Program.

Scheduling Optimization

LANGARA'S COMMITMENT TO SUSTAINABILITY

CHALLENGE

Managing comfort in buildings is a mix of art and science. Electricity and natural gas enable us to regulate the temperature and air flow within these spaces, and this energy consumed adds up in utility costs and greenhouse gases. Getting the right balance leads to comfortable and productive spaces, while also avoiding costs and minimizing our impact on the environment.

SOLUTIONS

Air handling units are controlled by a direct digital control (DDC) system, which enables Langara's Facilities Department to automatically start and stop operation based on specific schedules. Prior to the schedule optimization project, Langara's air handling units (which heat, cool and circulate air throughout the building) were running from 6:00 am until 11:00 pm.

In the summer of 2014, Langara's Energy Team launched a pilot scheduling program in B Building. Occupants were encouraged to fill out a short paper survey to indicate when they used the space. New schedules were developed and implemented based on the survey results for the summer months.

In the fall, the Energy Team toured B Building to check in with occupants and ensure that needs were being met and confirm schedules for the fall months. Based on the results of the pilot, the DDC schedules for the Library, C Building, and LSU were also reviewed to align with B Building operation hours. Announcements about the changes were communicated through *By the Way*, Langara's employee intranet.

By matching schedules of air handling units with when spaces were actually in use, Langara was able to optimize energy use and reduce waste.

SUSTAINABILITY

Langara is committed to sustainability and optimizing energy use on campus as a way to limit greenhouse gas emissions.

Learn more.
www.langara.ca/sustainability

ANNUAL SAVINGS

The DDC scheduling optimization project has led to the following overall energy savings:

- Electrical: 91,000kWh = $7,000 = 1%
- Natural Gas: 80GJ = $800 = 0.4%
- Emissions: 4.8tCO_2e = $120 = 0.4%

This is equivalent to the amount of CO_2 sequestered by four acres of forest each year.

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Building a Legacy of Energy Conservation

LANGARA BUILDINGS & ENERGY MANAGEMENT

The results over the past 15 years demonstrate a strong commitment to energy management and sustainability on campus. Our current rate of energy savings, achieved through projects and various operational initiatives, is equivalent to avoided costs of approximately $300,000 annually. This does not include the energy and cost savings realized from "building green". It is notable that our LEED buildings on campus use approximately 60% less energy per unit area than our oldest building on campus.

2000

1998
Langara joins Energy Innovator Program.

2000
Detailed energy study completed.

2001

2001
College Board introduces Environmental Responsibility Policy.

2002

2001/2002
Energy upgrade implemented.

2003

2002/2003
Energy Management Coordinator hired.

2004

2004
National Leadership Award from Canada's Climate Change Voluntary Challenge and Registry.

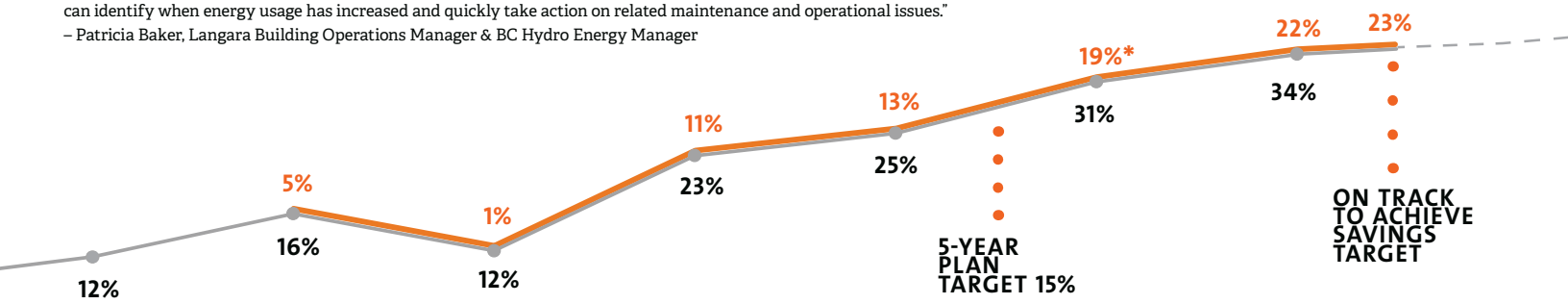
2005 2006 2007

2007
New Library designed to LEED Gold. Langara's policy is to have new building constructions be minimum LEED Gold Certified.

"Langara has been an active BC Hydro Power Smart Partner for over seven years and has implemented numerous energy efficiency measures on campus which have significantly helped the College to manage its energy costs."
– Ron Mastromonaco, BC Hydro Senior Key Account Manager

2000 Energy Savings Baseline (savings corrected for weather and construction)

"Installing sub-metering on campus and an Energy Management Information System (EMIS) has been an important part of Langara's Energy Management Program. Through regular reporting and review of our energy dashboard, we can identify when energy usage has increased and quickly take action on related maintenance and operational issues."
– Patricia Baker, Langara Building Operations Manager & BC Hydro Energy Manager



2008

2008
Greenhouse Gas Reduction Targets Act introduced.

Energy Management Assessment conducted through BC Hydro.

2009-2013
College Strategic Plan makes optimizing energy usage on campus a priority.

2009

2009
Geothermal capital upgrade of old library and new Students' Union Building – renovated to LEED Gold.

Langara joins BC Hydro Energy Manager Program and creates 5-year Strategic Energy Management Plan (SEMP).

2010

2010
Adopts the Association of Canadian Community College's Pan-Canadian Protocol for Sustainability.

Campus electrical and gas sub-meters installed for improved energy monitoring. Live energy use dashboard installed in Main Foyer of A Building.

2011

2011
Begins participation in BC Hydro's Continuous Optimization Program (COp).

Green IT energy study completed.

2012

2012
BC Hydro Energy Manager integrated into College facilities position.

BC Hydro's COp recommendations implemented for Library Building.

Electric vehicle charging stations installed on campus.

2013

2013
New Science & Technology Building project begins.

BC Hydro's COp recommendations implemented for A and B Buildings.

Creative Arts adopts new LED technology for studios and students showcase.

2014

2014
*5-year Strategic Energy Management Plan (SEMP) exceeds 15% savings target.

Academic Plan 2014-2019 makes sustainability a strategic priority.

New 3-year Strategic Energy Management Plan (SEMP) developed.

Green IT infrastructure upgrades begin.

2015

2015
Operator Training Initiative for building controls systems, including tablets for troubleshooting operational issues.

Energy awareness and engagement initiatives.

Lighting upgrades and controls.

Phase I of Central Heating Plant complete.

2000 Energy Savings Baseline (savings corrected for weather and construction)
2009 Energy Savings Baseline (savings corrected for weather and construction)
Strategic Energy Management Plan (SEMP) Target

NEW
3-YEAR
PLAN
TARGET 25%

ANNUAL SAVINGS ACHIEVED SINCE 2000
- 35% energy savings
- 15,000 GJ of fuel usage
- 2.3 million kWh of electricity usage
- $300,000 in avoided energy costs

2000-2015 SAVINGS OF 3,500 TONS OF CO2
Equivalent to taking 740 cars off the road for one year.*

*Average of 4.75 metric tons of CO_2 emissions per passenger vehicle per year.

2016

2016
Planned opening of new Science & Technology Building; participation in BC Hydro's New Construction Program.

Phase II of Central Heating Plant.

Library LED lighting retrofit.

2017

2017
Planned Phase III of Central Heating Plant.

LED lighting retrofits.

2018 2019 2020

GREENEST CITY BY 2020
Langara's Central Heating Plant supports the City of Vancouver's "Greenest City by 2020" action plan by incorporating a district heating connection. The City plans to develop a low carbon energy source district heating system along the Cambie corridor.

"The College is committed to being part of a sustainable society. Building green is one way Langara demonstrates a commitment to energy management and sustainability on campus. The opening of the new Science and Technology Building in 2016 will be our third LEED Gold building on campus."
– Wendy Lannard, Langara Facilities Director

CARBON NEUTRAL SINCE 2011
In 2008, the Greenhouse Gas Reduction Targets Act set a target for BC public sector organizations to reduce their greenhouse gas (GHG) emissions by 33% by 2020, and 80% by 2050, compared to 2007 as baseline.

Since 2010, Langara has annually measured, reported, and offset GHGs related to its building energy, fleet fuel, and paper use.

By 2013, Langara achieved 33% reduction compared to the 2007 baseline year, meeting the provincial target seven years ahead of time.

— — **Strategic Energy Management Plan (SEMP) Target**

Other Sustainability Activities in 2015

Waste Management

- Added additional multi-stream recycling stations in all B Building office pods

Transportation

- Fully transitioned student U-Pass BC program to Compass Card
- Hosted Bike to Work Week Celebration Stations in May and October
- Installed standalone bike repair station in parkade
- Launched a spare parts program for employee bicycle repairs

Also, as part of the College's Academic Plan, a specific committee (APAG5) was established to look at the cross-disciplinary nature of sustainability in curriculum, advocate sustainable practices and build sustainable partnerships. The committee includes a cross-section of academic and administration employees. Initiatives in 2015 included:

- Draft Sustainability Purchasing Policy in collaboration with Purchasing and Human Resources.
- Promote and celebrate sustainability successes on campus with representation at the Energy Fair; sold fine arts prints with proceeds towards a student bursary.
- Organized events to raise awareness of transportation issues.
- Raised awareness on campus related to existing sustainability projects including a community garden, apiary, and wetlands areas.
- Organized events to engage and reconnect with our Langara retirees.

Ongoing updates are included on the Academic Plan website:

http://iweb.langara.bc.ca/academic-plan-updates/environmental-financial-and-social-sustainability/about-priority-5/

Plans to Continue Reduction of Greenhouse Gas Emissions in 2016 and Beyond

Initiatives planned to reduce greenhouse gas emission, related to the Energy Management Plan in 2016 and beyond include:

Policy

- Continue to finalize Indoor Air Temperature Policy and implement operationally.

Operations & Maintenance

- Continue timely repairs of equipment to minimize impact on energy usage.
- Additional metering of heating loads at the building level for better energy monitoring and targeting.
- Continuing monitoring, targeting and reporting (MT&R) the buildings' energy use, including a process for operators to identify and address operational issue in a timely manner.

Engagement & Awareness

- Academic Plan Priority 5 (Sustainability) Committee – introduction to Langara as a Living Lab for Sustainability at the Curriculum Conference – Curriculum for Global Citizenry; present Energy Dashboard as an opportunity to incorporate sustainability into curriculum.
- Continue to raise awareness related to plug loads, inventory space heaters, utilize most efficient option where required.

Green Renewal

- Planning and budgeting for Phase 3/4 of our new Central Heating Plant project.
- Continue to install new LED lighting in the Library.
- Exterior lighting upgrades – new LED technology to replace end of life equipment and improve lighting levels and quality.
- Incorporate new energy efficient lighting technologies and controls into campus renovations, including developing a standard for all renovations.
- Continue to install thin client desktops and server virtualization at Langara. This three-year initiative will reduce campus IT electrical usage by approximately 80%.
- Continue to investigate and quantify opportunities for end-of-life mechanical equipment on Campus, specifically related to A Building and areas of C South which are the largest energy saving opportunities.

Green Buildings

- Complete construction of new LEED Gold Science & Technology Building, including participation in BC Hydro New Construction Program.

Other Sustainability Activities in 2016 and beyond

Waste Management

- Create a Sustainability Coop Student position to conduct research and engage stakeholders
- Relaunch the recycling program in September with new and improved messaging, signage and facilities
- Eliminate emptying of individual office garbage bins by janitorial staff

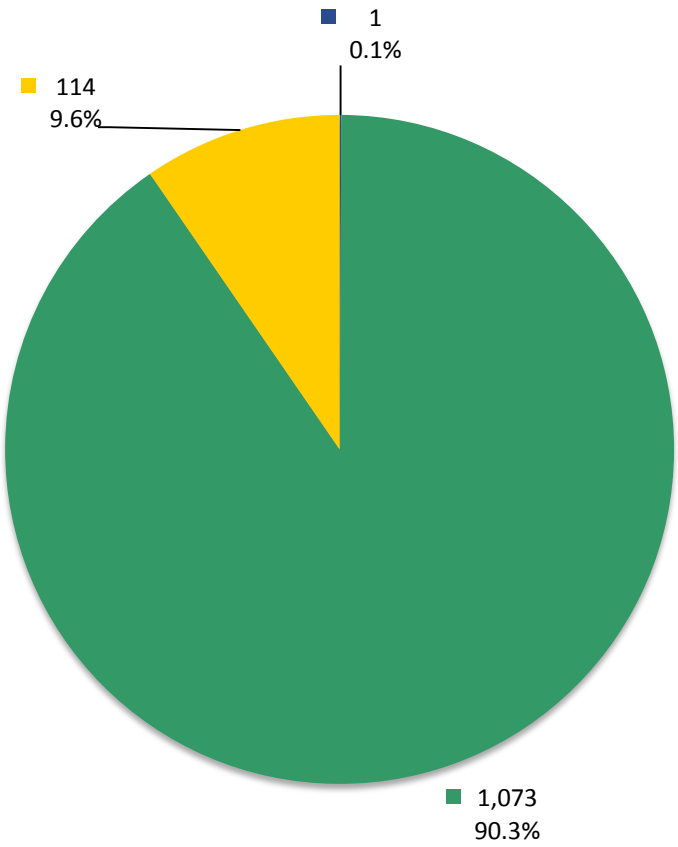
Transportation

- Participate in Bike to Work Week and Commuter Challenger events
- Create an active transportation survey and action plan with Haste BC

Academic Planning Action Group 5 (APAG5)

- Recycle bikes for student's initiative.
- Continue to develop Sustainability Purchasing Policy in collaboration with Purchasing and Human Resources.
- Introduction to Langara as a Living Lab for Sustainability at the Curriculum Conference – Curriculum for Global Citizenry.
- Proposal to pursue an AASHE (Association for the Advancement of Sustainability in Higher Education) - "STARS" rating – a Sustainability Tracking Assessment & Rating System. STARS provides an avenue for international recognition of an institution's progress along the path of sustainability and helps identify best practices, and generate future goals. It also acts as a tool to engage the college community in building a culture of sustainability.

Langara College
Greenhouse Gas Emissions by Source
for the 2015 Calendar Year (tCO_2e*)



Total Emissions: 1,189

- 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 2015 (Generated May 25, 2016 10:50 AM)

Total offsets required: **1,189**. Total offset investment: $**29,725**. Emissions which do not require offsets: **0** **

*Tonnes of carbon dioxide equivalent (tCO_2e) 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.

2015 Carbon Neutral Action Report Survey

Organization Name:

Langara College

Please select your sector:

- Post-Secondary Institution

1) Stationary Sources (Buildings, Power Generators, Ext. Lighting) Fuel Combustion, Electricity use, Fugitive Emissions:

Please indicate which actions your PSO took in 2015:

Have developed an overall strategy/plan to reduce energy use in your organization's buildings inventory:

Yes

If Yes, please describe:

We have had an Energy Manager since 2009. We are in our third year of our current 3 Year Strategic Energy Management Plan. We are achieving approximately 20% energy savings and 30% GHGs emissions reductions compared to a 2009/10 baseline, corrected for weather.

Undertook evaluations of building energy use:

Yes

Performed energy retrofits on existing buildings:

Yes

Built or are building new LEED Gold or other "Green" buildings:

Yes

Please list any other actions, programs or initiatives that your organization has introduced that support emissions reductions from buildings:

Continuous optimization of Building Controls and energy monitoring, including training and implementation of operations reviews and tasks to address to maintain achieved energy savings. Capital upgrades, including completion of Phase 2 of a multi year central heating plant project; design to utilize a future Low Carbon Energy Source planned for the Cambie Corridor. New LED lighting in

various areas of the college.

2) Mobile Sources (Fleet, Off-road/Portable Equipment) Fuel Combustion:

Indicate which actions your PSO took in 2015:

Have put in place an operations policy/program to support systematic reductions in fleet related emissions:

(e.g., program to convert fleet to renewable fuels)

No

If Yes, please describe:

Fleet is an insignificant energy source. No plans are in place to address this item. It would not be feasible.

Replaced existing vehicles with more fuel efficient vehicles (gas/diesel):

No

Replaced existing vehicles with hybrid or electric vehicles:

No

Took steps to drive less than previous years:

No

Please list any other actions, programs or initiatives that your organization has introduced that support emissions reductions from fleet combustion:

Not applicable.

3) Supplies (Paper):

Indicate which actions your PSO took in 2015:

Have put in place an operations policy/program to facilitate a systematic reduction in paper-related emissions:

(e.g., policy to purchase 100% Recycled Content; default to double-sided printing)

No

If yes, please describe:

No policy in place yet. We are working on implementing the technology required to record usage in a way that can be tracked. 1-2 year time frame. Once this is implemented, a more strategic approach to reducing usage can be carried out.

Have put in place an operations policy/program to facilitate behavioural changes from paper use:

(e.g. awareness campaign to reduce paper use):

No

If yes, please describe:

Not yet. see above.

Used only 100% recycled paper:

No

Used some recycled paper:

Yes

Used alternate source paper:

(e.g., bamboo, hemp, wheat etc.)

No

Please list any other actions, programs or initiatives that your organization has introduced that support emissions reductions from paper supplies:

We purchase a large percentage of our paper supplies with 30% recycled content. We have working on implementing a method to track usage.

4) Other Sustainability Actions:

Please note that this section is optional

Business Travel

Created a low-carbon travel policy or travel reduction goal:

(low-carbon = lowest emission of greenhouse gas per kilometer per passenger)

No

Encouraged alternative travel for business:

(e.g. bicycles, public transit, walking)

Yes

Encouraged or allow telework/working from home:

No

Other:

(No response)

Education Awareness

Have a Green/Sustainability/Climate Action Team:

Yes

Supported green professional development:

(e.g. workshops, conferences, training)

Yes

Supported or provided education to staff about the science of climate change, conservation of water, energy and/or raw materials:

No

Other:

Hosted a Curriculum Conference "Curriculum for Global Citizenry" which included aspects of Langara as a Living Lab for Sustainability - highlighting current successes.

Adaptation Planning for Climate Risks

Have assessed whether increased frequency of extreme weather events and/or long term changes in climate will affect your organization's infrastructure, its employees and/or its clients:

No

Have incorporated these anticipated changes in climate into your organization's planning and decision making:

No

Other:

(No response)

Other Sustainability Actions

Established a water conservation strategy which includes a plan or policy for replacing water fixtures with efficient models:

No

Have put in place an operations policy/program to facilitate the reduction and diversion of building occupant waste stream from landfills or incineration facilities:

(e.g., composting, collection of plastics, batteries)

Yes

Established green standards for goods that are replaced infrequently and/or may require capital funds to purchase:

(e.g., office furniture, carpeting, etc.)

No

Incorporated lifecycle costing into new construction or renovations:

No

Please list any other sustainability actions your organization has taken not listed above:

It is not an official policy at this point, but we do have a recycling program with the following highlights:
- Approximately 76 recycling stream sorting stations located in public areas, hallways, employee spaces and lounges
- Recycling of organics, plastics, paper towels, mixed papers, refundable containers, electronics, metal, batteries, light bulbs, construction materials
- Paper towel recycling in all washrooms and kitchenettes
- Best practices for our food vendors to use all recyclable containers and utensils and to recycle all food and packaging materials with minimal landfill contribution

We have encouraged alternative transportation by providing:

- Bike racks (covered and uncovered) all around campus
- Secured bicycle parking facilities
- Shower rooms and cycling gear lockers
- Air hoses, charging stations, spare parts and dedicated repair station
- Sponsorship of cycling safety and maintenance workshops through HUB (cycling advocacy non-profit)
- Participation in Bike to Work Week (host of our own celebration station) and Commuter Challenge region wide events

During renovations: energy and emissions are considered when determining lighting and mechanical systems and controls, including reusing materials and furniture where possible.