

Vancouver Coastal Health Authority's 2016 Carbon Neutral Action Report



Declaration Statement

This Carbon Neutral Action Report for the period January 1st, 2016 to December 31st, 2016 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2016 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2017 Vancouver Coastal Health Authority final Carbon Neutral Action Report will be posted to our website at bcgreencare.ca

The cover photo is of the interior of the Greta and Robert H.N. HO Psychiatry & Education Centre,
(The HOpe Centre) at Lions Gate Hospital.

Executive Summary



Executive Summary:

Carbon Neutral Action Report 2016 Vancouver Coastal Health

Mary Ackenhusen, President and Chief Executive Officer

I am pleased to present Vancouver Coastal Health's 2016 Carbon Neutral Action Report.

As part of the provincial public sector commitment to achieve net-zero emissions, Vancouver Coastal Health (VCH) has achieved carbon neutrality for a seventh consecutive year.

In 2016, VCH's carbon dioxide equivalent (tCO₂e) emissions footprint was 40,482 tonnes. Our 2016 footprint was a 19.1 percent decrease from the 2007 baseline.

We managed to achieve this by implementing 18 energy savings projects, which are estimated to achieve a 3.5 gigawatt hours of electricity and 42,492 gigajoules of natural gas savings. This has reduced our carbon footprint by 2,149 tCO₂e.

Concerning the CO₂ footprint, beyond conservation measures, VCH purchased carbon offsets from the Ministry of Environment at a total cost of \$1,062,652 to maintain a carbon neutral status.

I am proud to state that I, along with over 1,700 other Vancouver Coastal Health staff, have joined our internal GreenCare Community in pursuit of reducing our operational energy and environmental impact. Reducing our impact will ultimately add to the health of our clients, staff, facilities, benefit the wellbeing of the extended communities we serve.

As 2017 progresses, I will continue to support our innovative and collaborative approach towards reducing VCH's environmental and carbon footprint, which drives our commitment to create sustainable health care.

A handwritten signature in blue ink, appearing to read 'Mary Ackenhusen', written in a cursive style.



Healthy people
Healthy planet



Our CO₂ Footprint

2016 GREENHOUSE GAS EMISSIONS BREAKDOWN AND OFFSETS APPLIED TO BECOME CARBON NEUTRAL

Vancouver Coastal Health reports its organizational carbon footprint based on guidelines provided by the Carbon Neutral Government Regulation (CNGR) and B.C. Climate Action Secretariat (CAS).

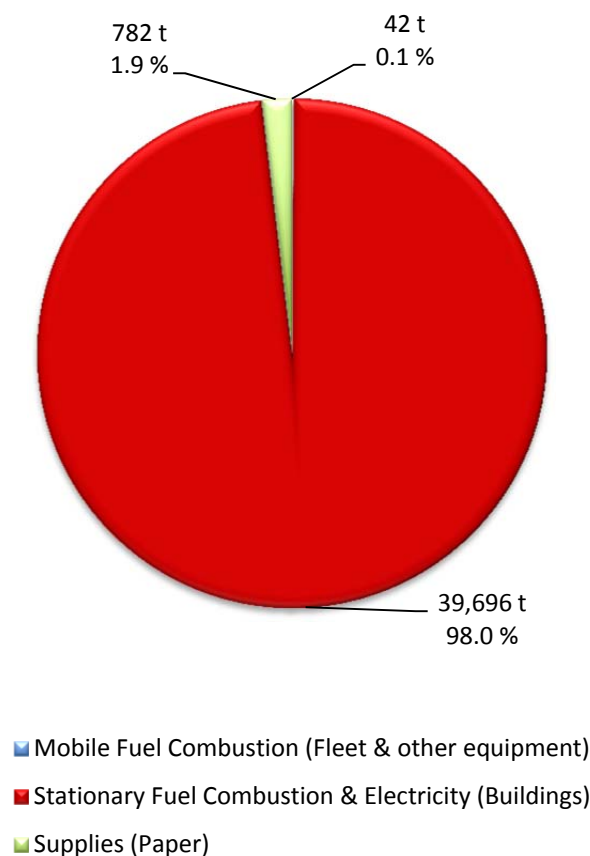
CAS uses various elements of reporting, based on the GHG Protocol Corporate Standard, which has classified carbon reporting into three scopes. Of these three scopes and various elements within each, CAS has determined Vancouver Coastal Health's carbon footprint to comprise of six different greenhouse gases, which are converted to tonnes of carbon dioxide equivalent (tCO₂e). These main sources of emissions are categorized in three main groupings: Stationary Combustion and Purchased Energy (buildings), Mobile Combustion (Fleet), and Supply (Paper).

As shown in the chart on the left, 98 percent of Vancouver Coastal Health's in-scope emissions are attributed to the owned and leased buildings stationary combustion, and purchased energy; the largest area to focus our mitigation efforts.

Vancouver Coastal Health's 2016 carbon emissions were 40,496 tCO₂e. To become carbon neutral in 2016, Vancouver Coastal Health purchased carbon offsets from the Ministry of Environment at a total cost \$1,062,653.

"The environmental impact from healthcare facilities, operations, and services affects the health of the populations and patients they are meant to serve." - Adapted from World Health Organisation & Healthcare without Harm

Vancouver Coastal Health's 2016 Greenhouse Gas (In-Scope) Emissions by Source



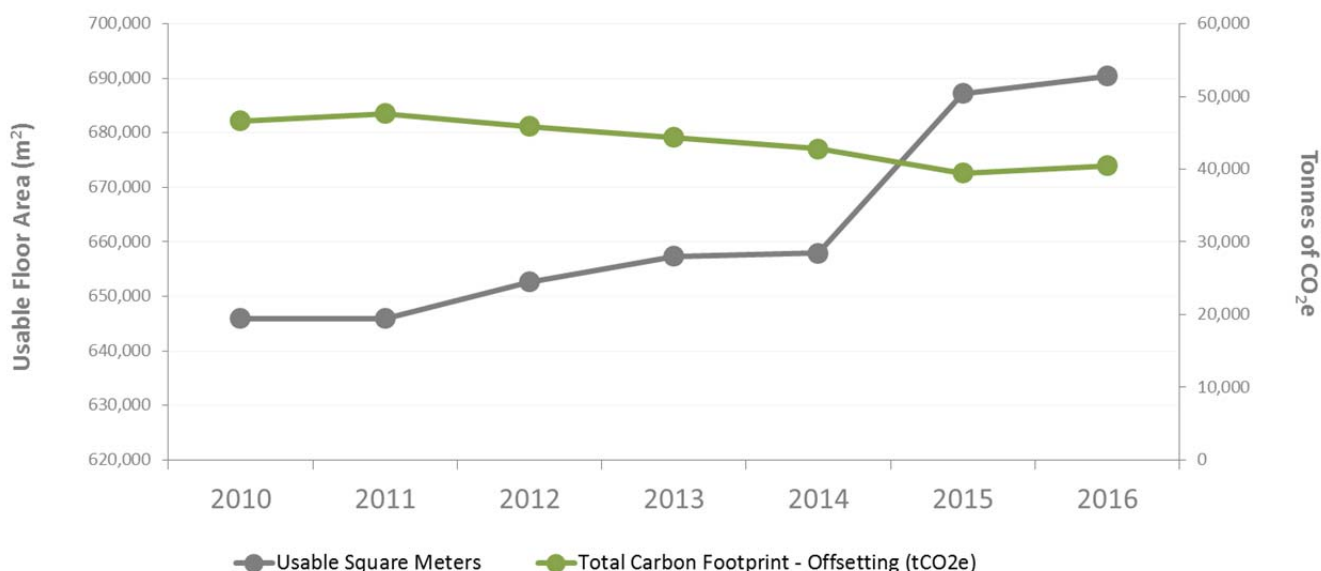
CHANGES TO VANCOUVER COASTAL HEALTH'S PORTFOLIO

Vancouver Coastal Health has been able to maintain significant energy and GHG reductions while increasing our portfolio and expanding our services to serve our growing regional population. This success has largely been due to the energy retrofit and conservation programs in our existing buildings and the integration of high energy efficiency guidelines standards in the new buildings. Vancouver Coastal Health has increased its useable facility area growth since 2007 by 14.5 percent; a growth of 6.9 percent has occurred since 2010 and this trend is presented in the following graph.

Vancouver Coastal Health (includes Bella Coola and RW Large)					
BUILDINGS, FTE AND WEATHER	2007	2013	2014	2015	2016
Distinct VCH Health Buildings	n/a	164	163	165	165
% Owned	84%	85%	85%	88%	88%
% Leased	16%	15%	15%	12%	12%
Usable Square Meters ¹	602,766	657,356	657,905	687,180	690,374
Full-Time Employee Equivalents ²	12,738	14,262	14,343	14,355	14,568
Weather (Heating Degree Days) ³	2,870	2,820	2,627	2,490	2,537

Vancouver Coastal Health had a staff population of 14,568 full-time equivalent (FTE) staff in 2016, a 1.5 percent increase from the previous year as shown in the table below. The FTE count has been growing steadily since 2012 and compared to 2007 there has been an FTE increase of 14.4 percent.

Useable Floor Area and Emissions (2010-2016)



Natural gas is the predominant fossil fuel used for space heating, hot water and process loads. The carbon emissions associated with our natural gas use is approximately 93.4 percent of the total building emissions. Although our priority actions are to focus on our natural gas combustion plant, there are many drivers to continue reducing purchased energy (electricity) and other in-scope emission sources.

There has been a 19 percent decrease in the carbon footprint since 2007, as show in the table below, and it should be noted that with absolute emissions there is no consideration to weather impacts or other external drivers that impact emissions. Depending on these independent variables the year over year change in emissions may not fully reflect the mitigation efforts, emission avoidance projects and initiatives, across the portfolio.

Vancouver Coastal Health (including Bella Coola and RW Large)						
CO ₂	Our Carbon Footprint (in tCO ₂ e)	2007	2013 ³	2014	2015	2016
	Mobile Fuel Combustion (Fleet)	104	59	57	61	42
	Stationary Fuel Combustion & Electricity (Buildings)	48,536	43,873	42,768	38,618	39,696
	Supplies (Paper)	1,402	871	797	824	782
	Total Carbon Footprint (tCO ₂ e)	50,042	44,804	43,623	39,503	40,520
	Emissions Which Do Not Require Offsets ^{1,2}	-19	-25	-23	-19	-24
	Total Carbon Footprint (tCO ₂ e)	50,023	44,779	43,600	39,484	40,496
	Adjustments / Corrections	0	-399	-815	0	-14
	Total Carbon Offsetting (tCO₂e)	50,023	44,380	42,785	39,484	40,482
\$	Purchased Carbon Offsets ⁴	\$ -	\$ 1,128,875	\$ 1,089,325	\$ 939,275	\$ 1,012,050
	Purchased Carbon Offsets + HST/GST⁵	\$ -	\$ 1,185,319	\$ 1,143,791	\$ 986,239	\$ 1,062,653
KPI	Emissions per Full-Time Employee	3.93	3.11	3.00	2.75	2.78
	Emissions per Meter Square Facility Space	0.083	0.068	0.065	0.057	0.059

The carbon emissions reported are not normalized annual weather fluctuations. The use of Heating Degree Days (HDD) is a metric designed to reflect the demand for energy required to heat a building. The HDD's for 2016 were 1.9 percent greater than those recorded in 2015, therefore, natural gas and resultant emissions were in part influenced due to HDD.

Actions Taken To Reduce Our CO₂ Footprint

2016 LIST OF ACTIONS TAKEN TO REDUCE CO2 FOOTPRINT

Stationary Emissions (Buildings)

- In 2016, Vancouver Coastal Health continued its effort to further reduce our environmental impact by initiating 18 energy savings projects for a total estimated savings of 3.5 GWh of electricity and 42,492 GJ of natural gas for a reduction of 2,149 tCO₂e of GHG.
- Vancouver Coastal Health fully utilized the Carbon Neutral Capital Program (CNCP), to fund an energy and emission reduction project. Over \$1.1m of CNCP funds, combined with incentive funding was invested into an energy efficiency upgrade project, which resulted in 1968 tCO₂e emission savings.
- Vancouver Coastal Health completed the fifth year of the Green Revolving Fund (GRF), a successful project that re-invests funds created through energy savings.
- Vancouver Coastal Health continues to embed sustainability across the organization by supporting staff engagement initiatives such as the GreenCare Community site and provides tips and toolkits on energy reduction and other environmental initiatives. As well, the Green+Leaders program continues to train Vancouver Coastal Health staff as sustainability champions, along with the BC Hydro Workplace Conservation Agreement program.
- Vancouver Coastal Health updated our Energy and Environmental Sustainability Design Guidelines for New Construction and Major Renovation projects with the intent to ensure health care related new construction and major renovation projects are built to the highest standard of human, environmental health, performing efficiency, and financial investment.

Mobile Fleet Combustion (Fleet and other vehicles)

- In 2016, Vancouver Coastal Health's Transportation Demand Management Coordinator and Active Transportation Facilitator worked to improve, promote and establish alternative transportation opportunities for Vancouver Coastal Health staff.
- The VGH Cycling Centre provided access to a state-of-the-art end-of-trip facility, with more than 170 indoor bicycle parking spots, including 12 electric bicycle spots, lockers, showers, towel service, a lounge and a bike repair room for maintenance and tune-ups. In 2016, VGH's Cycling Centre grew its user base and expanded its services to include more workshops and events.
- An active and clean commute is supported across Vancouver Coastal Health with the 1,151 bike parking stalls; an increase of 18 during 2016.

- **Vancouver Coastal Health now has six electric vehicle-charging stations** across three core sites; an increase of 2 stalls in 2016.
- **196 Vancouver Coastal Health staff participated in the 2016 Clean Commuter &**

Wellness Challenge, a campaign to encourage staff to try an active commute.

- **In 2016, 46,122 health care staff were shuttled between Vancouver Coastal Health sites**, using the internally organized Jack Bell shuttle service.



Figure 1: The exterior of the Greta and Robert H.N. HO Psychiatry & Education Centre,(The HOpe Centre) at Lions Gate Hospital.

Supplies (Paper)

- **As part of the Green+Leaders program, a paper/waste reduction campaign** supported volunteers with Paperless Meeting Toolkits to encourage their colleagues to reduce paper use. The Paperless Meeting Toolkit brief is shown below.
- **In 2016, Vancouver Coastal Health encouraged teleconferencing** for meetings by installing

web-conferencing hardware and software at various sites.

- **In collaboration with BCSS (HSSBC)**, Vancouver Coastal Health has started to discuss the procurement of wheat based paper supplies will explore a proposal to convert the bulk of paper purchased to 30% recycled content

Actions That Fall Outside the Scope of the Carbon Neutral Government Regulations:

- **Continued with the successful Green+Leaders (G+L) behavior change program**, with a focus on fostering sustainable behaviors in four key areas: Zero Waste, Energy Conservation and Climate Neutral, Active & Clean Transportation and Social Sustainability. In 2016, Vancouver Coastal Health had 93 active G+L in the program.
- **Vancouver Coastal Health continues to support the GreenCare Community (GCC) site**, which now has 1,731 Vancouver Coastal Health staff registered and provides inspiring articles, toolkits and resources. This website is used to communicate all EES projects and initiatives, as well as engage health care staff with the EES themes and offer a place for staff to collaborate.
- **Education and awareness communication via the various internal communications**, including stories published on Vancouver Coastal Health News and other communication channels, continues to champion behavior change and celebrate environmental sustainability success.
- **Continued with the sponsored BC Hydro Energy Wise Network Program (EWN)**. This program supports the G+L program and also provides tools and resources for other awareness initiatives, such as our Facilities Maintenance and Operations (FMO) engagement strategy.
- **25 Vancouver Coastal Health employees were educated on Waste Management** processes and 8 new Recycling Champions were trained.

Vancouver Coastal Health plans to continue reducing GHG emissions and Energy in the following ways:

- **Planning and implementing energy and emission reduction projects** in our existing building portfolio by utilizing the Carbon Neutral Capital Program (CNCPP), and supplementing with internal capital funds and incentives from BC Hydro and Fortis BC.
- **Engaging with design engineers** to ensure our new builds adopt energy efficient design principles.
- **Continue to explore low emission energy supply options**, demand reduction opportunities, and leading technology applications.
- **Continuing to engage with site operations staff** and external consultants to identify GHG / Energy opportunities.
- **Engaging and educating our staff**, via the existing Green+Leaders program, GreenCare Community and the BC Hydro Workplace Conservation Agreement.
- **Developing a roadmap for climate adaptation**, including resiliency assessment for three Vancouver Coastal Health site.

- **Working with GreenCare's refreshed Strategic Framework**, Vancouver Coastal Health will strive to advance health care practices that respect environmental stewardship, noting that the environmental impact from health care facilities, operations and services influence the health of the populations and patients we

serve. Vancouver Coastal Health will engage in a collaborative approach to create a sustainable and environmentally responsible health care system, which continues to advance health and wellness in its broadest sense.



Figure 2: Vancouver City Scape <http://design-environment.com/news/archives/2775>

Feature Project

Vancouver General Hospital Heat Recovery Chiller Project

Vancouver General Hospital (VGH) offers specialized health care services to residents in Vancouver and across the province. The chiller plant serving two main buildings on the VGH campus – Jim Pattison Pavilion and Centennial Pavilion - were in need of additional cooling capacity to meet the peak temperature on warm summer days and minimize the use of a low efficiency steam absorption chiller.

The Energy and Environmental Sustainability team partnered with the VGH Facility Maintenance and Operation team to move toward a solution that considered both the operational requirements while minimizing the environmental impact. A detailed energy study was commissioned and a clear opportunity was proposed by the consultant.

The study identified that the absorption chiller consumed 43 percent of the total chiller plant energy even though it was only in operation a quarter of the time of the other two main chillers. Through extensive trend analysis additional opportunities to optimize the operation and chiller sequencing of the remaining chiller plant were uncovered. In this complex environment with a variety of acute care needs and heat generating equipment there is a year round 300 ton cooling load; the heat from this process was being rejected through the cooling towers.

The integration of two new heat recovery chillers into the central cooling plant was proposed in addition to several other energy optimizing measures. The project design moved forward and had a high level of project support and engagement from the VGH Facility Maintenance and Operation team and senior leadership; this collaborative approach assisted with early risk identification and improved overall project coordination.

“This smart and low risk design is an ideal application of this heat recovery technology. The complete design will support the peak cooling load and recover waste heat from the cooling process; improving the plant's operation and minimizing our environmental impact. ” – Kori Jones, Energy Manager, Lower Mainland Facilities Management

Technology: Low Risk Heat Recovery Chiller

Application, Dedicated Chiller Control System

Energy Savings: An estimated 39,600 GJ; a net energy saving of 35,000 GJ per annum

GHG Reductions: An estimated 1,968 tonnes mitigation

Business Case: Project < 6 year payback, NPV of \$1.2 million

Benefits/Co-Benefits: Water Savings; Influenced decision to move towards site chiller plant strategy; Reduced cooling tower maintenance

Total Project Cost: \$1.4 million

Operational Cost Savings: \$265,000 (energy, water, and offsets savings)

Several different heat recovery chiller configurations were assessed and the installation one 250 ton dedicated heat recovery chiller was prioritized to take advantage of the heat recovery to offset the steam generation; this ensures the greatest operation savings and GHG mitigation.

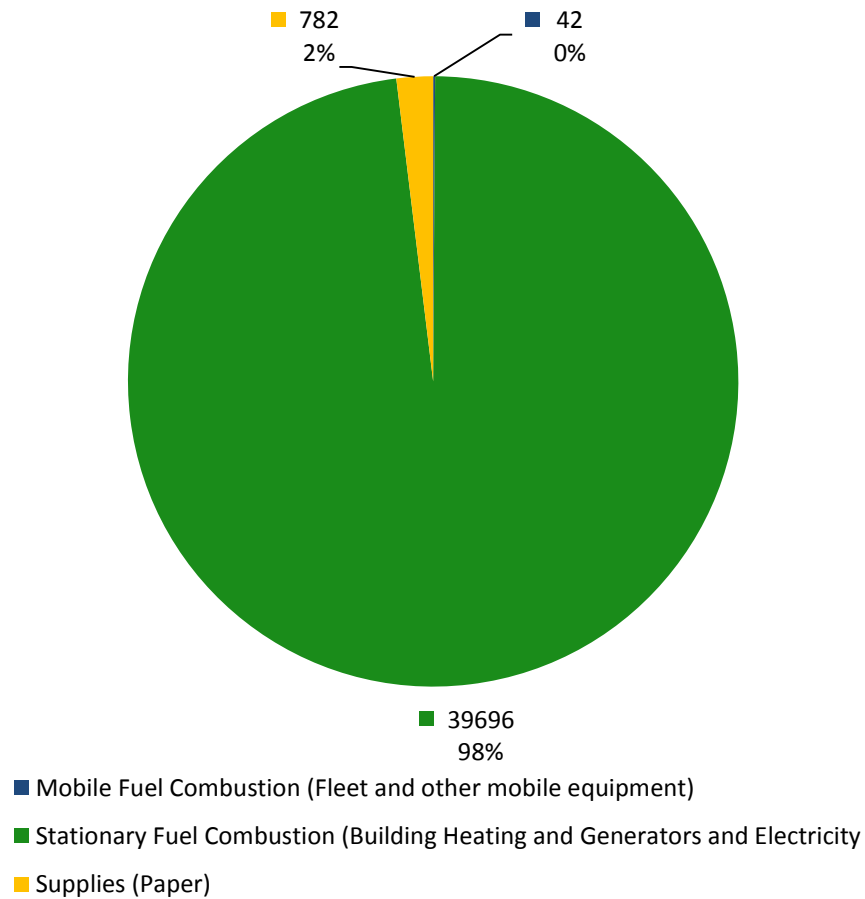
The other integral project measures were an upgrade to a variable speed drive on the lead chiller condenser pump and the addition of a dedicated cooling plant control system to automatically stage on chillers, pumps, and cooling towers at their most efficient operating points. The design included the tie-in connections for the second chiller, to be installed later this year, to minimize the install costs and potential shutdown requirements.

Considering the complexity of this central cooling plant a commissioning and optimisation plan was developed to ensure the plant operates as designed over the shoulder seasons. The energy and emission savings will be monitored and verified after one full year of data is available. Our phased approach, drawing on the instrumental site knowledge of the VGH Facility Maintenance and Operation team will result in an estimated annual savings of 35,000 GJ and \$265,000 in operation savings; this will mitigate 1,968 tCO₂e per year going forward minimizing the environmental impact of Vancouver General Hospital on the populations this facility serves.



Figure 3: Heat recovery chiller and pumps installed at Vancouver General Hospital.

Vancouver Coastal Health Authority (including Bella Coola and RW Large)
Greenhouse Gas Emissions by Source
for the 2016 Calendar Year (tCO₂e*)



Total Emissions: 40,520

Offsets Applied to Become Carbon Neutral in 2016 (Generated May 16, 2017 9:24 AM)

Total offsets required: **40,496**. Total offset investment: **\$1,012,400**. Emissions which do not require offsets: 24 **

*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 at must be reported. As outlined in the regulation, some emissions do not require offsets.

2016 Carbon Neutral Action Report Survey

Part One (external)

Contact Name(s):

Kori Jones

Organization Name:

Vancouver Coastal Health Authority

Please select your sector:

- Health Authority or Affiliate

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

During 2016, did your organization take any of the following actions to support emissions reductions from buildings?

Select all that apply

- Performed energy retrofits of the organization's buildings.: 18 energy retrofits were completed on 12 buildings, on 10 sites, in 2016.
- Built, or are building new LEED Gold or other "Green" buildings.: The Joseph & Rosalie Segal Family Health Centre (JRSFHC) is a LEED NC project that was in progress during the 2016 calendar year, it will be completed in 2017.
- Other actions? Please describe briefly.: (1) Exploring how to best use the Energy Engagement Strategy with FMO team.

Briefly describe your organization's plans to continue reducing emissions from its stationary sources in future years.

Vancouver Coastal Health is developing a 3 year Strategic Energy Management Plan (SEMP), complete with details of our Energy & GHG use, reduction targets and planned actions to achieve these targets. Although this is a 3 year rolling plan, the SEMP is reviewed and updated annually. This allows us to compare our energy use & GHG performance across the building portfolio and adjust the planned actions accordingly. The SEMP includes the following 6 actions:

- 1. Promotion of Energy Conservation via our Policy & Strategic Framework;*
- 2. Site specific energy studies and audits will continue to be carried out on inefficient processes and plant;*
- 3. Energy conservation measures will be identified and technical projects implemented;*
- 4. Existing buildings will continue to be optimized;*
- 5. Energy awareness and educational strategies will be implemented;*
- 6. Energy efficient solutions will be recommended for new construction and major renovations, including connections to potential District Energy Systems.*

During 2016, did your organization participate in utility-sponsored energy demand management program(s) (e.g. BC Hydro's Energy Management (Manager))?

Yes

If yes, please describe briefly:

In 2016, Vancouver Coastal Health started the 8th year of participation in the BC Hydro Energy Manager program and 6th year in the Fortis BC Energy Specialist Program. Participation in other utility-sponsored energy demand management programs include:

- 1. BC Hydro and Fortis BC Continuous Optimization (C.Op.) program*
- 2. BC Hydro and Fortis BC New Construction (NC) program*
- 3. BC Hydro Business Energy Savings Incentive (BESI) program*
- 4. BC Hydro Project Implementation Funding program*
- 5. BC Hydro Energy Study & Audit program*
- 6. BC Hydro Energy Wise Program*
- 7. Fortis BC Commercial Custom Design program*
- 8. Fortis BC Efficient Boiler program*
- 9. Fortis BC Efficient Commercial Water Heater program*

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

During 2016, did your organization take any of the following actions to support emission reductions from its mobile sources?

Select all that apply

- Took steps to drive less than previous years.
- Other actions? Please describe briefly.: Reduced fleet vehicles count in 2016.

Briefly describe your organization's plans to continue reducing emissions from its mobile sources in future years.

- 1. Fleet vehicles to be replaced by more fuel efficient model or disposed of, as and when required.*
- 2. The successful UBC-VGH staff / patient shuttle will be continued for the foreseeable future.*

3) Supplies (Paper):

During 2016, did your organization take any of the following actions to support emissions reductions from paper supplies?

Select all that apply

-
- Awareness campaign focused on reducing office paper use.

- Other actions? Please describe briefly.: As part of the paper/waste reduction campaign within the Green+Leaders (G+L) behaviour change program, volunteers were supplied with Paperless Meeting Toolkits to encourage their colleagues to reduce paper use. There are now 93 active G+Ls in Vancouver Coastal Health and affiliates.

Briefly describe your organization's plans to continue reducing emissions associated with its office paper use in future years.

-The online GreenCare Community (GCC) site provides tips and toolkits on using less paper, such as promoting paperless meetings. There are currently 1,731 VCH staff registered on the GCC.
-BC Clinical and Support Services (BCCSS) will explore a proposal to convert the bulk of paper purchased to 30% recycled content.

4) Other Sustainability Actions:

Business Travel:

During 2016, did your organization take any of the following actions to support emissions reductions from business travel?

Select all that apply

- Encouraged alternative travel for business (e.g. bicycles, public transit, walking)
- Encouraged or allowed teleworking or working from home
- Other, please describe briefly: Cycling – hosted a number of cycling workshops, bike repair sessions, Bike to Work Week celebration stations, Carpooling – online registration via carpool.ca, face-to-face carpool meetup, Walking – hosted WednesdayWalk, o Carsharing – established business account with Modo, promoted other carshare organizations, o Electric Vehicle Charging Stations – installed more EVCS at select facilities

Education Awareness:

During 2016, did your organization have any of the following programs or initiatives to support sustainability education and awareness?

Select all that apply

- Green, Sustainability or Climate Action Team
- Support for professional development on sustainability (e.g. workshops, conferences, training)
- Supported or provided education to staff about the science of climate change, conservation of water, energy and/or raw materials
- Other, please describe briefly: (1) Continued with the successful Green+Leaders (G+L) behaviour change program, with a focus on fostering sustainable behaviours in four key areas: Zero Waste, Energy Conservation and Climate Neutral, Active & Clean Transportation and Social Sustainability. In 2016, Vancouver Coastal Health had 93 active G+L in the program. 2) At the end of 2016, 1,731 employees were registered on the Lower Mainland Facilities Management GreenCare Community (GCC) site. This website is used to communicate all EES projects and initiatives, as well as engage health care staff with the EES themes and offer a place for staff to collaborate. (3) Continued with the sponsored BC Hydro Workplace Conservation Awareness Program (WCA). This program supports the G+L program and also provides tools and resources for other awareness initiatives, such as our Facilities Maintenance and Operations (FMO) engagement strategy. (4) Educated 25 VCH employees on Waste Management processes and trained 8 Recycling Champions.

Other Sustainability Actions:

During 2016, did your organization have any of the following programs or initiatives to support sustainability?

Select all that apply

- An operations policy or program to facilitate the reduction and diversion of building occupant waste (e.g., composting, collection of plastics, batteries) from landfills or incineration facilities
- Lifecycle costing of new construction or renovations

- Other, please describe briefly: Recycling Renewal Program (standardized recycling for mixed paper and mixed containers) now implemented at all VCH core sites. In 2016, we initiated a Safer Chemicals project to reduce toxicity of floor cleaning products at Vancouver Coastal Health and affiliate sites. Project outcomes will be a case study and webinar and will be complete in 2017.