

2013 Carbon Neutral Action Report

LANGARA COLLEGE | MAY 2014

Executive Summary

Our Commitment

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 on our world and future generations. 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 commitment to reducing Greenhouse 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 environment 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's policy is to have any new building constructions be LEED® Gold Certified at minimum. Our new Science & Technology Building slated for completion in 2016 will be built to this standard. To date, Langara's Library Building has captured national and international attention for its environmentally progressive features. The Library is a landmark facility on campus and in the community. Together with the Students' Union Building and the renewed C Building (formerly the Library and now home to a mixed use of classrooms, meeting spaces, and administration), all three buildings received LEED® Gold Certification for providing optimum comfort and energy efficiency.

Langara College has been working at reducing greenhouse gases and increasing sustainability for many years. This has come from both internal changes and policies and from incentive programs developed by BC Hydro, Office of Energy Efficiency, Natural Resources Canada, and the Association of Canadian Community Colleges. Langara College has been reporting their Energy Management Action Plan through the Canadian GHG Challenge Registry annually and has been recognized as a Gold Champion Level Reporter since 1999; this registry has recently closed. We continue our efforts to reduce energy and GHGs strategically and have recently exceeded our target of 15% energy savings over 5 years.



About Langara

Located in beautiful Vancouver, BC, Canada, Langara College provides University, Career, and Continuing Studies education to more than 21,000 students annually. With over 1,700 courses and 130 programs offered, Langara's expansive academic breadth and depth allows students of all ages, backgrounds, and life stages to choose their own educational path.

Declaration Statement

This is the 2013 Carbon Neutral Action Report for Langara College. This report contains our 2013 emissions profile, offsets purchased, and the actions we have taken in 2013 to reduce our GHG emissions. It also outlines our plans to continue reducing emissions in 2014 and beyond. By June 30, Langara College's final CNAR will be posted to our website at langara.bc.ca/sustainability.

The College is proud of its efforts to reduce energy usage and greenhouse gases. We look forward to continuing our role as environmental stewards.

Roy Daykin

Vice-President, Administration and Finance

Emissions and Offsets Summary

Langara College’s GHG emissions for the mandatory reporting categories for 2007 and 2011-2013 are summarized in the table below. 2007 was the Ministry base year for GHG target reduction.

GHG Emissions Summary

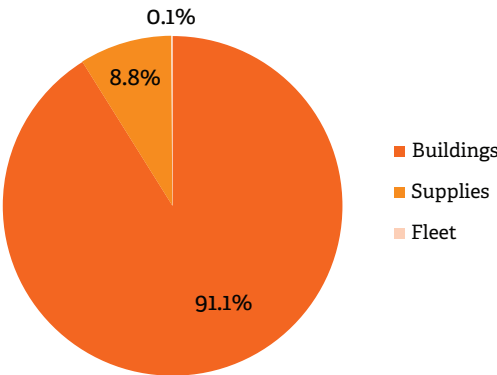
Note: all GHG emissions stated in this report are developed using Smarttool and reported in “tonnes of CO₂ equivalent”, or “tCO₂e”.

tCO ₂ e				
	2007	2011	2012	2013
BUILDINGS	2,020.1	1,588.5	1,444.4	1,278.5
SUPPLIES		138.1	129.2	123.4
FLEET		1.5	1.8	1.5
TOTAL	2,020.1	1,728.1	1,575.3	1,403.4

Emissions Breakdown by Category

The chart shows our emissions breakdown in tCO₂e by category for 2013. The graph highlights that Buildings (energy usage) is our biggest contributor to GHG emissions at the college, followed by Supplies (paper usage). Fleet is considered negligible and is not a priority in our strategic planning for GHG reductions.

It was estimated that stationary fugitive emissions from cooling comprise less than 0.01% of Langara’s total emissions, and to collect data for emissions from this source was not feasible. For this reason, emissions from this source have not been included in Langara’s total greenhouse gas emissions profile.



Offsets Summary

The total emission offsets applied to become carbon neutral in 2013 is 1,403.4 tonnes.

Langara College was required to pay \$37,065 inc. taxes in carbon offsets to become carbon neutral.

Greenhouse Gas Emissions in calendar year 2013:	
Total Emissions	1,403
Total Emissions for Offsets	1,403
Adjustments to GHG Emissions Reported in Previous Years:	
Total Emissions	9
Total Emissions for Offsets	9
Credit owing from PCT at end of 2012 reporting year:	
Credit Owing	1,412
Total Emissions for Offsets for the 2013 Reporting Year: (column D of Invoice)	0

Emissions Reduction Activities 2013

Langara has been actively reducing GHG emissions for almost 15 years through policy and projects on campus. “Buildings” Energy Management has been our primary focus for GHG reductions over the past few years, with “Supplies” (paper) addressed to some extent. Additionally, we have carried out other GHG reduction initiatives including Waste Management, Transportation, Community Engagement, and Research.

GHG Emissions Savings Summary

tCO ₂ e							
	2007	2012	2013	SAVINGS 2013*	% SAVINGS 2013*	SAVINGS 2013**	% SAVINGS 2013*
BUILDINGS	2,020.1	1,444.4	1,278.5	165.8	11%	741.6	37%
SUPPLIES	-	129.2	123.4	5.81	4%		
TOTAL	2,020.1	1,573.6	1,401.9	171.6	11%	741.6	37%

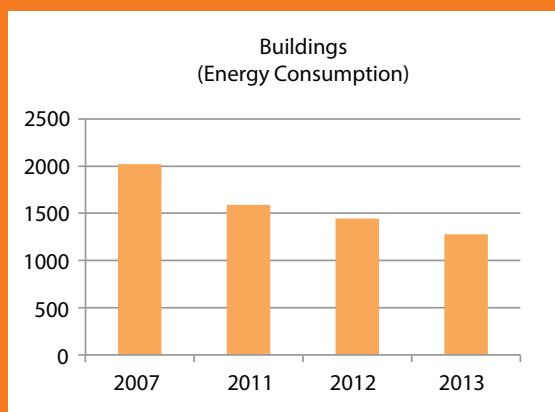
* compared to 2012 ** compared to 2007

Over the past year (2012-2013), Langara College decreased its tCO₂e by 11% through actions taken.

The BC government has made a commitment to reduce GHG emissions by 33% below 2007 levels by 2020 on an absolute, calendar year basis. Langara has already reached this goal; through our buildings energy management initiatives and policies, Langara’s absolute emissions have been reduced by 741.6 tCO₂e or 37% compared to 2007.

Buildings

The graph below summarizes the reported GHG emissions for "Buildings", which include both direct emissions from natural gas and indirect emissions from electricity using Ministry standard emissions factors in Smarttool. The graph shows a continuous decrease in GHG emissions for the campus on an absolute basis. As noted previously, from 2012 to 2013 we saved 11% on emissions through our actions.



The various initiatives related to buildings carried out in 2013 are discussed in the following sections.

BC HYDRO ENERGY MANAGER PROGRAM

We have extended our commitment to BC Hydro's Energy Manager Program for a sixth year.

BC HYDRO CONTINUOUS OPTIMIZATION PROGRAM

Final commissioning of A & B buildings "Continuous Optimization" measures were completed.

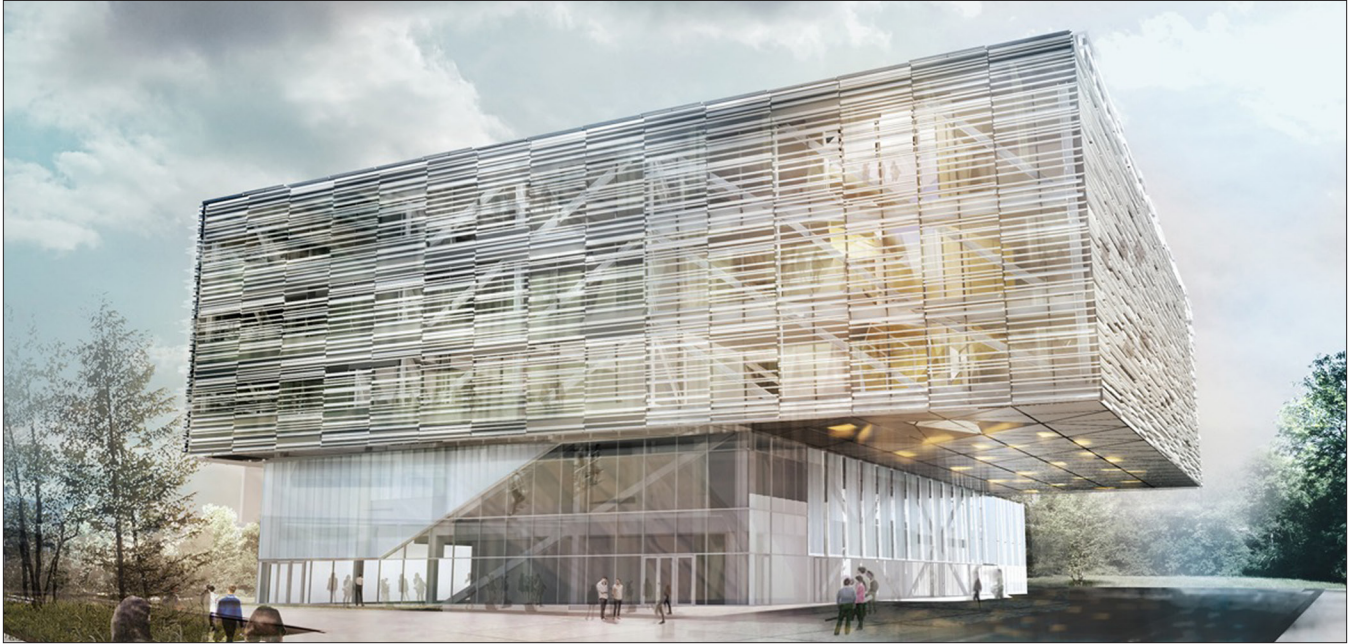
BUILDING RENEWAL

B Building - installing new VAV controllers, valve repairs, and graphical interface for schedule optimization. Re-piping B Building heating is required as existing piping gaskets were leaking when temperatures were not at peak winter supply temperatures. Following the re-piping, heating plant controls will be able to be optimized for seasonal temperature changes.

C Building & LSU - Controls, graphics, and piping upgrades. Continued commissioning and monitoring for further optimization.

L Building - Mechanical and controls review, including repair of mechanical equipment as required based on annual maintenance inspections, purchase of controls hardware, and equipment for upgrades. Upgrades are required to address occupant comfort and end of life or unsupported hardware. Review of sequence operations was carried to determine further optimization potential.

Campus Wide - Central Heating Plant Study and strategic planning.



Artist rendering of new Science & Technology Building

NEW CONSTRUCTION – NEW SCIENCE & TECHNOLOGY BUILDING

In 2013, Langara started construction for a new Science & Technology Building. The intent for the new Science & Technology Building is to provide a high-quality learning environment while achieving a LEED Gold level of certification through the implementation of a comprehensive sustainability strategy. Energy efficiency measures combined are expected to reduce annual energy consumption for the project by over 30% compared to ASHRAE 90.1-2010.

The building envelope assemblies, lighting systems, and HVAC systems and controls for this project will be designed and commissioned to reduce the energy consumption of the building. A high performance enclosure, with roof and wall R-values that exceeds code requirements will reduce the overall heating and cooling requirements for the facility. The ventilation system will respond to changes in occupancy and CO₂ concentration. A Thermenex HVAC thermal energy exchange system uses the energy flows within a building to maximize efficiency, reuse “waste” heat, and reduce energy use. Occupancy sensors will control lighting in all other regularly occupied spaces. Solar panels are included in the design.

This building is participating in BC Hydro’s New Construction Program.



Langara representatives and local dignitaries break ground on new building.

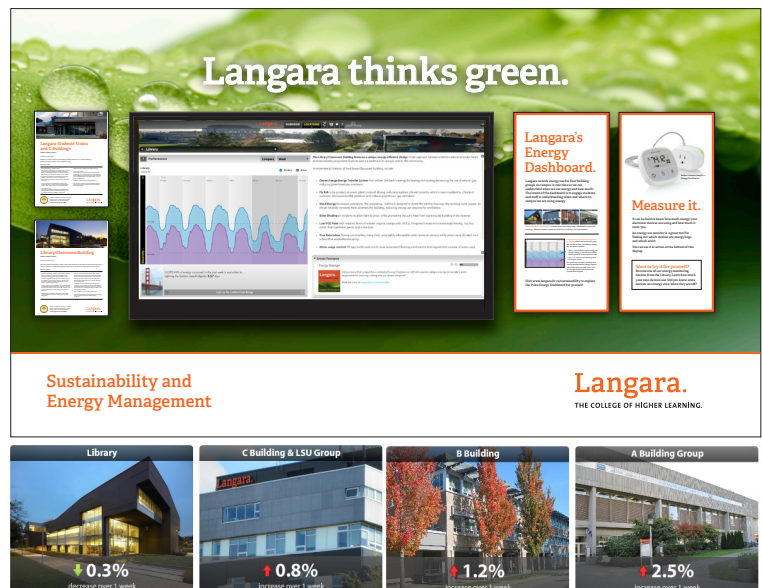
IT and Sustainability

Langara's Information Technology (IT) Department has completed several sustainability initiatives and others are currently underway. Most initiatives relate to a reduction in overall buildings energy usage. They include:

- Adoption of Thin-Clients using virtual desktop through Citrix technology. Infrastructure to support such technology was implemented in 2013 and deployment in labs and employee offices is ongoing and will take another one to two years to complete. The virtual desktop technology will reduce campus computer electricity usage by approximately 80%.
- Sustainable procurement practices to regularly update computer equipment with energy efficient and compliant devices on campus has been implemented and continues.
- Instituting protocols to conserve energy across campus has been implemented and is ongoing.
- Data Centre consolidations of existing hardware with virtual environments continues, resulting in an overall reduction in energy usage.

Sustainability & Energy Management Dashboard

We continue to exhibit live energy usage on campus through a Sustainability and Energy Management dashboard and display case in the foyer of the Building A. Posters and social media campaigns are used to communicate campus and global sustainability initiatives and events - Sweater Day and Earth Hour were included this year.



Success Stories

In this fifth year since implementing the energy saving strategic plan, Langara has not only met but also exceeded its energy saving targets. To communicate Langara's sustainability successes to stakeholders and the larger campus community, the Energy Manager worked with the Communications & Marketing department to develop and produce a series of success stories. These are summarized below, and included in the following pages. They can also be viewed on our website at langara.bc.ca/sustainability

- "A measurable difference" highlights our achievements in the five-year strategic energy management plan.
- "Lifelong learning for buildings, too" summarizes our actions and successes related to our participation in the Continuous Optimization Program.
- "Creative Arts meets energy smarts" highlights our innovative energy-efficient lighting solutions on campus.



A measurable difference.

LANGARA'S 5-YEAR STRATEGY FOR SAVING ENERGY EXCEEDS TARGETS

SUPPORT FOR SAVING ENERGY

Langara College is committed to saving energy and has been working in partnership with BC Hydro to achieve its goals. In 2009, with sponsorship through BC Hydro, an Energy Manager was brought on board to help Langara develop and implement an energy management plan, engage the campus community in energy conservation, and track success in energy reduction goals. In addition, Langara participated in an Energy Management Assessment (EMA) workshop to assess current energy-related practices and identify opportunities for improvement. That same year, Langara joined the BC Hydro Continuous Optimization (COp) program, which helps identify and implement building system controls that improve energy efficiency.

THE STRATEGIC ENERGY MANAGEMENT PLAN

In 2009, Langara created a Strategic Energy Management Plan (SEMP) to take our commitment to saving energy above and beyond benchmark standards and BC government regulations. The SEMP, prepared by the Energy Manager in association with the Facilities Department, supports Langara's commitment to reducing its energy use and environmental impact.

As part of this plan, Langara set the goal of reducing campus energy use of existing buildings by 15% (from 2009/10 levels), as well as greenhouse gas emissions (GHGs), over a 5-year period. The SEMP is updated on an annual basis by Langara's Energy Manager as a way to track progress toward this goal.

SAVING ENERGY TAKES COMMUNICATION

Langara engages with the entire college community to influence attitudes and change behaviour. Over the past five years, Langara has organized a variety of campus engagement activities to encourage students, staff, faculty, and the community to participate in energy conservation actions.

Additional resources include:

- Interactive monitoring of Langara's energy use with the Pulse Dashboard
- Belkin Energy Monitor devices available at the Library for individuals to track personal energy use

Learn more.

www.langara.bc.ca/sustainability

ENERGY SAVING CHALLENGES

Langara is growing.

Since 1999, the campus building area has increased by 17%, equivalent to over 72,000 ft².

Langara is a diverse hub of activity.

While the majority of the academic activities on campus take place in a classroom environment, there are also various science and computer labs and theatre spaces. In addition to being used by students, staff and faculty, the College facilities also host numerous community events.

It takes money to save energy.

The total College budget is approximately 107 million dollars annually; utilities cost the College just less than 1 million dollars per year. The challenge is to identify energy saving opportunities that make financial sense.

Over the last five years, we have implemented numerous energy saving projects. All of these actions have helped us become more resilient to rising energy costs, reduce our environmental impact, and contribute to fostering a sustainable campus community. In 2014, we met and exceeded our energy savings target.

2009 - 2014 SAVINGS OF 1100 TONS OF CO2

Equivalent to taking 240 cars off the road for one year.



*Average of 4.75 metric tons of CO2 emissions per passenger vehicle per year.

% ENERGY SAVINGS OVER ESTIMATED BASELINE



YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
2009/2010:	2010/2011:	2011/2012:	2012/2013:	2013/2014:
<ul style="list-style-type: none">Energy Manager hiredSEMP created	<ul style="list-style-type: none">Campus electrical and gas submeters installed for improved energy monitoringCOp investigation phase begins in Building L	<ul style="list-style-type: none">Building L COp implementationGreen IT studyBoiler condition testing & reviewBuilding A & B COp investigation phaseOperations manual for energy efficiency	<ul style="list-style-type: none">COp implementation in the gym, daycare and Building ABuilding B COp implementation, including new VAV controlsLED lighting upgradesElectric vehicle charging stations	<ul style="list-style-type: none">Creative Arts LED installationsBuilding B & C DDC control and piping upgradesGreen IT infrastructure upgrades

OUR COMMITMENT TO SUSTAINABILITY

We know that our choices, both big and small, impact our world and future generations. 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. More specifically, our energy goals are:

- To optimize the campus energy usage with the existing technology and controls;
- To reduce Langara's greenhouse gas (GHG) emissions;
- To reduce and control energy costs and minimize exposure to energy price volatility;
- To upgrade building systems with the most efficient alternative through capital improvements and maintenance where feasible, considering the life cycle cost of the equipment;
- To raise awareness of the need to use energy efficiently among the college community;
- To minimize the load on BC's electrical infrastructure and as a result, minimize the environmental impact of new generation capacity.

ANNUAL SAVINGS ACHIEVED

- 27% of fuel usage
- 11% of electricity usage
- 26% of GHG emissions
- \$165,000 in avoided costs

Over the past five years, all energy saving measures combined had a payback period of less than two years. Energy savings will also pay for almost 1.3 million dollars in building renewal capital over the next 7 years, and this equipment will last much longer than that. The overall net savings for the College should reach close to one million dollars.



Lifelong learning, for buildings too.

LANGARA'S ONGOING COMMITMENT TO SAVING ENERGY

From innovative energy upgrades in existing buildings to industry-leading construction projects, Langara College is building a sustainable campus.

Optimizing the existing heating, ventilation, air conditioning, and lighting systems was no small task, given the variety of equipment and controls at Langara. To tackle the challenge, Langara joined BC Hydro's Continuous Optimization program (COP) in 2009, which has helped to identify issues and implement projects that improve building energy efficiency. The program consists of two integrated components - building recommissioning, and the development of an Energy Management Information System (EMIS).

Now almost five years into the program, COP has been implemented in 86% of building area on campus, including the installation of real-time metering to track energy use, and conducting multiple controls optimization studies. This has led to substantial energy savings -- over \$110,000 in avoided costs from three buildings (L, A, and B) after the first year of implementing energy reduction measures. Energy-saving measures combined for each site had a less than two-year simple payback, and funding to investigate measures was provided by BC Hydro. Considering Langara's utility bill has been nearly a million dollars per year, these are significant savings.

"Once we took a detailed look at the operation of the heating, cooling, and lighting systems at Langara, even in new buildings like the Library, it was possible to find measures to achieve further energy savings," says Patricia Baker, Langara's Energy Manager. "From correcting the scheduling of heating and cooling systems, to the identification and replacement of faulty sensors, we have come a long way towards getting our house in good energy-efficient order."

With the support of BC Hydro, an initial review by Enersolv Consulting, and implementation by Prism Engineering, COP has proven to be an energy-saving success story for Langara College -- and it is far from over. COP is now being implemented in the Student Union Building and Building C for Fiscal 2013/2014. Langara has also taken energy savings measures beyond COP to capital improvement projects, realizing further savings.

"COP implementation has provided us with the tools we need for continuous monitoring and control strategy adjustment," says Baker. "Together with our energy management team, our building operators now have what they need to maintain a proactive approach to continuous energy savings and improvement."

Learn more.

www.langara.bc.ca/sustainability

SUSTAINABILITY

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

ENERGY SAVING

Participating in the COP program is just one of the ways that we are achieving our energy reduction goal.

In 2009, Langara set the goal of reducing campus energy use of existing buildings by 15% (from 2009/10 levels). Over the last five years, we have implemented numerous energy saving projects and in 2014, we met and exceeded our target.

CONTINUOUS OPTIMIZATION MEASURES

TOTAL SAVINGS FOLLOWING THE FIRST YEAR OF COP IMPLEMENTATION

L BUILDING | SAMPLE MEASURE: EXHAUST FAN COMMISSIONING

Built in 2007, the LEED Gold Certified Library building has captured both national and international attention for its environmentally-progressive features and unique energy-efficient design. Exhaust fans in the parking lot underneath the building are controlled by CO2 sensors. The retrocommissioning report revealed that the fans were continuously operating at 100% speed due to improper commissioning and faulty wiring of CO2 sensors. To fix the issue, the CO2 sensors were re-wired and the exhaust fans now run only when needed.

L BUILDING
45% ELECTRICITY SAVINGS
\$60,000 AVOIDED COSTS

A BUILDING | SAMPLE MEASURE: START-UP MODE

The retrocommissioning report for A Building identified that the start-up modes for the HVAC (heating and cooling) systems were not commissioned correctly. Every morning, cold outdoor air was being introduced into the building as heating equipment worked to bring the building up to a comfortable temperature. A simple re-programming fix now ensures that the outdoor air dampers remain closed for 30 minutes after heating begins, to ensure that the building reaches the desired temperature without the extra work of heating cold outdoor air.

A BUILDING
6% ELECTRICITY SAVINGS
\$30,000 AVOIDED COSTS

B BUILDING | SAMPLE MEASURE: AHU-5 VALVE REPLACEMENT

A closer look at the energy data revealed that an Air Handling Unit (AHU) in B Building was wasting energy due to a faulty cooling coil control valve. Essentially, too much chilled water was being introduced into the system, which was working extra hard to bring air up to the required temperature. Once the valve was replaced, this extra energy use was eliminated.

B BUILDING
22% ELECTRICITY SAVINGS
\$27,500 AVOIDED COSTS

KEY COP MEASURES

- Optimized DDC (Direct Digital Control) system equipment schedules
- Upgraded DDC graphic interface for increased usability for operators and facility managers
- Calibrated and replaced faulty CO2 & temperature sensors for optimization of equipment control
- Optimized equipment ventilation rates to ensure airflow rate slows down when not required
- Recommissioned VAV (Variable Air Volume) flow rate and optimized controls for more individual programming and schedules
- Installed new VAV controls hardware
- Replaced faulty heating valves on equipment
- Commissioned controls system to improve point functionality and communication



Creative Arts meets energy smarts.

LANGARA'S INNOVATIVE LIGHTING SOLUTIONS

CHALLENGE

Each year, the creative talent of students in Design Formation, Fine Arts, Professional Photography, and Publishing is showcased in a final Grad Gallery Show. In 2013, organizers hosted the event as the first-ever pop-up show in the main foyer of A Building. The new format presented challenges for how new state-of-the-art, energy-efficient lighting design could be used to facilitate aesthetic lighting requirements for the exhibit, address colour rating needs, and accommodate the varying sizes and angles of each student work.

SOLUTIONS

Langara conducted a full assessment of the existing lighting system. The results helped to inform the new lighting design, which featured new LED track lighting and several retrofits. These installations dramatically improved the lighting in the main foyer and for the pop-up gallery.

RESULTS

The new lighting retrofit resulted in an overall energy savings of 85%, and boasts a 2 to 3-year payback on the installation. The lighting quality for the pop-up gallery was such a success that the Buffalo Lounge and other studios, where student artwork is created and displayed throughout the year, were also retrofitted with new energy-efficient lighting.

SUSTAINABILITY

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

Other energy-efficient lighting projects on campus include:

- Retrofitting the main Langara sign with energy-efficient bulbs
- Installing LED lighting to illuminate pathways and improve safety
- Utilizing advanced lighting controls to make the most of daylight

These lighting projects are just one of the ways that we are achieving our energy reduction goal.

In 2009, Langara set the goal of reducing campus energy use of existing buildings by 15% (from 2009/10 levels). Over the last five years, we have implemented numerous energy saving projects and in 2014, we met and exceeded our target.

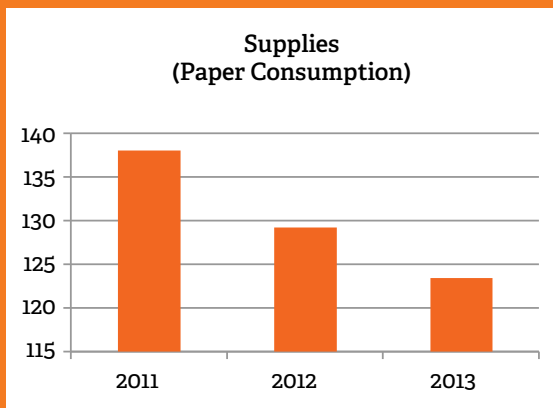
Learn more.

www.langara.bc.ca/sustainability



Supplies

The graph below summarizes the Smarttool reported GHG emissions for "Supplies". Supplies include all standard office paper purchase by the college for various operations, including the print shop. Emissions are based on Ministry standard emissions factors in Smarttool for office paper. The graph shows a continuous decrease in GHG emissions for the campus on an absolute basis. As noted in the savings summary, from 2012 to 2013, we saved 4% of our emissions related to paper usage.



All our office paper used is 30% post – consumer recycled content and Sustainable Forestry Initiative certified sourcing.

PaperCut – Print Monitoring Software

The college has recently implemented Papercut, a new print management system. This system provides advantages such as duplex printing, more granular reporting, including data on which printers and users have the highest usage. The initial phase of this project has been implemented and is monitoring all lab printers. The next phase will include shared employee printers.



Other Emissions Reduction Activities 2013

Waste Management

Langara is working toward a near zero waste mandate. A strategic initiative was implemented to reduce general waste to the landfill by increasing recycling streams. The Facilities department, with the assistance of Communications & Marketing, launched a College-wide campaign that introduced the addition of wet-waste (compostable) recycling to Langara's existing recycling program.

Recycling Depot

Langara encourages recycling and has accessible recycling containers located throughout the campus. A recycling depot was built as a hub for all recycling streams on campus. Recyclable materials (both new and existing) are organized here for transport and processing.

Waste Audit

In December 2012, through a Request for Proposals process, Urban Impact was chosen to handle Langara's waste and recycle program. They conducted a one-day audit of waste on the campus to provide us with a clear snapshot of our waste generation. The audit showed we could reduce our waste by up to 90% with targeted improvements.

Plan in Action

The following initiatives have been implemented over the past year:

- Implement a comprehensive recycling centre in the student cafeteria and employee lounge to capture the various waste streams
- Implement composting in the cafeteria kitchen by providing compost collection bins
- Provide more efficient recycling locations throughout the campus to capture more waste streams.
- New recycling bins have been strategically placed across the campus to encourage students to recycle their waste and to separate materials correctly. The bins are individually marked for paper, organic, returnable containers, and waste.
- All garbage bins have been removed from classrooms and labs. Students are responsible for their waste and for putting all recyclable materials in the appropriate bins located throughout the campus.
- Provide bins specifically for recycling of paper towels in washrooms. Used paper towels are a major contributor to on-campus waste but are 100% recyclable if clean, and compostable if soiled. We have placed 94 bins throughout the campus to capture and recycle this waste.
- A recycling committee and Green Team has been created to promote the program and begin an educational process for students and employees.



Force and Sully, aka the Green Men, get Langara employees and students excited about waste management and recycling.

Green Team

A Green Team of employee and student volunteers was formed to educate members of the campus community on Langara's recycling program. To familiarize the college community with the green initiatives across campus, a full campaign was launched at the start of the school year. During the launch event in September 2013, information was distributed via printed T-shirts, pamphlets, and buttons. Our partners, Urban Impact, were on hand with information on "Recycling in the Workplace". To engage students, Vancouver Canucks superfans, The Green Men, made a special guest appearance to demonstrate how to "go green" by reducing waste and recycling responsibly.

Ongoing Waste Management

Recycling

- Recycling cardboard and paper, mixed containers, soft plastics, Styrofoam, e-waste, batteries, fluorescent tube lighting, compact fluorescent bulbs, construction waste, office/classroom furniture, wood pallets, bubble wrap, and plastic strapping
- Recycling batteries for fire alarms, emergency lighting, computers, laptops, and audio-visual equipment
- Picking up cafeteria cooking oil and recycling it into bio-diesel fuel
- Returning all refundable drink containers (e.g. glass, plastic, cans, and tetra pack beverage containers) and donating all the money to student bursaries each year.

Composting

For more than 10 years, the College has maintained an on-site compost with the help of our Environmental Studies students, which in turn is used in Langara's Community Garden. In our current program, compostable recycling is managed through Urban Impact, which includes wet-waste generated throughout the campus. We now capture 100% of organic waste from food preparation from the cafeteria kitchen, Tim Horton's, Starbucks, and employee kitchens throughout campus. Food scraps, coffee grounds, and other disposed organics are all composted. Both the student cafeteria and Langara daycare are 100% wet-waste facilities.

Langara recognizes that biodegradable dishware, cutlery, and containers break down faster than plastic or paper.

As such, Langara's cafeteria offers biodegradable consumer food packaging, plates, and utensils, all made from compostable materials such as sugarcane, cornstarch, and bamboo.

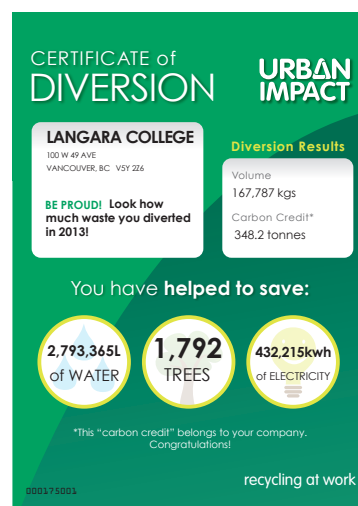
Measuring Success

Each year, Langara receives a Certificate of Diversion from Urban Impact. This helps us to understand the impact of our actions, and to address areas for further improvement. The weight diverted numbers shown in the certificate right include all traditional recyclables, such as:

- Paper/fibre (including cardboard)
- Glass
- Metal
- Rigid plastic
- Soft plastic
- Compost (organic waste)
- E-waste
- Small appliances
- Batteries

Certain materials are excluded from the diversion results because of the sporadic and highly variable nature of these pick-ups. They include wood/construction waste and fluorescent light bulbs/tubes. However, these excluded materials are completely recycled at Langara as well.

In addition to the total number of kilograms diverted, the certificate provides the equivalent water, trees, and electricity saved for all paper products recycled, as well as the associated carbon savings.



The Certificate of Diversion illustrates the impact of our actions translated into a "Carbon Credit" in tonnes.

Transportation and Greening Our Commute

Electric Vehicle Plugin Station

In March 2013, Langara College installed two level 2 electric vehicle charging stations on campus as part of the Plug in BC Program with support from the province of British Columbia and the Fraser Basin Council. Electric vehicles reduce the impact of greenhouse gas emissions from single-occupancy vehicles and can be used to make your commute cleaner and greener.

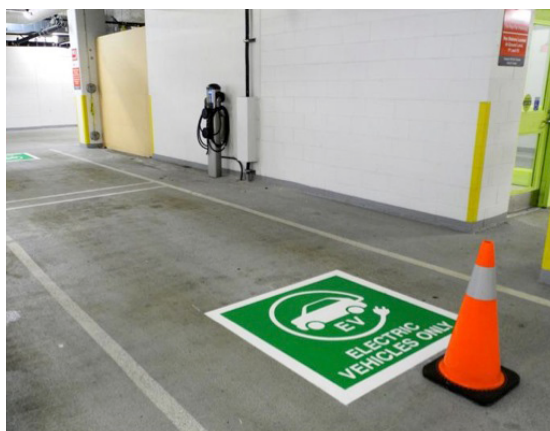
Transit

We are conveniently located along the Canada Line at the Langara-49th Ave station, and many of our staff and students commute by Canada Line and bus transit regularly. We are one of the four original institutions in the Lower Mainland to participate in the U-Pass program, which provides all students with a transit pass as part of their fees. We are working closely with TransLink for seamless integration with Compass Card technology to continue offering this benefit and convenience.

Cycling

We provide end of trip facilities for cyclists and joggers including: bicycle racks all around the campus with over 300 spots, six shower facilities excluding athletics, two secure bicycle lockup rooms, 3 banks of lockers specifically for cyclists, three air compressor locations, two covered shelters, and two charging areas for electric bicycles. With construction of our new building underway, we have plans to add an additional secure bicycle lockup to fit 54 additional bicycles and two more shower rooms.

We also encourage cycling by participating in each Bike to Work Week (twice per year) by hosting a celebration station with free food, prizes, and mechanic services. We offer sponsorship to employees who wish to upgrade their cycling road safety skills by taking workshops offered by HUB.



Carpool

We have three rows of conveniently located parking stalls reserved for student and staff carpools. We also have a sub-site with the Jack Bell Ride-Share matching database to help potential carpooling employees and students find matches. With construction of our new building eliminating a significant number of regular stalls, we will be working with the Communications & Marketing department over the summer to further encourage carpooling and utilize available spaces more efficiently.

Virtual Meeting Technology & Web-conferencing software

We are currently testing a subscription-based software from BCNet called BlueJeans. We allow Skype on our network, but there is no focused support for it.

Desktop web-cameras available to staff

Users are allowed to purchase web-cameras through their department, but this not a standard item. Most laptops have built-in web-cameras, and the Mac desktop computers and Mac Lab have web-cams.



Research

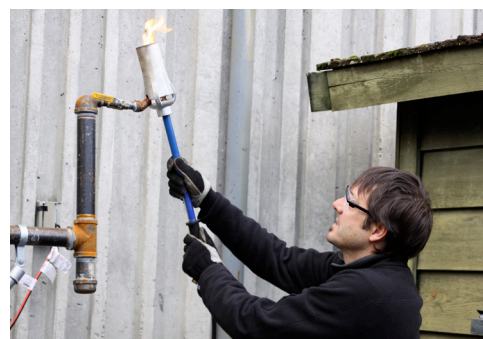
Biochar Project

In September 2011, Langara College began an active research project exploring the science of biochar production and use. Developed and led by Chemistry instructor Kelly Sveinson, the biochar experimental reactor explores the potential of converting certain solid wastes into biochar (more commonly known as charcoal).

The project uses Langara's experimental biochar reactor to convert a variety of biomass wastes into biochar, a substance similar to charcoal. Produced from pyrolysis of biomass (such as wood), biochar is a form of carbon that is removed from the atmosphere and has climate change mitigation potential. Biochar has also been shown to have soil benefits, and so may be a valuable amendment for agriculture or forestry applications. It can also be used as a renewable solid fuel.

Active research studies in Langara's Biochar Project include:

- Metal adsorption by biochar
- Production and characterization of biochar
- Effects of biochar on plants



Plans to Continue to Reduce GHGs in 2014 and Beyond

As in previous years, energy management of our “building’s” energy usage is the focus of our GHG reduction strategy. Outlined below is a draft of our Strategic Energy Management Initiatives planned for the next three years. We are currently working on refining this plan, including target setting.

Strategic “Buildings” Energy management Initiatives for 2014-2016

1. Maintain Best Performance by Building

- Utilize new sub metering and energy management information systems to monitor, target, report and take actions on anomalies.
- Install additional sub metering for improved benchmarking and performance tracking.
- Training for operators related to systems and identifying operational issues.
- Improved maintenance reporting and tracking.
- Improved building document filing system – drawings, specifications and operating manuals.

2. Green Buildings

- New Science and Technology Building construction to minimum LEED® Gold standards
- Support review of budget decisions with respect to life cycle costing to highlight operating costs and environmental impact.
- Participate in BC Hydro New Construction program.
- Ensure proper commissioning, training, and hand off of new building.

3. Green Renewal

- Take action on failed controls and equipment in a timely manner; consider life cycle cost of replacement where applicable.
- Install additional building controls that make financial sense.
- Review Building A end of life equipment with respect to energy savings potential for retrofits to integrate into Facilities Capital Strategic Planning process; includes strategic renewal of Campus Central Heating Plant.
- Establish best practices for renovations on campus, considering LEED® for renovations guidelines.
- Green IT

4. Awareness + Behaviour Change

- Update Langara Community on projects and successes related to Energy Management Initiatives.
- Engage staff in behaviour change initiative to minimizing energy usage on campus where appropriate.
- Raise awareness of the importance of energy efficiency and sustainable practices on campus and in our world - Provide messaging related to events and innovations related to energy efficiency and sustainability.
- Continue to work towards integrated campus wide sustainability planning and reporting.

Key Projects Identified for Upcoming Year

- New Science & Technology Building: targeting LEED® Gold Certification - BC Hydro New Construction Program
- Green IT: labs and staff computers will be updated with the new technology over the next couple years, with the end result of reducing campus computer electricity usage by approximately 80%
- New Central Heating Plant Strategic Planning
- Occupancy Schedules Optimization & Engagement

AASHE Member

We are now members of AASHE, the Association for the Advancement of Sustainability in Higher Education. AASHE is an association of colleges and universities that are working to create a sustainable future. To further its mission of empowering higher education to lead the sustainability transformation, AASHE provides resources, professional development, and a network of support to enable institutions of higher education to model sustainability in all areas, from governance and operations to education and research.



Other Actions

PaperCut

The next phase of PaperCut implementation will be to convert shared employee printers over to this new system. The new system will also provide us with more granular reporting and we can now see which printers print the most and who prints the most. This will allow us to develop additional, strategic strategies related to paper usage reduction initiatives.

Waste Management

Continue to implement recommendations from Urban Impact, related to our waste audit results and findings.

Green Team

Langara aims to grow stewardship on campus with Green Team representatives to champion both the College's new waste management initiative and behaviour change initiatives related to energy usage. Involving a larger body of both employee and student volunteers will continue to be a priority.

Transit

We are working closely with TransLink for seamless integration with Compass Card technology to continue offering the benefit and convenience of the U-Pass program.

Cycling

With construction of our new building underway, we have plans to add an additional secure bicycle lockup to fit 54 additional bicycles and two more shower facilities.

Carpool

With construction of our new building eliminating a significant number of regular stalls will be eliminated, we will be working with our communications department over the summer to further encourage carpooling and utilize available spaces more efficiently.

Harvest Box Program

The Harvest Box CSA program provides subscribers with a weekly box of fresh, seasonal produce grown on FarmCity Co-op member farms - all located in the Metro Vancouver region. Boxes are delivered each week to a set location for pick-up. With 15 or more participants, we will be able to host a pick-up on site at Langara College!

Community Garden

The Langara Community Garden is run by the Langara Community Garden Society, which is made up of faculty, staff, and students from Langara College, as well as members from the community. In Spring 2014, we have added an apiary to the garden, with the intent to augment the local bee population.

Biochar Project

In 2014, Langara College was awarded a \$25,000 grant by the National Science and Engineering Research Council (NSERC), under the College and Community Innovation Program. The Applied Research and Development grant (ARD) will provide valuable funding to new research in the biochar project developed and led by Chemistry instructor Kelly Sveinson. Full information on the study, 'Metal adsorption by biochar', can be found at www.langara.bc.ca/departments/chemistry/biochar-project/metal-adsorption-by-biochar.html



Ministry Standard Survey Forms

2013 Carbon Neutral Action Report (CNAR) - Part 2 ACTIONS

Created Tuesday, May 27, 2014

<http://fluidsurveys.com/surveys/cas-z/2013-cnar-form-bps-actions/1e8d652c1b59020698c4b2da78f804c0/>

Page 1

Please complete the following sections of the 2013 Carbon Neutral Action Report form. Save your work frequently to prevent it from being lost. You can also save a copy for your own use as either a WORD or PDF file using the buttons at the bottom of each page.

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When the form is complete press the submit button on the last page to automatically submit the information to the Climate Action Secretariat (CAS). Do not press submit before you are ready – this may result in a loss of work.

In addition to completing this survey (Part 1 2), you are required to submit your completed Overview (Executive Summary) and Self-Certification Checklist. The 2013 Overview template was included in the email sent and can also be found on the LiveSmart leaders Community.

Please ensure you meet the following reporting deadlines:

A DRAFT 2013 CNAR is due to CAS by March 31, 2014. The draft is comprised of the Overview ONLY (no executive sign-off required).

The FINAL 2013 CNAR is due to CAS by May 30, 2014. The final 2013 CNAR includes Part 1 Part 2 survey form and Overview.

The Self-Certification Checklist is due to CAS by May 15, 2014.

For more information about the Carbon Neutral Government process, please refer to *Becoming Carbon Neutral 2013*, or should you have any questions please contact climateactionsecretariat@gov.bc.ca.

Organization Name

Langara College

Actions Taken to Reduce Emissions

1) Stationary Fuel Combustion, Electricity (Buildings):

Indicate which actions were taken in 2013:

Performed energy retrofits on existing buildings

Yes

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

Yes

Undertook an evaluation of overall building energy use.

Yes

Please list any other actions taken to reduce emissions from Buildings:

Final commissioning of A & B buildings "Continuous Optimization" measures.

B Building - Installation of new VAV controllers, valve repairs and graphical interface for schedule optimization. Heating water re-pipe as existing piping gaskets were leaking when temperatures were not at peak winter supply temperatures; following re-pipe, heating plant controls will be able to be optimized for seasonal temperature.

C Building & LSU - Controls, graphics and piping upgrades; commissioning and monitoring continues for further optimization.

L Building - mechanical and controls review, including repair of mechanical equipment as required based on annual maintenance inspections, purchase of controls hardware and equipment for upgrades. Upgrades are required to address occupant comfort and end of life / unsupported hardware. Review of sequence operations was carried to determine further optimization potential.

Green IT

Infrastructure upgrades required for deployment of thin clients to reduce campus computer electricity usage by approximately 80%.

Creative Arts LED Track Retrofits

Upgraded studios with better, more efficient lighting, reducing electricity usage by over 80% with a less than 3 year simple payback.

2) Mobile Fleet Combustion (Fleet and other vehicles):

Indicate which actions were taken in 2013:

Do you have a fleet?

No

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

No

Replaced existing vehicles with hybrid or electric vehicles

No

Reduced the overall number of fleet vehicles

No

Took steps to drive less than last year

No

Please list any other actions taken to reduce emission from fleet:

Not applicable.

3) Supplies (Paper):

Indicate which actions were taken in 2013:

Used less paper than previous year

Yes

Used only 100% recycled paper

No

Used some recycled paper

Yes

Used alternate source paper (Bamboo, hemp, etc.)

No

Please list any other actions taken to reduce emissions from paper use:

Use only 30% Post - Consumer Recycled Content. (Sustainable Forestry Initiative Certified Sourcing)

The college implemented a new print management system called PaperCut. This will provide more granular reporting on who prints and how much. This will help develop strategies for reduction initiative, including behavior change and awareness. In addition, will help with reporting and analysis of successes.

Actions Taken to Reduce Emissions - continued

Explain how you plan to continue minimizing emissions in 2014 and future years:

Buildings energy usage reductions is our focus. We are currently finalizing an updated 3 Year Strategic Energy Management Plan which will focus on:

- Maintaining Best Performance achieved over the past 5 years*
- Green Building Initiatives*
- Green Renewal*
- Awareness & Behavior Change Initiatives*

Key projects next year include:

- New Science and Technology Building in progress - targeting LEED Gold*
- Green IT - implementing thin client technology throughout campus*
- New Central Heating Plant Strategic planning and Phase I upgrades*
- Occupancy Schedules optimization and engagement.*

If you wish to list any other "sustainability actions" outside of buildings, fleet, paper and travel check "yes". This reporting is optional.

No

Thank you for completing the 2013 Carbon Neutral Action Report.

If this form is now complete please use the submit button below to forward it to the Climate Action Secretariat, otherwise you can save it to continue at a later time. Only use the submit button once the form is 100% complete.

You can also save your own copy as a WORD or PDF file.

Once you click the submit button, the Climate Action Secretariat will create a PDF summary of these actions to append to your final CNAR Overview when it is submitted. Together, these will be posted on the Ministry of Environment website by June 30, 2014 as your final report for 2013.

2013 Carbon Neutral Action Report (CNAR) - Part 2 ACTIONS

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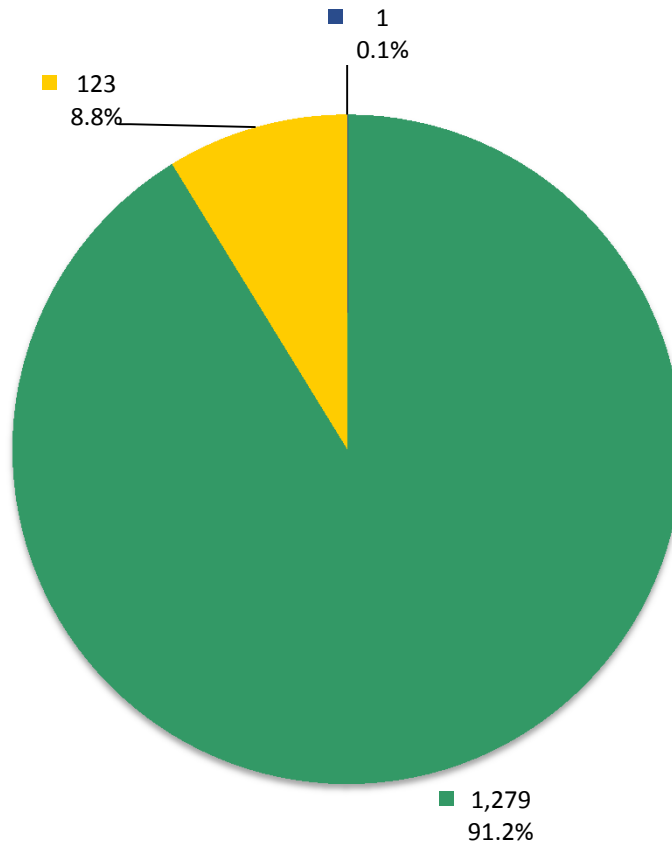
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No

**Langara College
Greenhouse Gas Emissions by Source
for the 2013 Calendar Year (tCO₂e*)**



Total Emissions: 1,403

- 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 2013 (Generated May 21, 2014 2:40 PM)

Total offsets required: **1,403**. Total offset investment: **\$35,075**. Emissions which do not require offsets: **0** **

*Tonnes of carbon dioxide equivalent (tCO₂e) 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.