Provincial Health Services Authority
Province-wide solutions. Better health.

2014 Carbon Neutral Action Report

Executive Summary

Carl Roy
President and Chief Executive Officer

I am pleased to present Provincial Health Services Authorities (PHSA) fifth annual Carbon Neutral Action Report (CNAR).

PHSA is proud of its leadership in reducing its carbon footprint and integrating green health care principles across the organization. It has led to PHSA being recognized as one of Canada's Greenest Employers for four consecutive years.

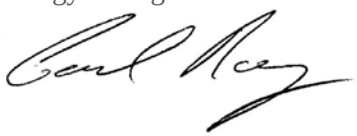
In 2014, PHSA had a carbon footprint of 18,902 tonnes of carbon dioxide equivalent (tCO2e), which was offset at a total cost of $496,253. This represents a 21.2 per cent decrease from the 2007 PHSA carbon footprint. Since 2010, PHSA has reduced its annual offset costs by $195,803.

In 2014 we completed two energy conservation projects that resulted in a savings of 870 eMWh and a cost avoidance of $42,390.

The domestic hot water and lighting upgrades at the Vancouver Island Cancer Centre stands out as a major project, not just because of the significant energy savings, but also the level of collaboration achieved with the site's facility and maintenance staff that operate and maintain the building. The facility and maintenance staff worked remotely with the PHSA energy management staff in the Lower Mainland, and worked closely with the energy consultants on the execution of this project.

The estimated annual savings, from this specific project, is approximately 111 MWh of electricity, 504 GJ of gas, 27.4 tCO2e of carbon, and $11,000 in avoided energy costs.

Looking ahead, in 2015, the energy management team has nine projects in progress or pending, which are expected to achieve an additional 7.0 eGWh of estimated avoided energy consumption and $334,000 in energy savings.



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11.2 %
decrease in $C0_2$ per m^2 of facility space at PHSA since

18,902
(tCO2e) is PHSA adjusted 2014 carbon footprint

45.7%
decrease in CO_2 per staff member at since 2007

11.3%
decrease in PHSA facility space since 2007

Our CO_2 Footprint

2014 GREENHOUSE GAS EMISSIONS BREAKDOWN AND OFFSETS APPLIED TO BECOME CARBON NEUTRAL

Provincial Health Services Authority (PHSA) reports its organizational carbon footprint in accordance with the Greenhouse Gas Reduction Targets Act (GGRTA) and the Carbon Neutral Government Regulation (CNGR) under guidance from the B.C. Climate Action Secretariat (CAS).

CAS provides guidance on which greenhouse gas (GHG) emissions are considered in scope in accordance with the legislation (see side bar). In non-technical terms, the main sources of GHG emissions can be grouped in three categories:

1. Stationary Emissions (Buildings)
    a. Direct fuel combustion
    b. Indirect (purchased electricity)
    c. Fugitive emissions (HFC's)
2. Mobile Emissions (Fleet Vehicles)
3. Supplies (Paper)

More than 95 per cent of PHSA's carbon footprint is related to the energy consumption from its owned and leased buildings. The majority of emissions from buildings are related to fossil fuel use for space heating, hot water and process heating loads.

Provincial Health Services Authority

PHSA's 2014 Carbon footprint was determined to be 18,902 tonnes of carbon dioxide equivalent (tCO_2e).

To become carbon neutral in 2014, PHSA purchased carbon offsets at a total cost of $496,253.

The Climate Action Secretariat of British Columbia had determined which GHGs are in scope and which ones are out of scope.

In Scope	Out of Scope
• **Six Green House Gases (GHG) are in scope for measuring and reporting:** • Carbon Dioxide - CO2, • Methane - CH4, • Nitrous Oxide - N2O, • Sulphur Hexafluoride - SF6, • Per fluorocarbons - PFCs, • Hydro fluorocarbons - HFCs	• All other GHG gases are considered out of scope.

CHANGES TO PHSA PORTFOLIO AND WEATHER INFLUENCE

PHSA's useable facility space has decreased 11.3 per cent since 2007, which is largely due to the decommissioning of the Riverview property. During the same time, the number of staff (measured in full time equivalents) has increased 45.1 per cent. During this time, PHSA controlled increases in facility space by seeking opportunities to optimize existing space use while maintaining safety and efficiency.

In 2014, emissions per full-time employee at PHSA (1.74 tCO_2e/FTE) have decreased by 45.7 per cent since 2007. And emissions per unit of floor area (0.06 tCO_2e/m^2) have decreased 11.2 per cent since 2007.

The carbon emissions reported are not adjusted for changes in climate temperatures. The use of Heating Degree Days (HDDs) is a metric designed to reflect the demand for energy required to heat a building. The HDDs for 2014 were nine per cent below those recorded in 2007, thus the demand for space heating, and hence natural gas use would have been lower compared to the demand in 2007.

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Actions Taken To Reduce Our CO_2 Footprint

2014 LIST OF ACTIONS TAKEN TO REDUCE CO_2 FOOTPRINT

PHSA

	Our Carbon Footprint (in tCO2e)	2007	2010	2011	2012	2013 [2]	2014
CO_2	Mobile Fuel Combustion (Fleet & other mobile equipment)	189	195	180	203	153	159
	Stationary Fuel Combustion & Electricity (Buildings)	22,930	20,413	22,497	24,949	19,887	17,923
	Supplies (Paper)	891	891	912	839	771	828
	Total Carbon Footprint (tCO2e)	**24,010**	**21,499**	**23,589**	**25,992**	**20,812**	**18,911**
	Emissions Which Do Not Require Offsets [1]	-9	-9	-9	-10	-10	-9
	Total Carbon Footprint (tCO2e)	24,002	21,490	23,581	25,981	20,802	18,902
	Adjustments / Corrections	0	0	0	0	3	0
	Total Carbon Footprint - for offsetting (tCO2e)	**24,002**	**21,490**	**23,581**	**25,981**	**20,805**	**18,902**
$	Purchased Carbon Offsets	$ -	$ 617,907	$ 540,036	$ 644,750	$ 538,025	$ 472,622
	Purchased Carbon Offsets +HST / GST	**$ -**	**$ 692,056**	**$ 604,841**	**$ 676,988**	**$ 564,926**	**$ 496,253**
KPI	Emissions per Full-Time Employee	3.21	2.26	2.61	2.44	1.95	1.74
	Emissions per Meter Square Facility Space	0.062	0.055	0.060	0.065	0.061	0.055

[1] As outlined in the Carbon Neutral Government Regulation of the Greenhouse Gas Reductions Target Act, some emissions do not require offsets.

[2] Carbon Footprint adjusted for 2013 due to building data corrections from the Climate Action Secretariat.

Stationary Fuel Combustion, Electricity (Buildings)

PHSA completed two energy savings projects in 2014:

- Retro-commissioning consisting mainly of ventilation adjustments was performed at the Child and Family Research Institute North and South buildings on the same campus as BC Children's Hospital and BC Women's Hospital + Health Centre (C&W). These buildings are purposed toward ground-breaking research at the Centre of Molecular Medicine and Therapeutics. These buildings have high ventilation requirements, and thus, the corresponding energy savings potential for optimizing the HVAC system is also high.

- Two energy conversation measures were implemented at Vancouver Island Cancer Center on the Royal Jubilee Hospital campus in Victoria. These were the decoupling of the domestic hot water supply from the facility's main boiler to allow for more efficient operation during the summer and shoulder seasons as well as a lighting upgrade within many of the building's offices and common spaces.

These two projects are projected to achieve a total estimated savings of 300 MWh of electricity, 2060 gigajoules (GJ) of natural gas, 106 (tCO_2e) of carbon and $42,390.

Mobile Fleet Combustion (Fleet and other vehicles)

PHSA installed six (5-120v; 1-240v) electric vehicle charging stations across two core sites: C&W and CFRI.

PHSA partners with Vancouver Coastal Health to provide staff a shuttle service between sites. In 2014, the shuttle provided transportation for 89,149 staff to and from PHSA facilities, and possibly removed the same number of single occupancy vehicle trips from the road.

Supplies (Paper)

The Green+Leaders (G+L) behaviour change program recruited nine new PHSA volunteers in the fall of 2014. This brings PHSA total to 72.

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PHSA

BUILDINGS, FTE AND WEATHER		2007	2010	2011	2012	2013	2014
Distinct PHSA Buildings		n/a	78	80	84	83	84
	% Owned	n/a	57%	57%	57%	68%	67%
	% Leased	n/a	43%	43%	43%	32%	33%
Usable Square Meters		388,990	389,883	392,728	400,444	342,311	344,956
Full-Time Employee Equivalents		7,471	9,492	9,022	10,646	10,646	10,841
Weather (summarized in Heating Degree Days) [1]		2,870	2,621	2,963	2,859	2,820	2,627

[1] Building energy consumption is influenced by climate conditions. Vancouver has a climate which predomintaly requires heating to satisify internal building temperatures. Heating Degree Days (HDD's) is a measurement designed to reflect the demand for energy needed to heat a building.

As part of the G+L paper/waste reduction campaign, these volunteers were supplied with Paperless Meeting Toolkits to encourage their colleagues to reduce paper use. In addition, PHSA continues to support the GreenCare Community (GCC) website, which provides tips and toolkits on using less paper, such as promoting paperless meetings. To date, 846 PHSA staff have joined the GreenCare Community.

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

In addition to specific projects mentioned previously, PHSA also did the following:

- A record 233 PHSA staff participated in the 2014 Clean Commuter Challenge (CCC), which is a campaign to get staff out of there single occupancy vehicle commuting.
- Provided 730 bike parking stall across sites.
- Encouraged the use of the internally organized Jack Bell shuttle when traveling commuting to various sites.
- Developed a staff engagement strategy to improve communication with Facilities Maintenance and Operations (FMO) staff with a focus on understanding the barriers to ongoing optimization of existing equipment and systems.
- Initiated the development of an engagement and integration strategy with Facilities Strategic Planning and Capital Project teams to embed energy conservation principles in their process and projects.
- Continued to promote energy conservation and GHG emissions reduction through staff-focused awareness and behaviour change programs, such as Green+Leaders, GreenCare Community website and the BC Hydro Workplace Conservation Agreement program.

FUTURE WORK TO REDUCE THE ORGANIZATION'S CO_2 FOOTPRINT

In **2015,** PHSA plans to continue reducing GHG emissions and Energy use by:

1. Implementing GHG/Energy reduction retrofit projects in its existing facilities.
2. Optimizing the mechanical plant and controls in its existing facilities.
3. Engaging with site operations staff and external consultants to identify GHG / Energy opportunities.
4. Engaging with strategic planners and capital project managers to ensure that energy conservation is embedded in their process and projects scopes.
5. Engaging with our external key stakeholders, such as utility partners, to identify energy reduction projects.
6. Engaging and educating our staff via the existing Green+Leaders program, GreenCare Community and the BC Hydro Workplace Conservation Agreement.
7. Building partnerships with our P3 partners to help them identify energy conservation opportunities.
8. Building partnerships with cities and municipalities to investigate district energy systems opportunities.
9. Investigating renewable/clean cost effective energy solutions.

SUCCESS STORY

The Djavad Mowafaghian Child Care Centre, managed by the YMCA and awarded LEED Gold in 2014, is located on the campus of the BC Children's Hospital and BC Women's Hospital + Health Care Centre in Vancouver.

The 684 m^2 child care centre provides space for 49 children infants, toddlers and preschoolers. The centre provides indoor and outdoor play, quiet time, offices, a kitchen, and a staff lounge.

Figure 1
Source: Recollective Consulting, dys Arhitectural, CES Engineering Ltd., AME Group

Energy Efficiency

The facility is designed to incorporate large overhangs to help prevent heat gain in the summer while allowing low winter sunlight to enter. This provides efficient light and warmth when needed most.

Various strategies enabled the project to eliminate the need for mechanical cooling.

- Windows are operable in the building to allow for passive rather than mechanical ventilation.
- An efficient envelope features an R-40 roof and high performance glazing to keep the building protected from extreme temperature fluctuations.
- Temperature set points for a small electrical /communication room were relaxed to reduce energy use.

These strategies helped reduce the overall energy use and demand by a minimum of 40 per cent more than the ASHRAE standard 90.1-2007

Other Sustainable Design Efficiency

- Smaller Maple trees were removed from the site and repurposed into climbing and play elements in the outdoor play spaces.
- The various energy conservation strategies will allow for the cooling demands to be satisfied with a fan rather than air conditioning. This will avoid the use of ozone depleting refrigerant chemicals.
- Parking was not increased on site. Sustainable transportation alternatives encouraged.
- In landscaping, regional and native drought-tolerant and drought-resistant vegetation was used.
- For air quality, operable windows for natural ventilation were installed.
- Daylight is accessible in all regularly occupied spaces to reduce demand for electric lighting.
- Learning activities in the child care centre were specifically modified to reduce or eliminate process water use. Storm water is collected for use on landscaping.
- Addressing the durability of the building's material assembly, a Durable Building Plan was created by a building envelope professional, with resilience as a key consideration in product specification. ■

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2014 Carbon Neutral Action Report (CNAR) - Part 2 ACTIONS

Organization Name

Provincial Health Services Authority

Actions Taken to Reduce Emissions

1) Stationary Fuel Combustion, Electricity (Buildings):Indicate which actions were taken in 2014:

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:

1. Rolled out a strategy to improve engagement with Facilities Maintenance and Operations (FMO) staff with a focus on understanding the energy building use, identifying reduction opportunities and optimization of existing equipment/plant.

2. Completed and rolled out a Design Guideline for New Constuction & Major Renovation projects to provide our Strategic Planning and Capital Project teams with direction for: Energy performance targets, Incentive application requirements, LEED requirements, Design Standards and Principles.

3. Continued to promote energy conservation and GHG emissions reduction through awareness and behaviour change programs, such as Green + Leaders, GreenCare Community website and the BC

Hydro Workplace Conservation Agreement program.

2) Mobile Fleet Combustion (Fleet and other vehicles):Indicate which actions were taken in 2014:

Do you have a fleet?

Yes

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

Yes

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

Yes

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

N/A

3) Supplies (Paper):Indicate which actions were taken in 2014:

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:

The Green + Leaders (G+L) behaviour change program recruited 9 more volunteers in the fall of 2014 and now there are 72 volunteers in PHSA. As part of the paper/waste reduction campaign, the volunteers were supplied with Paperless Meeting Toolkits to encourage their colleagues to reduce paper use.

Our online GreenCare Community (GCC) site includes content and provides tips on using less paper, such as promoting paperless meetings.

Actions Taken to Reduce Emissions - continued

Explain how you plan to continue minimizing emissions in 2015 and future years:

PHSA plans to continue reducing GHG emissions and Energy use by:

1. Implementing GHG/Energy reduction retrofit projects in our existing building portfolio by utilizing the Carbon Neutral Program Funding (CNCP).
2. Continuing the optimization of mechanical plant and controls in our existing building portfolio.
3. Continue engaging with site Operations staff and external Consultants to identify GHG/Energy opportunities.

4. Engaging with Strategic Planners and Capital Project Managers to ensure that our Design Guideline for New Construction & Major Renovation projects is embedded in their process and projects scopes.
5. Engaging and educating our staff via the existing Green + Leaders program, GreenCare Community and the BC Hydro Workplace Conservation Agreement.
6. Building partnerships with our P3 partners to help them identify energy conservation opportunities.
7. Building partnerships with Cities and Municipalities to investigate District Energy Systems opportunities with alternative energy solutions.
8. Investigating renewable/clean cost effective energy solutions.

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

Yes

Actions to Promote Sustainability and Conservation - OptionalThe following are actions that fall outside the scope of the Carbon Neutral Government Regulation, but which many organizations still undertake and may wish to report on. This section is optional for reporting.

Business TravelCreated a low-carbon travel policy or travel reduction goal (Low-carbon: Lowest emission of greenhouse gases per kilometre per passenger)

Yes

Virtual Meeting TechnologyInstalled web-conferencing software (e.g., Live Meeting, Elluminate, etc.)

Yes

Made desktop web-cameras available to staff

Yes

Encourage alternative travel to meetings (e.g., bicycles, public transit, walking)
Yes

Encourage carpooling to meetings
Yes

Education and AwarenessHave created Green, Sustainability, Energy Conservation, or Climate Action Teams.
(No response)

Provided resources and/or dedicated staff to support these teams
Yes

Provided behaviour change education/training for these teams (e.g., community-based social marketing)
Yes

Established a sustainability/green awards or recognition program
Yes

Support green professional development (e.g., workshops, conferences, training)
Yes

Planning for Cimate ChangeHave assessed whether extreme weather events and/or long term changes in climate will affect our organization's business areas
No

Long term changes in climate have been incorporated into our organization's decision making.
No

Actions to Promote Sustainability and Conservation - Optional (continued)

Staff Awareness and EducationProvided education to staff about the science of climate change

Yes

Provided education to staff about the conservation of water, energy, and raw materials

Yes

Provided green tips on staff website or in newsletters

Yes

Alternate Work/Commuting OptionsAllow for telework/working from home

Yes

Staff have the option of a compressed work week

No

Commuting by foot, bicycle, carpool or public transit is encouraged

Yes

Shower or locker facilities are provided for staff/students who commute by foot or by bicycle

Yes

Secure bicycle storage is provided

Yes

Other Sustainability ActionsEstablish a water conservation strategy which includes a plan or policy for replacing water fixtures with efficient models
Yes

Put in place a potable water management strategy to reduce potable water demand of building-level uses such as cooling tower equipment, toilet fixtures, etc. and landscape features
Yes

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

Have implemented a hazardous waste reduction and disposal strategy (Hazardous Waste: E.g., electronics including computer parts and monitors, batteries, paints, fluorescent bulbs)
Yes

Have incorporated minimum recycled content standards into procurement policy for consumable, non-paper supplies (e.g., writing instruments, binders, toner cartridges, etc.)
No

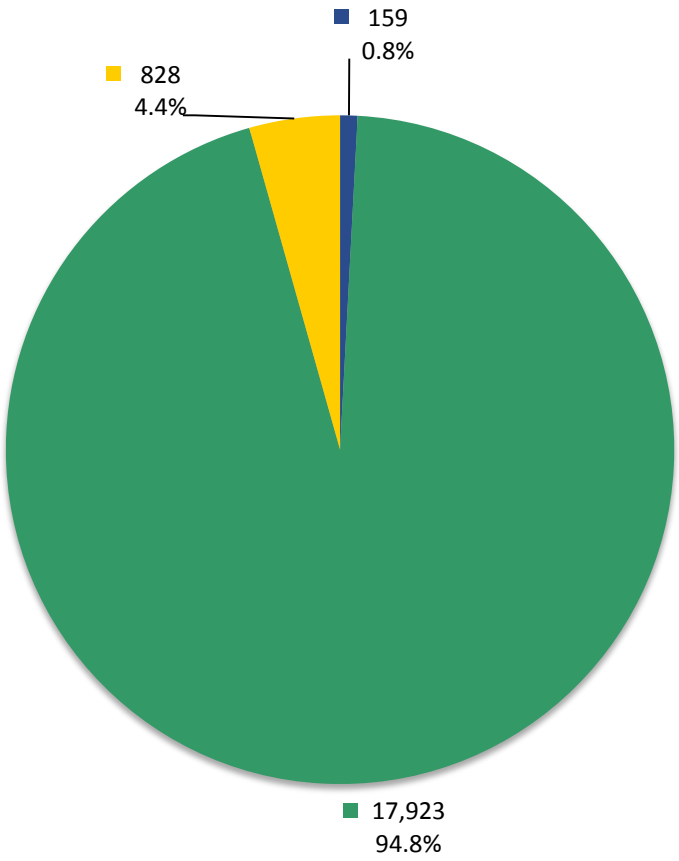
Established green standards for goods that are replaced infrequently and/or may require capital funds to purchase (e.g., office furniture, carpeting, etc.)
No

Incorporated lifecycle costing into new construction or renovations
Yes

Please list and other sustainability actions you wish to report not included in the previous list.

1. The annual update of our Environmental Accountability Report, including goals and targets for 10 strategic focus areas.
2. The continued success of the Recycling Program across the region.
3. The continued effort to reduce staff single occupancy vehicle commuting by such actions as, promoting the availability of electric car charging stations and the Clean Commuter challenge.

Provincial Health Services Authority
Greenhouse Gas Emissions by Source
for the 2014 Calendar Year (tCO_2e*)



Total Emissions: 18,911

- 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 2014 (Generated June 22, 2015 4:35 PM)

Total offsets required: **18,902**. Total offset investment: $**472,550**. Emissions which do not require offsets: **9** **

*Tonnes of carbon dioxide equivalent (tCO_2e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.

** Under the *Carbon Neutral Government Regulation* of the *Greenhouse Gas Reduction Targets Act,* all emissions from the sources listed above must be reported. As outlined in the regulation, some emissions do not require offsets.