

# 2011 CARBON NEUTRAL ACTION OVERVIEW REPORT



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

OKANAGAN CAMPUS



# ENVISIONING A SUSTAINABLE FUTURE

UBC's Okanagan campus has developed sustainability initiatives and commitments that deeply align with advancing Place & Promise: The UBC Plan and the Okanagan Strategic Action Plan.

The campus is committed to continue to responsibly steward sustainability at all organizational levels, to reduce our environmental impact and embed a culture of sustainability. The Okanagan Sustainability Office was established to help deliver on UBC's sustainability commitments and aspires to foster leadership across the campus to help achieve our collective goals and to broaden the impact of sustainability.



This report was produced by the University of British Columbia, Okanagan Sustainability Office. It supplements the Carbon Neutral Action Template and provides a high-level overview of the actions taken by the campus to reduce carbon emissions and create a culture of sustainability.

## ACKNOWLEDGEMENTS

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## EXECUTIVE SUMMARY

2011 marks the year of the University of British Columbia Okanagan campus' successful build-out, with the completion of new campus buildings, infrastructure and public realm. As the campus begins to enter the next phase of its development, UBC's commitment to sustainability will continue to underpin the campus' strategic focus, operations, and future plans.

Since 2007, the campus has undergone unprecedented growth. Five new academic buildings built to LEED® standard have been successfully completed, and the number of residences has more than doubled. The University has also grown its endowment asset on the Okanagan campus through the acquisition of an additional 104 hectares of agricultural land that can be used for teaching, learning and research. While the addition of the Engineering, Management and Education building, Health Sciences Centre and Purcell Residences in 2011 has resulted in a 15% increase of absolute building emissions over 2010 levels, the campus has achieved a 26% improvement in tCO<sub>2</sub>e efficiency per square meter over 2007 building emission baselines and a 26% reduction in tCO<sub>2</sub>e per student FTE. Greater efficiencies are largely attributable to the energy performance of the new buildings on campus. For example, the new Health Sciences Centre is targeted to use 49% less energy and generate 285 fewer tCO<sub>2</sub>e than a building of convention design.

UBC's strong commitment to sustainability, the opportunities presented with the rapid campus expansion and the BC Provincial Government's carbon neutral mandate have helped to create the conditions to build and enhance a new energy system on campus – the closed loop district energy system – that serves academic buildings on campus. The system transfers heating or cooling energy from an aquifer water loop into campus distribution piping on a separate closed loop. It combines simultaneous heating and cooling that enables waste heat to be harvested from data centers and other sources, and energy sharing between buildings. The system also uses a renewable energy source – heat pumps that use 85-95% carbon-free renewable hydroelectric power. It is anticipated that the final original academic buildings will be integrated into the loop in 2012 which will reduce natural gas consumption, greenhouse gas emissions and provide room for capacity and flexible fuel switching in the future.

Looking ahead, the campus will focus its efforts on measuring the efficiency of sustainable infrastructure development and system enhancements, while building new partnerships and opportunities to meet its carbon neutral goals. For example, the Okanagan Sustainability Office in partnership with Facilities Management is working collaboratively with FortisBC to finalize a Building Optimization Program which is anticipated to reduce energy use by an additional 10%. The program will enable real-time energy monitoring on nine buildings and retro-commissioning of five original campus buildings. Enhancements to existing systems and new programs, coupled with the development of energy management plan undertaken by these teams will set the roadmap to work toward the UBC President's green house gas emission reduction targets to 2050.

Detailed measures to reduce carbon emissions in 2011 and planned future actions form the basis of the CNAR Actions Template (attached). A high-level overview and additional measures to reduce emissions "above and beyond" to promote a culture of sustainability are provided below.



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# 2011 GREENHOUSE GAS EMISSIONS

The following greenhouse gas emissions have been quantified using the BC Provincial Government's SMARTTool Reporting Framework.

<b>Total Emissions Calendar Year</b>	<b>3,239 tCO<sub>2</sub>e</b>
Buildings	3,135 tCO <sub>2</sub> e
Mobile Combustion	41 tCO <sub>2</sub> e
Office Supplies	63 tCO <sub>2</sub> e

## FUGITIVE EMISSIONS

The following fugitive emissions have been deemed by the British Columbia Provincial Government as out of scope for reporting:

- Gases used for research and medical purposes
- Type R22 HFC's from refrigerating units on campus
- Any emission sources that comprise less than 1% of the campus total GHGs

In-scope HFC's have been tracked by the campus since 2010. In 2011, in-scope HFC's have amounted to 19.7 tCO<sub>2</sub>, approximately 0.6% of the total campus GHG emissions. While this is an increase over 2010 values, it is less than 1% of the total campus GHG emissions and is largely attributable to growth of campus buildings, infrastructure and building use.

The Okanagan Sustainability Office, working closely with Facilities Management remain committed to tracking and monitoring HFC's and to making adjustments where required to minimize future emissions from these and all sources.

## OFFSETS APPLIED TO BECOME CARBON NEUTRAL IN 2011



Total emissions offset to become carbon neutral in 2011 as provided for in SMARTTool as "total for offsets" is 3,237 tCO<sub>2</sub>e. Emissions that did not require offsets are listed as "out of scope" in the Carbon Neutral Government Scope clarification for the broader public sector document.

## CHANGES TO GREENHOUSE GAS EMISSIONS AND OFFSETS REPORTING FROM PREVIOUS YEARS

Following the public release of the 2010 Carbon Neutral Action Overview Report, it was determined that the total emissions and offsets applied for the 2010 calendar year were under reported by 3 tonnes CO<sub>2</sub>e. The difference in offsets required have been purchased and applied against our 2010 emissions.

## EMISSIONS REDUCTIONS ACTIVITIES

The following provides a high-level overview of specific actions and targets reported in the CNAR Actions Table attached.

## ACTIONS TAKEN TO REDUCE GREENHOUSE GAS EMISSIONS IN 2011

### A. Mobile Fuel Combustion

While fleet comprises only 1.3% of the campus greenhouse gas emissions portfolio, in 2011 the campus achieved a 25% reduction in fleet emissions, as compared to 2010 levels, which can be attributed to a reduction in fleet vehicle use, the retirement of older vehicles to electric and energy efficient models and adherence to anti-idling practices.

### ACTIONS

- Continued stewardship of sustainable mobile fuel combustion through adherence to Sustainable Fleet Procedures, replacement of retired fleet vehicles with electric and energy efficient models, and ongoing training and education to support sustainable fleet use.
- Implementation of measures to reduce reliance on fleet vehicles and divert the number of trips taken by encouraging fleet carpooling, walking or cycling.
- Installation of electrical vehicle charging stations on campus.

### B. Stationary Fuel Combustion, Electricity and Fugitive Emissions (Buildings)

The Okanagan campus has demonstrated greater efficiencies despite its growth and increases in operational demand. Building intensity calculations demonstrate a 7% improvement in 2011 tCO<sub>2</sub>e per square meter as compared to 2010, and a 26% improvement over 2007 levels. Greenhouse gas emissions per student full-time equivalent (FTE) have also improved by 26% despite a 53% increase in FTE since 2007.

Working in collaboration with our partner FortisBC, the campus has participated in FortisBC's Efficient Commercial Water Heater Program, Light Commercial ENERGY STAR® Boiler Program, and Powersense Program for greater energy efficiencies and utility savings and lower carbon emissions, throughout the campus build out.

#### **ACTIONS**

- Successful completion of Engineering, Management and Education and Health Sciences Centre academic buildings targeting LEED® Gold Certification, incorporating technologies that reduce energy use and carbon emissions. Completion of Purcell Student Residence and achievement of UBC's REAP Gold Level Certification.
- Began the integration of existing campus buildings into closed loop geo-exchange district energy system, including heat recovery from plant growth chambers and data centers.
- Completed lighting upgrades from T12's to T8's in all original academic buildings.

#### **C. Supplies (Paper)**

##### **ACTIONS**

- Formation of ITPAC (Information Technology Procurement Advisory Committee) bringing together multiple IT groups from both campuses.
- Developed new T & E (Travel & Expense) Program which will reduce the need for paper requisitions.
- More than doubled the amount of units on campus under the XGS agreement since 2010 (ensures unit consolidation where applicable and end-user training of sustainable features such as double-sided print).

## **PLANS TO CONTINUE REDUCING GREENHOUSE GAS EMISSIONS 2012-2014**

#### **A. Mobile Fuel Combustion**

- Implement anti-idling signage across key service delivery and high vehicle traffic areas on campus.
- Continued replacement of retired fleet vehicles with electric and energy efficient models. Encourage the purchase energy-efficient models where new fleet vehicles are required.
- Planned implementation of a new multi-purpose pathway/corridor to the campus made possible in partnership with the City of Kelowna and the Ministry of Transportation and Infrastructure.

#### **B. Stationary Fuel Combustion, Electricity and Fugitive Emissions (Buildings)**

- Establishment of a 10 Year Renewal Plan for the Campus designed to address deferred maintenance while integrating energy and carbon reduction measures to help achieve the campus' sustainability targets and goals.
- Integration of gymnasium expansion into geo-exchange district energy system.
- Launch Building Optimization Program for original campus buildings, in partnership with FortisBC and development of energy management plans to meet the UBC President's GHG emission reduction targets.

#### **C. Supplies (Paper)**

- Launch of UBC BuySmart – online tool to connect UBC staff and faculty with the right solutions.
- Paper RFP evaluation – work with preferred vendor towards new sustainable goals.
- Engagement of Supply Management and Sustainability Office to develop relevant projects looking at Life Cycle Analysis and Triple Bottom Line Assessments of environmentally friendly products such as paper made from wheat instead of wood fiber.

# ABOVE AND BEYOND: *Additional Measures to Reduce Emissions and Promote a Culture of Sustainability*

## OUR PEOPLE

### Among Many Sustainability Champions



#### AWARDS & RECOGNITION

The City of Kelowna's Mayor's Environmental Achievement Awards recognized Dr. Cigdem Eskicioglu, UBC Okanagan Faculty member, as the most environmentally dedicated individual in 2011. Implemented in BC's municipalities, farms, factories and mills, Dr. Eskicioglu's research focuses on generating renewable energy from bio wastes through anaerobic digestion. The processes have environmental and economic benefits, producing heat, energy and nutrient-rich fertilizer from municipal bio solids derived from food processing, agriculture and wastewater treatment.



## OUR CAMPUS

# Sustainable Buildings and Infrastructure



Left to right: Purcell Residence; Health Sciences Centre; Engineering Management Education Building

### SUSTAINABLE BUILDINGS OPENED IN 2011

The new Purcell Residence has achieved UBC's REAP (Residential Environmental Assessment Program) Gold Certification. Early in its construction it also received a FortisBC PowerSense award of \$58,000 for energy efficiency measures in design and construction. Sustainable features include its own closed loop horizontal geo-exchange system, solar-thermal collector panels for pre-hot water heating, and sunshades to reduce solar heat gain in areas where glazing is most prevalent. Preliminary energy modeling indicates a savings of 45% over the Model National Energy Code for Buildings.

**What is REAP?** REAP has been developed by UBC as a green building rating system for its residential buildings. The application of REAP standards is required for all new UBC housing developments, with performance measures ranging across five categories from basic compliance to platinum level.

The new Engineering, Management and Education Building is targeted to achieve LEED® Gold (Leadership in Energy and Environmental Design) Certification through the Canada Green Building Council's (CaGBC) LEED® for New Construction v1.0 rating system. It's also targeted to achieve 5/5 LEED® Innovation in Design points in Clearwater Utilization, Education, Green Housekeeping, and Green Power. The use of low flow fixtures is anticipated to provide 40% savings over conventional systems and the energy savings correspond to a 46% total cost savings at current utility rates.



The Health Sciences Centre, houses the new medical school. This building is also targeting LEED® Gold Certification through the Canada Green Building Council's (CaGBC) LEED® for New Construction v1.0 rating system. As a result of its energy efficient design, the building generates approximately 285 fewer tonnes of greenhouse gas emissions (CO<sub>2</sub>e) than a typical building of the same size. It has also integrated the largest green roof on campus, which has integrated indigenous plants and vegetation. Among many benefits, the green roof act as an insulator, reducing energy use for heating and cooling.

### OUR LAND

Since 1991, campus storm water has been diverted from the City of Kelowna's storm water system to a small human-made retention pond on the east side of the campus. The storm water retention pond was designed to look and function like a natural pond, and effectively treats storm water pollutants through evaporation and natural biological processes. Upgraded in 2011, the pond supports native plantings and a variety of aquatic life and ecosystems such as dense cattails, waterfowl and a variety of bird species.



## OUR RIDE

# Reducing Vehicle Travel to Campus

### STUDENT UNIVERSAL BUS PASS RENEWED

The Student U-Pass Program implemented on campus in 2007 has been successfully renewed in 2011, with 89% of voting students in favor of rate increases proposed by the Kelowna Regional Transit Partners. The fee increase was the first since the U-Pass was implemented, to help offset the costs of substantial service and infrastructure enhancements to the Okanagan campus undertaken by Kelowna Regional Transit, and is aligned with general fare increases effective January 1, 2012. In addition to providing resources through the Okanagan Sustainability Office to support the U-Pass Referendum campaign, the University of British Columbia Okanagan Campus remains committed to UBC's 10% subsidy of the student U-Pass Fee and the provision of the Transportation Hardship Fund in accordance with the Universal Bus Pass Agreement.

### TRANSIT SERVICE DELIVERY ENHANCEMENTS

The Okanagan Sustainability Office engages key transit stakeholders through its Post-Secondary Transportation Advisory Committee. Summarized recently are the service delivery enhancements provided by the Kelowna Regional Transit in partnership with BC Transit since the U-Pass was implemented on the Okanagan Campus.

- Express bus implementation – downtown/UBCO (2007)
- Major route restructuring/service hour expansion – Kelowna/West Kelowna (2007)
- Transit shelter/bench installs – UBCO and various locations, 14 new buses added (2007)
- Weekday and Sunday night service increase on major routes (2008)
- Additional trips on #23, #21, #7 Glenmore/UBCO routes (2008)
- TIPS signs introduced – over 50 locations/ additional transit benches installed (2008)
- Service hour expansion – #1 /#7 (15 min peak), #7 UBCO trip added, new shelters installed (2009)
- Rapid Bus stations built/HOV implemented, enhanced shelter installed-UBCO, 6 buses added (2010)
- Hwy 97 Rapid Bus Implementation/ associated route restructuring-Rutland (2010)
- #23 direct airport terminal service (2010)
- APC system initiated – data collection, stop management/trip planner completed (2010)
- Transit Future Plan completed (2011)
- New route implemented-#4, 2 new buses added (2011)
- 57 stops upgraded with shelters/accessibility upgrades – region wide, mag-strip pass system implemented (2011)
- Additional buses added to 97x/8 routes to address demand (2011)
- Piloted “park and ride” options from two locations in the City (2011)



### NEW MULTI-USE PATHWAY/CORRIDOR TO THE OKANAGAN CAMPUS

Spearheaded by a partnership between the Province of BC, the City of Kelowna and UBC, the development of a new multi-use pathway and bridge to campus is planned to begin in 2012. The new pathway will complement existing bicycle routes and trails on campus, and will provide cyclist and pedestrian commuters with a safe commute to campus.

The partners have agreed to cost-share a preliminary design study for the construction of a new bridge that will allow cyclists to bypass the Ellison overhead on Highway 97. The Province will contribute up to \$1.55 million toward the design and construction of the pathway and bridge with the balance of funding coming from the City of Kelowna. UBC will maintain the completed work.

### WHEELS, LOCK-UP AND CLEAN-UP

The newly relaunched UBCycles program (formerly UniCycles) provides the campus community with free bike access to an inventory of reclaimed, refurbished bicycles. Secure Bicycle storage was made available in September 2009 with the completion of the new University Centre, with additional units planned for implementation in 2012. Currently, open stand bike racks are located outside of every building and a covered rack is located by the bus loop. Cycling end of trip facilities are provided at various locations across the campus, detailed on the campus sustainability website. Annual bike to work week events are held for members of the campus community to encourage active transportation. 2011's event engaged over 40 riders for a total of 2,871 kilometers.

### ENABLING CONDITIONS TO REDUCE BUSINESS TRAVEL

100% of meeting rooms and all new classrooms on campus have access to video-conferencing capabilities. IT Services is currently working with campus stakeholders to trial various web-based software solutions that integrate personal or video-conferencing options.

## OUR CULTURE

# Embedding Sustainable Philosophy and Practices

### Our Awareness and Engagement Programs

#### THOMPSON-OKANAGAN REGIONAL CLIMATE ACTION FORUM

The Climate Action Secretariat, UBC's Okanagan Sustainability Office, FortisBC and the Fresh Outlook Foundation have partnered over the last several years to provide the Thompson-Okanagan Regional Climate Action Forum at UBC's Okanagan Campus. The event welcomes leaders from government, business, public sector, non-profit, education, and members of the public to raise awareness about climate change, share best practices and develop partnerships and coalitions to advance the Provincial Government's carbon neutral mandate. Topics range from climate action modeling to tours of the UBC's Okanagan sustainability features, including its innovative geo-exchange district energy system. The campus has also hosted the Climate Action Secretariat's Green Team Workshop for the region.

#### REEL CHANGE SUSTAINABILITY FILM FESTIVAL

For the past three years the Fresh Outlook Foundation has hosted this film festival at the UBC Okanagan campus in partnership with the Okanagan Sustainability Office. The festival presents critically acclaimed documentaries that span a myriad of sustainability topics locally and globally. The films are followed by panel discussions facilitated by members of business, nonprofit, public and education sectors, including UBC faculty, staff and students.

#### SUSTAINABLE COMMUNITY DEVELOPMENT PILOT GRANT PROGRAM

The Sustainable Community Development Internal Grant Pilot Project was a partnership spearheaded by the Provost and Vice-Principal, in collaboration with the AVP Administration and Finance, Director, Sustainability Operations, City of Kelowna Mayor and City Manager. It was developed for the purposes of providing faculty, students and staff the opportunity to apply sustainability-related research and learning in the community while building community engagement, capacity and actions to advance shared sustainability goals.

Among its many outcomes, City of Kelowna community members expressed the benefits associated with the program such as, the collaboration built between the University and the neighboring community; the potential to improve their community; and the partnership between the University and the City. Community members stated the program increased their levels of awareness regarding sustainability issues and actions they could undertake to support sustainable development in their community.

#### GREEN RESEARCH

UBC's Health, Safety and Environment and Okanagan Sustainability Offices partnered to offer a Green Research Workshop to engage the campus community on ways to maximize sustainability research and learning on UBC's Okanagan Campus. The 2011 workshop focused on wastes and how the campus community can reduce, re-use or turn waste into resources.

Supporting UBC's Green Laboratory initiatives, the UBC/Fisher Scientific contract was renewed for one more year which enables continued funding of Green Research initiatives and also supports the Fisher/Corning Plastics labs recycling initiative. At the Okanagan campus, 4,514 liters of Fisher Scientific supplied lab plastics were diverted from the campus waste stream in 2011, which totals over 10,000 liters diverted since the program's inception.







## ENERGY CUP CHALLENGE

Campus Life led students in a residence competition to reduce natural gas and electricity consumption on campus. Monthly residence energy usage data was provided from the Okanagan Sustainability Office, against which students measured their baselines and impact of their actions to reduce energy use. Measures to reduce natural gas consumption included reduced space heating; reducing domestic hot water use; and hanging clothes to dry instead of using dryers. The competition was promoted and communicated by a kick-off event, sustainability bulletin board presentations and residence newsletter updates that highlighted the monthly residence winners.

## WATERNOTES

Measures to improve water quality on campus have included the implementation of WaterFillz Kiosks in many new academic buildings and residences. The kiosks provide fresh, free, filtered water to students, faculty and staff who bring their bottles to the stations for fill-up. The WaterFillz Kiosks have been installed with the completion of each building, and to date have saved the campus over 200,000 - 500ml bottles.

## OUR PROCUREMENT POLICY

The campus continues to promote UBC's Sustainable Purchasing guide. Development of UBC BuySmart program is underway. The program will provide a list of preferred/pre-qualified vendors as well as sustainable partners. It will also educate end-users about sustainable purchasing such as recycled content in products and what logos to look for in each category. Steps planned 2012-2014 include the launch UBC BuySmart online tool and provide a list of preferred/pre-qualified vendors as well as sustainable partners. Supply Management will also begin working on third edition of Sustainable Purchasing guide in collaboration with the Sustainability Office and Student Housing & Hospitality Services.

## Our Facilities Management Team: Leadership Spotlight

Our campus Facilities Management Team has demonstrated consistent leadership in embedding sustainability principles into its operational mandate to support a sustainable campus culture and the achievement of campus sustainability goals. An early adopter of sustainability, Facilities Management is continually enhancing existing programs and building new ones to meet the demands of a growing campus in a sustainable way:

## ENHANCING GREEN HOUSEKEEPING PRACTICES

Since 2006, UBC's Okanagan campus has been following the Green Seal Certification Program, in alignment with ISO 14000 Standards for the Environmental Management Systems. Aligned with the LEED® accreditation process of the new Health Sciences Centre, Facilities Management is currently working on the enhancement of its green housekeeping practices by piloting the use of ozonated water for cleaning. This method eliminates 100% of the costs associated with cleaning products and supports the campus' scent free initiative.

## EXPANSION OF CAMPUS COMPOSTING PROGRAM

In 2011, Facilities Management expanded its existing composting program to a campus-wide system, with the addition of a second composting earth tub and the installation of a main composting station in each building. In addition, approximately 4,000 litres of cooking oil from kitchen facilities was collected and recycled into bio-diesel.

## RECYCLING DIVERTS WASTE FROM THE LANDFILL

The UBC Okanagan Campus diverted nearly 200,000 kilograms of recyclable materials from the landfill last year. Revenue from the recycling of plastics, tin, cardboard and related materials helped to fund the campus composting expansion.

# ACTIONS TOWARDS CARBON NEUTRALITY

The actions listed below contribute to a reduction in greenhouse gas emissions from sources for which public sector organizations are responsible under the carbon neutral government regulation of the Greenhouse Gas Reduction Targets Act.

ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
<b>Mobile Fuel Combustion (Fleet and other mobile equipment)</b>			
<b>Vehicle fuel efficiency</b>			
Replace vehicles with more fuel-efficient models	Ongoing/In Progress		Vehicle inventory update completed. Two gas golf carts were retired and replaced with four electric.
Replace larger vehicles with smaller models according to fleet "right-sizing" principles	Ongoing/In Progress		As existing vehicles are retired they will be replaced with high efficient and/or hybrid vehicles.
Perform regular fleet maintenance specifically to improve fuel-efficiency	Ongoing/In Progress	100% of vehicles are subject to regular maintenance for fuel efficiency	All vehicles are regularly maintained.
Replace small maintenance vehicles with more fuel-efficient models	Ongoing/In Progress	85% of small maintenance vehicles are fuel-efficient	Currently 74% of Facilities, Security and Parking golf carts are electric.
<b>Behaviour change program</b>			
Provide fleet driver training to reduce fuel use	Ongoing/In Progress	100% of current drivers are trained	100% of all new driving employees are trained.
Introduce anti-idling policy and/or raise anti-idling awareness for fleet drivers (e.g., signs, stickers, messages)	Ongoing/In Progress		100% completed and implemented in February 2010 for Facilities. Installation of additional anti-idling signage provided by Government of BC.
Encourage carpooling in fleet vehicles	Ongoing/In Progress		Continued promotion and encouragement to minimize the number of trips into town for purchase or sent one person to get all items.
Promote alternatives to fleet vehicle travel where possible (e.g., bicycles, public transit, walking)	Ongoing/In Progress		Included in Anti-idling practice. Continue promoting no use of golf carts in the courtyard between 8am-4pm.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Three remaining gas golf carts will be replaced by electric models by 2014. As existing vehicles are retired they will be replaced with high efficient and/or hybrid vehicles. Security has purchased a 100% electric car from Dynasty, now known as IT. Car will used for parking enforcement. It will be stored at the Quonset and requires a 110v outlet to recharge.	2008	No End Date (Continuous)
As existing vehicles are retired they will be replaced with high efficient and/or hybrid vehicles. Size will be considered and a purchasing factor balanced according to vehicles use.	2008	No End Date (Continuous)
Continue regular maintenance of all fleet vehicles.	2008	No End Date (Continuous)
Three remaining gas golf carts will be replaced by electric models by 2014. A new tractor to be purchased in 2012 for sanding, snow removal and general grounds maintenance use will be fuel efficient.	2008	No End Date (Continuous)
Continued driver training for new employees. Continuation of mandated pre-trip inspections for fleet vehicles (internal Facilities practice).	2010	No End Date (Continuous)
Encourage fleet practice to be implemented by other departments and site contractors.	2009	No End Date (Continuous)
Considering measures to eliminate need for fleet vehicles to collect items. Looking at strategies to reduce on/off campus travel, i.e.. Purchase through Central Stores. Continue to promote under Anti-idling practice.	2009	No End Date (Continuous)
Continue to promote walking where possible.	2009	No End Date (Continuous)



# ACTIONS TOWARDS CARBON NEUTRALITY

ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
<b>Other Mobile Fuel Combustion Actions</b>			
Relaunch of bike sharing program UBCycles (formerly UniCycles).	Ongoing/In Progress		Continued providing bike share program, via UniCycles, for students, staff and faculty use for on and off campus transportation on short or long term basis.
Installation of electric vehicle charging stations.	Ongoing/In Progress		Installed 6 electric vehicle (EV) charging stations in Lot E.
<b>Stationary Fuel Combustion, Electricity and Fugitive Emissions (Buildings)</b>			
<b>Planning/management</b>			
Enrol in a building energy benchmarking program (e.g., GREEN UP)	Ongoing/In Progress		Continuation of 2010 initiative, ensuring building energy benchmarking in place for all new buildings on campus. (e.g., FortisBC energy efficiency assessment, LEED® Gold Standards, Green Globes Design). Established Building Optimization Program with FortisBC.
Reduce office space (square meters) per employee	Ongoing/In Progress	3.3 is the current average rentable square meters per employee	Space audit conducted and completed.
<b>Owned buildings</b>			
Establish energy performance baseline for owned buildings	Ongoing/In Progress	100% of owned buildings have an established energy performance baseline	Energy performance baselines completed with the implementation of submetering and use of SMARTTool software. Remaining submetering installations for all new buildings completed. Campus build-out completed.
Register for performance labelling/ certification for operations and maintenance of owned buildings (e.g., LEED® EB:O&M)	Ongoing/In Progress		Purcell residence built to REAP Gold standard.
Achieve LEED® Gold certification at a minimum for new construction or major renovations	Ongoing/In Progress	1% of owned buildings are certified LEED® Gold or LEED® Platinum	Two buildings in UBC Okanagan campus inventory are LEED® Gold certified. All new academic buildings are built to LEED® Gold standard or equivalent. All new residential buildings are built to UBC REAP Building standards.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Continued promotion and education regarding bike sharing program to be relaunched in March 2012, newly rebranded as UBCycles. Bikes can be signed out for use as transportation on and off campus by students, staff and faculty.	2010	No End Date (Continuous)
Promote and educate community on availability of electric vehicle (EV) stations.	2011	No End Date (Continuous)
Implementation of energy monitoring system across buildings as part of the UBC Okanagan and FortisBC Building Optimization Plan.	2009	No End Date (Continuous)
Final space audit report available on Provost website( <a href="http://www.ubc.ca/okanagan/provost/__shared/assets/space_planning_initial_report28400.pdf">http://www.ubc.ca/okanagan/provost/__shared/assets/space_planning_initial_report28400.pdf</a> ) as of February 2012; next steps include roll out phase. Where possible, promotion of flexible open workspace is encouraged, e.g.. Provost and Research Services office have established cubicle style setting for staff office space.	2005	No End Date (Continuous)
Continuation of monitoring through SMARTTool reporting and implementation of dashboard monitoring system.	2010	No End Date (Continuous)
All residences built to REAP Gold standard. All new academic buildings are built to LEED® Gold standard. In process to achieve LEED® Gold certification for Engineering/Management/Education Building and Health Sciences Centre.	2005	No End Date (Continuous)
As mandated, all new academic buildings are built to LEED® Gold standard or equivalent and all new residential buildings are built to UBC REAP Building standards. In process to achieve LEED® Gold certification for Engineering/Management/Education Building and Health Sciences Centre.	2005	No End Date (Continuous)



## ACTIONS TOWARDS CARBON NEUTRALITY

ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
Incorporate integrated design process into new construction or during renovations of owned buildings	Ongoing/In Progress		Integrated design process incorporated through geothermal district energy system.
Incorporate a refrigerant management strategy into regular building management/maintenance to reduce fugitive emissions	Ongoing/In Progress		Continuation of reported refrigerant top-ups to UBC by service provider. UBC monitors service tags and maintains service records of equipment and reports in-scope emissions.
Perform energy retrofits on existing, owned buildings	Ongoing/In Progress		Existing academic buildings continued to be retrofitted to geothermal heating capability. Feasibility study completed by Stantec regarding implementing retrofits in old buildings. Phase II of the geothermal loop brought online.
<b>Retrofitting owned buildings</b>			
Upgrade mechanical systems (heating, cooling, ventilation) during retrofits	Ongoing/In Progress		New buildings have ventilation occupancy sensors built into high occupancy volume locations: sensors found in laboratories and theatres in Health Services Centre and in large classrooms and theatres in Arts & Sciences II and Engineering /Management /Education buildings.
Upgrade lighting systems during retrofits	Ongoing/In Progress		Additional upgrading and retrofits of lighting fixtures on all new projects. Continuation of T-12 phase out, replacing with T-8's in lighting systems. Completion of gym lighting retrofits saving campus 234,088kWh/year.
Upgrade/adjust control systems during retrofits	Ongoing/In Progress		CO2 occupancy sensor installation completed in Arts and Sciences buildings. Staggered lighting implemented in parking lots. Replaced old building signage lighting with solar powered lighting.
Improve building insulation (including windows) during retrofits	Ongoing/In Progress		No retrofits undertaken in 2011.
Install an on-site renewable energy demonstration project	Ongoing/In Progress		Solar panels installed on Purcell residence. Green roofs installed on Health Sciences Centre, Purcell residence and Engineering /Management /Education building. Research of green roofs being completed in University House. Completed geothermal and district energy loop system.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Incorporating heating and cooling systems into campus district energy systems. Continue to incorporate an integrated design phase for new construction and renovation of owned buildings, e.g.. planned gym addition to be incorporated into geothermal district energy system. Adding plant growth chambers in Fipke Centre and data centres in Administration, Engineering /Management /Education and Library buildings into the heat recovery option.	2005	No End Date (Continuous)
Continuation of reported refrigerant top-ups to UBC by service provider. UBC monitors service tags and maintains service records of equipment and reports in-scope emissions.	2008	No End Date (Continuous)
Working towards further enhancements of the geothermal system and energy reduction strategies in all existing owned buildings ongoing. Upon completion of Stantec's feasibility study, a review will be completed regarding recommendations concerning energy and GHG projects on campus. In addition, completing upgrades of washrooms for water saving potential, commercial freezers, and roof top units to alternative energy saving units, e.g.. heat pumps or coil, is being reviewed. Establishing energy management plan to be reviewed. Implementation of Building Optimization Project.	2008	No End Date (Continuous)
Roof top make up unit on Administration building being replaced. Ongoing occupancy retrofits to be completed on all laboratories and theatres in all existing buildings.	2009	2014
Continue to explore future projects to upgrade interior and exterior lighting on campus. Implement projects with a reasonable return on investment. Facilities to complete retrofit conversion from T-12 to T-8 in Administration building. Additional 3,600 T-12 ballasts to be changed to T-8 on campus in 2012; direct rebate applied to purchase cost. Retrofit will save campus \$31,390/year in operating costs.	2009	No End Date (Continuous)
CO2 occupancy sensors to be installed in Library. Installing solar powered signage lighting on all new buildings.	2008	No End Date (Continuous)
Various items being addressed by Building Optimization Program. Considering feasibility of implementing Continuous Optimization Program being rolled out by FortisBC in the Spring of 2012. In the meantime, opportunities in buildings identified will be reviewed for upgrading potential.	2009	No End Date (Continuous)
Integration of plant growth chambers in Fipke Centre and data centres in Administration, Engineering /Management /Education and Library buildings into the district loop. Continue to look at new energy assessment tools.	2007	No End Date (Continuous)



# ACTIONS TOWARDS CARBON NEUTRALITY

ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
<b>IT power management</b>			
Install power management software which shuts down computers outside of regular business hours	Ongoing/In Progress	30% of computers shut down automatically outside of regular business hours	The number of laptops on campus continues to increase which requires additional focus on user education. All computer labs' computers are set to automatically shut-off between 12am-7am (Mac computers are set to "sleep").
Implement server virtualization	Ongoing/In Progress	80% of servers have been virtualized since start year indicated	5% more completed in 2011. Virtualization of phone system in 2011 is 10% complete.
Apply auto-sleep settings on computer monitors and CPUs	Ongoing/In Progress	100% of computers have auto-sleep settings applied	Auto-sleep settings are applied to all computer monitors and CPU's.
Apply auto-sleep settings on printers, copiers, fax machines, and/or multi-function devices	Ongoing/In Progress	100% of devices have auto-sleep settings applied	All setting are set to auto-sleep.
Replace computers with ENERGY STAR models during regular computer upgrades	Ongoing/In Progress	100% of computers are ENERGY STAR rated	100% of computers are ENERGY STAR rated. All centrally funded computers are on a 4-year desktop and 3-year laptop replacement Evergreen program.
<b>Appliances and electronic devices</b>			
Replace refrigerators with ENERGY STAR models or source ENERGY STAR models for future purchases	Ongoing/In Progress		Procurement directive in place to source ENERGY STAR rated products campus wide. Standard when ordered through Supply Management. This is end-user driven to a certain point (need to educate). ENERGY STAR seminar was attended by Supply Management.
Replace other appliances or electronic devices with ENERGY STAR models or source ENERGY STAR models for future purchases	Ongoing/In Progress		Procurement directives in place to source ENERGY STAR rated appliances and electronic devices for future purchase. Standard when ordered through Supply Management. This is end-user driven to a certain point (need to educate). ENERGY STAR seminar was attended by Supply Management.
Replace desk lamp incandescent bulbs with compact fluorescent (CFL) bulbs or source more efficient desk lamps for future purchases	Ongoing/In Progress		Continued education on campus to encourage purchases and use of high efficiency light bulbs.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Measures toward behaviour change will continue to be the focus of next steps. Okanagan Sustainability Office working in collaboration with IT Services to develop and implement education and awareness program.	2005	No End Date (Continuous)
Completing additional 25% virtualization of the phone system; phone system to be completely virtualized for infrastructure servers within the next year. Over the next 3 years, there will be a reduction of the number of phone and physical servers by providing low to no cost virtual server options to researchers. Pilot projects include a virtual desktop for use in labs. Unique phone system field trial to begin with Mitel.	2007	No End Date (Continuous)
Continue to promote users to leave setting on as part of ongoing educational program.	2005	No End Date (Continuous)
Continue to ensure all settings on new equipment are set to auto-sleep.	2005	No End Date (Continuous)
Continue to ensure all new computers are ENERGY STAR rated.	2005	No End Date (Continuous)
Continue to transition to high efficient ENERGY STAR equipment as existing, less efficient equipment is retired. Continue to engage vendors and end users on adopting ENERGY STAR equipment. Supply Management will be incorporating UNSPCS codes for commodity tracking to report on type of appliance purchased to confirm if energy efficient units are purchased. UBC BuySmart will educate end-users on purchasing ENERGY STAR fridges.	2008	No End Date (Continuous)
Continue to purchase ENERGY STAR appliances and electronic devices as existing equipment is retired. Continued replacement of other appliances with ENERGY STAR models when ordered through Supply Management. Incorporate UNSPCS codes for commodity tracking to report on type of appliance purchased to confirm if energy efficient units are purchased. UBC BuySmart will educate end-users on purchasing ENERGY STAR appliances.	2008	No End Date (Continuous)
UBC BuySmart will serve as an educational tool for end-users (in this instance, encouraging the purchase of CFL bulbs and proper disposal will be outlined on the site under "lighting"). Include sustainability training during Pcard training, including new and existing staff to purchase environmentally friendly products such as CFL bulbs.	2009	No End Date (Continuous)

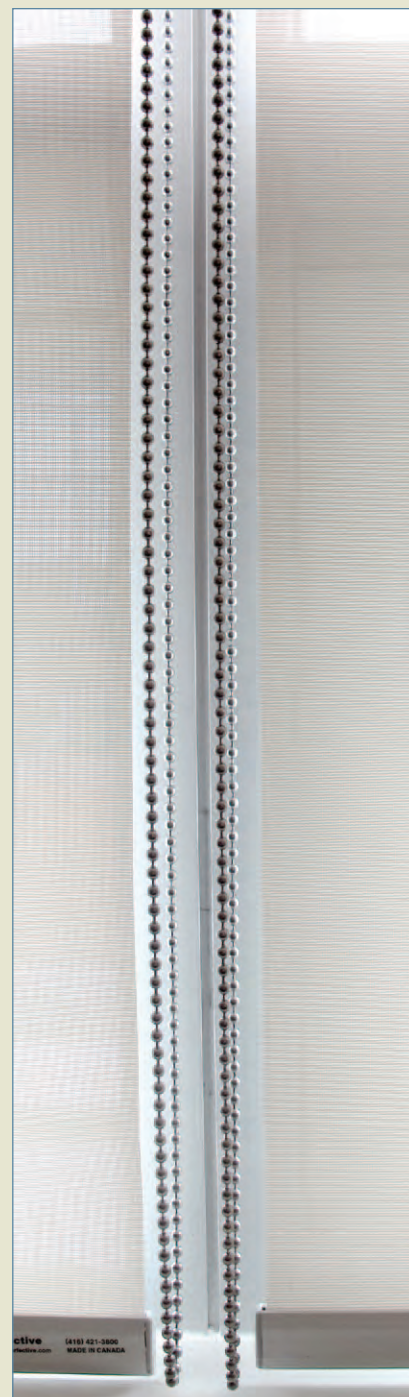


## ACTIONS TOWARDS CARBON NEUTRALITY

ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
<b>Behaviour change program</b>			
Help staff reduce personal energy use through “workstation tune-ups”	Ongoing/In Progress		Continual updates to Sustainability website that serves as a platform for communication, awareness building and behavioural change programs. Released 2nd annual Shift publication to promote and encourage sustainable behaviours. Continuation of IT Services’ Evergreen Program for computer and laptop replacement: 3-year laptop and 4-year desktop replacement program for permanent staff and faculty.
Ask staff to unplug electrical equipment or switch off power bars when not in use	Ongoing/In Progress		As above.
Ask staff to close blinds at end of work day to reduce heating/cooling demands	Ongoing/In Progress		As above.
Encourage staff to use air dry setting on dishwashers	Ongoing/In Progress		As above.
Provide tips to staff on saving energy in the office while working outside of regular business hours	Ongoing/In Progress		As above.
Encourage use of stairs instead of elevators	Ongoing/In Progress		As above.
Provide reminders for turning off lights (e.g., signs, stickers, messages)	Ongoing/In Progress		As above.
Promote hot water conservation	Ongoing/In Progress		As above.
<b>Other Stationary Fuel Combustion, Electricity, and Fugitive Emissions Actions</b>			
Replaced gymnasium flaker ice machine.	Completed in 2011		Replaced old flaker ice machine that used R134a with new more efficient machine that uses R404a.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Continual education, promotion, and encouragement of sustainable behaviours and practices. Producing 3rd annual Shift publication for distribution. Review expanding Green Teams on campus. Investigate holding another Greening Your Office event.	2009	No End Date (Continuous)
Continual education, promotion, and encouragement of sustainable behaviours and practices through communication at various events, workshops and presentations	2009	No End Date (Continuous)
As above.	2009	No End Date (Continuous)
As above.	2009	No End Date (Continuous)
As above. Continued collaboration with IT Services regarding programming options. Labs are locked down outside regular campus hours.	2009	No End Date (Continuous)
As above.	2009	No End Date (Continuous)
As above. Continued collaboration with IT Services regarding programming options. Labs are locked down outside regular campus hours.	2009	No End Date (Continuous)
As above.	2009	No End Date (Continuous)
	2011	2011



# ACTIONS TOWARDS CARBON NEUTRALITY

ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
Supplies (Paper)			
<b>Paper Type</b>			
Purchase 30% post-consumer recycled paper	Ongoing/In Progress	100% of total paper purchased contains 30% recycled content	Document Management Strategy in place; all copy paper purchased through Unisource contract contains a minimum of 30% recycled content. All virgin copy paper orders received by the vendor are substituted with 30% recycled content. Negotiated paper contract with the vendor to provide campus community 30% pcw for the same price as virgin copy paper. Continue to promote use of 30% post-consumer paper through Purchasing guide and SC toolkit.
<b>Printer/document settings</b>			
Switch networked printers and photocopiers to automatic double-sided	Ongoing/In Progress	10% of network printers or photocopiers are set to automatic double-sided	Automatic double-sided printing option preset on laboratory printers. 10% of UBCO computer fleet are located in laboratories, of which all have double-sided printing settings applied. Xerox assessment to streamline technology and equipment completed.
Apply "print and hold" settings to networked printers to eliminate unclaimed print jobs	Ongoing/In Progress	10% of network printers have 'print and hold' settings applied	All student print jobs must be released. 10% of UBCO computer fleet are located in laboratories, of which all have 'print and hold' settings applied.
Reduce default margin size in standard document templates (e.g., letters, briefing notes, forms, etc.)	Ongoing/In Progress		Xerox created letterhead and additional stationary templates to be purchased and utilized by all departments at UBC's Okanagan campus.
<b>Electronic media in place of paper</b>			
Install collaborative software for electronic editing (e.g. SharePoint, Groove, etc.)	Ongoing/In Progress	100% of staff workstations with software installed	All staff workstations have access to a common shared drive. Smart boards available in meeting rooms across campus.
Use electronic document library for filing common documents	Ongoing/In Progress		A campus-wide shared drive is available for access by all departments.
Post materials online that were previously printed	Ongoing/In Progress		Departments have varying policies for document management systems. Traditional paper documents have been transferred online using the UBC Website (such as campus maps, document, online registrations, etc.). All departments have access to a shared drive which serves as an electronic library. Supply Management and IT departments have developed an e-procurement option to eliminate the process of paper requisitions when procuring through Supply Management.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Supply Management completed a paper RFP which will be evaluated in 2012. From here, we will work with preferred vendor to determine new sustainable goals (move towards 100%, no virgin paper purchases through vendor, reduce paper where possible). UBC BuySmart will be a tool to educate end-users about sustainable paper purchases. SEEDS project is underway which is performing a triple bottom line assessment on Wheat Paper. Continue to focus on paper reduction strategies.	2009	No End Date (Continuous)
Increase awareness through behaviour change and user education programs to promote use of double-sided printing on all faculty and staff computers.	2009	No End Date (Continuous)
Increase awareness through behaviour change and user education programs to promote use of 'print and hold' settings on all faculty and staff computers. Look at development of incentive program: show user how much printing output is done each month/quarter and provide incentive to cut-back or adjust printing behaviours.	2005	No End Date (Continuous)
Increase awareness through user education to promote use of standard templates available through Xerox and Public Affairs.	2011	No End Date (Continuous)
Increased and continued education and promotion for faculty and staff to use shared drive.	2005	No End Date (Continuous)
Continue to educate new hires about campus-wide shared drive in which all departments have access.	2005	No End Date (Continuous)
Continue promotion of posting materials online to decrease paper use. Plan to install e-procurement system for FY12/13 that will replace the current paper-based program and revamp the current procure to pay program.	2005	No End Date (Continuous)



## ACTIONS TOWARDS CARBON NEUTRALITY

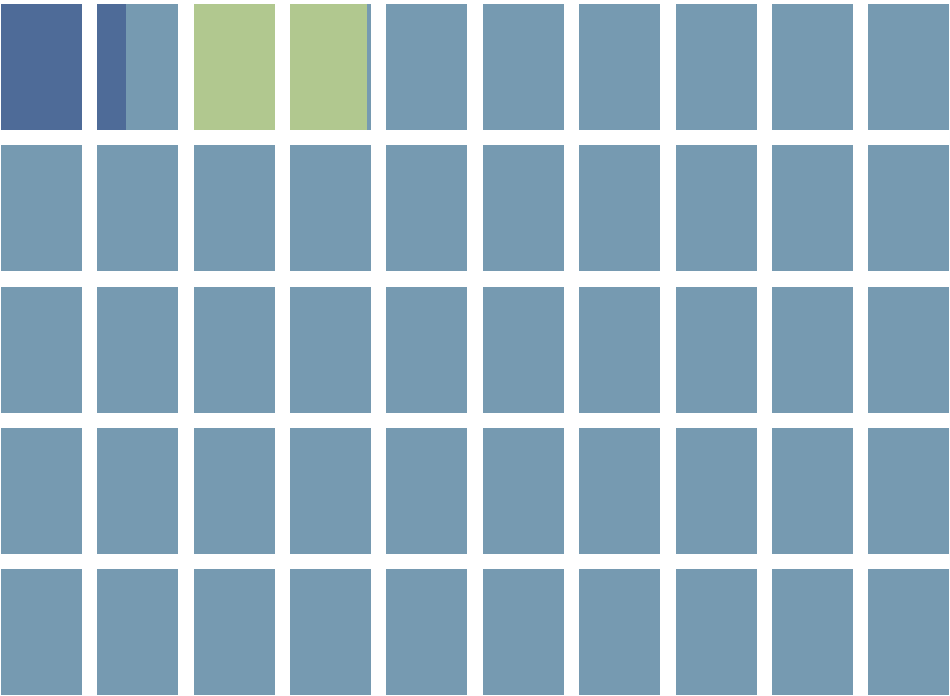
ACTION	STATUS (as of 12/31/11)	PERFORMANCE TO DATE (as of 12/31/11)	STEPS TAKEN IN 2011
<b>Behaviour change program</b>			
Train staff to use collaborative software for electronic editing (e.g. SharePoint, Groove, etc.)	Ongoing/In Progress		Promotion and awareness of shared drive as file sharing option on campus.
Encourage staff to hold paperless meetings or presentations (i.e., no handouts)	Ongoing/In Progress		Departments on campus have continued to make efforts towards using less paper at meetings by utilizing technology available, e.g.. Smart Boards, laptops.
Encourage re-use of scrap paper	Ongoing/In Progress		Continued promotion of the non-confidential scrap paper repurpose program which turns scrap paper into notepads.
<b>Other Paper Supplies Actions</b>			
Give user access to view printing numbers.	In Development		
Look at new opportunities to pool inventory sharing, i.e. Paper and general office supplies.	In Development		
Paperless Office	Ongoing/In Progress		Several offices are striving to develop paperless office practices and strategies.



STEPS PLANNED FOR 2012 -2014	START YEAR	END YEAR
Continue to increase and promote use of shared drive to faculty and staff.	2010	No End Date (Continuous)
Continue to have ongoing education programs. Promote use of Smart Boards and IPads at meetings.	2006	No End Date (Continuous)
Continual promotion of the non-confidential scrap paper repurpose program.	2008	No End Date (Continuous)
Work with IT Services regarding feasibility of process for an individual to view printing activity on a regular basis.	2012	No End Date (Continuous)
Work with Procurement regarding feasibility of introducing a shared inventory program.	2012	No End Date (Continuous)
Continue to promote paperless offices through behaviour change programs and sharing best practice strategies.	2010	No End Date (Continuous)



# GREENHOUSE GAS EMISSIONS BY SOURCE FOR THE 2011 CALENDAR YEAR (tCO<sub>2</sub>e\*)



The following greenhouse gas emissions have been quantified using the BC Provincial Government's SMARTTool Reporting Framework.

1.3% ..... 41	Mobile Fuel Combustion (fleet and other mobile equipment)
1.9% ..... 63	Supplies (Paper)
96.8% ..... 3,135	Stationary Fuel Combustion and Electricity (Buildings)
TOTAL EMISSIONS: 3,239	

## OFFSETS APPLIED TO BECOME CARBON NEUTRAL IN 2011

Total offsets required: 3,237. Total offset investment: \$80,925. Emissions which do not require offsets: 1 \*\*

\*Tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) 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.









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THE UNIVERSITY OF BRITISH COLUMBIA

2011 CARBON NEUTRAL ACTION OVERVIEW REPORT  
FOR UBC'S OKANAGAN CAMPUS