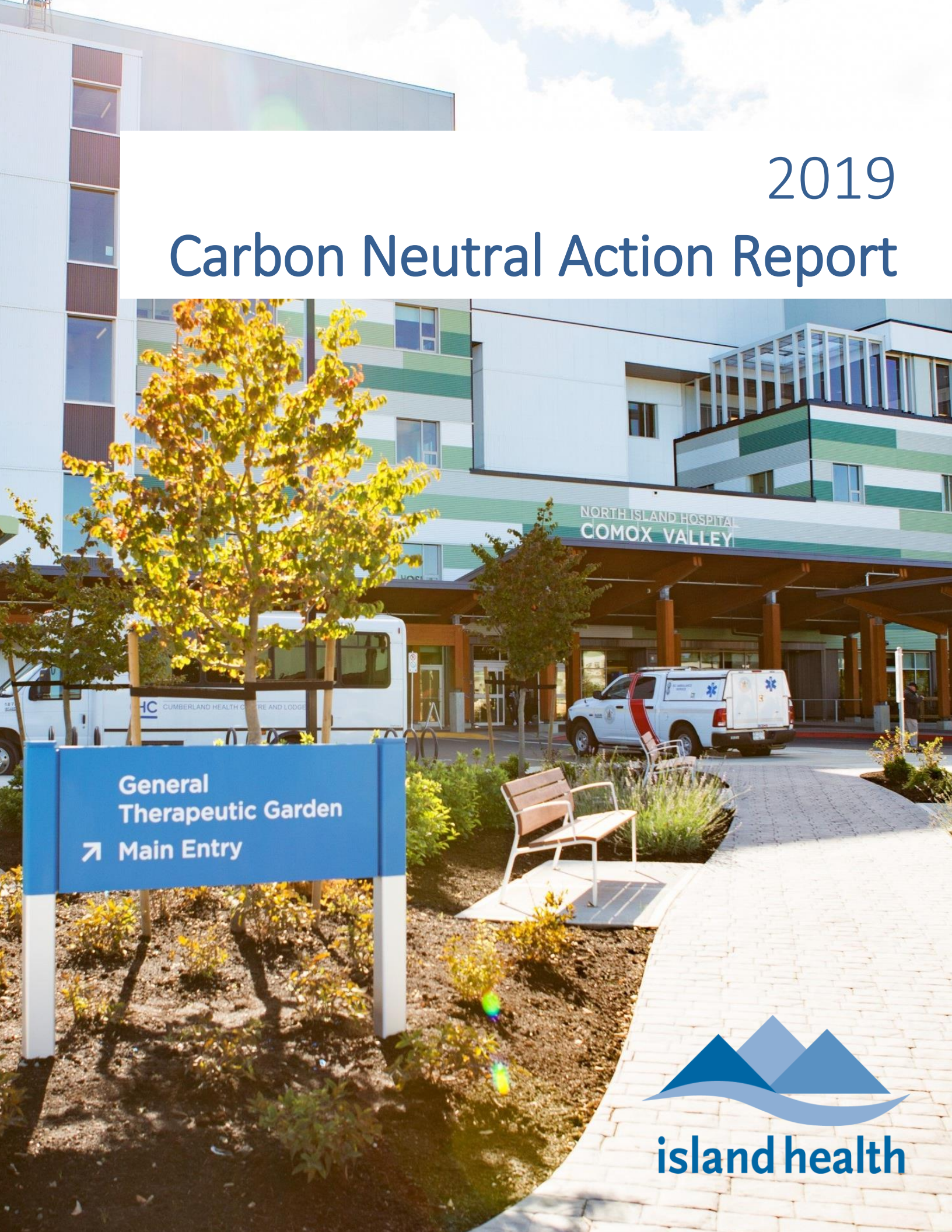
2019
Carbon Neutral Action Report



island health

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INTRODUCTORY NOTE

This year marks a decade of Island Health reporting and offsetting greenhouse gas emissions. To achieve carbon neutrality, carbon offsets are purchased for emissions within the scope of the *Carbon Neutral Government Regulation*, which includes buildings, fleet and paper. The Carbon Neutral Action Report discloses the emissions that require offsetting for 2019, actions taken in 2019 to reduce emissions, and future plans to mitigate the health authority's impact on climate change. Island Health is committed to being a positive contributor to climate change response by adhering to the legislated *Climate Change Accountability Act* and following the climate action plan outlined in *CleanBC.*

As we write this report, British Columbia is facing a public health emergency due to the COVID-19 pandemic. Island Health's response to the pandemic demonstrates how we live our values through our courage to innovate, and aspirations to the highest degree of safety. We are confident our actions today to foster organizational preparedness will increase our responsiveness to future health emergencies, including those precipitated by a changing climate. Climate change is intensifying extreme weather events and the spread of vector-borne disease, all with the potential to strain the health system. Island Health is therefore enhancing climate change resilience, while continuing our efforts to decrease greenhouse gas emissions.

Despite Island Health's mitigation efforts over the past ten years, achieving the provincially legislated emissions reduction targets remains a challenge without sufficient funding. Like most organizations, the health authority has many priorities competing for the same resources, making it difficult to direct investment into emission reduction projects, especially in the healthcare setting. In an effort to address this, the organization has received funding since 2014 through the Province's *Carbon Neutral Capital Program*, which has been integral for decreasing emissions in facilities. However, the amount has been insufficient to bring emissions down to meet provincial targets. Fortunately, an increase in funding of more than 300% as of fiscal year 2020/21 will advance Island Health closer to the provincial target. Island Health is actively working with the Ministry of Health, the Ministry of Environment and Climate Change Strategy, BC Hydro, FortisBC, other BC health authorities, and federal agencies to secure partnerships and funding for a greater rate of decarbonization.

New construction projects present a unique opportunity for greenhouse gas reduction, by replacing aging buildings with more efficient facilities. In existing buildings, Island Health's Energy Department and Facilities, Maintenance and Operations teams are reducing emissions through continuous optimization, retrofit projects and behaviour change initiatives. Buildings are the largest source of the organization's greenhouse gas emissions, but there are other sources of in-scope and out-of-scope emissions that are significant contributors to climate change.

Aligned with the *CleanBC* strategy, Island Health's vehicle fleet now has three zero-emission vehicles and several hybrids, increasing fuel efficiency and providing cleaner air in our communities. We are also reducing greenhouse gas emissions by using office paper made from sugarcane fibre, which is reported as having the same emission factor as wood-based paper with 100% recycled content. In addition to these emissions sources, the health authority is concerned about greenhouse gas from out-of-scope sources such as anesthetic gas, refrigerants and business travel. We have started tracking these sources so action can be taken to reduce our overall climate impact, beyond the provincial reporting requirements.

In March 2020, Island Health received the annual Energy and Environmental Stewardship Award from the Canadian College of Health Leaders. This award reflects the dedication of staff, from executive leadership to frontline workers. Island Health is proud to be recognized as a leader for its commitment to minimizing our adverse climate and environmental impacts.

James Hanson
Vice President
Operations and Support Services
Island Health

1. Overview

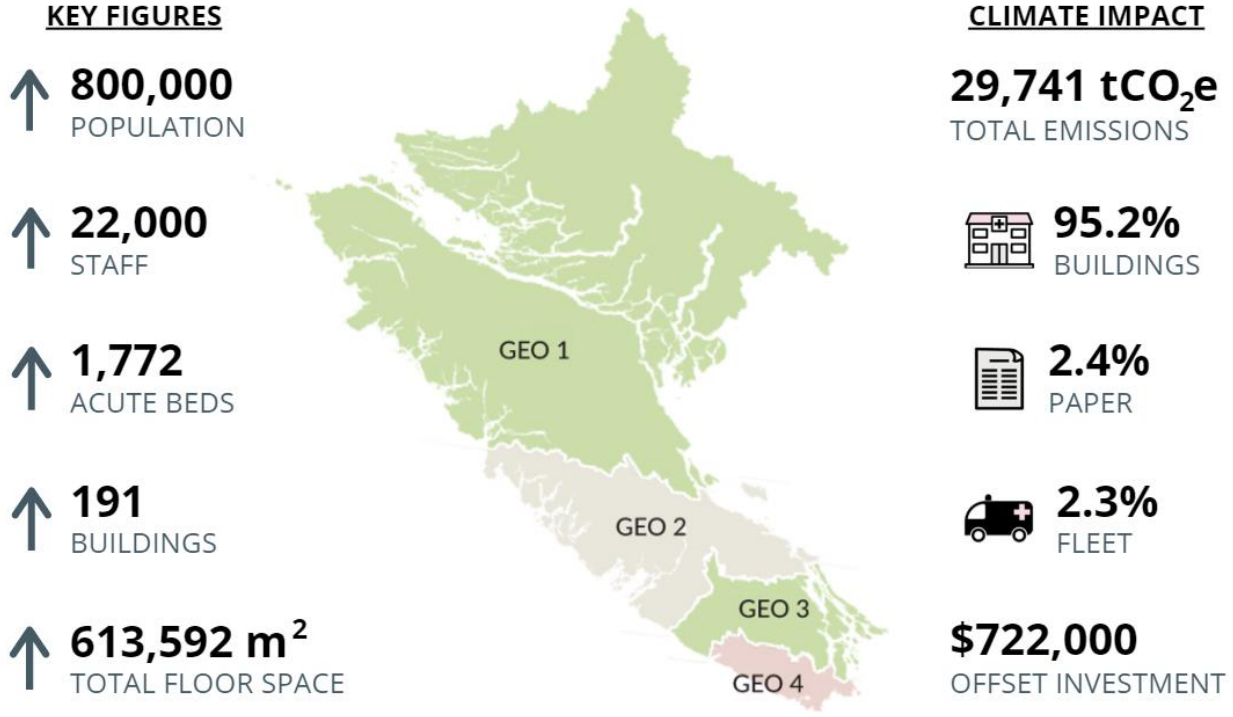
This Carbon Neutral Action Report for the period January 1, 2019 to December 31, 2019 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2019 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2020 and beyond.

By June 30, 2020, Island Health's final 2019 Carbon Neutral Action Report will be posted to our website at www.islandhealth.ca.

About Island Health

Approximately 22,000 health care professionals, technicians and support staff at Island Health provide health care to more than 800,000 people on Vancouver Island; the islands in the Salish Sea and Johnstone Strait; and the mainland communities north of Powell River and south of Rivers Inlet.

Figure 1: Island Health Figures at a Glance



Year after year Island Health expands to serve its growing communities. In 2019, the health authority experienced a rise in acute beds, buildings and total floor space, displayed by upward arrows in Figure 1. Since becoming carbon neutral in 2010, the health authority's total floor space has increased by 23%. Facilities are generating less emissions per square metre, but total floor space continues to grow. Growth of the organization is a challenge when trying to reduce emissions to meet the provincial targets. Offsettable greenhouse gas emissions are 12% below 2010 levels, but need to reach a 50% reduction by 2030.

Commitment

The *Climate Change Accountability Act* sets legislated targets of 40% reduction in carbon emissions from 2007 levels by 2030, 60% reduction by 2040 and 80% reduction by 2050. In 2019, the *Act* was amended to allow the provincial government to set additional targets and regulations for public sector buildings, fleets and fuels. Also introduced in 2019, the *Act* requires public sector organizations to manage risks arising from a changing climate and minimize adverse environmental effects.

The *CleanBC* Climate Action Plan, released in 2018, outlines a pathway towards achieving the provincial targets. Mandated in *CleanBC,* greenhouse gas emissions from public sector vehicles will be reduced by 40% from 2010 levels by 2030. Additionally, public buildings will demonstrate leadership with a higher target of a 50% reduction by the same year. Island Health engages regularly with the Province as new public sector targets and regulations are developed.

Through Island Health's 2019/20 – 2021/22 Plan, the Executive Leadership Team reaffirmed its commitment to being a positive contributor to environmental sustainability and climate change response. To minimize Island Health's carbon footprint, the health authority will reduce greenhouse gas emissions through continuous optimization of building systems, infrastructure renewal projects and the adoption of zero-emission vehicles.

The health authority continues to construct infrastructure that follows environmental stewardship best practices. In 2019, the two North Island Hospital campuses achieved *Leadership in Energy and Environmental Design* (LEED) Gold certification. Island Health operates two additional LEED Gold facilities, the Patient Care Centre in Victoria and the Emergency Department at Nanaimo Regional General Hospital, as well as one LEED Silver facility, the Oceanside Health Centre in Parksville. Future construction projects will pursue LEED certification, and aspire to the highest standards of health and safety for patients, staff and visitors.

While Island Health strives to enhance climate change resilience, further action is needed to prepare for a future of new climate extremes. Island Health has conducted several vulnerability and resilience assessments, identifying potential risks to critical infrastructure and operations. Initiatives are underway to ensure new construction, renovations and retrofits are designed using climate change information. Stakeholders are working across the organization to build Island Health's resilience. More information about these initiatives can be found in Section 7. Climate Adaptation & Resilience (page 19).

2019 Emissions and Offsets Summary Table

Table 1: Island Health's Greenhouse Gas Emissions and Offsets for 2019

As per the Directive issued March 31, 2020, each Public Sector Organization will use their 2018 Greenhouse Gas Emissions as a placeholder for the purposes of their 2019 Carbon Neutral Action Report.	
Total Emissions (tCO_2e)	29,741
Total $BioCO_2$[1]	861
Total Offsets (tCO_2e)	28,880
Offset Investment ($25 per tCO_2e)	$722,000

To reduce its emissions to net-zero, Island Health invests in emissions reduction projects by purchasing BC-based offsets through the provincial government. The offset payments provide incentives to BC-based projects that reduce emissions through greenhouse gas removal or avoidance according to provincial regulations. These projects support British Columbia's green economy and provide social, environmental and economic benefits to all British Columbians. The offset projects can be viewed on the BC Carbon Registry.

Retirement of Offsets

In accordance with the requirements of the *Climate Change Accountability Act* and *Carbon Neutral Government Regulation*, Island Health (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2019 calendar year, together with any adjustments reported for past calendar years (if applicable). The Organization hereby agrees that, in exchange for the Ministry of Environment and Climate Change Strategy (the Ministry) ensuring that these offsets are retired on the Organization's behalf, the Organization will pay within 30 days, the associated invoice to be issued by the Ministry in an amount equal to $25 per tonne of offsets retired on its behalf plus GST.

[1] "Biogenic" portion ($BioCO_2$) of the emissions from biomass, renewable natural gas and biofuels are not required to be offset due to their renewable source.

2. EMISSION TRENDS

Since 2010, Island Health has been reporting and offsetting greenhouse gas emissions using the Province's SMARTTool program. For the 2019 reporting cycle, the Province transitioned to a new Clean Government Reporting Tool for tracking emissions. However, the reporting process, including the transition to the new tool and verification of emissions, was impeded by the onset of the COVID-19 pandemic.

Due to the pandemic, the Province directed all public sector organizations (PSOs) to use their 2018 greenhouse gas emissions as a placeholder for the 2019 reporting year. This allows PSOs to meet legislated requirements, while providing flexibility as the public sector responds to the health emergency. Consequently, the data presented below reflect this directive with 2018 emissions used as an estimate for 2019. In the next reporting cycle, adjustments will be made to the 2019 reporting year.

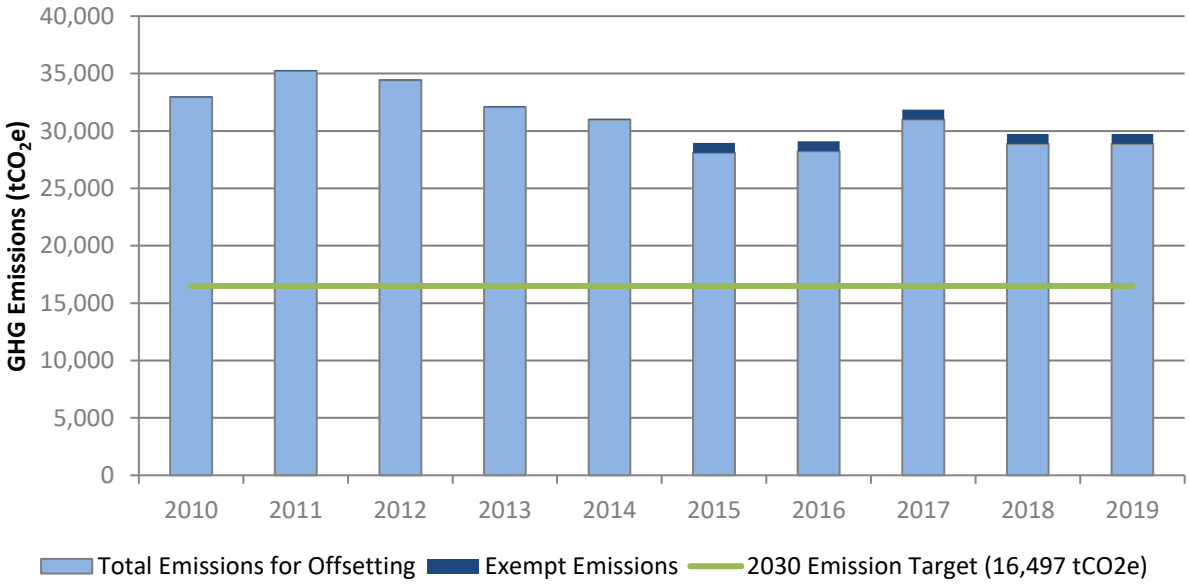
Table 2 provides detailed emissions information for the 2010-2019 period, including carbon offset costs, emissions per full time equivalent employee and emissions per square metre of floor area. Figure 2 shows total emissions for offsetting (light blue bar) and exempt emissions (dark blue bar) over the same period, compared to the 2030 emissions target (green line).

Table 2: Island Health's Emissions and Offset Data, 2010 to 2019

Year	Total Emissions (tCO_2e)	Exempt Emissions (tCO_2e)	Total Emissions for Offsetting (tCO_2e)	Offsets Cost plus GST ($)	Emissions per FTE[2] (tCO_2e/FTE)	Emissions per square metre (tCO_2e/m^2)
2010	32,993	61	32,938	822,835	2.90	0.066
2011	35,279	59	35,226	875,250	3.06	0.067
2012	34,470	52	34,423	859,125	2.87	0.066
2013	32,123	54	32,075	841,260	2.67	0.058
2014	31,050	56	30,994	813,068	2.55	0.056
2015	28,957	866	28,091	737,310	2.19	0.051
2016	29,147	866	28,277	743,321	2.12	0.052
2017	31,860	864	30,996	814,590	2.26	0.051
2018	29,738	858	28,880	759,150	2.00	0.047
2019	29,741	861	28,880	759,150	1.90	0.047

[2] The full time equivalent (FTE) data, provided by the Ministry of Health to all BC health authorities, was used to ensure consistency in methodology for the healthcare sector's Carbon Neutral Acton Reports.

Figure 2: Change in Island Health Emissions and Offsets, 2010 to 2019



Island Health's emissions peaked in 2011 when the Patient Care Centre opened in Victoria. Emission levels steadily decreased between 2011 and 2015. The 2016 emission level was slightly higher (0.5%) than the 2015 level due to a cold winter season and a number of delayed emission reduction projects. Emissions in 2017 increased by 9% compared to the 2016 level, with the opening of two new North Island Hospital campuses in Campbell River and Comox Valley. These new facilities increased overall floor area by approximately 40,000 square metres. Emissions in 2018 decreased 6.7% from 2017.

Overall, Island Health has decreased emissions from the peak level in 2011 despite an increase in total floor space over the same period. Emissions per full time equivalent have been declining steadily since 2011 until 2017 and stayed well below the peak value. This illustrates how the organization is making progress in reducing emissions while demand for services increases. Table 3 outlines Island Health's emissions by source, with buildings accounting for 95% and the remainder from fleet vehicles and office paper.

Table 3: Island Health Emissions by Source, 2010 to 2019

Emission Source [tCO_2e]	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fleet	922	901	879	892	911	888	897	978	693	693
Office Paper	831	747	717	714	691	706	677	687	724	724
Buildings Owned & Leased	31,240	33,631	32,874	30,517	29,448	27,363	27,573	30,195	28,321	28,324
Total Emissions[3]	**32,993**	**35,279**	**34,470**	**32,123**	**31,050**	**28,957**	**29,147**	**31,860**	**29,738**	**29,741**

[3] Total emissions include both exempt emissions and total emissions for offsetting.

2019 Emissions Outlook

Though Island Health is required to follow the Provincial directive of reporting 2018 emissions as a proxy during this reporting cycle, based on estimates it is expected for greenhouse gas emissions in 2019 to increase by approximately 4%.

One reason for the increase was the rupture of a natural gas pipeline in October 2018 which caused a shortage of natural gas in BC throughout the subsequent winter, leading to increased prices. To mitigate the impact of the unusually high prices, the health authority's larger facilities switched to using backup fuel oil for three days. While this allowed Island Health to avoid the worst of the spike in gas prices, it resulted in fuel oil consumption increasing by over 60% from the previous year. Standard fuel oil emits 1.4 times more emissions per unit of energy than natural gas in BC, contributing to an increase in 2019 emissions.

Another reason for the increased emissions was the loss of renewable natural gas (RNG). Island Health has reduced offsettable emissions since 2015 by purchasing a small amount of RNG, thereby increasing exempt emissions. However, in August 2019 FortisBC ended the sale of RNG to the health authority because of supply constraints, resulting in a 35% decline in exempt emissions. Standard natural gas has since replaced the RNG at Island Health facilities. This event reflects the challenges in securing cleaner fuels that are both accessible and affordable.

Emissions from fleet vehicles also increased as more distance was travelled in 2019. The organization expanded the availability of fleet pool vehicles, encouraging staff to use fleet vehicles rather than their personal vehicles. At the same time, Island Health's fleet has been moving towards more fuel efficient vehicles to minimize climate impacts. The vehicle emissions per kilometre have decreased, but total kilometres travelled have increased, leading to an overall rise in emissions.

The only emission source that experienced a decline in 2019 was paper. Emissions decreased by 5% from 2018 levels as a result of the increased use of an alternative paper with an emission factor equal to 100% recycled content paper.

To achieve the Province's public sector target for 2030, offsettable emissions need to drop by a further 45% in the next decade, regardless of increases in service levels. Since 2010, Island Health has not made sufficient progress towards reaching the provincial targets, despite efforts from Energy Management, Sustainability and Business Continuity, Facilities, Maintenance and Operations, Fleet Services, and Printing Services. All health authorities require additional support and resources to reach the 2030 targets and beyond.

3. Carbon Neutral Capital Program

In fiscal year 2014/15, Island Health began accessing funding from the Province's *Carbon Neutral Capital Program* (CNCP) to implement greenhouse gas emission reduction projects. Table 4 summarizes projects funded by the program. The six-year average cost of reducing emissions through these projects is $3,182/tCO$_2$e (Total Expenditure divided by Emissions Reduction). This value is being used to predict future emission reduction from CNCP funding.

Table 4: Summary of CNCP Projects

Fiscal Year	Project Description	Total Expenditure ($)	CNCP Funding ($)	Expected Annual Savings ($)	Emissions Reduction (tCO$_2$e/yr)	Average Cost of Emissions Reduction ($)
FY2015	Lighting upgrade Boiler optimization Heating, ventilation & air conditioning (HVAC) zoning	1,366,278	902,818	194,452	507.5	2,692
FY2016	Laundry plant upgrade Boiler plant replacement Domestic hot water decouple Zone isolation and lighting	1,474,278	828,505	172,639	525.2	2,807
FY2017	Heat recovery chiller Exhaust air heat recovery Zone control Domestic hot water decouple	1,354,402	817,953	104,640	654.7	2,069
FY2018	Boiler & heating plant upgrade Heat recovery HVAC upgrade	1,416,875	817,953	62,650	262.3	5,402
FY2019	Electronic zone control OR zone control HVAC zoning and scheduling	1,147,500	821,370	89,453	321.0	3,575
FY2020	Heat recovery system	1,222,320	822,320	47,131	479.7	2,548
	Average	**1,330,276**	**835,153**	**111,828**	**458.4**	**3,182**

The heat recovery project completed in fiscal year 2020 is the first phase of a three-phased project at the Royal Jubilee Hospital in Victoria. Due to the complexity and size of the original project, a limited annual CNCP budget and escalating construction costs, the project was divided into three smaller phases. Each phase of this project yields increasing energy and greenhouse gas reduction and once they are all complete, will deliver a total reduction of 886 tCO$_2$e and $162,358 in operating costs each year.

This heat recovery project is intended to harvest the waste heat being rejected from several stand-alone cooling systems operating year-round to serve areas such as medical imaging, server rooms and pharmacy, and then re-use that heat to warm the supply air to spaces requiring it. The system also recovers additional waste heat in the summer for the same purpose since there are areas of the hospital requiring heating year-round.

The completed first phase included the installation of three modular heat recovery chillers in the penthouse and an upgraded electrical system to power the chillers. These chillers are engineered to operate like heat pumps, taking heat from warm water rejected by the central chilled water plant and

boosting the temperature to the required building heating loop temperature. The heat is otherwise rejected to atmosphere through cooling towers.

Phase Two will install three additional heat recovery modules to provide chilled water for server rooms and pharmacy when the main chiller plant is not operating (during shoulder seasons and winter). Phase Three will add more load to the system to harvest more heat by extending chilled water piping to the Medical Imaging department. Both these phases will be completed in fiscal year 2020/21.

An additional benefit to this project is reduced load on the cooling tower. This will free up capacity needed as summer temperatures rise due to climate change. This is an example of a project which provides significant energy savings, greenhouse gas emission reduction and climate change adaptation benefits.

4. Emissions Reduction Projects in 2019

During fiscal year 2019/20, the heat recovery project at the Royal Jubilee Hospital delivered the greatest reduction in emissions, contributing to over 65% of the total greenhouse gas (GHG) avoided. Table 5 provides a summary of various projects completed in the fiscal year along with their associated costs, savings and emissions reduction. The incremental cost per tonne of greenhouse gas avoided and payback on incremental cost are calculated based on this information.

Table 5: Summary of Emission Reduction Projects in the 2019/20 Fiscal Year

Project Type	Total Cost ($)	Incremental Cost ($)	Total Annual Cost Savings ($)	GHG Avoided (tCO_2e/yr)	Incremental Cost per Tonne of GHG Avoided ($)	Payback on Incremental Cost (yrs)[4]
Boiler and Heating Plant Upgrades	86,250	49,000	15,998	76.70	639	1
Continuous Optimization	107,280	107,280	31,326	77.65	1,382	3
HVAC Conservation Measures	23,000	23,000	20,306	82.82	278	1
Heat Recovery Projects	1,021,000	909,680	38,918	479.68	1,896	18
2019/2020 Total	**1,237,530**	**1,088,960**	**106,548**	**716.85**	**n/a**	**n/a**

In Table 5, the Total Cost is the cost required to implement a project. When a piece of existing equipment is being replaced, the Incremental Cost is the extra cost required to achieve a higher efficiency from the equipment being replaced (e.g. mid-efficiency boilers being replaced with high efficiency boilers). When an energy efficiency project is a new addition to the existing infrastructure (e.g. adding a device to reduce existing motor use), the Incremental Cost equals the Total Cost of the project.

Incremental Cost per Tonne of GHG Avoided is the Incremental Cost divided by GHG Avoided. This measure gives a clear indication of the cost of emissions reduction by project type. Heating, ventilation, and air conditioning (HVAC) upgrades, continuous optimization and heat recovery projects are the most cost-effective in terms of reducing emissions.

Payback on Incremental Cost is calculated by dividing Incremental Cost by Total Annual Cost Savings, net of BC Hydro and FortisBC rebates. The exact payback varies for each individual project, with the longest payback rate for the heat recovery project. Most of these measures have a lifespan of 15 to 20 years, and generate cost savings regardless of their emissions reduction potential. As Island Health electrifies its heating requirements and provides cooling through a longer cooling season there will be considerable need to find energy efficiencies so utility budgets are not exceeded.

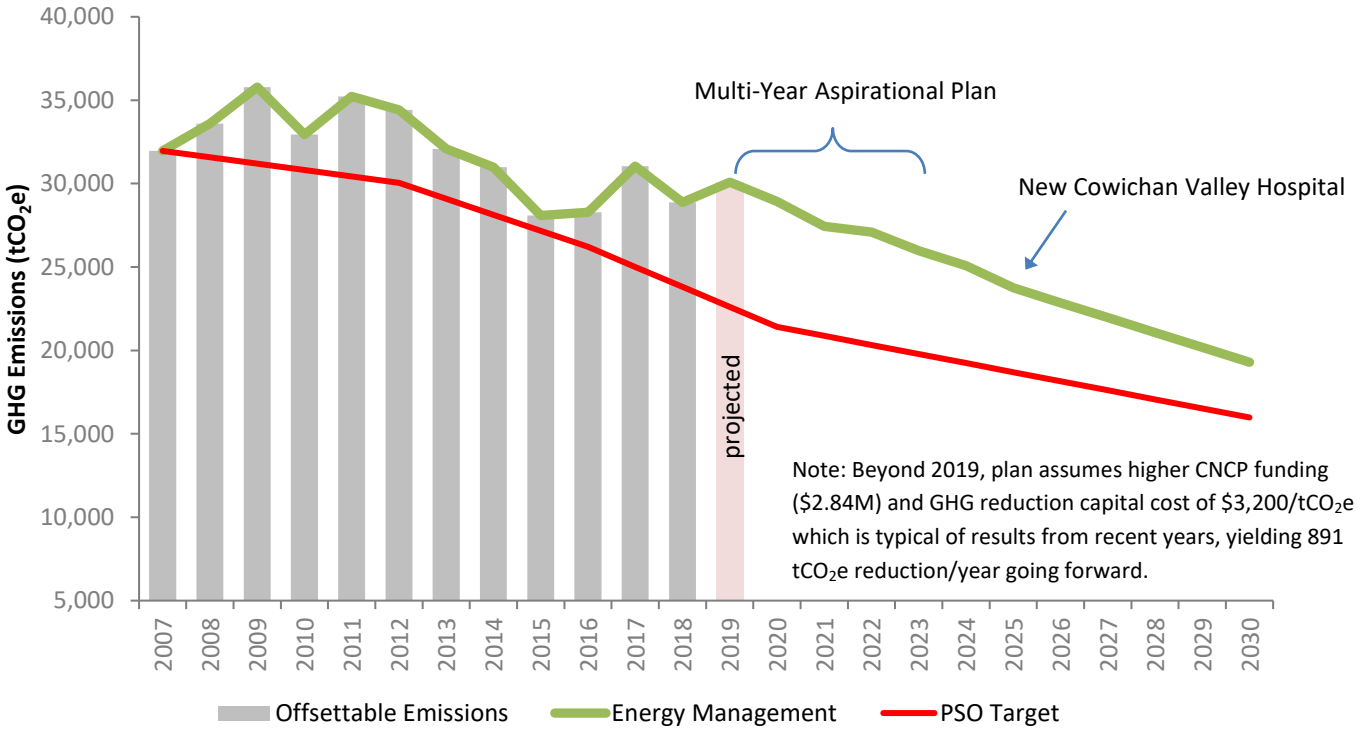
[4] Note that payback period is net of BC Hydro and FortisBC rebates.

5. Strategies to Reduce Emissions

Most of Island Health's building-related greenhouse gas emissions are from fossil fuels, primarily natural gas. In areas where natural gas is available, it is widely used for space and hot water heating, as well as for laundry and cooking. The future emissions reduction strategy for buildings is centred on improving existing buildings, ensuring new buildings perform to high standards, and utilizing cleaner energy sources.

The green line in Figure 3 represents the expected emissions reduction resulting from a steady investment going forward from the *Carbon Neutral Capital Program* (CNCP). The average cost of reduction is $3,200 per tonne of CO_2e, based on previous CNCP projects, and does not include escalation.

Figure 3: Island Health Emissions, Targets and Projections



Achieving the *CleanBC* emissions reduction target for public sector organizations (PSOs) remains difficult, as depicted in Figure 3. Island Health's cost per tonne of CO_2e reduction does not account for contingency, escalation and inflation. The aspirational plan also includes benefits beyond only emissions reduction, such as higher energy efficiency, climate change adaptation and enhanced occupant wellbeing.

The details of Island Health's emissions reduction plans are still in development, so this projection and its assumptions may yet change. Based on the current average cost of reduction and CNCP funding, it is clear that additional investment is required to decrease the organization's climate impact. Far more aggressive and expensive retrofits of existing infrastructure will be necessary to meet the provincial reduction targets.

Existing Buildings

In existing buildings, efforts will continue to focus on minimizing waste and improving efficiency of existing assets. This will require continued close collaboration between Energy Department staff and Facilities, Maintenance and Operations. In addition to *Carbon Neutral Capital Program* projects which will tend to focus on deeper retrofits, more effort will be made to uncover opportunities requiring relatively small upfront investment, such as system re-commissioning, continuous optimization including scheduling, optimized controls and improved maintenance (e.g. coil cleaning, steam trap repair and insulation). Utilizing future climate projections will also be important when designing replacement ventilation and air conditioning systems.

Minor Procedures Room at the new North Island Hospital

New Construction

The practice of setting aggressive targets for new construction projects will continue in order to avoid net increases in greenhouse gas emissions as Island Health expands. Early work in the business planning stages of the new hospital for the Cowichan Valley includes energy modeling of various design features in an effort to reach a design that meets both a 'net zero energy ready' and a 'net zero carbon' level of performance. Whether these stretch targets can be achieved within the financial constraints of the project remains to be determined. In addition, future climate projections are being incorporated into the design and planning to ensure this new facility is capable of handling extremes in weather anticipated over the service life of the building. As per Provincial mandates, this new hospital will be targeting LEED Gold certification.

Despite design features to reduce greenhouse gas emissions, new construction often increases Island Health's emissions. While emissions intensity (greenhouse gas emissions per square metre) is declining, overall floor area is increasing at a higher rate. This is a challenge for the new hospital in the Cowichan Valley as it is expected to be approximately three times the size of the existing hospital.

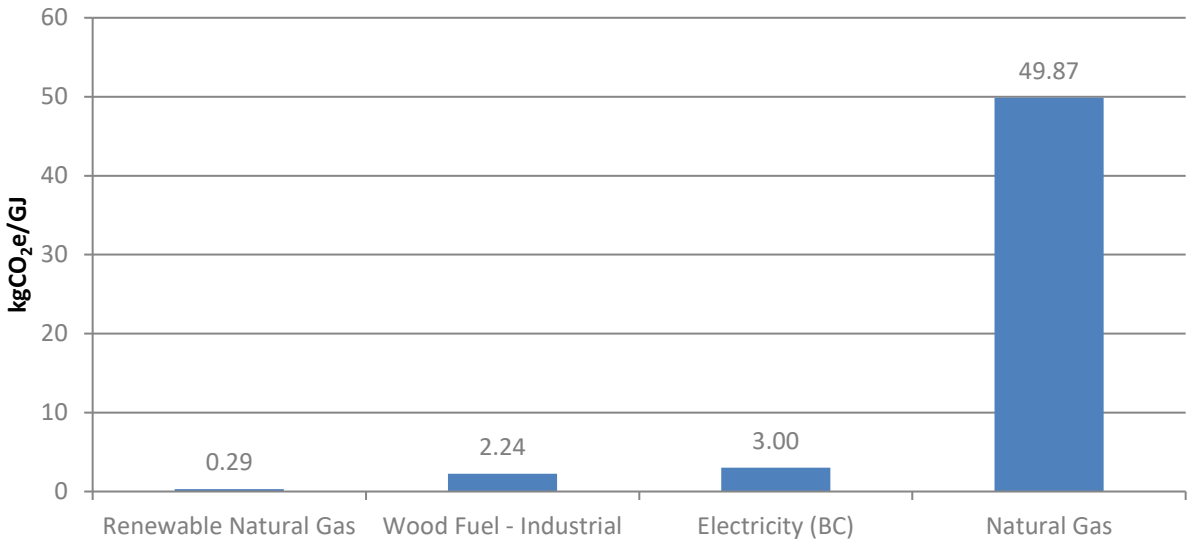
Consequently, new facilities are more efficient than the infrastructure they replace, but can result in net increases in emissions. Until new construction projects can achieve a 'net zero carbon' footprint, they will continue to increase the organization's emissions budget.

Clean Energy

Another key strategy for reducing greenhouse gas emissions involves increasing the share of low-carbon energy sources. Island Health has transitioned towards cleaner energy by electrifying facilities with the installation of heat recovery systems powered by BC's clean electricity, using renewable energy systems such as solar thermal and solar electric panels, as well as by procuring renewable natural gas when available. The health authority will continue exploring alternatives to fossil fuels including biomass.

Figure 4 illustrates the comparative emission factors for four energy sources: natural gas, electricity, wood fuel, and renewable natural gas. Natural gas produces the most emissions while renewable natural gas produces the least. Although emissions from solar energy would be zero, solar currently would not be able to meet the energy or high temperature demands required for hospitals, in part due to insufficient roof space. Solar energy will likely remain a small percentage of Island Health's overall energy mix.

Figure 4: Emission Factors by Fuel Type[5]



[5] Emission factors extracted from 2018 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions.

Zero-Emission Fleet Vehicles at Island Health

Fleet

Island Health is targeting emissions reduction by introducing zero-emission vehicles and improving fuel efficiency. The health authority is committed to the *CleanBC* provincial mandate by making 10% of light-duty vehicle replacements zero-emission vehicles, when suitable.

In 2019, Island Health added a third electric vehicle to its fleet, and installed three charging stations located at the North Island Hospital Comox Valley and Campbell River campuses, and the Peninsula Health Unit. Several hybrids are also in the fleet increasing overall fuel efficiency. Additional charging stations for fleet are planned for installation in 2020.

Funding remains the largest challenge to increasing zero-emission vehicles in the organization's fleet. Despite federal and provincial rebates, electric vehicles are more expensive to purchase and require costly charging infrastructure. There are further challenges associated with installing charging infrastructure in older facilities lacking electrical capacity, as well as in leased buildings. Approximately half of total fleet emissions are from heavy duty trucks, for which there are currently no suitable zero-emission alternatives available.

While the organization aims to achieve the *CleanBC* 10% replacement target year after year, this will not be enough to reach the Province's 2030 target of a 40% reduction in public sector fleet emissions from 2010 levels. Regardless, Island Health's Fleet Services continues to review optimal locations for new zero-emission vehicles and charging stations. As more fleet pool vehicles become available across the Island, the health authority is striving to increase overall fuel efficiency and reduce emissions.

Paper

In 2019, Island Health began using paper made from sugarcane fibre as its standard 8½ x 11 office sheet. This paper is produced from the residue waste of sugar production, and its greenhouse gas emission factor is considered to be the same as 100% recycled wood fibre based paper. Paper made from 100% recycled fibre has 37% lower emissions than paper made from virgin wood fibre. The organization is also exploring options to utilize this paper source for 8½ x 14 and 11 x 17 sizes.

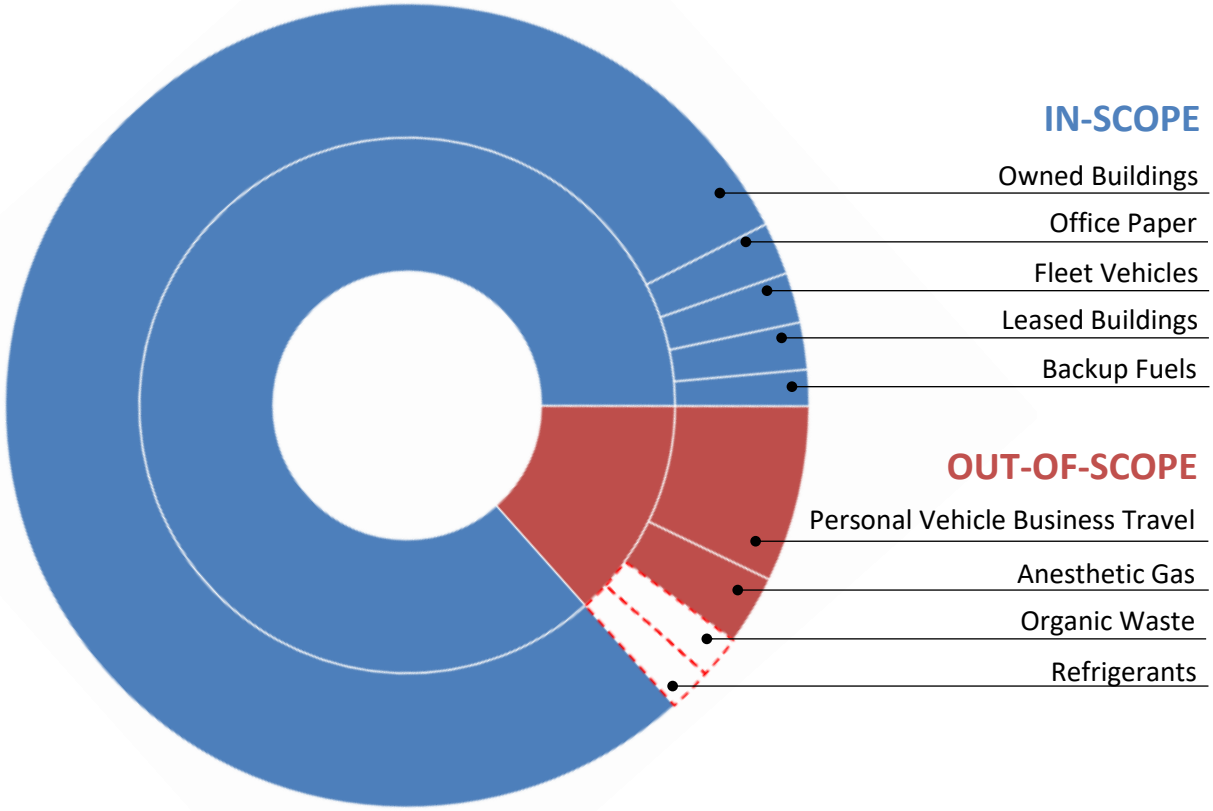
Further opportunities for emissions reduction involve using less paper through digitalization and changing behaviour. For example, in 2019 the organization adopted new software for online ECG results saving about 600,000 sheets of paper per year. Additionally, Information Management/Information Technology (IM/IT) supports behaviour change through an ongoing Print-LESS campaign with simple actions for employees.

6. Out-of-Scope Emissions

Island Health's climate impact extends beyond only buildings, fleet vehicles and office paper. Consequently, the organization is reducing greenhouse gas emissions from out-of-scope sources, such as personal vehicle business travel, anesthetic gas and organic waste. Out-of-scope emissions sources are not included in the *Carbon Neutral Government Regulation*, and are thus not formally reported. Carbon offsets are not required for out-of-scope emissions, but they still emit harmful greenhouse gas and further exacerbate climate change.

Figure 5 displays the various sources of greenhouse gas emissions at Island Health. In-scope sources are coloured blue and out-of-scope sources or coloured red.

Figure 5: Island Health's Extended Climate Impact



Illustrated in Figure 5, emissions from anesthetic gas and business travel in personal vehicles are estimated to be larger than the in-scope sources of office paper and fleet. Organic waste and refrigerants are shown in white because these emissions quantities are currently unknown. To decrease emissions

from organic waste, several hospital kitchens ensure food waste is composted. Collecting refrigerant data is challenging, but Island Health is taking measures to enhance monitoring.

Personal Vehicle Business Travel

Island Health covers a large geographic area, requiring substantial business travel. When staff use their personal vehicle for travel, the emissions are not included in the organization's total reported greenhouse gas impact. Distance travelled in personal vehicles accounts for more than five times the distance travelled in fleet vehicles. 54% of personal vehicle travel is attributed to home and community care health workers who travel regularly to support their clients. As home support services expand, emissions from vehicle travel will also increase unless zero-emission fleet vehicles can be provided at scale.

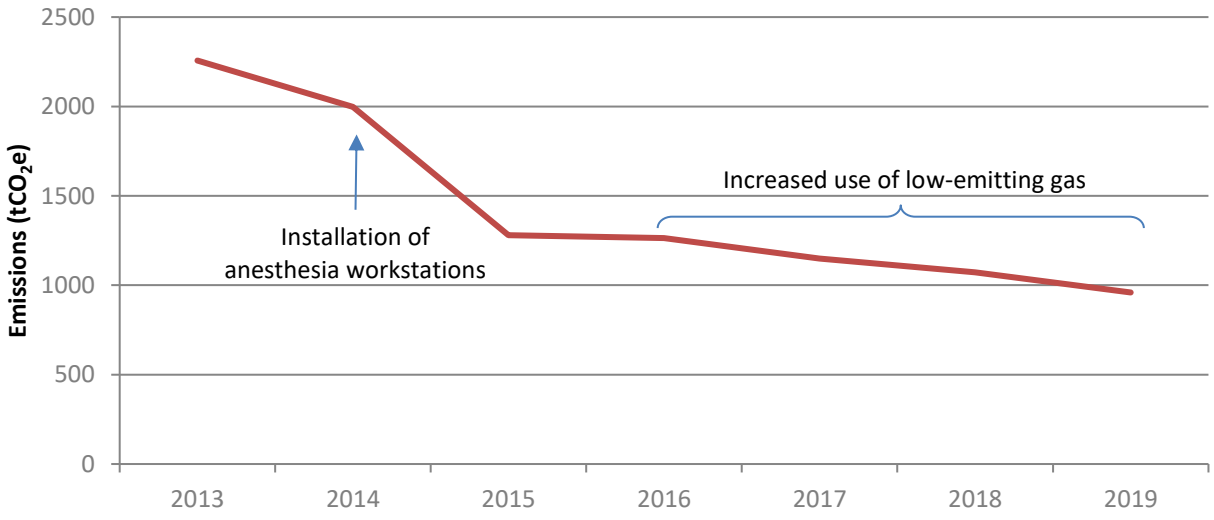
Island Health has taken steps to offer more pool vehicles at sites across the Island, for staff to use in place of their personal vehicle. This initiative provides greener vehicle options and reduces costs. Expanding access to pool fleet vehicles will raise reported in-scope fleet emissions, but is expected to offset less-efficient personal vehicle travel. With several zero-emission vehicles and hybrids, Island Health's fleet is aiming to be more efficient than the average passenger vehicle.

Anesthetic Gas

At Island Health, estimated greenhouse gas emissions from anesthetic gas are higher than some in-scope sources. Island Health primarily uses two types of anesthetic gas, one of which has a significantly higher global warming potential.

Over the past five years, Island Health's usage of the anesthetic gas with higher global warming potential declined, in favour of the lower-emitting gas. Anesthesia workstations are also installed, which reduce overall gas usage at the source. Since 2013 emissions have declined by approximately 57%, as indicated in Figure 6. Island Health's actions to reduce wasted anesthetic gas and associated emissions contribute to climate change mitigation.

Figure 6: Island Health's Emissions from Anesthetic Gas Use[6]



[6] Emissions are estimated using factors from Sulbaek Andersen et al, 2012

Climate Change Impacts Workshop at Island Health

7. Climate Adaptation & Resilience

Climate change continues to present risks for healthcare operations and infrastructure, and also to the health of our communities. While Island Health strives to minimize its climate impact, the health authority recognizes that building resilience within facilities is critical for maintaining health services as the climate changes. In 2019, the organization advanced resiliency by providing leadership, assessing risk, increasing climate change awareness, and incorporating climate change information into facility design.

Leadership

The health authority included climate change adaptation in Island Health's 2019/20 – 2021/22 Plan by identifying the need to enhance climate change resilience for the organization, as well as for the population served.

Organizational Risk

Island Health follows the British Columbia government's Risk Management Framework which applies to all types and categories of risk within the organization, from frontline or operational to enterprise level risks. Each year, the Board of Directors and Executive Leadership Team produce a summary of top risks facing the organization. In 2019, lack of resilience to the changing climate was identified as a top risk. As climate change is an unfolding event over a long period of time there will be many controls required to reduce impacts. The main control identified at this time involves targeting new construction so all facilities are developed to withstand climate extremes over their life span.

New Construction

New construction and renovations provide an excellent opportunity to incorporate climate change information into design. Currently, facilities are designed based on historical weather data, but this is not representative of the climate the new facility will operate in. This has led to the development of requirements for consulting engineers and architects to use future climate data to inform the design of building systems. Island Health is also contributing to a provincial health authority initiative for establishing Resilience Guidelines for Health Facility Design and Operations. Furthermore, an initial climate change workshop was provided to the project team working on the Cowichan District Hospital redevelopment, and work will continue through the project to ensure adaptive measures are included.

Existing Facilities Assessments and Investigations

Existing facilities remain the largest floor area within Island Health's building stock. The age of the facilities increases the likelihood for poor resilience to a changing climate. To understand the impacts to the facilities, there are a variety of assessment tools and methods available. Adapting to the future climate is a new risk to consider with unique challenges, as many organizations work towards enhanced resilience. For Island Health, the methodology needs to be effective from both a cost point of view and a practicality point of view. Since 2017, the health authority assessed three facilities using three different tools. The tool used in 2019 was Public Safety Canada's Regional Resilience Assessment Program, which reviews the resiliency of critical infrastructure at the time of assessment, without considering future changes in climate. This information is useful for understanding the current resiliency of facilities and identifying vulnerabilities. All the tools assessed at this time require significant input in terms of time and costs.

Facilities were also assessed through the 2019 Facilities, Maintenance and Operations (FMO) Extreme Weather Survey. FMO identified water shortage as having potentially catastrophic consequences, though with a lower likelihood of occurring. The most anticipated extreme climate events to impact FMO-managed facilities are extreme heat, followed by wildfire.

FMO participated in a study with the National Research Council of Canada to determine if air filtration performance could be enhanced. It was hoped that the tested system would reduce complaints from wildfire smoke and other sources of odour. The study was conducted during the summer of 2019 when there was very little wildfire smoke. However, the study determined the system provided a 23% improvement in filter efficiency for removing $PM_{2.5}$ (a component of wood smoke that is harmful to lungs) compared to the reference air handling system.

Extreme Weather Awareness

Health Emergency Management BC (HEMBC) initiated a system for tracking Environment Canada's weather warnings and issuing internal notifications depending on the type and severity of the warning.

Community Support

In 2019, Island Health provided heat advisories on public facing communications and published a new heat safety web page. The Environmental Health Office's Regional Built Environment Team developed a climate change health impacts fact sheet for municipalities to increase awareness of the need to incorporate future climate planning in community development (shown in Appendix A). Island Health also supports municipalities and regional districts as they develop climate resiliency plans, to ensure health impacts, along with facility dependencies, are considered.

Future climate resilience tasks:

- Continue participation in the development of the Resilience Guidelines for Health Facility Design and Operations
- Conduct an extreme weather events survey to gather data from clinicians
- Establish climate resilience guidelines and an exposure screening tool for internal projects
- Develop emergency water measures at Nanaimo Regional General Hospital
- Conduct overheating research with the National Research Council of Canada and evaluate adaptation strategies in response to extreme heat and vulnerable populations

8. Sustainability Initiatives

Many departments at Island Health are actively taking measures to achieve greater efficiency and reduce pollution and consumption of resources. Below are highlights of these activities in 2019.

Water Conservation

Island Health reviews water costs and consumption at all major owned sites through an online utility monitoring platform. Facilities with higher consumption and water rates are prioritized for further analysis. This analysis informs future opportunities for identifying water conservation measures. The Energy Department also incorporates a water performance review into quarterly meetings with Facilities, Maintenance and Operations. In addition to water monitoring, all new buildings are constructed with high water efficiency goals through LEED certification, including the new North Island Hospital campuses which have the lowest water usage per square metre.

A notable project completed this year was the removal of a water filtration system at the Lady Minto Hospital on Salt Spring Island. This was made possible because of improvements in the quality of the local water supply and the installation of an on-site copper-silver ionization treatment system. The removed filtration system consumed over 1,000 m^3 of water annually as part of its cleaning process through multiple back-wash cycles every hour. That was roughly 12% of the site's overall water consumption.

Behaviour Change

In 2019, Island Health continued its participation in the BC Energy Wise Network to access funding and coaching for behaviour change campaigns. This year's campaign aimed to establish a formalized process for Facilities, Maintenance and Operations staff to review the organization's energy management information system (EMIS) daily. EMIS displays real-time energy data so building operators can immediately identify energy use anomalies and then take steps to resolve them. Appendix B contains additional information about the campaign.

Waste Reduction

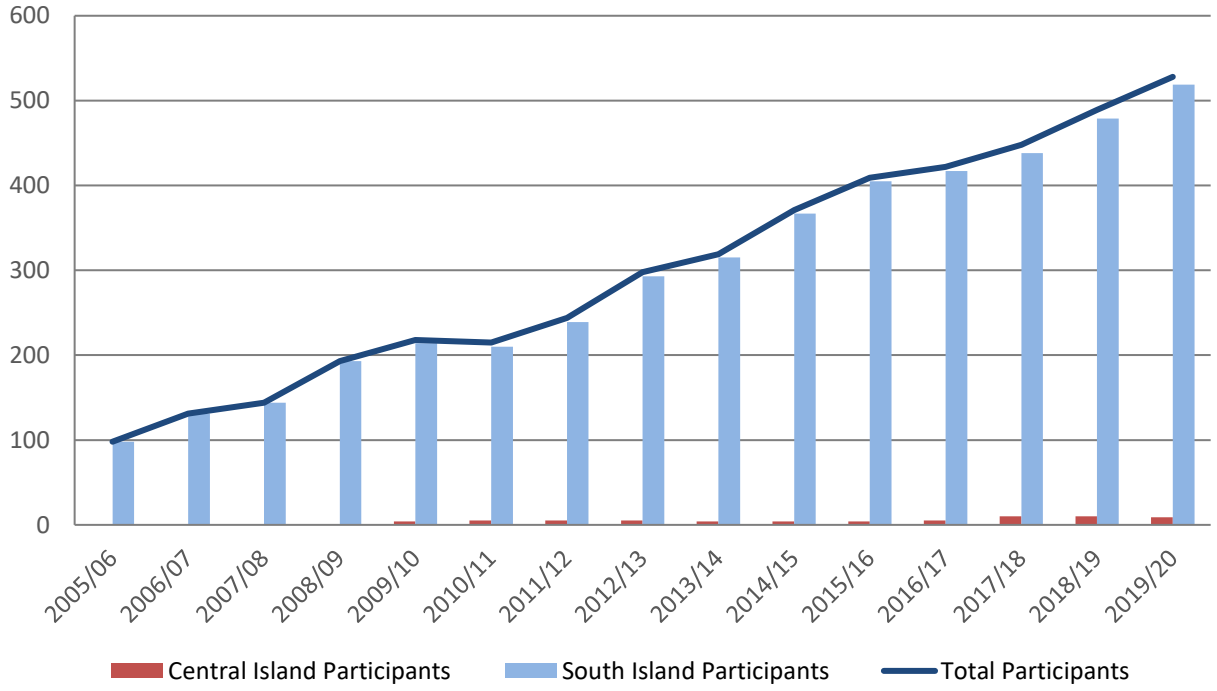
Island Health is advancing sustainability best practices by reducing waste and moving towards a greener supply chain. In 2019, Provincial Health Services Authority (PHSA) Supply Chain introduced new environmental fields to the province-wide Product Investigation Portal. Through the Portal, health authority staff can submit product concerns related to excess packaging, recyclability and other environmental issues. These concerns are shared with manufacturers and vendors to identify potential product changes and minimize environmental impacts.

Island Health staff are also leading initiatives to reduce the amount of waste generated in their work areas. For example, a nurse at Nanaimo Regional General Hospital led a pilot project to avoid unnecessary plastic water cups at the patients' bedside. With input from Infection Control practitioners, a 16-bed unit changed practices to refill one plastic cup every 24 hours per patient, instead of regularly providing a new cup. Through this simple action, the unit can avoid using approximately 6,200 cups annually. Healthcare workers are demonstrating persistence and creativity to find waste reduction solutions. Adjusting procedures, product design, or packaging requirements are recommended strategies to reduce waste and decrease Island Health's environmental footprint.

Transportation Demand Management

Parking Services promotes initiatives for decreasing single-occupancy vehicle traffic and demand for parking at Island Health sites. Through transportation demand management planning, Parking Services supports employees in optimizing their use of local transportation resources and Island Health programs. By getting people out of single-occupancy vehicles and into more efficient modes of commuting, the health authority reduces parking congestion and its climate impact. Initiatives to support transportation demand management include participation in the annual Bike to Work Week, offering employees subsidized BC Transit ProPass enrollment, and providing an inter-site shuttle between two major hospitals in Victoria. In fiscal year 2019/20, shuttle participation increased by 15% and employees' ProPass enrollment increased by about 8%, as displayed in Figure 7.

Figure 7: Island Health's BC Transit ProPass Participation



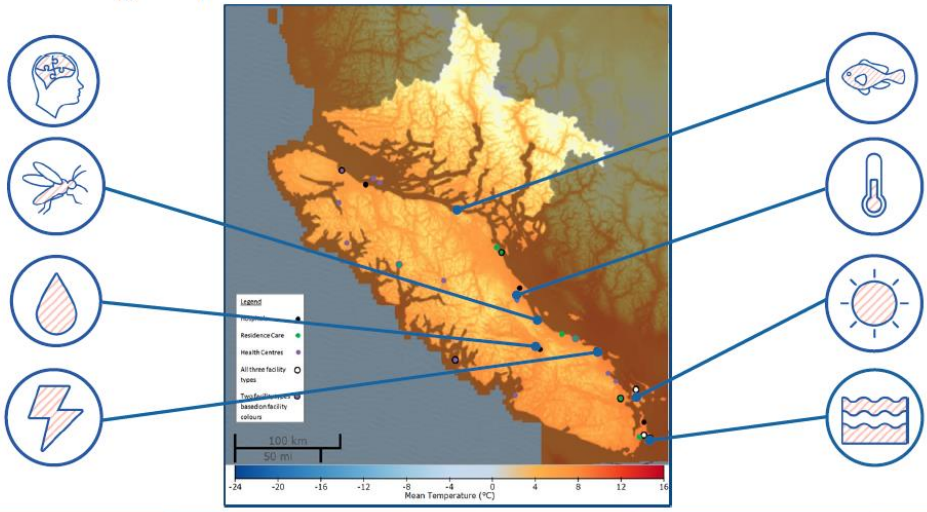
CLIMATE CHANGE

Impacts On Our Health

island health

Increasing annual temperatures are causing shifting precipitation, extreme weather and rising sea levels. Climate change's impacts are being felt in all Island Health regions, affecting people and the natural and built environments in which they live, work and play. Adapting to these environmental changes is the responsibility of all levels of government. Island Health's Medical Health Officers and Healthy Built Environment team support local governments by bringing a health lens to climate change discussions.

Climate Change Impacts On Vancouver Island



Current Health Impacts on the Island

SEA-LEVEL RISE

The Capital Regional District has identified areas in the City of Victoria and surrounding municipalities that will be underwater by 2100.

DISEASE AND VECTORS

In 2015, warming ocean waters contributed to a *Vibrio parahaemolyticus* outbreak in oysters, which affected 73 people who ate raw oysters in restaurants, bought them in stores or self-harvested.

EXTREME WEATHER EVENTS

A major windstorm in December 2018 resulted in prolonged power loss for many residents and affected water treatment.

FOOD INSECURITY

By 2050, warming oceans are projected to contribute to a 7.9% to 8.2% loss in salmon catches by the 'Namgis First Nation.

SEASONAL DROUGHT

In August 2018 the province issued a level 4 drought rating, the highest level of drought severity, for east Vancouver Island, parts of west Vancouver Island and Salt Spring Island.

SEASONAL FLOODING

In 2016, the Tseshaht First Nation declared a state of emergency and partial evacuation in response to heavy flooding and rainfall.

INCREASING TEMPERATURE

Courtenay/Comox Valley had record-setting heat waves (32.7°C) in July 2018, with other heat warnings issued Island-wide.

MENTAL AND SOCIAL WELL-BEING

A 2017 survey of Island Health staff showed that those working in the field had increased worry regarding dehydration and heat exhaustion during summer heat waves.

HBE@viha.ca

Created June 2019

	Climate Driver	Hazard	Health Outcome
Mental and Social Well-being	Extreme weather events ↑ in frequency and intensity (flooding, windstorms, storm surges)	↑ exposure to events resulting in displacement, infrastructure damage and injuries	• ↑ stress and mental health impacts
Increasing Temperature	↑ annual average temperatures	More frequent, prolonged heat events, ↓ air quality	• Heat-related illness and mortality
Seasonal Flooding	Accelerating snow melt and ↑ precipitation in the winter	Contamination of drinking water, damage to homes and civic infrastructure	• Illness from contaminated water • Stress from displacement and property damage
Seasonal Drought	↑ temperatures and ↓ precipitation in the summer	Water scarcity, ↑ risk of wildfires	• Disruption of quality of life • ↑ prevalence of respiratory conditions related to poor air quality
Extreme Weather	↑ risk and severity of storm surges, windstorms and heavy rain	Damage to infrastructure and residences	• Injuries and fatalities • Service interruptions
Sea–level Rise	↑ sea levels	Contamination of drinking water, loss of land, damage to coastal infrastructure	• Displacement from sea-level rise • Saltwater intrusion
Diseases and Vectors	↑ temperatures, with changing seasonal weather patterns	↑ prevalence and incidence of pathogens	• ↑ infection rates from new and/or re-emergent pathogens
Food Insecurity	↑ temperatures and sea levels, flooding and drought	Loss of agricultural land and ↓ food output	• ↑ food insecurity

Island Health is dedicated to bringing a health perspective to climate change work. Our involvement includes:

- Supporting climate change adaptation plans
- Reviewing climate change emissions inventories
- Partnerships at local working group tables
- Bringing health data, literature and evidence to these conversations…

Interested in our work? Contact us at HBE@viha.ca

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Energy Wise Network EMIS Onboarding

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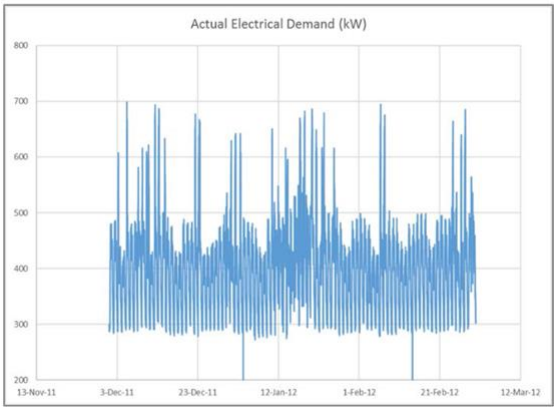
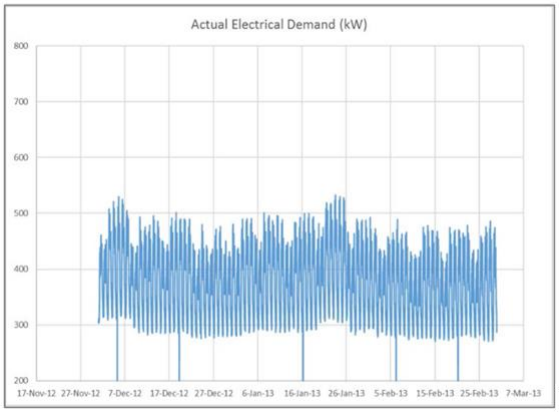
BEFORE



AFTER



Campaign Overview

The *Energy Management Information System (EMIS) Onboarding* campaign was developed to train building operators on using the EMIS program to check electricity and gas demand trends daily. By adopting daily energy monitoring as a standard practice, FMO operators can identify and more quickly resolve problems that are causing higher than normal utility costs, possible equipment failure, or even occupant discomfort.

Results

The Energy Department hosted one-on-one training sessions with FMO operators across the organization. In the fiscal year, approximately 20 operators were trained, with plans to train more early in the next year. Operators learned how to navigate the EMIS website and interpret real-time energy data. Operators also report daily findings to supervisors, and may be tasked with further investigation. Overall, more FMO staff are able to quickly identify energy issues, contributing to an organizational culture of efficiency and conservation.

Background

The Island Health Facilities, Maintenance & Operations (FMO) staff plays an important role in finding energy conservation opportunities. FMO staff are involved in a number of engagement campaigns aimed at operating buildings more efficiently and supporting the organization's goal of reducing energy consumption and greenhouse gas emissions.

The Energy Wise Network was launched in 2016 to help organizations in their energy engagement programs.

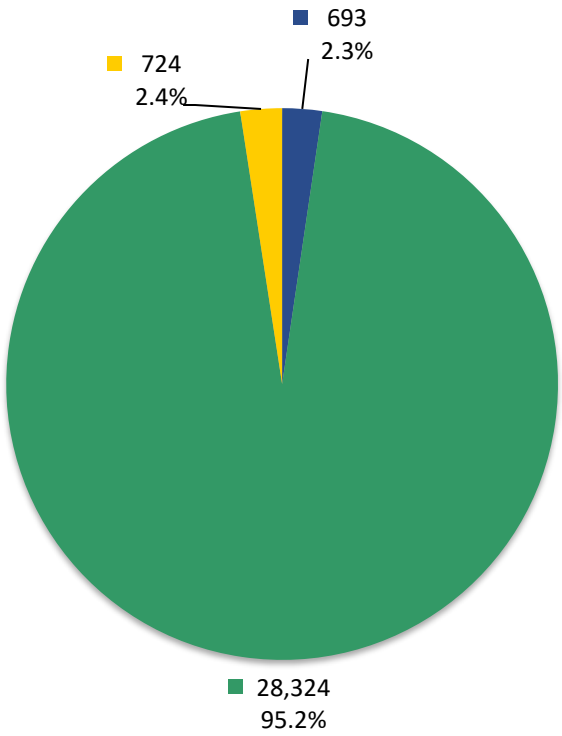
The network is made up of Advanced Education, Government, Schools (K-12), Hospitality, Municipalities, Property Management, and Retail sectors.

We're working together to help B.C. save energy.

BC Hydro Power smart | FORTIS BC Energy at work

APPENDIX C: EMISSIONS SOURCE REPORT

Vancouver Island Health Authority
Greenhouse Gas Emissions by Source
for the 2019 Calendar Year* (tCO_2e)**



Total Emissions: 29,741

- 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 2019

Total offsets required: **28,880**. Total offset investment: $**722,000**. Emissions which do not require offsets: **861**

*As per the Directive issued March 31, 2020, each PSO will use their 2018 GHG Emissions as a placeholder for the purposes of their 2019 CNAR.

**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.