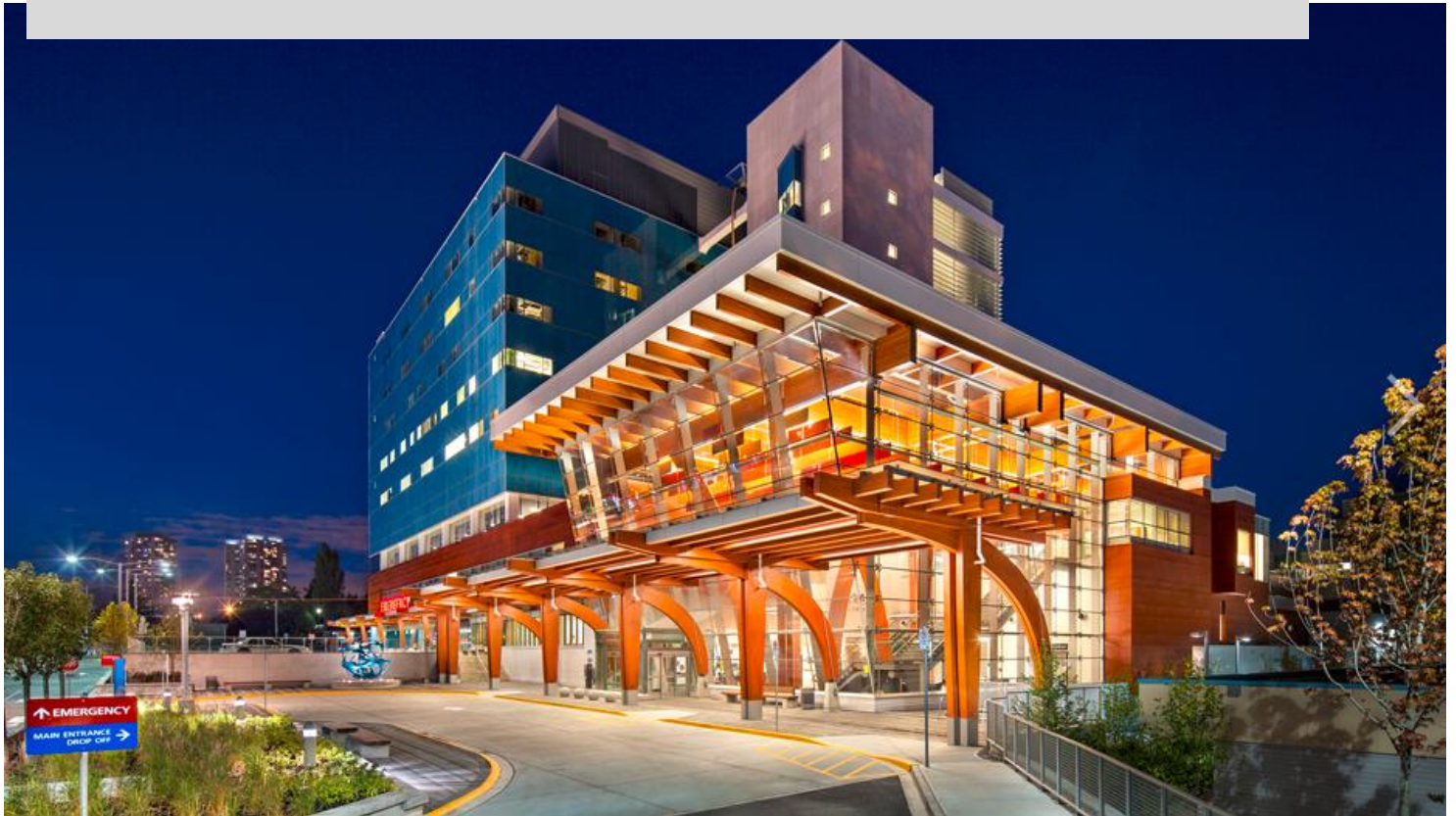


Fraser Health's 2016 Carbon Neutral Action Report



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 Fraser Health's final Carbon Neutral Action report will be posted to our website at bcgreencare.ca

The cover photo is of the LEED Gold Critical Care Tower at Surrey Memorial Hospital

Executive Summary



Executive Summary: Fraser Health Carbon Neutral Action Report 2016

Michael Marchbank, President and Chief Executive Officer

I am proud to present Fraser Health's 2016 Carbon Neutral Action Report.

This marks the seventh consecutive year we have achieved carbon neutrality as part of the Province of British Columbia's public sector commitment to net-zero emissions.

Fraser Health's 2016 carbon footprint was 37,136 tonnes of carbon dioxide equivalent. Health care is an energy-intensive industry that continues to grow with expanding and aging populations.

Despite increases in facility space (27 per cent increase) and people (23 per cent increase), Fraser Health has managed to reduce the tonnes of CO₂ equivalent per square meter of facility space by 21 per cent.

We accomplished this in 2016 by initiating 20 retrofit projects that saved Fraser Health an estimated 6.9 gigawatt hours of energy - reducing our carbon footprint by 1,005 tonnes of CO₂.

In addition, we reduced our fleet vehicles from 43 to 37 and continued to support staff engagement programs, such as the Clean Commuter and Wellness Campaign and Green+Leaders, which encourage a work culture of energy conservation.

To counteract the CO₂ emissions which we were unable to reduce through conservation measures, we purchased carbon offsets from the Ministry of Environment at a total cost of \$974,820.

Thank you to all our employees, physicians and volunteers - as well as key external partners - for their hard work to reduce Fraser Health's environmental and carbon footprint. We know every individual can make a difference. By working together we are able to provide both quality care and a greener health care environment for our patients and our community.

Our CO₂ Footprint

2016 Greenhouse Gas Emissions Breakdown and Offsets Applied to Become Carbon Neutral

We report our carbon footprint based on guidelines provided by the Carbon Neutral Government Regulation and B.C. Climate Action Secretariat.

The B.C. Climate Action Secretariat uses various elements of reporting, based on the Greenhouse Gas Protocol Corporate Standard, which has classified carbon reporting into three scopes. Of these three scopes and various elements within each, the Climate Action Secretariat has determined Fraser Health's carbon footprint to comprise of six different greenhouse gases, which are converted to tonnes of carbon dioxide equivalent (tCO₂e). The main sources of emissions are categorized into three main groups:

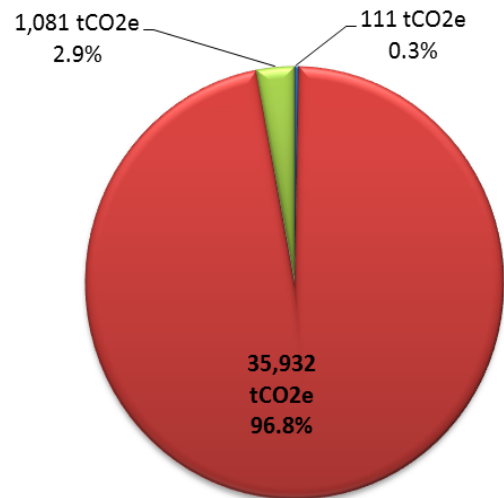
- Mobile Fleet Combustion (Fleet)
- Stationary Combustion and Purchased Energy (buildings)
- Supply (Paper)

As shown in the chart on the right, 97 per cent of Fraser Health's in-scope emissions are attributed to the stationary fuel combustion and purchased energy from our buildings. This is the largest area to focus our mitigation efforts on.

Fraser Health's 2016 carbon emissions were 37,136 tCO₂e, including a 12 tCO₂e adjustment from 2015. This represents a two per cent increase from 2015 and an estimated 1.5 per cent increase in the carbon footprint since 2007. This is a great achievement since the Fraser Health facilities and staffing portfolios have grown significantly during the same time period. Fraser Health's useable facility space has increased by 28 per cent and full time equivalent positions have increased by 30 per cent.

To become carbon neutral in 2016, Fraser Health purchased carbon offsets from the Ministry of Environment at a total cost \$974,820.

Fraser Health 2016 Greenhouse Gas (In-Scope) Emissions



- Mobile Fuel Combustion (Fleet and other mobile equipment)
- Stationary Fuel Combustion and Purchased Energy (Buildings)
- Supplies (Paper)

“The environmental impact from health care facilities, operations, and services affects the health of the populations and patients they are meant to serve.” - Adapted from World Health Organization and Health Care without Harm

Changes to Fraser Health's Portfolio

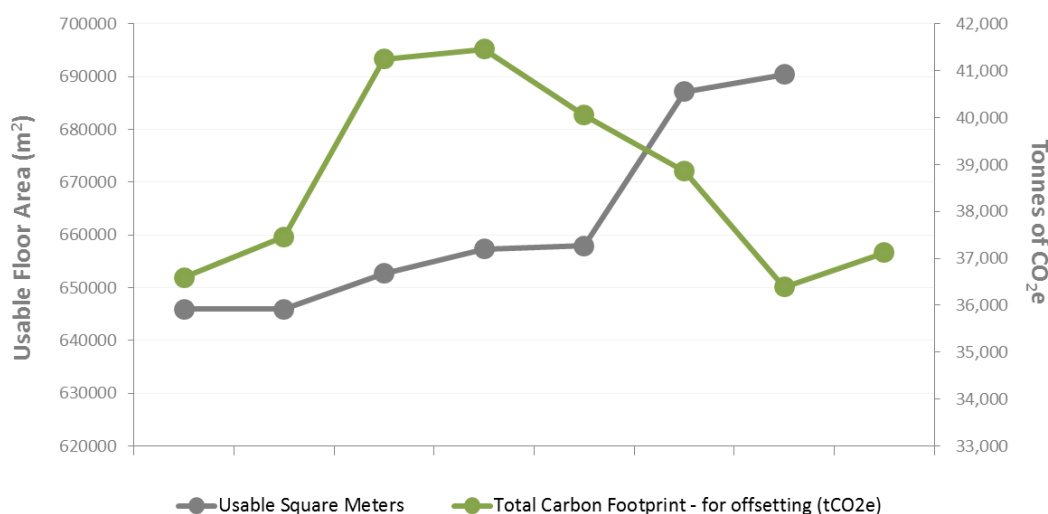
The carbon emissions reported are not adjusted for changes in weather temperature. Vancouver and the Fraser Valley have a climate which predominately requires heating to satisfy internal building temperatures. The use of Heating Degree Days is a method designed to reflect the demand for energy required to heat a building. The Heating Degree Days stated in the table above for 2016 indicate a two per cent increase in the heating energy demand compared to 2015. This will have a direct effect on the carbon emission, due to the increased natural gas consumption from the stationary combustion plant.

Fraser Health					
BUILDINGS, FTE AND WEATHER	2007	2013	2014	2015	2016
Distinct FHA Buildings:	n/a	150	153	151	153
% Owned:	n/a	80%	82%	82%	81%
% Leased:	n/a	20%	18%	18%	19%
Usable Square Meters¹:	538,274	635,226	681,528	681,264	686,942
Full-Time Employee Equivalents²:	14,029	16,964	17,584	17,997	18,298
Weather (Heating Degree Days)³:	2,870	2,820	2,627	2,490	2,537

Fraser Health has been able to achieve significant energy and greenhouse gas reductions despite the fact that our overall floor area has been growing for the last few years with the addition of several new sites. This 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 new buildings.

Taking into consideration the portfolio growth, the overall emissions per useable floor area in 2016 has actually decreased by 21 per cent since 2007.

Useable Floor Area and Emissions (2010-2016)



¹ Usable area excludes roof tops, interstitial spaces and parking areas

² FTE data provided by Ministry of Health

³ The Heating Degree Days are taken from Vancouver Airport using a base temperature of 18°C

Nearly 97 per cent of Fraser Health's carbon footprint is related to stationary fuel combustion and purchased energy from the energy consumed in its owned and leased buildings. Natural gas is the predominant fossil fuel used for space heating, hot water and process loads in our stationary combustion plants. Carbon emissions associated with our use of natural gas make up 95 per cent of building emissions.

FRASER HEALTH						
Our Carbon Footprint (in tCO ₂ e)		2007	2013	2014	2015	2016
CO ₂	Mobile Fuel Combustion:	136	126	124	106	114
	Stationary Fuel Combustion:	35,404	38,622	37,736	34,875	35,948
	Supplies (paper):	1,056	1,320	1,010	1,434	1,081
	Carbon Footprint ⁴ :	36,596	40,067	38,870	36,415	37,143
	Emissions not requiring Offsets ⁵ :	- 8	- 17	- 12	- 19	- 20
	Total Carbon Footprint:	36,587	40,050	38,859	36,396	37,124
	Adjustments / Corrections ⁶ :	0	5	0	- 3	12
	Carbon Offsets (tCO₂e):	36,587	40,055	38,859	36,393	37,136
\$	Purchased Carbon Offsets ⁷ :	n/a	\$1,043,543	\$1,020,128	\$955,001	\$974,820
KPI	Emissions per FTE:	2.61	2.36	2.21	2.02	2.03
	Emissions per usable space:	0.068	0.063	0.057	0.053	0.054

Although our priority actions are to focus on our natural gas combustion plant, we are still motivated to reduce purchased energy (electricity) and other in-scope emission sources.



Figure 1: Fraser River in New Westminster by the Royal Columbian Hospital

⁴ It was estimated that Fugitive Emissions from cooling equipment do not comprise more than 0.01% of Fraser Health's total emissions and have been deemed out-of-scope and have not been included in our total greenhouse gas emissions profile.

⁵ As outlined in the Carbon Neutral Government Regulation of the Greenhouse Gas Reductions Target Act, some emissions do not require offsets.

⁶ Carbon Footprint adjustments due to building data corrections from the Climate Action Secretariat.

⁷ Purchased Carbon Offsets represent the actual invoice amount to purchase offsets in the specific calendar year and include taxes.

Actions Taken To Reduce Our CO₂ Footprint

2016 List of Actions Taken to Reduce CO₂ Footprint

Stationary Emissions (Buildings):

- In 2016, Fraser Health continued its effort to further reduce our environmental impact by initiating **20 retrofit projects** with a total estimated energy savings of 6.9 eGWh (24,700 GJ), resulting in greenhouse gas savings of 1,005 tCO₂e.
- Fraser Health fully utilized the **Carbon Neutral Capital Program** to fund several energy / greenhouse gas emission reduction projects at Felburn Care Centre, Mission Memorial and Ridge Meadows Hospitals. Over \$1 million of Carbon Neutral Capital Program funds, combined with internal capital funds and incentives were invested and 43 per cent of the above greenhouse gas savings are a result of this program.
- Fraser Health completed the **second year of the Green Revolving Fund**; a successful initiative which allows us to re-invests funds created through electricity energy savings.
- Fraser Health completed a **Fortis Custom Study at Burnaby Hospital** and commenced with three further studies at Chilliwack General, Eagle Ridge and Ridge Meadows Hospitals.
- Fraser Health implemented over **35 optimization energy conservation measures** at Chilliwack General, Eagle Ridge and Mission Memorial hospitals, as part of the BC Hydro / Fortis BC Continuous Optimization Program.
- Fraser Health continued to roll out an **engagement strategy** with facilities maintenance and operations, adding Burnaby Hospital to four existing sites. The strategy focuses on energy use in buildings, identification of reduction opportunities and optimization of existing equipment/plants.
- Fraser Health continues to embed **sustainability** across the organization by supporting staff engagement initiatives such as the Green+Leaders program, the GreenCare community website, and the BC Hydro Energy Wise program.
- Fraser 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, Fraser Health reduced its fleet vehicles** from 43 to 37.
- **Eight electric vehicle charging stations were installed** and activated, making a total of 50 at eight Fraser Health sites.
- **Fraser Health continued the shuttle transport service** for ambulatory patients, family members and courier packages between three facilities and the Sky Train station at Surrey City Centre. In 2016, the shuttle facilitated the transfers of 40,969 passengers and 46 packages.
- **Fraser Health now has 509 bike parking stalls.**
- **In 2016, 65 Fraser Health employees registered** with the carpool / ride-match program (Carpool.ca), connecting health care staff to carpool with colleagues at the same Fraser Health site.

Supplies (Paper)

- **In 2016, 15 volunteers joined the Fraser Health Green+Leader program**, making a total of 91 active Green+Leaders in Fraser Health. As part of the waste reduction campaign, they were supplied with toolkits to reduce paper use through double-sided printing, paperless meetings and more.
- **Fraser Health continued to provide inspiration, tips and toolkits to reduce waste, including paper use, on the GreenCare Community website.** Fraser Health currently has 1,400 staff registered for the GreenCare Community.

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

- **One hundred and sixty Fraser Health staff participated in the 2016 Clean Commuter and Wellness Challenge**, a campaign which encouraged staff to choose healthier transportation, such as walking, biking, carpooling or taking transit.
- **Education and awareness communications via the GreenCare Community website**, as well as stories published on Fraser Health's internal communication channels, continued to promote behavior change and celebrate environmental sustainability success.
- **Training, resources, toolkits, and recognition support staff champions** through the Green+Leaders program.
- **The Lower Mainland Energy Environment and Sustainability team educated 208 employees on waste management process** and trained 22 to become recycling champions.

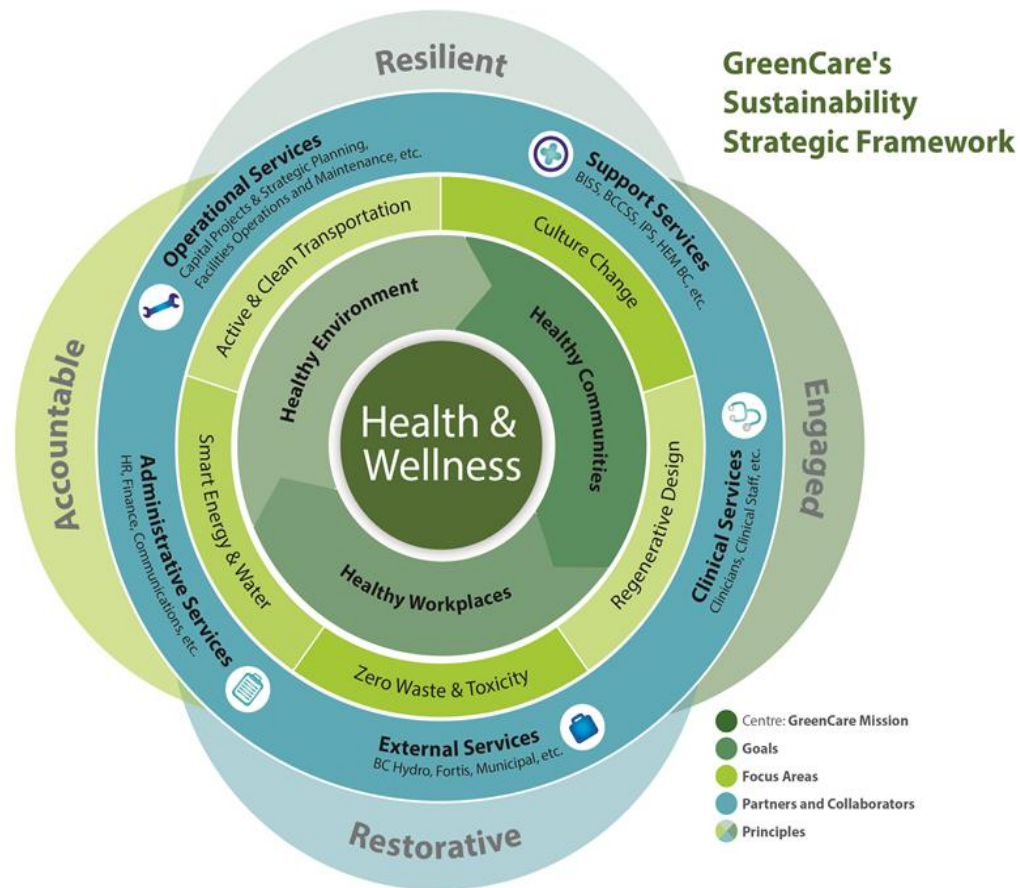
Future Actions to Reduce Our CO₂ Footprint

Fraser Health Plans to Continue Reducing Greenhouse Gas Emissions and Energy Use By:

- **Planning and implementing greenhouse gas / energy reduction projects** in our existing building portfolio by using the Carbon Neutral Capital Program and supplementing with internal capital funds and incentives from BC Hydro and Fortis BC.
- **Continuing the optimization of mechanical plants and controls** in our existing building portfolio.
- **Reinvesting 90 per cent of electricity savings** from F17 fiscal year to supplement our Green Revolving Fund and invest into electricity reduction projects.
- **Engaging with design engineers** to ensure our new buildings adopt energy efficient design principles.
- **Undertaking site energy studies**, with support from facilities maintenance operations employees and external consultants, to identify greenhouse gas / energy reduction opportunities.
- **Engaging and educating Fraser Health employees**, through the Green+Leaders program, GreenCare Community and the BC Hydro Energy Wise program.
- **Developing a roadmap for a strategic adaption climate resilience plan.**
- **Building partnerships with cities and municipalities** to investigate

district energy systems opportunities with alternative energy solutions.

- **Working with GreenCare's refreshed strategic framework** to advance health care practices that respect environmental stewardship, in recognition that the environmental impact from health care facilities, operations, and services influence the health of the populations and patients we serve. Fraser 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.



Success Story: Project Collaboration

Reducing energy can be a challenge for health authorities with heavy demand related to 24-hour operations, specialized equipment, and service requirements for hospital operations. Fraser Health's energy management team uses a collaborative and coordinated approach to combat this challenge.

In 2016, Fraser Health celebrated the success of these coordinated efforts at Ridge Meadows Hospital. The facilities maintenance and operations team including Doug Davis, Shaun Keech and Rick Molnar worked closely with the energy management team including Robert Bradley, Kori Jones and Jeson Mak, to install a new condensing boiler, and upgrade the controls on the ventilation systems.



Figure 2: Ridge Meadow's Maintenance and Operations Staff and Corporate Energy Management Staff

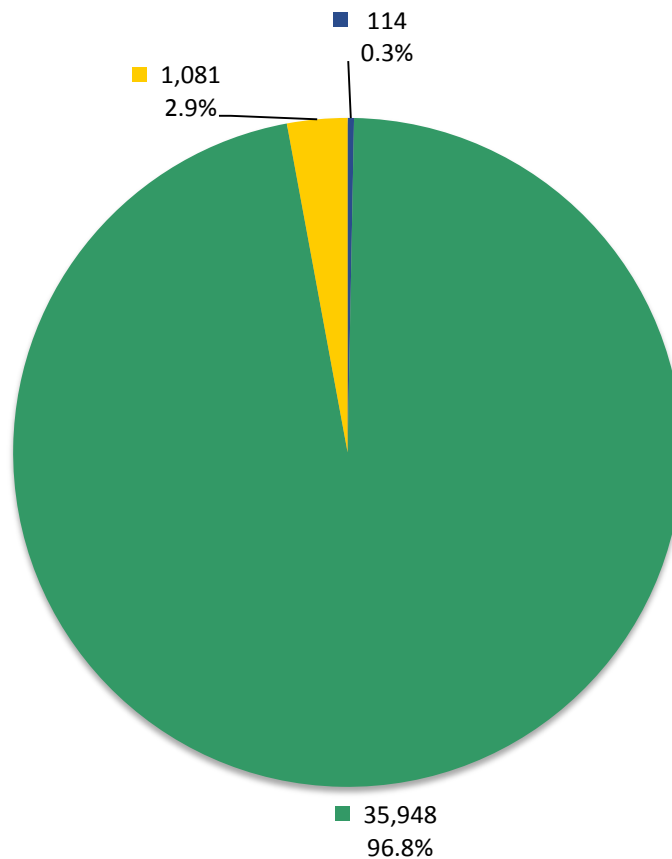
The installation of these measures was completed in March 2016. External funding sources including the Carbon Neutral Capital Program and financial incentives from both Fortis BC and BC Hydro were instrumental in completing these measures. A full year of measurement and verification confirmed the estimated energy savings were achieved. The total natural gas and electricity savings are respectively 5,000 GJ and 183,000 kWh, resulting in a greenhouse gas emission savings of over 250 tCO₂e.

"We were approached by our energy team to investigate the possibility of a boiler expansion at Ridge Meadows Hospital. I found the whole process to be incredibly collaborative. They included us in decisions with regards to types of equipment, location, scope adjustments, schedule and implementation of the project. I am glad we have an energy management team that is proactive and always looking for ways to improve our facilities and are willing to invest in infrastructure to make those improvements. This project is a great example of what happens when we work together." says Rick Molnar, facilities maintenance and operations team manager for Ridge Meadows Hospital.

The collective efforts continued after the initial project with implementation of new chillers, heat pumps, and cooling towers by the end of 2016. In addition to capital upgrades, energy management and facilities maintenance and operations teams continued to collaborate on a new energy study aimed at building on the momentum gained from the 2016 projects. The newly identified measures will include hot water heat exchangers and a boiler stack economizer. The goal is to improve the efficiency of the condensing boiler and heat pumps implemented through the first two phases. These measures, targeted for completion in 2017, will move Ridge Meadows Hospital further towards optimal energy efficiency.

Fraser Health demonstrates a shared commitment to reducing our carbon footprint through improvements in energy efficiency. Through the coordinated efforts of the energy management and facilities maintenance and operations teams, the positive momentum is continuing forward. Our multi-phased collective approach is estimated to drop annual emissions by 450 tCO₂e, which correlates to a 25 per cent reduction in greenhouse gas emissions from 2015. Incorporating energy saving projects prior to 2015, Ridge Meadows Hospital greenhouse gas emissions has dropped by 36 per cent (750 tCO₂e) since 2010.

Fraser Health Authority Greenhouse Gas Emissions by Source for the 2016 Calendar Year (tCO₂e*)



Total Emissions: 37,143

- 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 2016 (Generated May 16, 2017 9:38 AM)

Total offsets required: **37,124**. Total offset investment: **\$928,100**. Emissions which do not require offsets: **20** **

*Tonnes of carbon dioxide equivalent (tCO₂e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.

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

2016 Carbon Neutral Action Report Survey

Part One (external)

Contact Name(s):

Robert Bradley

Organization Name:

Fraser 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

- Conducted an energy audit/study of building(s) in the organization's portfolio
- Performed energy retrofits of the organization's buildings.: 20 retrofits projects, including 3 optimization projects, were completed in 2016 at 11 sites. The total energy savings are estimated at 6,866,000 kWh (24,700 GJ) and this equates to GHG emissions savings of ~1,005 tCO₂e.
- Built, or are building new LEED Gold or other "Green" buildings.: Building a New Mental Health Building as part of RCH Redevelopment under the LEED HC v4 certification process
- Other actions? Please describe briefly.: (1) Implemented over 35 optimization energy conservation measures at 3 sites. (2) Added Burnaby Hospital to our previously rolled out Energy Engagement Strategy with FMO. (3) Promoted the use of our Energy and Environmental Sustainability (EES) Design Guidelines for New Construction and Major Renovation projects. (4) Continued to promote energy conservation and GHG emissions reduction through awareness and behaviour change programs.

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

Fraser Health has 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, FH started the 8th year of participation in the BC Hydro Energy Manager program and 3rd 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

- Replaced existing vehicles with more fuel efficient vehicles (gas/diesel).: 1 of the 37 fleet vehicles was replaced with a more fuel efficient vehicle
- Other actions? Please describe briefly.: (1) Reduced fleet vehicles from 43 to 37 during 2016. Two were sold at the end of 2015 and four were not used and disposed of during 2016. (2) Continued with the Surrey staff / patient shuttle services, including the transfers of 40,969 passengers and 46 packages, between three FH facilities and Sky Train station at Surrey City Centre.

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

- 1. Fleet vehicles will continue to be replaced by more fuel efficient model or disposed of, as and when required.*
- 2. The successful Surrey staff / patient shuttle service between three FH facilities and Sky Train station at Surrey City Centre 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.: (1) 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 91 active G+Ls in FH. (2) The online GreenCare Community (GCC) site provides tips and toolkits on using less paper, such as promoting paperless meetings. Fraser Health currently has 1,400 staff registered on the GCC.

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

BC Clinical and Support Services (BCCSS) will explore a proposal to convert the bulk of paper purchased to 30% recycled content. The current contract expires in November 2017. For context, in 2016 ~ 15% of the paper purchased had 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: (1) FH have a total of 50 Electric Vehicle charging stations installed at 8 core sites and these were utilised to a higher extent in 2016. (2) Staff at FH continued to utilise the carpool / ride match program (Carpool.ca), with 65 employees registering to use the program in 2016. (3) The Energy & Environmental Sustainability (EES) team coordinated and delivered a Lower Mainland Clean Commuter Challenge (campaign to encourage staff to choose alternative healthier modes of commuting), where over 160 FH staff participated over a 2 week period.

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, Fraser Health had 91 active G+L in the program. (2) At the end of 2016, 1,400 FH 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 208 FH employees on Waste Management processes and trained 22 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