

2014 Carbon Neutral Action Report

Vancouver Island Health Authority, May 30, 2015



Executive Summary – Island Health 2014

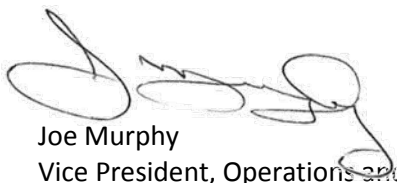
This is a milestone year for Island Health’s carbon neutral journey. The organization has achieved five years of carbon neutrality through the purchase of carbon offsets, has five more years to reach its greenhouse gas emissions target and it is the first year that emissions have been below 2007 levels. To date Island Health continues to make significant investment to be carbon neutral by purchasing carbon offsets. For 2014, Island Health purchased \$813,068 worth of carbon offsets. The good news is, thanks to emission reduction efforts, the amount required was \$28,192 less than the previous year. These reductions are made possible by such programs as the Carbon Neutral Capital Program for Health Authorities introduced in 2014. The Carbon Neutral Capital Program provides funds specifically targeted at greenhouse gas emissions reduction. Using these funds Island Health was able to successfully reduce emissions by 13% from our peak emissions in 2011.

As stated within this report Island Health’s Board of Directors and Executive are committed to the organization’s emissions reduction target. This goal is supported by health care workers through Green Team participation and awareness campaigns. Many employees have shown a high level of concern for the environment and climate change as they understand that a healthy planet supports a healthy population and this makes sense for the communities we serve.



Since 2007 emissions reduction has largely been achieved by conservation measures implemented on existing systems. However, significant reductions are those that are attainable through major capital work and Island Health knows the best place to achieve significant reductions is with the heating plants themselves. This equipment keeps the hospitals warm and provides hot water and steam for sterilization and humidification. All of these plants are fueled by hydro carbon fuels that provide the high level of heat desired. Unfortunately these fuels also contribute to climate change through the release of greenhouse gas emissions. Other countries have not had the access to the inexpensive fuels that Canada enjoys and have developed reliable, clean burning, efficient woodchip heating boilers.

Our next major heating plant replacement is at Nanaimo Regional General Hospital, our second largest facility, and is proposed to include a biomass boiler. The boiler will reduce greenhouse gas emissions, diversify our energy supply and save a significant amount on our natural gas bills. Interestingly enough, this project will provide a payback for the entire heating plant. Going forward, heating plants will have to transition away from hydro carbons to low carbon systems, and this plant will be Island Health’s first major step in that direction.



Joe Murphy
Vice President, Operations and Support Services

Overview

Island Health provides health care to residents on Vancouver Island, the islands of the Georgia Strait, and the mainland communities north of Powell River and south of Rivers Inlet. We are a diverse region serving a diverse population. Providing health care over this wide geographic area requires many buildings dispersed across the region. Facilities are the largest source of greenhouse gas emissions for the health authority. Some *quick facts* about Island Health:

ISLAND HEALTH QUICK FACTS...

FACILITIES = **224 Buildings**

BUILDING AREA 2014 = **550,000 m²**

INCREASE IN AREA SINCE 2007 = **9.3%**

LEED GOLD, FACILITIES = **3 Buildings**

LEED GOLD, BUILDING AREA = **50,935 m²**

STAFF FULL TIME EQUIVALENT 2014 = **11,570.5**

GHG EMISSIONS OFFSET (2013) = **32,069 tCO₂e**

GHG EMISSIONS OFFSET (2014) = **30,922 tCO₂e**

ANNUAL GHG REDUCTION 2014 = **1,147 tCO₂e**

GHG EMISSIONS per m² 2007 = **0.06234**

GHG EMISSIONS per m² 2014 = **0.05622**

EMISSIONS TARGET (2020) = **21,060 tCO₂e**

PAID IN CARBON OFFSETS 2014 = **\$813,068**

Commitment

Island Health Executive and the Board of Directors (the Board) remain committed to achieve a 33% carbon emissions reduction from 2007 levels by 2020 and are fully supportive of energy conservation programs and sustainability.

The *Greenhouse Gas Reduction Targets Act* states that greenhouse gas emissions should be 33% below 2007 levels by 2020. In 2011, Island Health's emissions peaked at 35,220 tCO₂e due to the addition of the Patient Care Centre in Victoria. Since this peak, Island Health's emission levels have decreased by 13%.

By 2020 Island Health's emissions will need to be 21,060 tCO₂e or 9,862 tCO₂e below 2014 levels. This will require Island Health to cut emissions each year by an average of 1,972 tCO₂e per year. It should be noted that this is a milestone year for Island Health being the first year greenhouse gas emissions are below our estimate of 2007 emissions; we have been offsetting emissions since 2010 and only have 5 years left until 2020.

Challenges for Island Health Meeting GHG Reduction Commitment:

Cost – To date, costs to reduce emissions has been \$3,300/tCO₂e for Island Health.

- Average funding to date has been \$2,000,000/year investment.
- To meet target requires a \$6,000,000/year investment.

Technology - Alternate energies do not provide high enough temperatures to meet the hospitals' sterilization needs. These options are being pursued for low temperature needs. Biomass (clean burning woodchip technology) provides the higher temperatures.

- Biomass boilers at the 2 largest sites could reduce emissions by 11,700 tCO₂e.

Greenhouse Gas Emissions Reporting and Offset Purchase

Statement of 2014 Emissions and Previous Year Comparison

Internal data collection processes are in place to identify all sources of carbon emissions as defined by the *Greenhouse Gas Reduction Targets Act*. A methodology document is produced each year outlining the reporting and self-certification process. This year is our third year of self-certification. Island Health has reported on carbon emissions using the BC Government's SMARTTool program and started offsetting emissions in 2010. Our total emissions to offset, from all sources, are as follows:

Emission Source [tCO ₂ e] ¹	2010	2011	2012	2013	2014
Fleet	922	901	878	892	881
Office Paper	831	747	717	714	691
Buildings Owned & Leased	31,241	33,631	32,874	30,517	29,375
Total Emissions	32,994	35,279	34,469	32,123	30,947
Carbon Neutral or Offset Exempt Emissions	61	59	52	54	56
Total Emissions to Offset²	32,933	35,220	34,417	32,069	30,891

¹Calendar Year; ²Reported May 15, 2014 in SMARTTool

Due to usage of BioDiesel, 56 tCO₂e are offset exempt. Buildings are the primary source of greenhouse gas emissions, accounting for 95.0% of total emissions. Island Health has determined its consumption of fugitive gas (i.e. leaks from pressurized equipment) is less than 1% of the overall emissions and is disproportionately onerous to collect data. For this reason, these gasses have been deemed out of scope. Please see Appendix A for the Emissions Report from SMARTTool.

Statement of Adjustments to Reported Greenhouse Gas Emissions and Offsets

Following the public release of Island Health's 2013 Carbon Neutral Action Report, corrections were made due to the end of calendar year billing and corrections to data. This resulted in an increase to 2013 emissions requiring offset purchases; changing from 32,023 tCO₂e to 32,069 tCO₂e. There were also downward adjustments for 2012, 2011 and 2010. Overall these adjustments resulted in a decrease to the emissions requiring offset purchase by -6 tCO₂e. The following table shows the changes as well as the total cost adjustments.

Year	Adjustment [tCO ₂ e]	2014 Emissions ³	Emissions Previously Reported ⁴
2013	46	32,069	32,023
2012	-7	34,424	34,417
2011	-40	35,260	35,220
2010	-5	32,937	32,932
Total Adjustments	-6	Island Health Emissions - May 2015	
Cost Adjustment	-\$157.50	\$150.00(-6x \$25/tonne) + \$7.50 (5% GST)	

³As reported on 06/10/15 from SMARTTool; ⁴From Island Health 2013 Carbon Neutral Action Report, May 2014

Statement of Offset Purchases from Ministry of Environment Climate Action Secretariat

For 2014, Island Health purchased \$813,068 in offsets from the Ministry of Environment Climate Action Secretariat in order to be Carbon Neutral. The offset payments provide incentives to greenhouse gas reduction projects within British Columbia that would otherwise not have been completed. These projects support British Columbia's green economy. At \$25 per tonne, this investment provides a cost effective means of reducing British Columbia's greenhouse gas emissions.

In 2014, the provincial government announced that the Pacific Carbon Trust would be closed and that the Climate Investment Branch within the Ministry of Environment's Climate Action Secretariat will make offset purchases for 2014 and beyond. Since 2010, the Pacific Carbon Trust has retired over 3.0 million tonnes of CO₂e that is equivalent to emissions from over 1.2 billion litres of gasoline.

In 2014 the government also announced the Carbon Neutral Capital Program would be extended to the Ministry of Health and this program continues in 2015. The result has provided Island Health with capital intended to be spent directly on greenhouse gas emission reduction projects.

Operational Changes in 2014

The following table tracks the net new space added to Island Health's building inventory since 2007.

Net New Space Added or Removed Since 2007 as of December 2014	Year	Area (square metres)
Decommissioned – Bay Pavilion, Royal Jubilee Hospital Campus	2007	-2,232
Nanaimo Regional General Hospital Perinatal Department	2008	2,189
Victoria General Hospital Emergency Department	2009	1,660
Port Hardy Hospital Multilevel Care Beds	2009	499
Royal Jubilee Hospital Energy Centre	2009	218
Nanaimo Regional General Hospital Renal Department	2010	1,109
Cowichan District Hospital Pharmacy	2010	152
Cowichan District Hospital Island Medical Program	2011	219
Royal Jubilee Hospital Patient Care Centre	2011	41,139
Decommissioned – South, East and Centre Block RJH Campus	2012	-9,130
Nanaimo Regional General Hospital Emergency Department	2012	6,179
Cowichan Lodge Psychogeriatric & Tertiary Care Facility	2012	603
Saanich Peninsula Hospital Operating Rooms	2012	827

Decommissioned - Campbell River Home and Community Care	2013	-517
Oceanside Health Centre	2013	3,436
Port Hardy Primary Care Centre	2014	475
Nanaimo Estevan Road	2014	1,124
TOTAL NET NEW		46,854

Fleet and Paper

Island Health has decreased the size of its fleet by 39 vehicles and 5 large trucks. Emissions from fleet were 881 tonnes down from the peak in 2010 of 922 tonnes. Paper consumption continues to decrease through device consolidation, double sided printing and going paperless for many processes. Emissions from paper for 2014 were 691 tonnes.

For a year-to-year comparison refer to the chart in the Statement of 2014 Emissions and Previous Year Comparison section above. For a percentage breakdown by emissions type refer to Appendix A for Vancouver Island Health Authority's Greenhouse Gas Emission Source report from SMARTTool for 2014.

In Scope Emission Reduction Activities 2014

Single Site Reduction

The project that had the largest emission reductions for 2014 was a waste heat recovery project at the Royal Jubilee Hospital that can reduce emissions by 199 tCO₂e annually. By installing a condensing economizer we can capture the waste heat from the boiler exhaust to pre-heat domestic hot water. This project cost \$261,000 and was funded by the 2014/15 Carbon Neutral Capital Program; it also received \$109,000 in incentives from FortisBC. The condensing economizer saves an estimated 3,973 GJ annually or enough gas to heat 400 homes a year.



RJH Assistant Chief Engineer, Sacha Menard, inspecting the Royal Jubilee Hospital Flue Gas Condensing Economizer

Summary of Reduction Measures for 2014

The following table is a summary of the various projects that were completed in 2014/15 fiscal year and the associated Greenhouse Gas (GHG) emissions reduction, savings, cost and payback:

Project Summary	GHGs Avoided [tCO ₂ e/yr]	Total Utility Savings [\$]	Total Costs [\$]	Payback [yrs]
Boiler and Heating Plant Upgrades	283.73	\$ 83,594	\$ 964,495	12
Heating, Ventilation and Air Conditioning Conservation Measures	179.66	\$ 78,355	\$ 512,841	7
Lighting and Electrical Savings Projects	30.19	\$ 61,968	\$ 685,434	11
Heat Recovery Project at 2 Sites	148.97	\$ 45,358	\$ 359,378	8
Energy Efficient Equipment	0.07	166.25	\$ 4,895	29.44
Continuous Optimization of Mechanical Systems at 7 Sites	225.40	\$ 83,327	\$ 312,368	4
Total 2014/15	868.02	\$ 352,769	\$ 2,839,411	8

This work and previous year's efforts were recognized by BC Hydro awarding Island Health the Power Smart Leadership Excellence Award, noting that Island Health continues to lead health authorities in British Columbia and across Canada in energy management excellence. They specifically acknowledged the Strategic Five Year Plan, site specific targets for energy savings, and fully utilizing BC Hydro Power Smart programs.

Energy Studies in 2014

In 2014, Island Health completed three BC Hydro and twelve FortisBC funded energy studies. These studies identified energy conservation and greenhouse gas reduction measures. After coordination with Island Health Facilities Maintenance & Operations, recommendations will result in requests for capital and implementation occurs once funding is obtained. These studies will provide the basis of energy conservation measures for the next three years. The Victoria Laundry took the findings from a recent FortisBC energy study and undertook a pilot of a drier heat recovery system. The pilot was so successful the Laundry will use Carbon Neutral Capital funding in 2015 to install the system on the 10 remaining boilers.

Green Behavior Program for 2014

Island Health supports Green Teams at six facilities throughout Vancouver Island. The Green Team program, which has been operating since 2011, was established to create a culture of sustainability at Island Health and help promote positive change towards becoming a more sustainable organization.

In 2014, to reach Island Health staff and to provide education and support on how to be more sustainable, the Energy Efficiency and Conservation department alongside Green Team members rolled out a host of campaigns and events. Each of the Green Team sites had a fun and educational quiz show, Energy Jeopardy, where staff learned about sustainability and won prizes. The Green Team program also initiated the Cut the Carbon Contest where all Island Health staff were encouraged to tell us their

story on what they do to be sustainable at work, at home and at play. Green Team members also met on a regular basis to discuss sustainability issues and how to foster sustainability at their sites with support from the Energy Efficiency and Conservation department.

Outside of the Green Team program, Island Health staff learned about sustainability through regular Green Tips and Green Newsletters and the Green Island Health intranet website. Residents of Vancouver Island also were made aware of Island Health's successes through a publication in the Times Columnist and a brand new public facing environmental focused website.



Green Champions at Saanich Peninsula Hospital

In Scope Emission Reduction Activities - 5 Year Plan

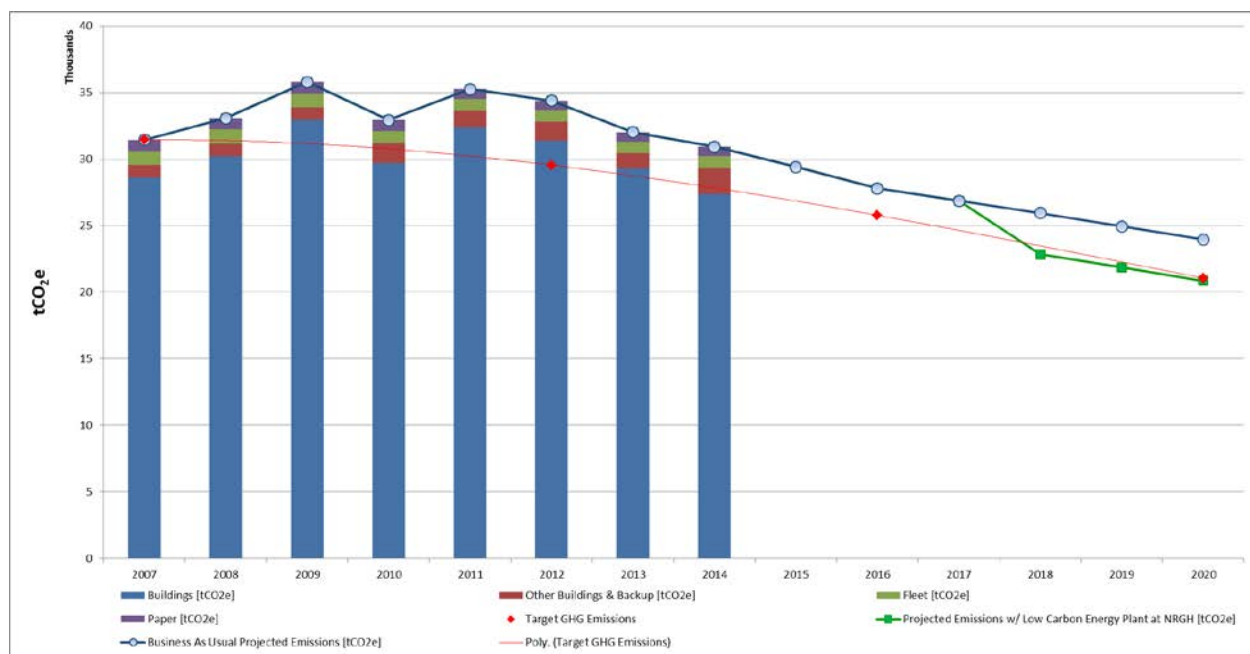
Emission Reduction is Possible

The majority of Island Health's carbon emissions come from buildings. Many of these facilities and boiler plants were constructed in the 1950's and 1960's. At the time energy conservation was not a concern and massive steam boilers provided steam for laundry, sterilization, domestic hot water, food preparation and heat for the hospitals. Reducing the reliance on steam has been underway at various sites for several years, but many buildings and sites will need to rely on steam for many more years as it is still necessary for sterilization and humidification.

Since many boilers within Island Health facilities need replacement over the next several years, Island Health has been investigating the use of biomass from waste wood as a potential fuel source for sites that require steam and high temperature hot water. By replacing some or all of the natural gas boilers at our largest facilities with low carbon energy systems, Island Health can ensure the longevity and self-sufficiency of our facilities and meet GHG targets. The next site due for heating plant replacement is Nanaimo Regional General Hospital (NRGH) and heating plant replacement provides the greatest potential for emissions reduction.

- Adding biomass boilers to the new boiler plant at NRGH would reduce the emissions of that plant by 3,100 tCO₂e and save the organization \$800,000 per year in utility costs and offset payments. The estimated premium for doing this is \$4.2 million and has a 5.25 year payback. The savings are significant enough that the entire plant replacement could be paid for from savings in 22 years.

Although the NRGH boiler plant replacement provides significant emissions reductions to achieve the Island Health’s target, many energy saving and greenhouse gas emissions projects will be undertaken on existing buildings and systems (see Energy Management below). A five year plan has been developed to determine which projects will be completed. Below is a graphical representation of Island Health’s Five Year Plan. The red line represents Island Health’s target emission to meet the 33% reductions by 2020, the blue line represents a business as usual case including energy conservation, and the green line represents the potential impact of a low carbon energy plant at NRGH. Further on in the report is a detailed list of the projects expected to be undertaken in the next five years.

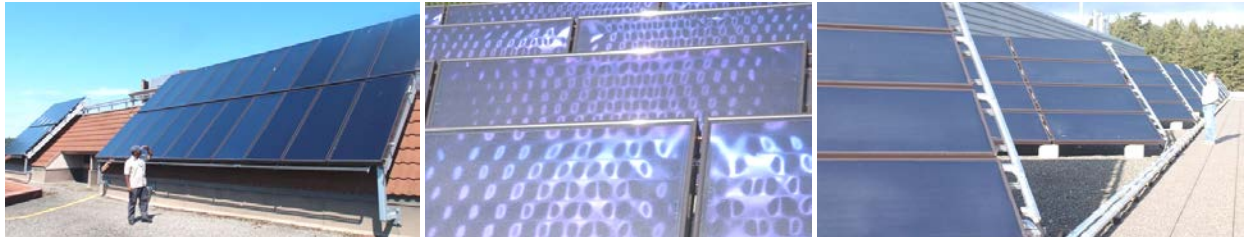


Island Health Annual GHG Emissions, Targets and Projected Emissions to 2020

Alternative Energy

Island Health currently has four solar thermal arrays preheating domestic hot water. Three are located in the Greater Victoria Area at Aberdeen, Saanich Peninsula, and Victoria General Hospitals (see photo next page). The last installation is located at Cairnsmore Place in Duncan. By using the sun to pre-heat domestic hot water we have reduced natural gas use by 850 GJ in 2014 - that’s enough to power 8.5 homes and keep 45 tonnes of carbon emissions out of the air each year. Funding was provided from the provincial Public Sector Energy Conservation Agreement (PSECA) and FortisBC.

Island Health continues to look for opportunities to include solar photovoltaic and solar thermal in our energy mix and in particular at isolated locations so they can become more resilient and self-sufficient during storm outages.



Solar thermal installations at Aberdeen, Saanich Peninsula and Victoria Regional Hospitals

Energy Management in Existing Buildings

Island Health has been conducting energy management activities for the past several years and, in 2014, led the healthcare sector in BC. Our program identifies energy conservation measures within the organization and systematically implements projects each year. In 2014 we invested \$2.8 million of regular capital, of which \$857,000 was from the Carbon Neutral Capital Program (CNCP), for an 1,147 tCO₂e GHG reduction from 2013. To meet our 2020 target, we will need to reduce our emissions by 9,862 tCO₂e. That means over the next 5 years we will need to achieve an average reduction of 1,972 tCO₂e per year.

Past projects indicate that energy conservation measures result in greenhouse gas reductions. On average annual GHG savings are approximately 1,000 tCO₂e per year and require an investment of approximately \$2,500 to \$3,000. This includes retro-commissioning, heat recovery, domestic hot water system upgrades, boiler plant upgrades and building control systems optimization. Based on this estimate, if Island Health is to meet its greenhouse gas reduction targets, an investment of \$5 to \$6 million per year is required for the next five years, which far exceeds past annual investment levels.

It has become clear that it is far more costly to the organization to reduce GHG emissions through energy conservation measures alone. Significant studies were completed in 2014 into a low carbon energy plant at Nanaimo Regional General Hospital and as noted above fuel switching to low carbon systems is where significant savings can be achieved. Island Health has also looked at new construction and has been able to minimize the impact of new facilities through use of innovative new technologies, energy conservation measures and minimal reliance on fossil fuel fired heating plants (see New Construction section below).

The following table is a summary of projects identified in our five-year Strategic Energy Management Plan and the expected greenhouse gas reduction. The table illustrates that greenhouse gas emissions can be reduced and there is an economic payback for doing this. Many of these projects also update aged infrastructure improve occupant comfort and environmental conditions within the facilities.

Project Summary	GHGs Avoided [tCO2e/y]	Total Utility Savings [\$]	Total Costs [\$]	Payback [yrs]
Boiler and Heating Plant Upgrades	103.67	\$ 40,531	\$ 1,297,171	32
Heating, Ventilation and Air Conditioning Conservation Measures	203.86	\$ 91,491	\$ 864,600	9
Lighting and Electrical Savings Projects	19.18	\$ 48,760	\$ 538,396	11
Heat Recovery at 2 Sites	235.93	\$ 63,046	\$ 482,000	8
Green Team 2% of site energy consumption	187.99	\$ 82,795	\$ 120,460	1
Energy Efficient Equipment	2.98	\$ 6,933	\$ -	0
Continuous Optimization at 2 Sites	36.00	\$ 19,186	\$ 52,192	3
Total 2015/16	789.61	\$ 352,743	\$ 3,354,819	10
RJH Boiler Plant Replacement	228.08	\$ 67,887	\$ 180,000	3
CHCC - Ventilation Upgrade	30.13	\$ 13,718	\$ 37,240	3
Steam to Hotwater Conversion Nanaimo General	199.20	\$ 51,271	\$ 565,000	11
Lighting and Electrical Savings Goal	24.69	\$ 55,364	\$ 611,915	11
Heat Recovery at Nanaimo General	779.37	\$ 201,327	\$ 835,000	4
Energy Efficient Equipment	5.18	\$ 12,047	\$ -	0
Continuous Optimization at 2 Sites	311.46	\$ 142,757	\$ 400,000	3
Envelope Upgrades at NRGH	10.93	\$ 4,459	\$ 45,000	10
Total 2016/17	1,589.04	\$ 548,830	\$ 2,674,155	5
Boiler and Heating Plant Upgrades	60.44	\$ 17,971	\$ 327,485	18
Heat Recovery	236.31	\$ 76,043	\$ 1,096,900	14
Lighting and Electrical Savings Goal	24.69	\$ 55,364	\$ 611,915	11
New Construction Campbell River Hospital	751.65	\$ 236,703	\$ 5,447,681	23
New Construction Comox Valley Hospital	-547.78	\$ 318,334	\$ 5,967,095	19
Green Team 2% of site energy consumption	363.29	\$ 165,478	\$ 120,460	1
Energy Efficient Equipment	7.78	\$ 18,071	\$ -	0
Total 2017/18	896.38	\$ 887,964	\$ 13,571,536	15
Low-Carbon Energy Plant at NRGH	3,100.00	\$ 800,000	\$ 4,200,000	5
Lighting and Electrical Savings Goal	24.69	\$ 55,364	\$ 611,915	11
New Construction - The Summit	736.21	\$ 114,876	\$ 2,500,000	22
Energy Efficient Equipment	10.37	\$ 24,094	\$ -	0
Continuous Optimization at RJH	154.34	\$ 68,156	\$ 300,000	4
Total 2018/19	4,025.61	\$ 1,062,491	\$ 7,611,915	7
Lighting and Electrical Savings Goal	24.69	\$ 55,364	\$ 611,915	11
Green House Gas Emissions Reduction Goal	1,000.00	\$ 297,648	\$ 3,000,000	10
Continuous Optimization Ph 2	90.00	\$ 37,000	\$ 140,200	4
Green Team 2% of site energy consumption	363.29	\$ 165,478	\$ 120,460	1
Energy Efficient Equipment	10.37	\$ 24,094	\$ -	0
2019/20	1,488.35	\$ 579,584	\$ 3,872,575	7
5 Year Total	8,788.99	\$ 3,431,611	\$ 31,085,000	9

New Construction

New construction provides a great opportunity to improve a building's greenhouse gas emissions performance as well as include adaptive strategies for the changing climate. Island Health has found that it pays to go beyond constructing new buildings to LEED® Gold standards. The best way to do this is to enroll in BC Hydro's and FortisBC's New Construction Whole Building Program thereby receiving technical input/know how and incentives for energy conservation measures. Island Health has used this program in the past and was awarded the BC Hydro 2014 Power Smart Excellence Award for New Construction for the Nanaimo Regional General Hospital Emergency, Psychiatric Emergency and Psychiatric Intensive Care Addition.

Going forward Island Health has enrolled the new North Island Hospitals in this program. The hospitals are under construction in Comox and Campbell River, are being built to very aggressive energy targets and are anticipated to have a GHG emissions performance of a quarter to an eighth compared to the existing hospitals. They will also be district energy ready should a low carbon district energy system become available during the life of the building.

Although each new building added to Island Health's stock is becoming successively more energy efficient than the last, if provincial targets are going to be met then all replacement construction must have energy and emissions targets that are, at minimum, 33% below the 2007 emission levels for the building they are replacing or any net new space must be constructed with net zero emissions. This has yet to be achieved at Island Health (though the North Island Hospitals will bring us very close).

Initiative to Reduce Provincial Emissions and Improve Sustainability

Island Health is incorporating sustainability into its practice and continues to implement various means to reduce emissions.

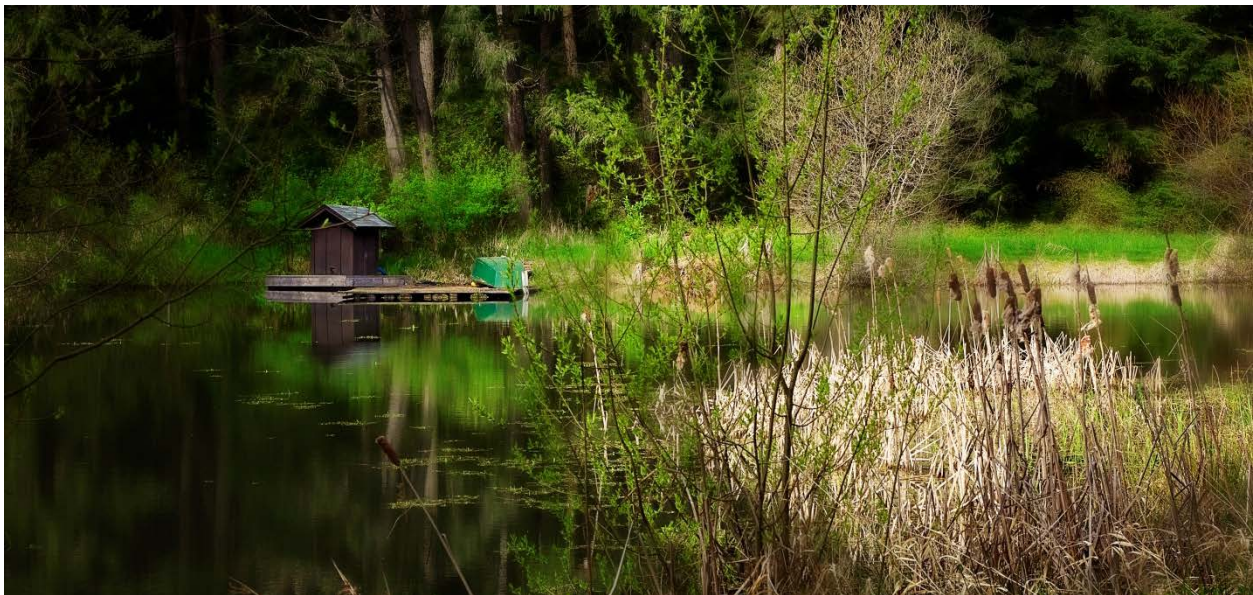
In 2014 General Support Services, which oversees Island Health contracted staff (e.g. Food Services and Housekeeping), introduced a Strategic Initiative Coordinator position to implement a best management practices program targeting biomedical waste at Victoria General Hospital (VGH). The program identifies areas in waste management operations that could be optimized with minimal behavior change from staff. One area identified was proper signage/posters to identify each waste container and its acceptable contents. Another initiative investigated the waste hauling frequency versus the maximum fill rate of the large collection bins. VGH was able to reduce the waste hauling pickup frequency from the bins by 50%, thus reducing transportation emissions and saving 50% on transportation costs. Future waste reduction initiatives include linen management and increased education and awareness programs for staff.

Island Health remains committed to make strides towards reducing carbon emissions in various other ways such as encouraging low emission transportation, purchasing energy efficient products, expanding the Telehealth network and engaging with the public about greenhouse gas reductions.

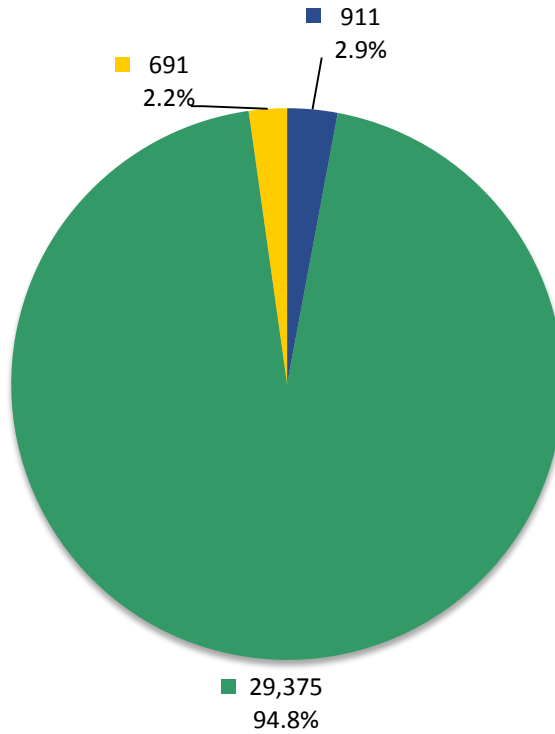
Island Health is proud of its efforts in the past five years to:

- become carbon neutral by purchasing carbon offsets
- establish an emissions reduction target
- plan, invest and implement real reduction measures
- develop an achievable five year plan to take the organization to 2020

It is also exciting that Island Health has achieved emissions reductions below 2007 levels. However, there remains a lot of work to do so that we become an environmentally sustainable organization less reliant on fossil fuels and with a more diversified energy supply. Many employees are also working hard to minimize waste and find better ways of delivering health care that are not as resource intensive yet also provide better service to patients and the communities served.



APPENDIX A
Vancouver Island Health Authority
Greenhouse Gas Emissions by Source



Total Emissions: 30,977

- 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 03, 2015 11:21 AM)

Total offsets required: **30,922**. Total offset investment: **\$773,050**. Emissions which do not require offsets:

*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.

APPENDIX B

Island Health Carbon Neutral Action Report for 2014

Part 1: Data

PSO Data

Variable	Response
PSO Data How many Full Time Equivalent employees (FTEs) do you have within your organization?	11,570.5
PSO Data How many small vehicles are in your fleet (gators, forklifts, snowmobiles)?	47
PSO Data How many medium-sized vehicles are in your fleet (cars, trucks, SUVs, ambulances)?	143
PSO Data How many large vehicles are in your fleet (school buses, buses, transport trucks)?	28
PSO Data How many buildings does your organization own?	91
PSO Data How many buildings does your organization lease space in?	133
PSO Data What is the total amount of floorspace in your organization (including occupied and unoccupied space)? please report in square meters	550,000
PSO Data Schools, Universities and Colleges only - number of student FTEs as of Dec 31, 2014?	0

Green Buildings

Green Buildings refers to any buildings built to a higher level of energy efficiency than the standard building code including LEED®, Boma Best, Living Building, Passive House or other designations

How many Green Buildings do you own?

Variable	Response
How many Green Buildings do you own? LEED® Non-certified	(No response)
How many Green Buildings do you own? LEED® Silver	(No response)
How many Green Buildings do you own? LEED® Gold	3
How many Green Buildings do you own? LEED® Platinum	(No response)
How many Green Buildings do you own? Other - Boma Best, Living Building, etc.	(No response)

How many Green Buildings do you lease space in?

Variable	Response
How many Green Buildings do you lease space in? LEED® Non-certified	(No response)
How many Green Buildings do you lease space in? LEED® Silver	(No response)
How many Green Buildings do you lease space in? LEED® Gold	(No response)
How many Green Buildings do you lease space in? LEED® Platinum	(No response)
How many Green Buildings do you lease space in? Other - Boma Best, Living Building, etc.	(No response)

APPENDIX B

Island Health Carbon Neutral Action Report for 2014

How many Green Buildings do you have under construction (as of Dec 31, 2014)?

Variable	Response
How many Green Buildings do you have under construction (as of Dec 31, 2014)? LEED® Non-certified	(No response)
How many Green Buildings do you have under construction (as of Dec 31, 2014)? LEED® Silver	(No response)
How many Green Buildings do you have under construction (as of Dec 31, 2014)? LEED® Gold	2
How many Green Buildings do you have under construction (as of Dec 31, 2014)? LEED® Platinum	(No response)
How many Green Buildings do you have under construction (as of Dec 31, 2014)? Other - Boma Best, Living Building, etc.	(No response)

Describe the one action taken in 2014 that resulted in, or is expected to result in, the greatest emissions reductions for your organization:

The project that had the largest emission reductions for 2014 was a heat recovery project at Royal Jubilee Hospital that reduced emissions by 199 tCO₂e/yr. By installing a condensing economizer we could capture the heat from the boiler exhaust stacks to pre-heat domestic hot water. This project cost \$261,000 and was funded by the 2014/15 Carbon Neutral Capital Program, it also received \$109,000 in incentives from FortisBC. The heat exchanger saves an estimated 3,973 GJ annually or enough gas to power 400 homes a year.

Provide a "wish list" of reduction actions your organization would like to take, i.e. what are the priority projects your organization sees as being most effective in leading to substantive reductions of emissions and increased energy efficiency (regardless of cost or other limiting factors)?

1. Adding biomass boilers to the Nanaimo Regional General Hospital's new boiler plant would reduce the emissions of that plant by 3,100 tCO₂e and save the organization \$623,000 per year in utility costs and offset payments. The estimated premium for doing this is \$5.8 million and has a 9.3 year payback.
2. A single biomass boiler providing base steam load at Royal Jubilee Hospital would reduce Island Health's greenhouse gas emissions by as much as 25% per year and save the organization \$1.5 million a year in utility costs and offset payments. The cost for installation is estimated at \$11.1 million and has a payback of 7.4 years.
3. Past projects indicate that bundling energy and greenhouse gas reducing projects for existing buildings require an investment of \$2,500 to \$3,000 per tCO₂e and will include, for example, retro-commissioning, heat recovery, and control systems upgrades. For Island Health to meet

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its greenhouse gas reduction targets an investment of \$6 million per year is required for the next 5 years.

4. As each building is energy retrofitted, an adaption risk assessment is also completed and these measures are considered as part of the mitigation measures. For example, areas that have high incidence of power outages and may be susceptible to increased storm activity could have alternate methods of generating electricity that are also low greenhouse gas emitting such as photovoltaic solar collectors.
5. Any net new space added to the organization is required to be net zero greenhouse gas emissions and include adaption measures based on a risk assessment for the geographical area.

What are the barriers your organization faces when trying to implement emissions reduction initiatives? It is expected that funding is a major issue. If there are other barriers as well please describe those.

Funds for studies, planning and preliminary engineering for carbon reduction projects - the utilities only fund studies that meet their criteria to a 50% level. This means some carbon reduction projects may not be included, in particular looking at alternate energy. The Carbon Neutral Capital Program application process and timelines require the projects be well developed prior to funding being received.

Perception – one of the measures that has been identified as having a significant impact on reducing greenhouse gas emissions for Island Health is the use of biomass from waste wood. There is concern about how the public will perceive or react to this type of technology. Government support for the implementation of these projects via independent studies of existing biomass systems will waylay the fears or concerns of the community and funders.

Does your organization have an emission reduction target? If yes, please describe below.

Yes - the Executive and the Board of Directors of Island Health are fully supportive of energy conservation, carbon emissions reduction and sustainability. The Greenhouse Gas Reduction Targets Act (Bill 44) states greenhouse gas emissions should be 33% below 2007 levels by 2020. As of 2014 Island Health's emission levels have continued to decrease and the commitment remains to achieve a 33% reduction by 2020. This year is the first year emissions have dropped below 2007 levels.

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Does your organization have a strategic plan to implement emission reduction activities (e.g. a five year plan)? If yes, please describe below:

Yes -Island Health's Energy Efficiency and Conservation department has a plan in place that will reduce emissions on average 1,000 tCO₂ per year. The plan requires an investment of \$2,500,000 in capital each year and is based on current energy studies and programs with BC Hydro and FortisBC. The average annual savings is estimated to be just over \$200,000. By 2020 that means we will have saved 6,000 tCO₂ per year and spent \$15,000,000. Unfortunately this will not meet our target. We have estimated that we need to reduce emissions by close to 10,000 tCO₂ per year from current levels. It is likely that more savings can be found within our existing facilities with a larger investment of capital; however, we do not think we can meet the target with existing fuels. Our best opportunity is to change fuel type when we do boiler replacements. As noted above, replacing a single gas boiler at NRGH with a biomass boiler will reduce our emissions by 10% per year.

Part 2: 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:

Island Health's organization wide awareness campaign continues. Specific behavior changes are targeted at seven sites using Green Teams and Green Champions. The savings started with the inception of the program in August 2011.

Another low cost program for reducing greenhouse gases is BC Hydro and FortisBC's Continuous Optimization Program. The program takes a systematic look at all of the heating, ventilation and air conditioning systems controls to make sure they are optimized. Over time, large facilities can end up with systems or components left in manual or schedules out of date for the activities that are going on in the spaces. This year Island Health, through recommendations noted from this program, invested in a zoning project that has provided the necessary equipment and controls to shut down heating and cooling systems in areas when unoccupied.

Historically backup fuels for boiler systems and emergency generators were kept fresh by burning them in the boilers every year. These fuels produce more greenhouse gases than natural gas and are also

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expensive. Sites have installed fuel polishing systems to save money and reduce greenhouse gas emissions from burning off these fuels.

Island Health has installed heat recovery chillers instead of regular chillers when there is an opportunity to utilize the waste heat from the cooling process. The waste heat is used to preheat domestic hot water and supply reheat-coils. These systems can also be used to recover heat from exhaust air streams in the winter. This equipment has a coefficient of performance of three or greater – that means any heat recovered is increased by a factor of three or more. This heat is used to preheat incoming outside air.

A great deal of heat goes up the flues from the boilers. A flue gas economizer has been installed at the Royal Jubilee Hospital to recover this heat.

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 efficient 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: No

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

No additional actions taken to date.

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

Used less paper than previous year: Yes

Used only 100% recycled paper: Yes

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:

A behavior change campaign called “Dr PrintLESS” was executed with double side printing defaults and saw a 16% reduction. Message delivered without paper via a series of videos, intranet ads and news stories.

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

Island Health continues to implement its five year plan for energy reduction measures and continues to investigate new technologies and alternate energy. The Carbon Neutral Capital Program started in 2014 - the projects reduced emissions by 539 tonnes and saved \$190,802 in operating costs. The average cost per tonne reduced was \$134.

The average cost per tonne is the total project cost divided by the year emissions reduction over the life of the project. The Carbon Neutral Capital Program continues in 2015 and this year's projects should reduce emissions by 396 tonnes, save \$188,900 in operating costs and the average cost per tonne is \$710 per tonne of emissions saved. Going forward, Island Health will continue to look to see the average cost per tonne reduced.

Actions to Promote Sustainability and Conservation

Business Travel

Created a low-carbon travel policy or travel reduction goal (Low-carbon: Lowest emission of greenhouse gases per kilometre per passenger): No

Virtual Meeting Technology:

Installed 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: No

Education and Awareness

Have created Green, Sustainability, Energy Conservation, or Climate Action Teams: Yes

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: No

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

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Planning for Climate Change

Have assessed whether extreme weather events and/or long term changes in climate will affect our organization's business areas: **Yes**

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

Staff Awareness and Education

Provided 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 Options

Allow for telework/working from home: **Yes**

Staff have the option of a compressed work week: **Yes**

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 Actions

Establish 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: **No**

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: **No**

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Other sustainability actions not included in the above list:

2014 - IMIT Printer Optimization

2014 - Battery recycling

2014 – Commercial composting at South Island sites

2014 – Using eco-friendly cleaners in Commercial Laundry

2014 – New Employee Training slides with commitment to sustainability and encouraging green actions

2014 – “Cut the Carbon” employee contest