Strategic Energy Management Plan

Vancouver Island Health Authority - 2020

(Image of the heat recovery chiller installed during the Royal Jubilee Hospital D&T Heat Recovery Chiller Phase 1 project.)

BC Hydro Power smart

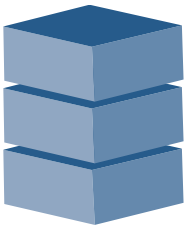
FORTIS BC

Energy Department

[Warren Boyle, Joe Ciarniello, Bjorn Richt]

Executive Summary

This year the Energy Department has aligned its goals with VIHA's new strategic framework. The Strategic Energy Management Plan (SEMP) is used to communicate these goals to both internal and external stakeholders.



Island Health's Strategic Framework Goal #3: ***Increase Health System Value and Ensure the Sustainability of Health and Care Services***

Objective #3: *"We will advance environmental stewardship best practices in our buildings, services, processes and culture to ensure our environmental foot print is minimized"*

As part of our incentive funding agreements with BC Hydro and FortisBC we also have project-based energy reduction targets we are required to meet. These targets are integrated into our strategic goals in a manner which helps strengthen the overall plan. Our goals are intended to enhance facility performance; to ensure goals are not pursued without regard for operational costs, two additional key performance indictors (KPI) which directly impact operational cost are also tracked and reduced. These are energy use index (EUI) expressed in units of energy consumed per unit of floor area per year (kWh/m^2/year) and water use index (WUI) expressed in units of water consumed per unit of floor area per year (m^3/m^2/year). Going forward our primary goal will be to reduce our greenhouse gas (GHG) emissions so we minimize our contribution to climate change, while also driving down the EUI and WUI of our buildings to minimize operating costs. A large part of reducing GHG emissions is permanently reducing natural gas and electrical energy use, which is also mandated through FortisBC and BC Hydro contracts.

Goals

Reduce Total GHG Emissions	Reduce Energy Use Index	Reduce Water Use Index

Results So Far?

Overall, we have made progress towards achieving our goals. Key highlights include:

- **7.5% reduction in GHG emissions** since 2010 in spite of a 25% increase in floor area and 38% increase in FTEs
- **16% reduction energy use intensity** since the start of the energy management program in F2008 (data weather normalized and based on corrected floor areas)
- **9.3% reduction in water use intensity** since 2015.

These results are encouraging especially when considering pressure from continued organizational growth, increased use of energy intensive technology (i.e. medical imaging equipment), decreased incentives from BC Hydro, limited capital funds for retrofit projects, and escalating electricity and natural gas rates. The reduction in energy and water use intensity has helped to mitigate the financial impact of these pressures; however, the challenges remain particularly great in terms of GHG emissions reduction. Progress towards the 2030 GHG reduction target currently falls short of where it needs to be as shown in the score card below.

Based on booked energy savings to date, since the energy management program started in F2008, we have implemented projects that result in the cumulative effect of avoiding more than 26,690,000 kWh of electricity use and 138,096 GJ of natural gas consumption. At today's rates, that's worth $3,500,000 in avoided energy costs. To put that into perspective, we currently spend more than $15,000,000 each year to power our facilities.

Another important result to share is the value received from our partnerships with BC Hydro and FortisBC as they continue to support Island Health through funding for staff, energy studies, and most importantly incentives for project implementation. It's through these partnerships that we are able to maximize the benefits of our program. Since 2007 we have received cheques totaling nearly $8.0 Million from BC Hydro and since 2010 nearly $5.0 Million from FortisBC to help cover program and project costs. In the most recent 3 years, we've averaged total revenues of $1.2 Million/year from these organizations.

Incentive & Rebate revenues of **$1.2 Million/year** in the last 3 years

BC Hydro
$8.0 Million total to date

FortisBC
$5.0 Million total to date

Strategic Goal Score Card

Goal	Baseline	Achieved in 2019	2019 Target	2030 Target
GHG Emissions Level (tCO_2e/year)	32,938	**30,484**	25,605	16,641
Energy Use Index (EUI) (kWh/m^2/year)	551	**463**	451	367
Water Use Index (WUI) (m^3/m^2/year)	1.82	**1.65**	1.72	1.46

This score card highlights that we have only realized a total GHG emissions reduction of 2,454 tCO_2e or 7.5%. We should have achieved a 22.3% reduction by now in order to be on track for meeting the required of 50% reduction by 2030, or total emissions of no more than 16,641 tCO_2e. The challenge is exacerbated by the fact it will get harder, in other words more costly, to reduce emissions in future.

GHG Emissions

50% reduction by 2030, from 2010 levels

Energy Use Index

33.3% reduction by 2030 from F2008

Water Use Index

20% Reduction by 2030 from 2015

What Now?

The SEMP details a plan to address progress towards our GHG reduction goal which requires an additional investment in building systems optimization, energy efficiency, electrification and deep retrofits. A lack of cost efficient projects, defined as the capital cost of annual emissions reduction in $/$tCO_2e$, is a key barrier in meeting our annual reduction target of 1,400 tCO_2e/year. The current process of using end of life replacements as the primary project pipeline will only get us part way to our goal. An energy policy should be implemented to prescribe various solutions that maximize GHG reduction potential of projects. For example, whenever replacing gas-fired roof-top air handlers we could limit ourselves to replacing them with models that do not use natural gas as the source of heat but instead use air-source heat pumps. An effective energy policy will help set expectations for developing projects in a capital efficient manner and ensure proper funding is in place; both keys to achieving our GHG reduction goal.

While a policy is being developed, we are ensuring existing resources are applied as effectively as possible. To accomplish this, we've reaffirmed where the greatest energy and GHG reductions can be made and prioritized the opportunities in those area. An analysis of all building types in terms of energy use intensity (EUI), total energy use, and cost intensity (CI) was completed to establish our key focus areas for F2021 and beyond. As a result, the focus continues to be on:

Large Acute Care	• 74% of total energy and highest EUI of all facility types
Long Term Care	• Second highest consumer of total energy at 12%
Small Acute Care	• Higest cost per area due to remoteness - by 2x

Our master project list (MPL) is then used to prioritize projects within these areas creating the Multi-Year Plan. Based on projects selected, our current expected results in the next three years are as shown here, pending approval of capital in years two and three.

Targets & Projected Results from Multi-Year Plan					
Goals	**Annual Reduction Target**	**Year 1 2020/21**	**Year 2 2021/22**	**Year 3 2022/23**	**3-Year Average**
GHG Emissions[1] (tCO_2e/year)	1,400	2,443	956	713	1,371
Energy Use Index[1] (EUI) (kWh/m^2/year)	9.6	23.8	10.4	8.2	14.1
Water Use Index (WUI) (m^3/m^2/year)	0.02	0.02	0.02	0.02	0.02
BC Hydro Booked Electricity Savings[4] MWh/year	1,200	1,743[2]	721[2]	600[3]	1,021
FortisBC Booked Natural Gas Savings[4] GJ/year	19,000	20,682[2]	13,884[2]	10,000[3]	14,855

1. GHG and EUI change in each year is based on net effect of energy reduction from all projects, divided by the total VIHA floor area of 550,934m^2. This includes impact of electricity or gas increases in some projects. It does not reflect the "booked" savings as booked savings are that which is only recognized by BCH or FBC on specific projects they fund.

2. Based on projects listed in the Q2 2020/21 Energy Management Accountability Report – reflects current incentive agreements and/or anticipated agreements.

3. Estimate only based on 3rd year of Multi-Year Plan as shown Table 10.

4. "Booked" electricity and natural gas savings are savings that BC Hydro and FortisBC recognize through one of their incentive or rebate programs. These savings do not directly reflect overall energy savings predicted in our plan because not all projects that we complete are recognized by BC Hydro or FortisBC, and some projects actually increase electricity use in order to lower natural gas, for example, a heat recovery chiller. Booked savings however is an important key performance indicator to track because it tells if we're meeting our obligations to these two funding agencies and it also reflects impact on EUI.

These goals are set using the SMART methodology, and while attainable, will not be achieved without operational changes and additional capital funding. The table below summarizes the incremental capital cost of projects in each year of the Multi-Year Plan as well as the predicted cost of GHG reduction from that investment. It's clear the cost to reduce emissions is currently escalating. (Refer to Table 10 in **Section 6. Multi-Year Plan**.)

	2020/21	2021/22	2022/23	Average
Incremental Capital Cost	$5,153,000	$3,964,000	$5,312,000	$4,810,000
Incremental Capital Cost/tCO_2e	$2,109	$4,147	$7,451	$4,569

In addition to our energy and environmental goals, the SEMP contributes in other more intangible ways such as improved occupant comfort, reduced maintenance costs, and improved infrastructure reliability. Examples include improved light quality and reduced maintenance costs associated with new LED technology, new heat recovery systems that offset natural gas while at the same time, providing improved air conditioning for occupants during hotter than normal summer days.

Table of Contents

1. Purpose

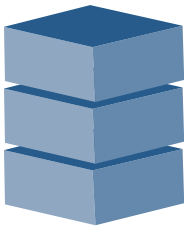
The Strategic Energy Management Plan (SEMP[1]) is our business plan for reducing greenhouse gas (GHG) emissions, energy consumption, water usage and utility costs. The SEMP:

- Sets our objectives and targets for this fiscal year (Plan)
- Provides a realistic plan for achieving them (Do)
- Tracks benchmarks to measure progress (Check)
- Identifies opportunities and areas for improvement (Act)

The SEMP shows where we are today, where we want to be in the future, and how we intend to get there. Quarterly reviews of the SEMP reveal if we are meeting our targets. If not, the Energy Department will work with our stakeholders to adjust the plan.

2. Organizational Alignment

Island Health has set a strategic framework that provides a road map for the organization and includes the following commitment:



To Increase Health System Value and Ensure the Sustainability of Health and Care Services (Island Health's Strategic Framework Goal #3)

Objective #3: *"We will advance environmental stewardship best practices in our buildings, services, processes and culture to ensure our environmental foot print is minimized"*

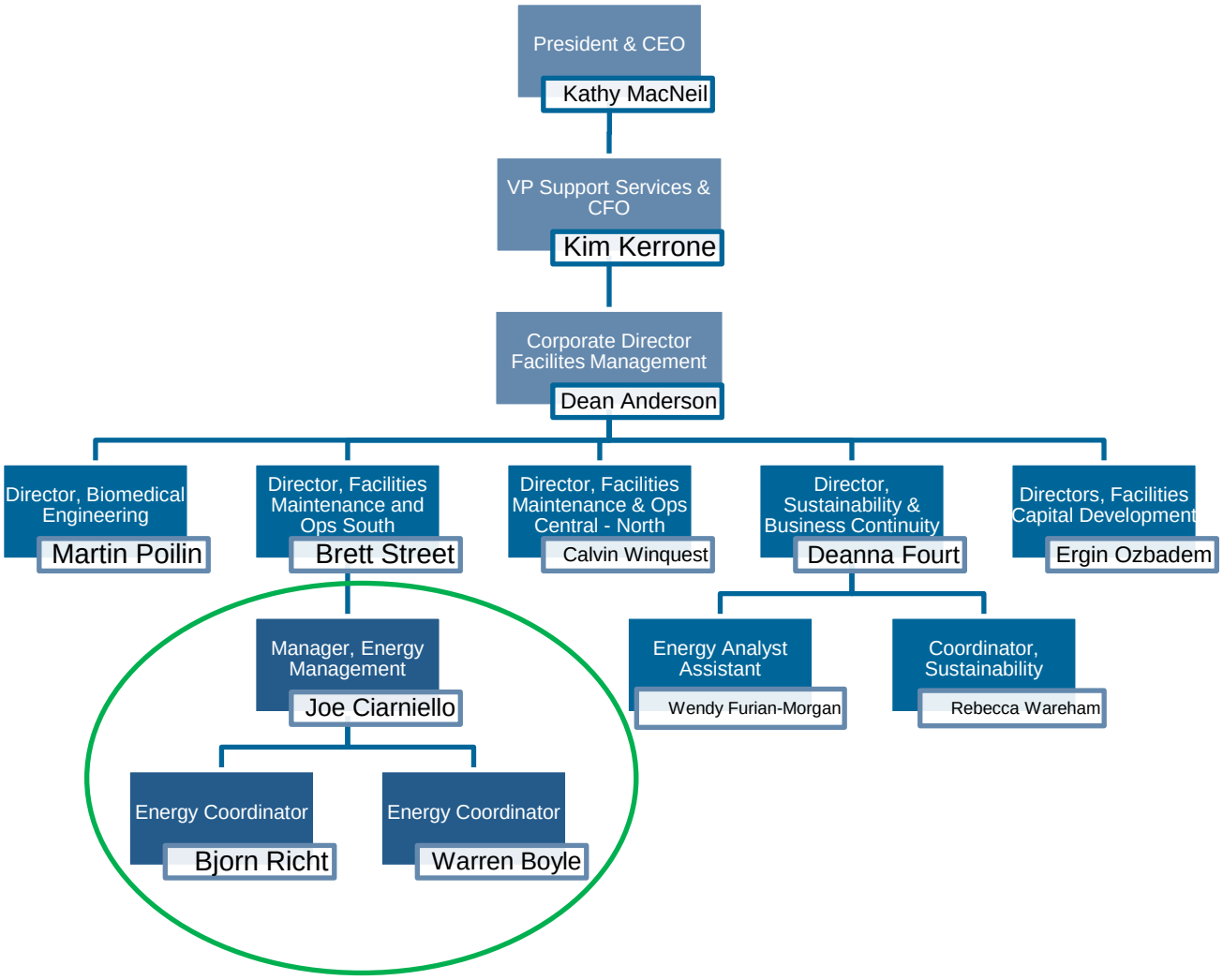
Island Health's Energy Department meets annually to establish goals in alignment with this framework as well as with BC Hydro and FortisBC to establish energy reduction targets, otherwise known as "booked savings".

Overarching these goals and targets are the BC Government's legislated GHG reduction targets for the province, enacted through the *Climate Change Accountability Act* (formerly the *Greenhouse Gas Reduction Targets Act*). More recently, through the CleanBC plan, the provincial government has set even more aggressive targets for the public sector requiring that we reduce our GHG emissions from buildings by 50% by 2030, as opposed to 40%.

[1] The SEMP includes the Energy Department's ***EEC Master Project List*** Excel file.

Organizational Chart

The Energy Management department has direct reporting to the director level of Island Health; this aligns with Island Health's commitment to the objectives of the Energy Management department.



Key Performance Indicators & Targets

Progress toward our goals is monitored and tracked using key performance indicators (KPIs) which provide an indication how well we're doing. There are five main KPIs we track in order to assess the success of our Strategic Energy Management Plan, as follows:

KPIs				
Total GHG Emissions (tCO_2e/year)	Energy Use Index (kWh/m^2/year)	Water Use Index (m^3/m^2/year)	Booked Electrical Savings (kWh/year)	Booked Natural Gas Savings (GJ/year)

Targets we are aiming for in each KPI are shown below. The first three are broken down into more manageable annual targets in Table 9.

Targets				
50% reduction by 2030, from 2010 levels	33.3% reduction by 2030 from F2008 levels	20% Reduction by 2030 from 2015 levels	1,200,000 kWh/year	19,000 GJ/year

3. How Are We Doing?

Energy projects are identified through several streams.

- The first is through the analysis of building operations by way of a detailed energy audit. These are often carried out by engineering consultants with many years of experience in building design and in identifying opportunities for energy reduction.
- The second stream is via the capital projects delivery team where an energy efficiency lens is applied to retrofit and replacement projects which are occurring as part of infrastructure renewal plans.
- A third stream is through our facility operators who really know our buildings best and their unique characteristics and opportunities.

Projects are then prioritized by:

1. End of Life or Risk of Failure (Immediate need vs pure efficiency improvement)
2. Fiscal Performance (O&M savings, marginal capital cost increase)
3. GHG reduction potential and energy savings

With projects identified and prioritized, more detailed analysis and costing is carried out to better quantify energy savings and project costs to minimize risks and uncertainty. Study costs are usually funded in whole or in part by

FortisBC, BC Hydro or the provincial government through the CleanBC plan. Once studies are complete and the project benefits have been confirmed, capital incentive funding applications are submitted to FortisBC and BC Hydro. When capital funding is approved, the project is then transitioned into the capital project delivery team who then manages the detailed design and construction process.

As projects are executed, the Energy Department supports the project teams and interfaces with operations to prepare for the new equipment and systems being installed. Once the project is complete and turned-over to operations, the Energy Department reviews operational data to confirm the energy savings align with targets; completes close out activities to finalize any rebate or incentive agreement requirements; and after implementation, ensures the calculated energy savings are "booked" by BC Hydro or FortisBC in order to measure progress towards meeting our contractual obligations to those agencies.

Our performance can be measured by trending our key performance indicators over time which is reported on in this plan. We evaluate the performance of individual projects based on avoided energy consumption, using new performance information, to estimate what energy use would have been if no changes were made. Performance can be normalized for changes in weather; however, capturing changes in building use and service/occupancy levels is not feasible. This should be contextually considered when reviewing this plan.

Note on Data: Due to a recently discovered limitation within the energy use database, total building area has been over reported in historical data, which has artificially lowered aggregated performance indices EUI and WUI. For F2020 this data has been corrected to more accurately represent actual historical performance for the entire Island Health building fleet. This correction reveals we've actually made more progress than previously thought.

Table 1. KPI Score Card

Goal	Baseline	Current Value (F2020)	Current Target (F2020)	2030 Target
GHG Emission Level **tCO_2e**	32,938	**30,484**	25,605	16,641
Energy Use Index (EUI) **kWh/m^2**	551	**463**	451	367
Water Use Index (WUI) **m^3/m^2**	1.82	**1.65**	1.72	1.46
Booked Electrical Savings (kWh/year)		**803,576**	600,000*	
Booked Natural Gas Savings (GJ/year)		**14,005**	13,900*	

*for F2020 only.

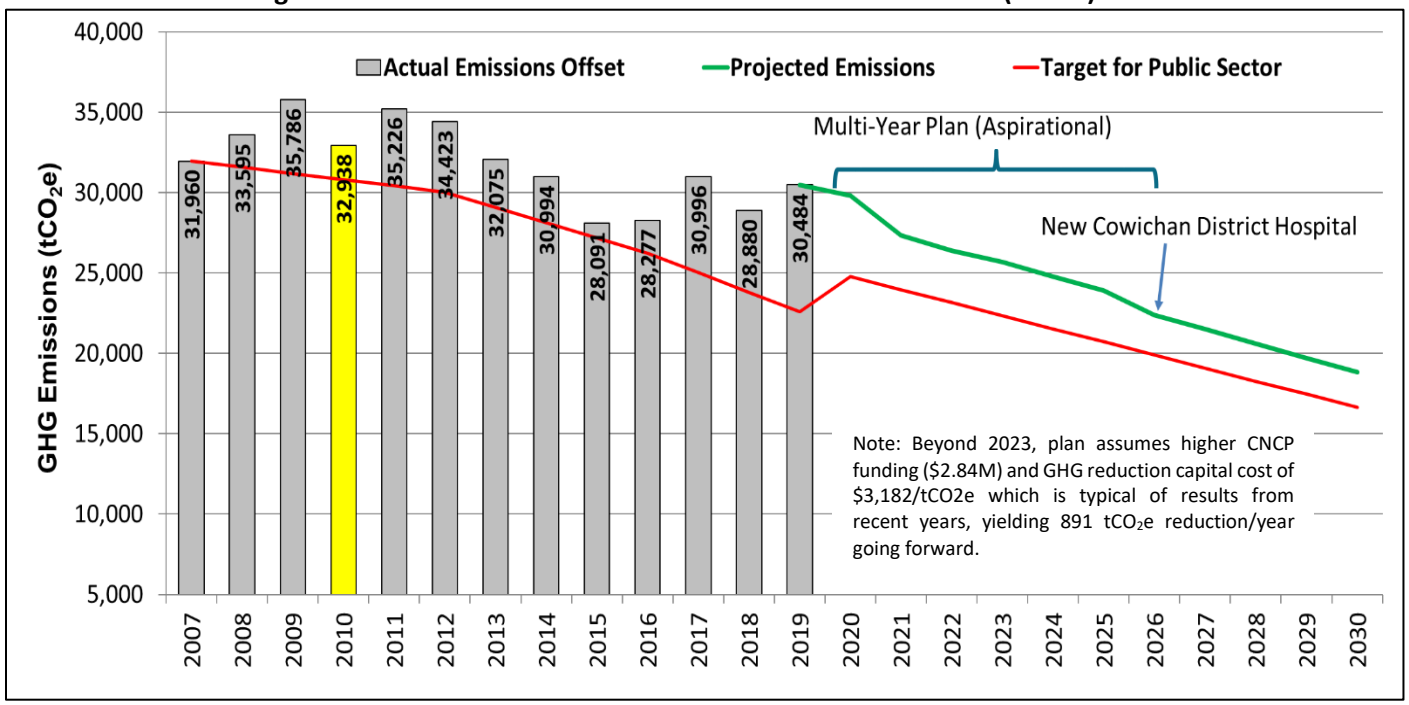
Highlights/Lowlights

Lowlight - GHG Emissions Reduction

Since 2007, the majority of Island Health's GHG emissions reduction has been achieved from capital investment in energy conservation measures at our owned sites. The heating plants in our buildings provide the heat to keep occupants warm, produce the hot water for hand washing, and steam for sterilization and humidification. While essential, our heating plants consume fossil fuels and produce 95% of Island Health's GHG emissions which contribute to climate change.

As shown below in Figure 1, our conservation efforts have had a positive impact as emissions have declined even as the organization has grown. The red line indicates the provincial emissions reduction target and the green line predicts where we will be with our current aspirational investment level as detailed in the Multi-Year-Plan. As of 2019 we achieved a total reduction a 2,454 tCO_2e from 2010 levels which is a modest 7.5% reduction. We should have achieved a 22.3% reduction by now in order to be on track for meeting the required of 50% reduction target by 2030, or total emissions of no more than 16,641 tCO_2e.

Figure 1 Island Health Offsettable Greenhouse-Gas Emissions (tCO2e)



With the addition of new building assets and expanded services across Island Health, our operational floor area has increased 25% and our FTEs has increased 38% since 2010. The addition of operational space and staff significantly increases overall GHG emissions, requiring even deeper efficiency and carbon reduction measures to meet the provincial targets.

Of All our GHG Emissions, 95% is associated with **buildings**, 3% with **fleet vehicles**, and 2% with **paper**.

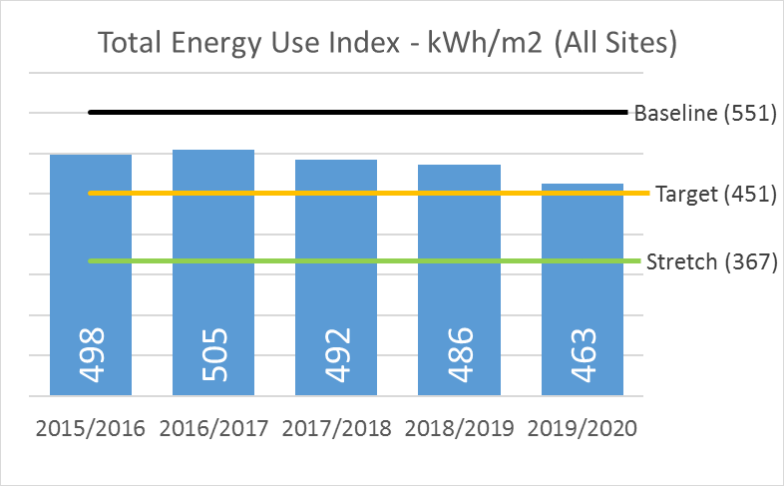
This document does not specifically address in detail GHG emissions reduction plans associated with our fleet or paper use. In general however Island Health is working to lower emissions from fleet through electrification and conversion from diesel to CNG (compressed natural gas). That means replacing passenger vehicles and light trucks that have reached end of life with new fully electric or hybrid models and switching from diesel to CNG for heavy trucks. Emissions associated with paper consumption is being lowered by reducing total paper consumption as well as procuring more paper that is made from 100% recycled content. Recycled paper has a lower GHG emissions associared with it than paper made from virgin wood pulp.

For the public sector, the target has been revised as of 2020 to a 50% reduction by 2030 from 2010 levels for buildings. This is a change from the original legislated target for the province of a 40% reduction by 2030 from 2007 levels. This explains the kink in the red target line in Figure 1 at 2020.

Highlight - Energy Use Index (EUI)

Island health has reached a new low for its total building energy use per unit floor area (EUI) having realized a 16% reduction from baseline in F2020.

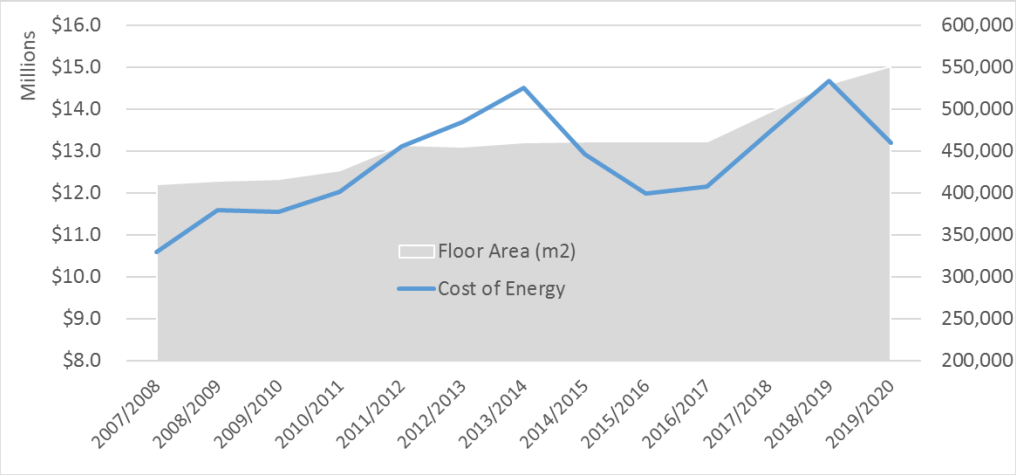
Figure 2. Energy Use Index - All Owned Sites Combined* (EUI)



*normalized for weather.

Figure 3 illustrates Island Health's expanding operations by way of increasing floor area. This highlights one of the challenges to achieving the 2030 target of 50% emissions reduction. Figure 3 also shows total energy cost and illustrates how metrics such as EUI are be a better indication of our performance since unit cost of energy is out of our control for the most part, as are changes in building use.

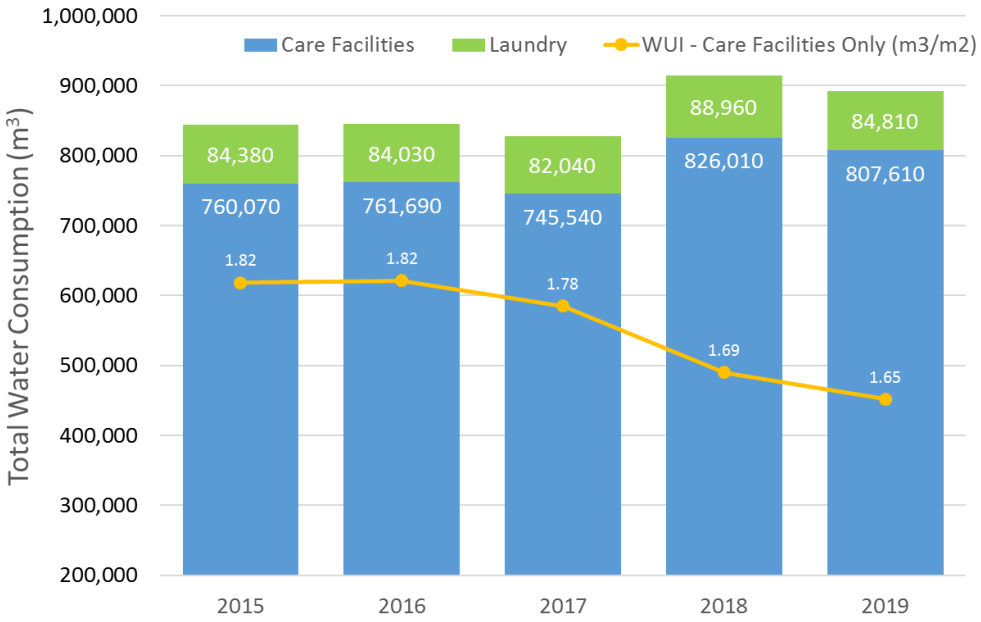
Figure 3. Floor Area and Total Cost of Energy



Highlight - Water Use Index (WUI)

Water use has seen a downward trend over the past five years. Figure 4 shows that our water use index (WUI) has reached a low of 1.65 cubic meters of water per square meter of building area. Our total water consumption was down year over year by 2.4% in 2019 equating to 22.6 million litres less water consumed.

Figure 4. Water Consumption and Water Use Index

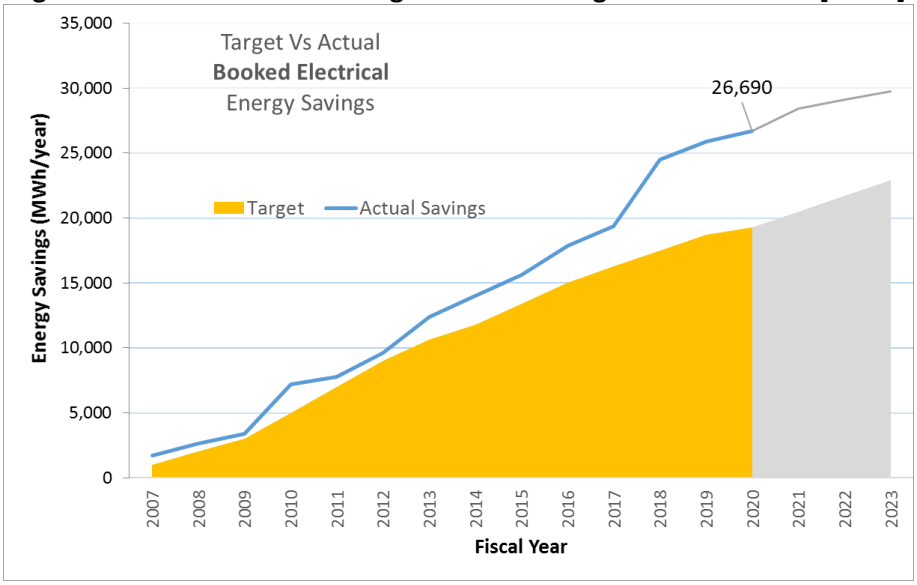


Water Use Index decreased **2.4%** because we used **22.6** million litres less

Highlight - Booked Electrical Energy Savings

Energy savings accumulated over time is more indicative of the energy management program performance, rather than savings achieved in any one year. A graphical representation of our performance against the BC Hydro target is shown in Figure 5 and demonstrates that Island Health continues to exceed BC Hydro savings expectations over the long term.

Figure 5. Actual Electrical Savings Booked vs Target F2007 – F2023 [MWh]

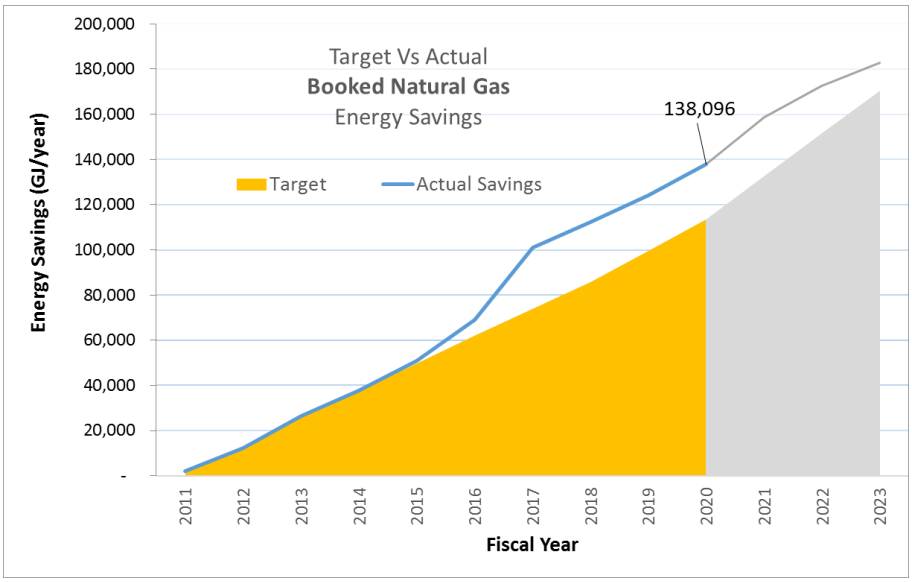


In F2020 the cost of a unit of electrical energy was $0.0843/kWh. This is a blended rate inclusive of all charges, taxes, fees and offset payments. Based on this rate and the cumulative impact of energy projects since F2007, we are currently avoiding $2,250,000 in annual electricity costs as a result of those projects.

Highlight - Booked Natural Gas Energy Savings

Natural gas savings are accounted for by FortisBC through a variety of their conservation programs. **Figure 6** below shows savings since F2011 and illustrates performance remains above target.

Figure 6. Actual Natural Gas Savings Booked vs Target F2011 – F2023 [GJ]



In F2020 the average cost of a unit of natural gas energy was $9.20/GJ. This is a blended rate inclusive of all charges, taxes, fees and offset payments. Based on this rate and the cumulative impact of energy projects since F2011, we are avoiding $1,270,000 in annual natural gas costs as a result.

When considering the impact of both avoided electricity and natural gas consumption from energy efficiency projects over the time-span shown in Figures 5 and 6, we are currently avoiding $3,500,000 in annual energy costs. This of course assumes that all past projects continue to deliver the savings predicted which may not necessarily be true so for that reason, these results could be overstating the avoide costs. However, these results do not include savings achieved through many other projects that have not been recognized by BC Hydro or FortisBC so for that reason, these results could also understate the actual impact of the energy management program. The authors therefore submit these results are in fact reflective of the program's benefits.

In F2020, the cumulative avoided cost of energy from **all** past energy **efficiency** projects reached $3,500,000/year

See Appendix D for the tabulated data in Figures 5 and 6.

Island Health Roll-Up

Figure 7 EUI and Cost of Energy

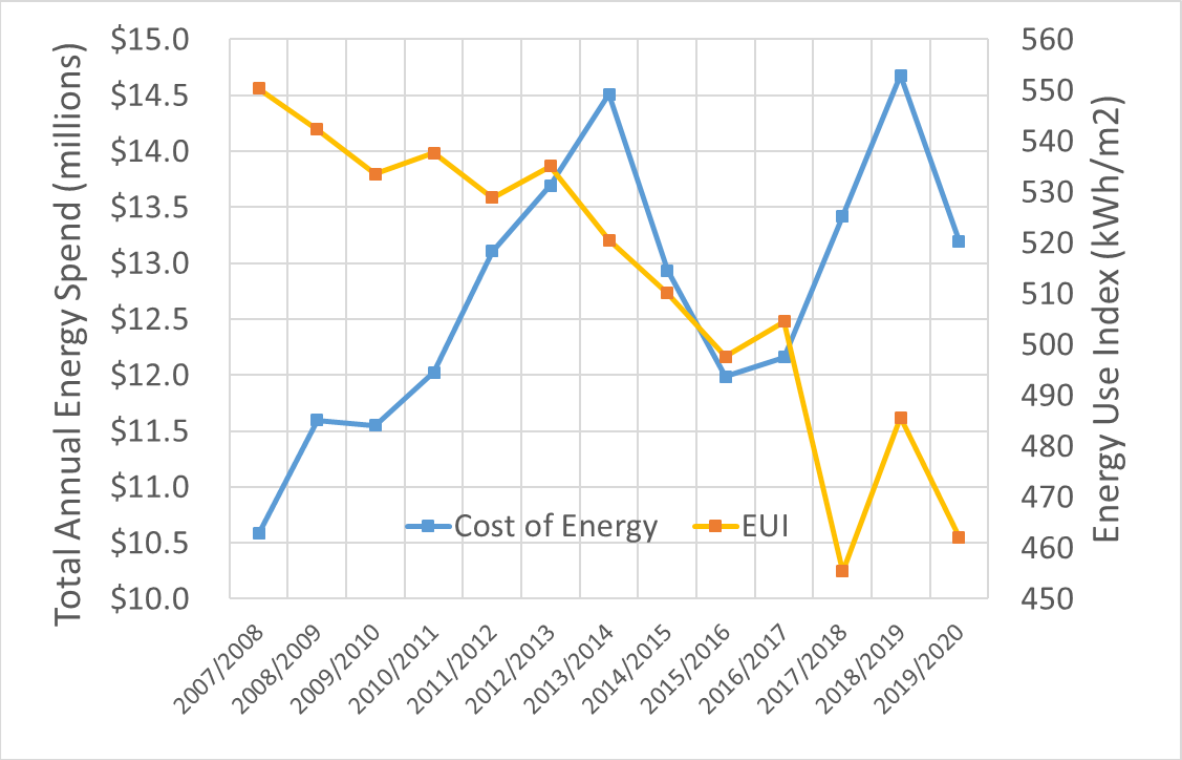


Figure 7 shows the trend of total energy spend compared to weather adjusted EUI. The cost of natural gas has fluctuated recently and contributed most significantly to the changes in total cost of energy. Independent to market influences on the price of energy, Island Health has worked to reduce the overall energy intensity of its building assets from 551 kWh/m^2 in F2008 to 463 kWh/m^2 last year for a 16% reduction (weather adjusted).

Energy intensity of buildings is 16% lower than it was in F2008

Our 2030 goal is to reduce EUI by 33.3% from F2008 to 367 kWh/m^2; while good progress has been made, a deeper focus on reducing gas consumption and increased operational excellence will be needed to get us there.

Island health continues improving the operational efficiency of its building assets, driving down EUI, the best measure of long term continual improvement of building energy efficiency. As Island Health improves and expands service delivery and quality, it's appetite for energy grows however. With 2030 now less than 10 years away, the challenge of GHG reduction has been set and we must rise to meet it. Incremental improvements will not get us there, and the energy management program has an opportunity to focus on deep retrofits, fuel switching, and operational efficiency improvements to accelerate our progress.

4. GHG Reduction - What Will it Take?

To meet the target of a 50% GHG reduction by 2030, Island health must cut emissions on average by roughly 1,400 tCO_2e each year. To achieve this, additional investments will need to be made in three areas at least.

Optimize Existing Assets	•Launch an aggressive continuous optimization program facilitated by a new Building Controls Engineer and budget for parts and labour to optimize existing building systems
Efficiency & Electrification	•Replace older equipment with new more efficient models •Retrofit mechanical systems to more efficient designs •Where feasible, use heat pumps which can substantially lower the requirement for fossil fuels
Deep Retrofits	•Convert to lower temperature heating systems •Upgrade building envelopes
Renewables	•Switch to biomass fuels at off-gas-grid sites •Secure RNG for 2030 and beyond to cover shortfall in GHG reduction

With regard to what happens beyond 2030, we may need to consider increased operational funding to purchase renewable natural gas (RNG) at $115k/year for each 1,000 tCO_2e we are short of the target based on today's prices. That could mean $300,000 to $500,000 additional annual operating costs, assuming current reduction trends are maintained without additional funding. This cost could in fact exceed $500,000 considering future RNG cost increases and potential shortfall given diminishing returns on GHG reduction investments.

To be effective in achieving results in these areas, the following needs to be addressed.

Funding

Total funding to achieve our goal will need to be between $2.8 Million and $5.6 Million annually. This is an order of magnitude estimate for the cost to achieve our carbon reduction targets. It is based on a cost ranging from $2,000 to $4,000 per tCO_2e. In recent years, projects targeting GHG emissions have achieved reductions at a cost of $3,100/$tCO_2e$. The incremental cost of carbon reduction measures could be lowered with a more strategic focus during asset replacement.

Policy

To create a more accurate estimate of the cost to fully realize carbon reduction targets Island Health needs to create an energy policy to guide decision making. The energy policy can establish what type of projects are most efficient in terms of $/$tCO_2e$ and how project alternatives should be evaluated, specifically in terms of future cost of fuel or carbon.

Projects

Longer term the Energy Department and Stakeholders need to identify more projects that can substantially lower GHG emissions. This goes hand-in-hand with the additional capital funding of course and is our best hope for achieving our GHG reduction goals. At present, because of the lack of capital for infrastructure renewal we are leveraging funding that is available through the Ministry of Health's Carbon Neutral Capital Program (CNCP) to both lower emissions and renew infrastructure. Although these projects qualify for CNCP funding, some don't necessarily reduce emissions to a great extent. The current situation can be characterized as one where we are trying to address multiple needs with limited capital but not necessarily maximizing GHG reduction.

irrespective of **funding**,
current project development process **cannot** meet
1,400 tCO_2/year target longer term

Taking a systematic approach, i.e. we will replace all rooftop air handling units with electrified versions; can enable the strategic development of projects to maximize CNCP funding for its intended purpose, regardless equipment lifecycles.

5. Facility Benchmarks

To prove the performance of efficiency measures and identify opportunities for improvement, it is important to evaluate individual building energy performance over time; this illustrates how each facility is currently performing against its benchmark and its performance relative to other similar facility types within the organization.

Buildings are grouped by facility type, based on their health care purpose. The total energy use represents electricity and fossil fuel consumed to meet building needs for heating, cooling, lighting, ventilation, domestic hot water, clinical functions and process loads. Clinical functions include medical imaging and laboratories. Process loads include elevators, space humidification, sterilization and food service kitchens. Backup boiler and generator fuels are not included here. These figures have been weather corrected except where noted.

(See Appendix B for a complete list of Site Acronyms and Definitions.)

Large Acute Care

Large Acute Care have unique requirements and provide the most services. Our Large Acute Care facilities consume the most energy of all our buildings, accounting for 74% of all consumption in F2020.

Figure 8. Large Acute Care F2016 to F2020 EUI Performance (kWh/m2)

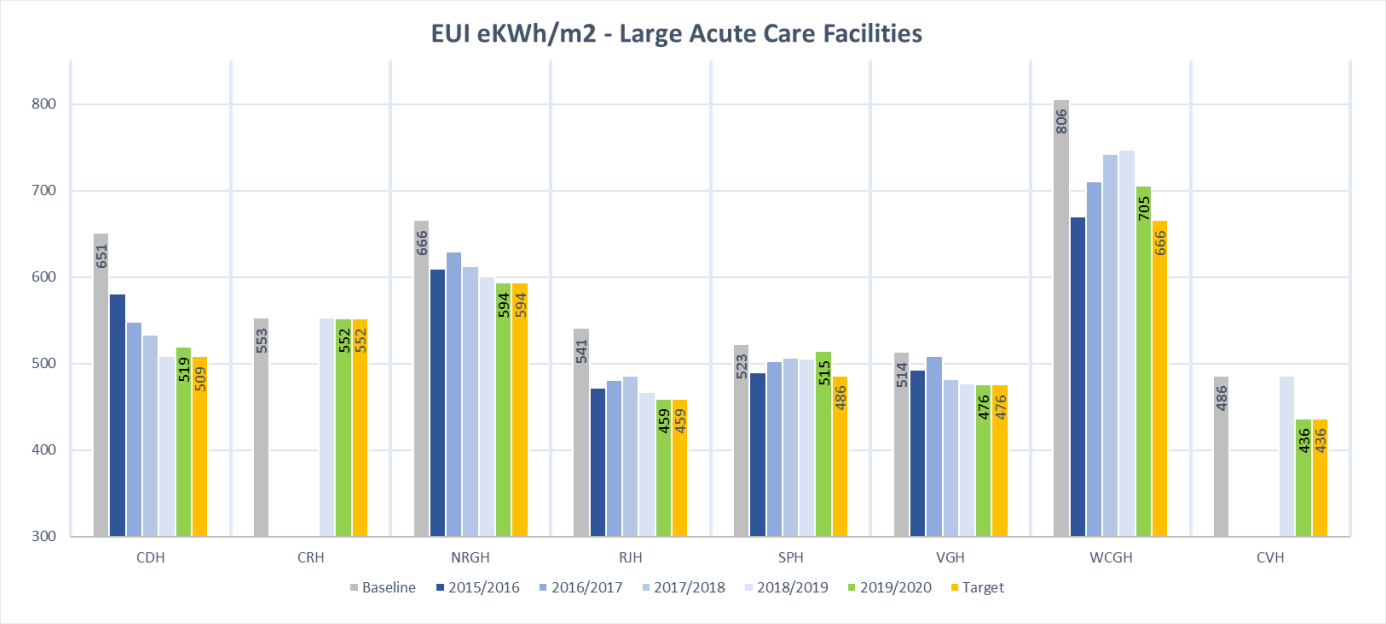


Table 1. Large Acute Care for F2020

Facility	Floor Area [m2]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Total CI [$/m2]	Emissions [tCO2e]
CDH	16,498	3,205,592	5,357,298	519	$25	996
CRH	31,905	11,416,880	6,208,229	552	$34	1,236
NRGH	54,440	13,520,432	18,799,298	594	$29	3,425
RJH	155,304	26,787,642	44,552,919	459	$22	8,096
SPH	14,647	3,546,579	3,992,111	515	$28	754
VGH	49,554	9,198,531	14,372,936	476	$23	2,678
WCGH	14,117	4,142,477	5,816,604	705	$36	1,088
CVH	39,028	12,939,450	4,093,925	436	$30	873

Long Term Care

Long Term Care facilities are the second highest consumer of energy. These facilities are not as energy intense as hospitals, focusing instead on providing a home-like environment for residents. Long Term Care facilities consumed 12% of our total energy in F2020.

Figure 9. Long Term Care F2016 to F2020 EUI Performance (kWh/m²)

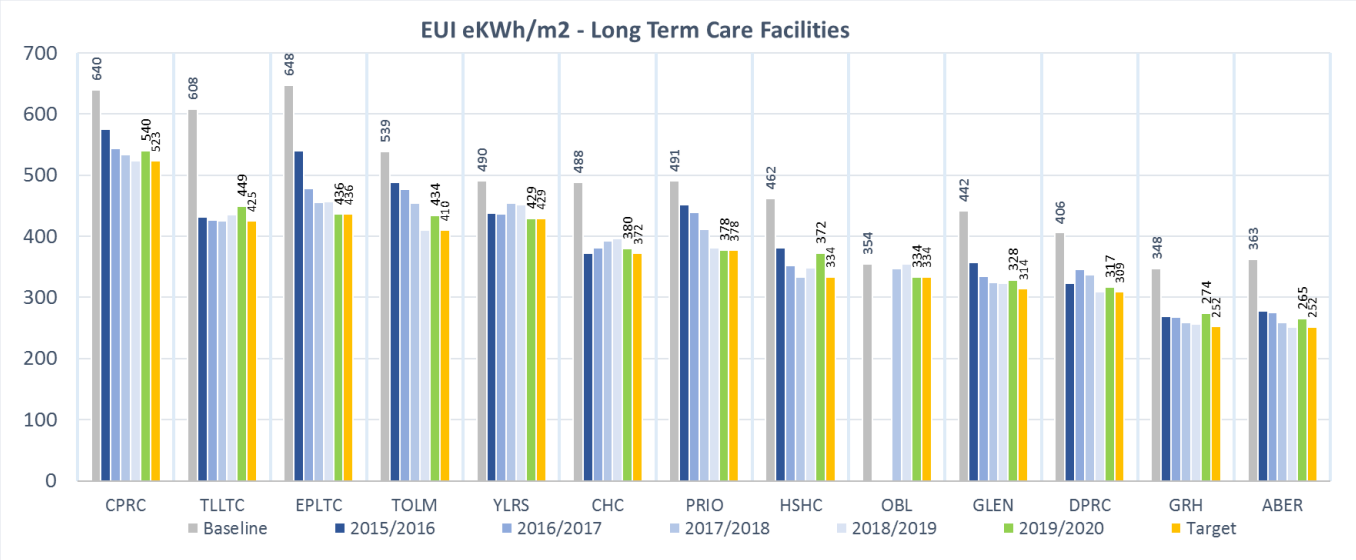


Table 2. Long Term Care Facilities for F2020

Facility	Floor Area [m2]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Total CI [$/m2]	Emissions [tCO2e]
CPRC	3,662	611,262	1,365,761	540	$27	252
TLLTC	4,651	1,950,716	139,067	449	$25	46
EPLTC	4,000	511,769	1,232,112	436	$20	227
TOLM	2,629	204,592	935,412	434	$18	170
YLRS	5,467	734,348	1,611,243	429	$19	297
CHC	5,328	807,799	1,214,901	380	$20	227
PRIO	7,149	830,539	1,868,243	378	$19	344
HSHC	1,600	279,008	316,254	372	$26	60
OBL	14,381	1,266,591	3,535,661	334	$15	648
GLEN	7,609	799,605	1,699,383	328	$15	314
DPRC	6,928	703,759	1,492,428	317	$16	275
GRH	17,517	1,022,303	3,780,205	274	$11	689
ABER	9,726	1,142,016	1,438,868	265	$14	270

Small Acute Care

Small Acute facilities are mostly located in and serve rural communities. They consumed 2% of our total energy in F2020.

Figure 10. Small Acute F2016 to F2020 EUI Performance (kWh/m²)

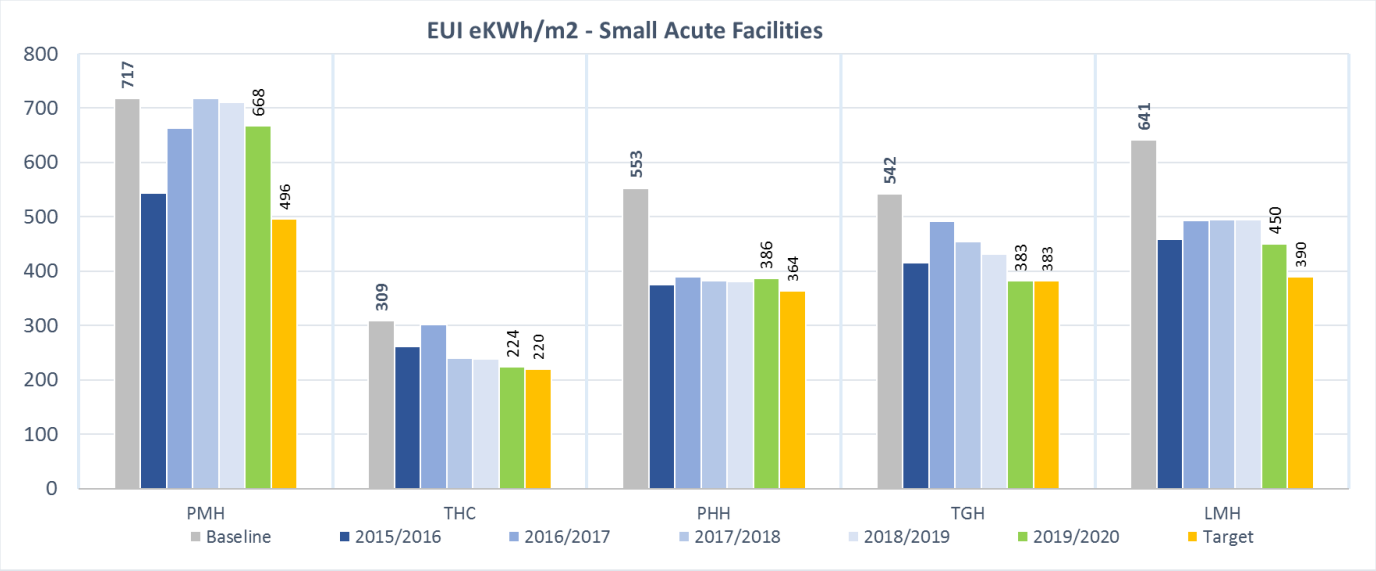


Table 3. Small Acute Care for F2020

Facility	Floor Area [m2]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Total CI [$/m2]	Emissions [tCO2e]
PMH	1,176	370,747	414,404	668	$89	94
THC	381	85,298	0	224	$28	1
PHH	4,463	1,601,545	122,261	386	$26	49
TGH	1,700	286,028	364,676	383	$43	98
LMH	3,981	721,278	1,069,939	450	$55	240

Office/Outpatient Facilities

These facilities have been grouped together due to their similar usage profiles. Operating typically during weekday office hours only, these facilities consume the least amount of energy within our portfolio. Office/Outpatient facilities consumed 1% of our total energy in F2020.

Figure 11. Office/Outpatient F2016 to F2020 EUI Performance (kWh/m²)

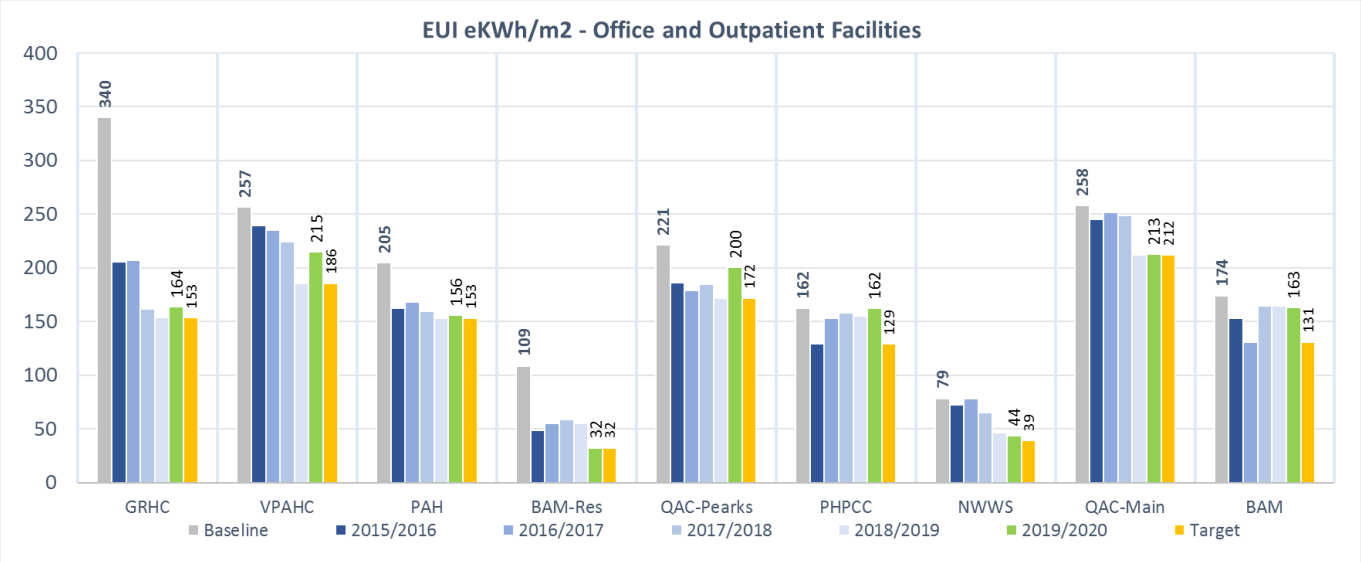


Table 4. Office/Outpatient F2020

Facility	Floor Area [m2]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Total CI [$/m2]	Emissions [tCO2e]
GRHC	799	130,668	0	164	$21	1
VPAHC	1,181	133,212	120,719	215	$17	23
PAH	468	72,990	0	156	$20	1
BAM-Res	278	9,002	0	32	$4	0
QAC-Pearks	3,905	201,469	581,258	197	$10	106
PHPCC	475	77,159	0	162	$21	1
NWWS	1,858	77,386	3,600	44	$5	1
QAC-Main	8,909	675,873	1,219,954	213	$11	226
BAM	700	81,205	32,857	163	$23	8

Mental Health

These facilities serve a variety of patients who require mental health and substance use services. These facilities consumed 2% of our total energy in F2020.

Figure 12. Mental Health F2016 to F2020 EUI Performance (kWh/m²)

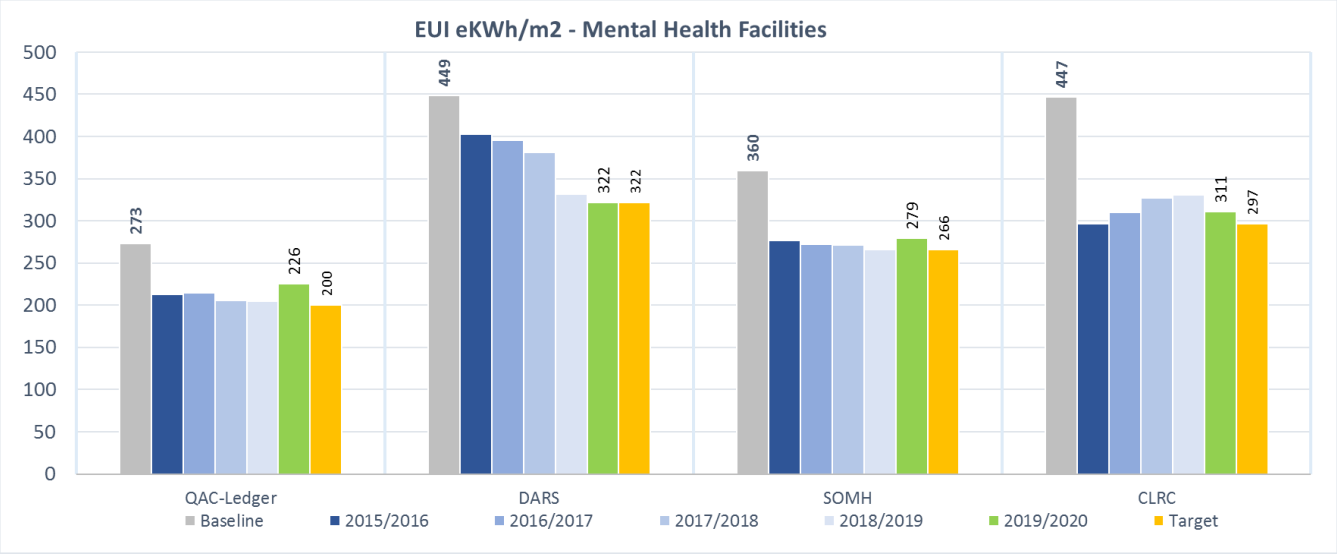


Table 5. Mental Health F2020

Facility	Floor Area [m2]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Total CI [$/m2]	Emissions [tCO2e]
QAC-Ledger	2,772	230,500	395,415	226	$14	73
DARS	1,733	151,718	406,429	322	$19	75
SOMH	3,497	357,229	618,660	279	$17	115
CLRC	5,440	616,397	1,076,581	311	$16	200

Health Centres

These facilities serve patients on a short term, primary care or urgent care basis. Health Centres used 2% of our total energy consumption in F2020.

Figure 13. Health Centres F2016 to F2020 EUI Performance (kWh/m²)

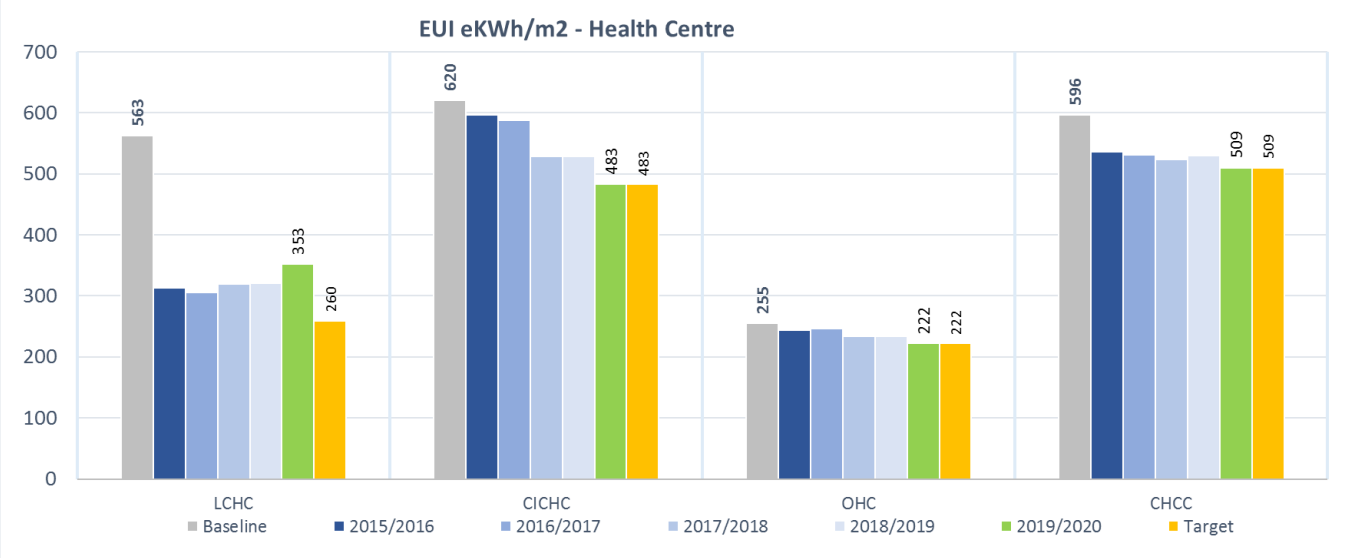


Table 6. Health Centre F2020

Facility	Floor Area [m2]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Total CI [$/m2]	Emissions [tCO2e]
LCHC	3,348	432,980	747,373	353	$21	139
CICHC	2,129	442,196	586,386	483	$64	132
OHC	3,638	563,160	244,377	222	$16	50
CHCC	5,116	865,133	1,740,969	509	$23	322

Laundry Facilities

Laundry facilities are unique because their energy use is primarily driven by the amount of laundry processed. There is a small amount of energy used to maintain space comfort and make hot water for domestic use. In total, the two laundry facilities, Cumberland Regional Laundry and Victoria General Hospital Laundry, combined used more than 7% of what all energy we used in F2020.

Figure 14. Laundry Facilities F2016 to F2020 EUI Performance (kWh/kg of laundry)

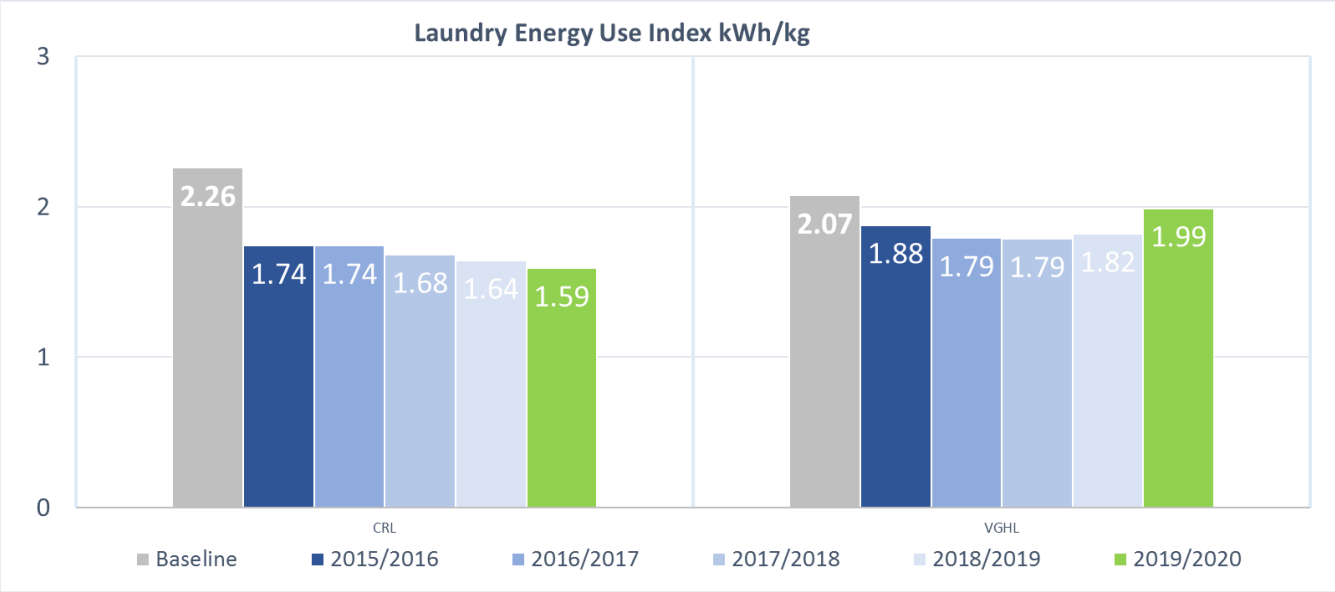


Table 7. Laundry Facilities F2020

Facility	Laundry [kg]	Electricity [kWh]	Fossil Fuel [kWh]	Total EUI [kWh/m2]	Emissions [tCO2e]
CRL	3,368,074	523,445	4,834,542	1.59	873
VGHL	5,937,260	1,985,441	9,823,536	1.99	1785

(This laundry data is not weather adjusted.)

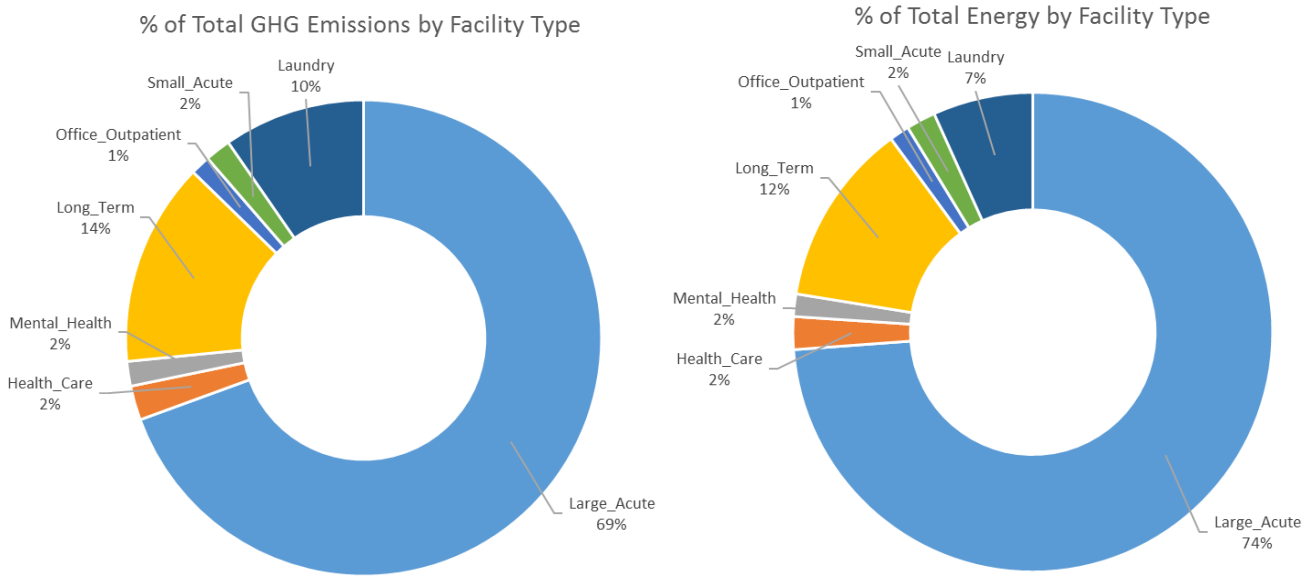
New Island Health Facilities

A new hospital is being planned for the Cowichan Valley to replace the existing Cowichan District Hospital. The business plan having been submitted to the province for approval, the project is now moving into the final stages of indicative design and detailed output specifications. Once the project is approved by the province, it will move to the procurement stage for detailed design in F2022 with construction anticipated to start in F2023 and occupancy expected in F2026. The new hospital will be located on a greenfield site, will be designed to achieve LEED Gold certification, and will target additional levels of energy efficiency and GHG emissions reduction beyond what LEED requires. Specific design features to reduce energy consumption and GHG emissions have yet to be finalized and approved but will include electrification of some equipment and advanced heat recovery systems to minimize natural gas requirements. It will also likely include a large solar electric array on the roof to help offset purchased electricity and lower daily peak demand. The project has been enrolled in both FortisBC's Commercial New Construction (CNC) program as well as the province's CleanBC CNC program. It is anticipated that incentives from these programs will help offset the extra cost associated with more energy efficient design features.

Focus Areas

Our efforts continue to focus on opportunities which have the greatest potential to reduce energy consumption and GHG emissions. As always the facility type which is the largest consumer of energy is our large acute care centres which accounted for 74% of Island Health's total energy consumption in F2020. Figure 15 **Total GHG and Total Energy Use by Building Type** shows what share of the total emissions and energy consumed by each different facility type. Large Acute Care centres have both the largest total energy consumption and largest total GHG emissions. Figure 15 **Total GHG and Total Energy Use by Building Type** also illustrates the close link between energy consumption and GHG emissions.

Figure 15 Total GHG and Total Energy Use by Building Type (%)



Large Acute care centres also have the highest energy use index of any other building type within Island Health, followed by Small Acute Care centres and Health Care centres, as shown in Figure 16.

With both the highest overall energy use and the highest EUI, Large Acute Care centres will continue to be a main focus for energy projects in F2021. Long Term Care facilities will also be a focus, with a relatively high EUI, they are the second largest consumers of energy at Island health at 12%. Finally, Small Acute care centres, while a small contributor to total energy use, through geographic constraints they have almost double the energy cost per building area compared to a Large Acute Care centre as seen in Figure 17 below.

Figure 16 EUI by Building Type F2016 to F2020 (kWh/m²)

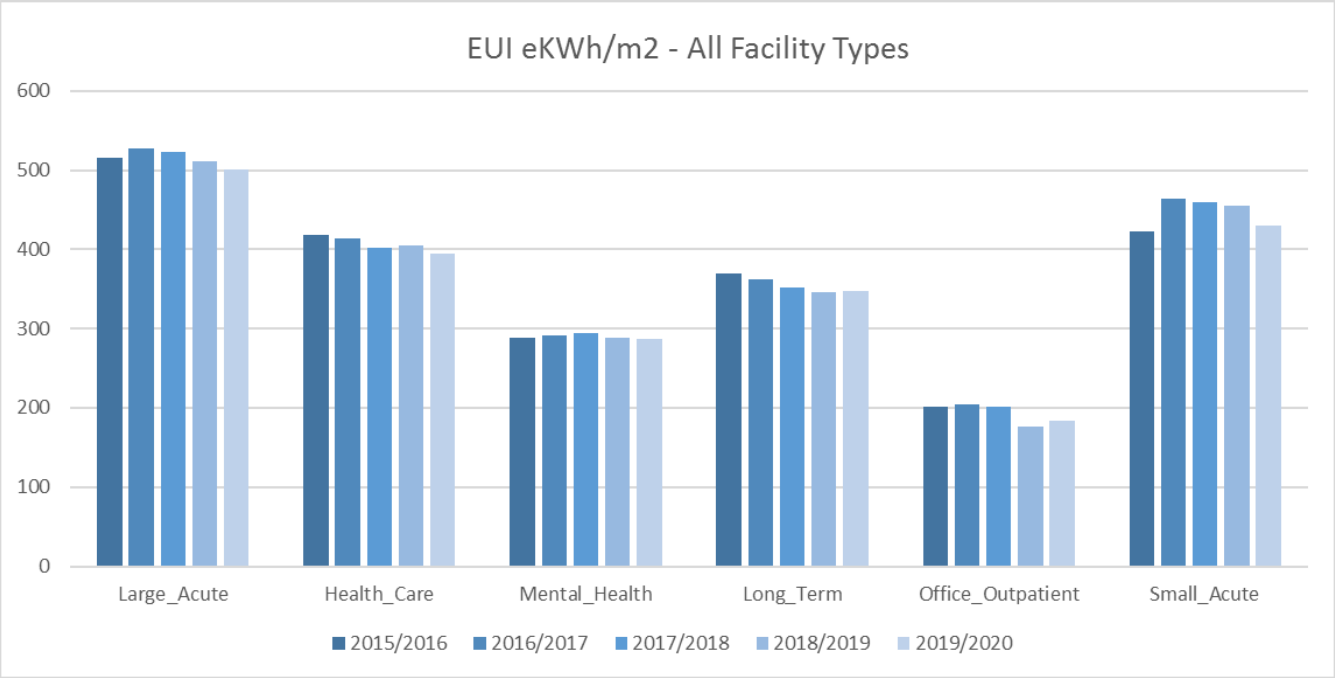
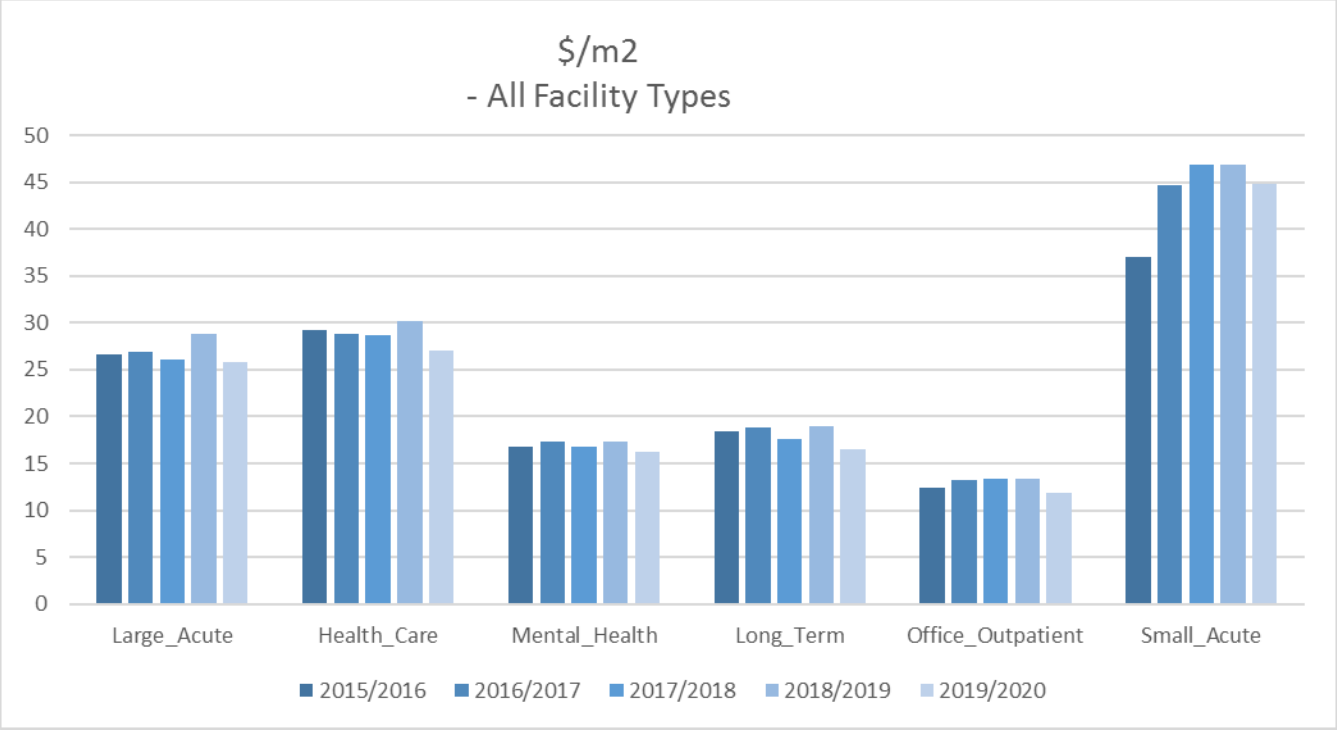


Figure 17 Energy Cost Index by Building Type F2016 to F2020 ($/m²)



6. Multi-Year Plan

Each year, Island Health's energy team updates the Multi-Year Plan (MYP), an integral part of the SEMP, through focused strategic planning sessions. The MYP identifies electrical and fossil fuel energy savings and resultant GHG emissions reduction from currently approved capital projects and projects proposed in future years. The MYP evolves as new and potentially better opportunities are uncovered through energy studies and advances in technology. The MYP is a component within the Master Project List (MPL), which is used to strategically develop projects that help us meet our KPI targets and achieve our goals. The KPI targets for F2021 are set as shown in Table 8 here. The results expected from the projects listed in the MYP are shown in columns two to four with last column providing the average of the three years.

Table 8. KPI Multi-Year Plan Projected Results

Goal	Annual Target	F2021	F2022	F2023	Average
GHG Emission Reductions[1] tCO_2	1,400	2,443	956	713	1,371
Electricity Savings MWh	1,200	1,743[2]	721[2]	600[3]	1,021
Natural Gas Savings GJ	19,000	20,682[2]	13,884[2]	10,000[3]	14,855
Energy Use Index Reduction[1] (EUI) kWh/m^2	9.6	23.8	10.4	8.2	14.1
Water Use Index Reduction (WUI) m^3/m^2	0.02	0.02	0.02	0.02	0.02

1. GHG and EUI change in each year is based on net effect of energy reduction calculated for each project, divided by the 2020 total VIHA floor area of 550,934m^2. It includes impact of increases in electricity or gas in some projects. It does not reflect the "booked" savings – that's just savings recognized by BCH or FBC on only specific projects they support.
2. Based on projects listed in Q2 2020/21 Energy Management Accountability Report
3. Estimated based on 3rd year of Multi-Year Plan as shown below.

Table 10. Multi-Year Plan Detailed Project List

Fiscal Year	Program Type	Project Name	Electrical Energy Savings [kWh/yr]	Fossil Fuel Savings [GJ/yr]	Greenhouse Gas Savings [tCO2e/yr]	Incremental Project Costs [$]
2020/21	BOILER	ABH - Boiler 2 Replacement	0	292	15	$ 65,258
	CON-OPS (BCH)	WCGH - Continuous Optimization - BCH$	90,000	243	13	$ 68,898
	CON-OPS (BCH+FBC)	RJH - Phase III Continuous Optimization - Implementation	1,089,900	13,050	662	$ 397,200
	CUSTOM (FortisBC)	RJH - EMP Return Air Conversion - FBC$ - CNCP	-49,012	3,276	163	$ 360,000
		RJH - PCC HVAC Conservation Measures - Heat Wheel	0	115	6	$ 1,900
		RJH - PCC HVAC Conservation Measures - FBC Gas Savings	0	4,945	247	$ 36,651
		NRGH - New Thermal Energy Plant	0	2,975	148	$ 779,434
		NRGH - Non-Condensing Ecomonizer	0	2,177	109	$ 121,333
		NRGH - O2 Trim System with Cumbustion Fan VFD	101,272	502	26	$ 51,637
	NEW CONSTRUCTION	The Summit @ Quadra Village	-3,504,443	-7,436	-408	$ 716,900
	PROGRAM ENABLED	RJH - PCC HVAC Conservation Measures - BCH Progam Enable	473,000	0	5	$ 45,955
	VIHA FUNDED	SPH - AHU Fan Motor Replacement and VFD Addition	171,000	0	2	$ 76,950
		RJH - D&T Heat Recovery Chiller - Phase 2 - CNCP	748,235	628	39	$ 1,280,000
		RJH - D&T Heat Recovery Chiller - Phase 3 - CNCP	-1,002,459	12,117	594	$ 1,133,000
		OBL - Decant & Transfer Builidng to CRHD	1,378,084	16,201	823	
	WATER HEATER	SOMH - House 3 Demand DHW Heater	0	3	0	$ 17,672
		2020/21 Total	**-504,423**	**49,088**	**2,443**	**$ 5,152,787**
2021/22	CUSTOM (BC Hydro)	CHC - Lighting Upgrade - BCH$	126,642	0	1	$ 130,724
		NRGH - Upgrade Kitchen Refrigeration Systems	150,000	0	2	$ 50,000
	CUSTOM (BCH+FBC)	RJH - West Block 4 Biomedical Engineering Relocation	25,352	973	49	
	CUSTOM (FortisBC)	CPRC - Boiler & DHW Systems Renewal – CNCP	18,238	856	43	$ 115,000
		GRH - Pneumatic to Electric Controls Conversion - CNCP	123,838	1,238	63	$ 100,000
		VGH - DHW System Renewal	991	426	21	$ 642,000
		SPH - DHW System Renewal & Optimization – CNCP	11,300	525	26	$ 125,000
	VIHA FUNDED	TLLTC - Electric Boiler Replacement	1,210,339	-5,215	-247	$ 150,000
		RJH - Chiller Plant - AFD for 1000 Ton Chiller Add 24/7 Loads	246,570	0	3	$ 160,000
		WCGH - Pipe Insulation	0	541	27	$ 35,000
		EPLTC - Pipe Insulation	0	78	4	$ 7,000
		NRGH - Heat Recovery on EF2 and New OR Exhaust	-380,000	4,637	227	$ 75,000
	CleanBC Custom	YLRS - Heat Pump Installation - CNCP	-190,200	3,720	183	$ 1,925,000
		GRH - UPCC Heat Pump AHU	-173,183	1,975	97	$ 143,134
	CleanBC Lite	CICHC - Heat Pump DHW System (reduces propane) - CNCP	-25,079	542	33	$ 40,600
		NRGH - Hydrotherapy Heat Recovery AHU – CNCP	-45,000	2,057	102	$ 100,000
		NRGH - Lab AHU Replacement	-610,125	6,582	322	$ 165,703
		2021/22 Total	**489,683**	**18,935**	**956**	**$ 3,964,161**
2022/23	CUSTOM (BC Hydro)	PHH - Lighting Upgrade - BCH$	124,058	0	1	$ 99,000
		RJH - PCC Stairwell Bi-level Lighting	45,000	0	0	$ 22,000
	CUSTOM (BCH+FBC)	GRH - Envelope Upgrade (Window Replacement)	0	630	31	$ 1,000,000
		VGH - Phase 3 Zoning & Scheduling	0	3,079	154	$ 350,000
	CUSTOM (FortisBC)	SPH - Pneumatic to Electronic Control Conversion - CNCP	116,383	1,164	59	$ 116,500
		VGH - Eliminate Glycol HXs, Convert to 2-way Valves & Variable Flow Heating - CNCP	249,422	1,971	101	$ 500,000
	VIHA FUNDED	CHCC - Replace Main Heating Boilers - FBC$ - CNCP	0	563	28	$ 111,800
		CLRC - Replace RTUs with HRV and Heat Pumps - CNCP	-8,600	1,410	70	$ 250,000
		NRGH - Pipe Insulation	0	1,430	71	$ 70,000
		CPRC - Pipe Insulation	0	128	6	$ 6,000
		NRGH - Rehab AHU Renewal Phase 1 & 2 of 6	-48	1,234	62	$ 1,337,926
	(blank)	DARS - Boiler & DHW Plant Renewal with Electrification - CNCP	-9,600	1,100	55	$ 199,200
		RJH - EMP L1 South HVAC Upgrade - CNCP	68,532	1,354	68	$ 550,000
	CleanBC Custom	QAC-Pearkes - Boiler Plant Renewal or Electrification - CNCP	0	110	5	$ 700,000
		2022/23 Total	**585,147**	**14,173**	**713**	**$ 5,312,426**

The Master Project List also allows the Energy team to keep track of the status of all active and potential projects, and in particular, the expected and actual return on investment; this enables the team to identify whether there are sufficient projects underway to meet the objectives and targets of this SEMP. If not, the team uses the MPL to revise the plan in order to ensure objectives are met.

The MPL is used to capture any and all ideas to be evaluated each year should the business case change. This ensures we do not lose sight of opportunities and that we have a healthy source of new ones to draw from as funding is made available.

Budgets shown in the first year of the MYP have already been approved. Capital requests have been submitted for projects in future years but approval is uncertain at this time. Projects that are approved will be identified and funds released at the start of each fiscal year.

Projects highlighted in yellow fall into the "low carbon electrification" category and may qualify for current provincial incentives under the new CleanBC program.

7. Risks & Challenges

There are several risks that need to be considered in planning and executing towards the goals of this SEMP, as follows.

Table 9. Risk Matrix

Risk	Mode	Impact	Response
Increasing Building Use Hours or Occupancy	Increases EUI of buildings, offsetting positive impact of energy efficiency measures	LOW: Not able to meet EUI reduction goal	Accept: Higher asset utilization is a good thing when paired with an increase in health care capacity. If there is a large change we can evaluate the possibility of normalizing data.
Growth of Operational Area	Increases total energy use offsetting positive impact of energy efficiency measures	LOW: Facility Area growth is expected to be at least 5% over the next 10 years	Accept: Additional operational area can be quantified. However new buildings should be designed to have zero net GHG emissions.
Locking In to Fossil Fuel Infrastructure	Installing new boilers locks in fossil fuel consumption and required offset payments for the life of the new equipment	HIGH: Prevents deep reductions in GHG emissions required to meet goal	Avoid: New energy policy should be structured to minimize the types and quantity of natural gas consuming equipment installed
New High Efficiency Boiler Efficiency Realization	High efficiencies are only realized during specific operating conditions	LOW: Operational savings required to offset additional cost might not be realized	Mitigate: Ensure that required design modifications are completed to allow boilers to operate at design efficiency. May result in additional capital cost for modifications.

Risk	Mode	Impact	Response
Renewable Natural Gas Availability and Cost	RNG is currently fully subscribed and not available for purchase. RNG cost is $7/GJ higher than regular natural gas, or roughly 300% more.	MED: Some RNG in our gas supply will be required if we don't meet our GHG reduction targets	Avoid: The additional cost of RNG should be considered when evaluating energy efficiency and fuel switching project alternatives to properly price the future cost of fuel.
Deteriorating Performance of Existing Assets **(was Persistence)**	Existing building systems operating in an inefficient manner due to failing equipment and sub-optimal control sequences.	MED: Lowest cost approach to improving energy efficiency and lowering GHG emissions is to make the most of the assets we currently have.	Mitigate: A sustained and substantial increase in effort to optimize existing building systems is required.
Limited Capital	Major retrofits of existing facilities, as well as other measures, will be required to achieve the GHG reduction goal and these are costly.	MED: Capital will always be limited.	Mitigate: Leverage all facilities capital projects to lower energy and GHG emissions by ensuring the most efficient equipment and system designs are adopted. Advocate to the MoH for higher levels of CNCP funding.

8. Energy Studies & Other Professional Services

Table 12a lists energy studies and other professional services Island Health undertook in F2020. Table 12b shows the program under way in F2021. Studies hone in on specific opportunities or more specialized initiatives and may also be completed for sites which have not had an energy study in the last three to four years and have a high EUI or high total energy use.

On average the Energy Department invests nearly $200,000 each year on energy studies and other related professional services such as preliminary design and costing. BC Hydro covers 50% of qualifying energy study costs. FortisBC currently funds 50% of studies that meet specific natural gas reduction criteria. The balance of Fortis supported study costs are usually refunded after at least some measures have been implemented. The province will also fund studies as part of the CleanBC plan which currently pays 50% of study costs up to a maximum of $20,000 per study. Energy studies are critical to an energy management program as they provide the details required for sound decision making and enable the strategic prioritization of resources. Energy studies also provide required information for the Carbon Neutral Capital Program (CNCP) funding applications to the Ministry of Health as well as other funding programs.

Table 12a Energy Studies & Other Professional Services Completed in F2020

New Studies for 2019/20		
Cumberland Laundry comprehensive study	$	4,639
RJH C-Op Hand-Off	$	-
VGH DHW Phase 2A & 3A base system only (prelim engineering & costing)	$	10,650
VGH DHW & AHU Combined Study (detailed ECM assessment, prelim engineering & costing)	$	53,250
SPH Lighting Audit	$	4,728
NRGH Heat Recovery Coil Additions (OR Exhaust & EF2) - design	$	6,280
WCGH DHW Pre-Heat engineering	$	6,900
C-Op Round II: WCGH Implementation PHASE (design & engineering services)	$	19,600
Pulse Energy Contract Renewal	$	26,624
PCC ECM Design, Specifications and Implementation Support	$	6,800
FMO Training Webinars & Workshop	$	10,185
C-Op Round II: WCGH (Standard Recomissioning) COMPLETION PHASE	$	-
TOTAL Cost	$	149,656
Budget, includes extra studies revenue	$	154,295
Variance	$	4,640

Table 12b Energy Studies & Other Professional Services Underway in F2021

Project Title	Cost
New Studies/Engineering for 2020/21	
Mt. St. Mary's Lighting Study BCH-07034	$ -
CICHC DHW Heat Pumps CleanBC Lite Workbook	$ -
YLRS Heat Recovery System CleanBC Custom Workbook	$ -
NRGH Hydrotherapy AHU Replacement CleanBC Lite Workbook	$ -
GRH Pneumatic to Electric Controls Upgrade	$ -
SPH DHW Systems Renewal Study	$ -
Pulse Energy System- annual licensing fees	$ 26,624
WCGH Heat Recovery Chiller Deep Dive by Bernie Nelson	$ 32,550
Green Freight Assessment (GHG reduction potential of CNG conversion of laundry trucks)	$ 3,000
PHH Biomass Boiler Study (delay to 21/22)	$ -
GRH Window/Door Replacement Study	$ 29,000
QAC Pearkes Boiler and Heat Pump Schem Design & cost/benefits report **(BCH-06853)**	$ 31,460
NRGH Window/Door Replacement Study (on hold)	$ -
In-House C-Op Investigations at Smaller Sites (QAC, DPRC, CHC, PHH, CLRC)	$ -
NRGH Kitchen Refrigeration Renewal Options Study (BCH-06542)	$ 6,900
CDH BC Hydro New Construction Program BCH-06749	$ 15,000
CDH FortisBC New Construction Program	$ 25,000
RJH C-Op Hand-Off COP13-595	$ 19,950
PCC ECM Design, Specifications and Implementation Support	$ 7,200
C-Op Round II: WCGH Implementation PHASE (design & engineering services) BCH-04910	$ 4,900
C-Op Round II: WCGH (Standard Recomissioning) COMPLETION PHASE BCH-04910	$ 4,100
RJH D&T HRC Phase 2&3 energy calculations for CleanBC application BCH-06681	$ 2,400
NRGH Lab AHU CleanBC Like Workbook BCH-06709	$ 1,500
NRGH Heat Recovery Coil Additions (OR Exhaust & EF2) - construction support	$ 2,575
TOTAL Cost	$ 212,159
Budget, includes extra studies revenue	$ 194,751
Variance	**-$17,408**

Projects with no cost indicated are either on hold, fully funded by an outside organization, or are being funded through project planning/engineering capital.

9. Awareness and Behaviour Change (Engagement Plan)

Island Health recognizes the impact employees have on reducing energy consumption and GHG emissions. The Energy Department operates its multi-faceted employee engagement program and partners with BC Hydro through the Energy Wise Network program and FortisBC through their Conservation and Outreach Program for support and resources.

Our engagement program is made up of three main components: webinars, workshops, and quarterly energy review meetings with operators, lead by energy department staff. We have chosen to focus specifically on Facilities Maintenance and Operations (FMO) staff since they have the most direct impact on and ability to reduce energy. Recognizing we have our own in-house pockets of excellence in highly trained and motivated employees, the Energy Department continues to shed light on and share their best practices across the organization. This includes recognizing and acknowledging who these people are in our Quarterly Energy Management Accountability Reports.

Energy Wise Network Program

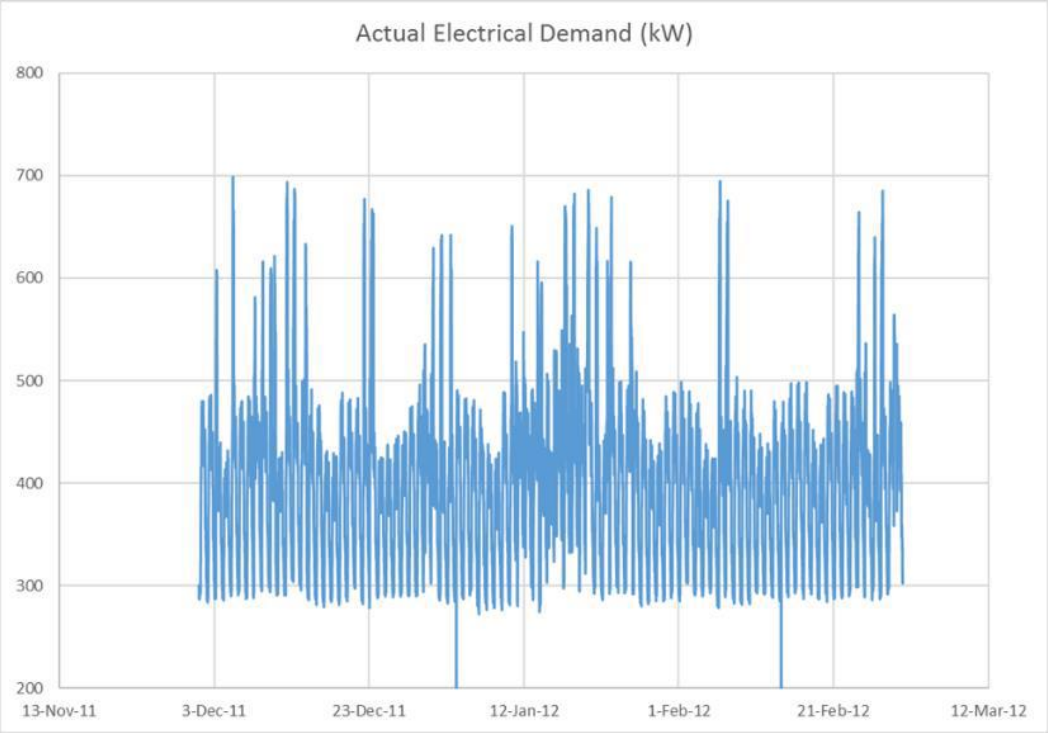
This awareness and behavior change program is made available and funded by BC Hydro's Energy Wise Network (EWN) program. The EWN program provides funding for prizes and food, support from an engagement consultant, and educational opportunities through webinars and workshops. Island Health has been benefiting from BC Hydro's engagement programs since 2010.

The EWN program focus in F2020 was to train and enable more staff to use our real-time energy management information system (Pulse Energy) for daily monitoring of electricity and natural gas use and anomaly reporting. The system shows energy consumption in real-time. It allows operators to identify and follow-up on anomalies they could not otherwise see. This is helping operators to identify day-to-day operational issues causing energy waste and helps them confirm that the changes they make are having the desired impact. The program was executed using these five steps:

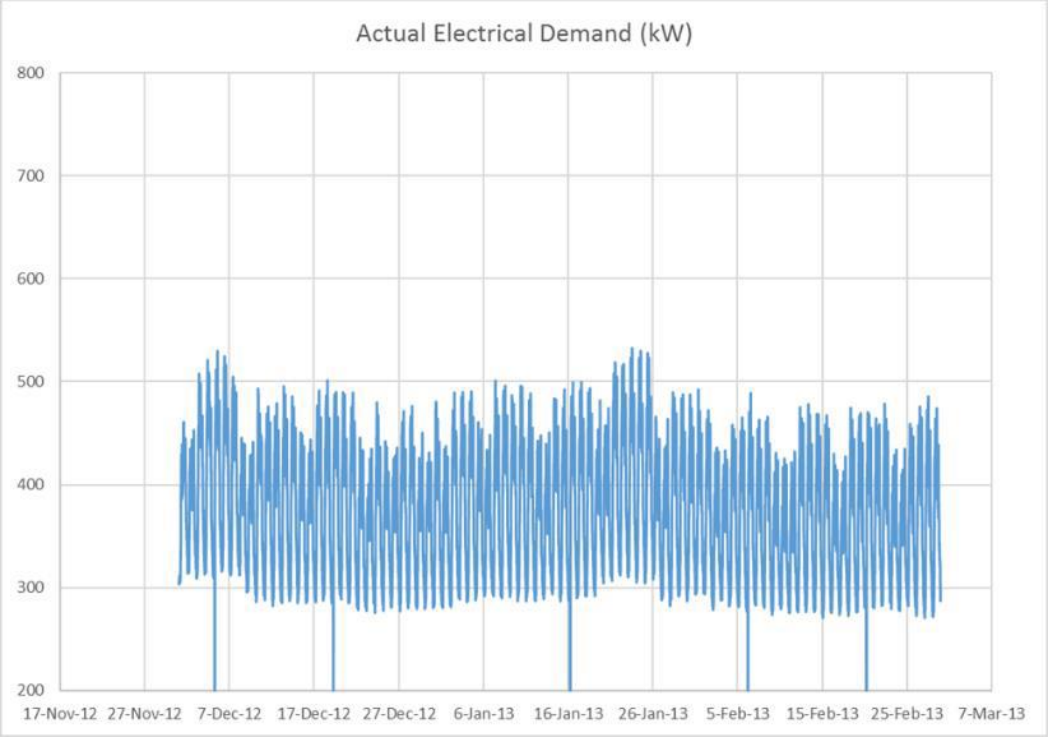
1. Updated all energy baselines to establish what is normal consumption for each site.
2. Automatically distributing six week and six month CUSUM reports showing actual vs normal consumption.
3. Revised and updated Pulse Energy training material.
4. Conducted one-on-one in-person training sessions with operators.
5. Established procedures where operators review Pulse Energy trends daily and report anomalies to their supervisor and plan investigative steps when warranted. This helps operators identify if their equipment is running as expected and should lead to improved overall building performance.

An example of how monitoring energy use this way helps is shown in the Pulse Energy charts below for electricity demand in kW. They reveal something is causing spikes up to 700 kW on multiple occasions during winter (first chart). The next trend shows the impact of the change that FMO eventually made – spikes are gone. Something is causing electrical demand to spike. Turns out it was the electrically heated helipad. Shutting off that heating system and instead, de-icing using conventional means saved the site over $10,000 annually.

Before (2011)



After (2012)



FortisBC Education & Behavior Program

Building on the success of the F2018 and F2019 programs, this year's activities were centered around three events: two 2.0 hour training webinars and one day-long in person workshop. All three events were tailored to our FMO staff since they have the most direct influence and control over energy use. The webinars were hosted at larger sites by energy department staff and FMO managers whenever possible in order to help stimulate questions and discussion. The webinar format allowed every FMO employee from across the organization to attend and participate regardless of how remote they were.

In F2019 we added the in-person workshop based on the recognition that our staff have a great deal of knowledge and experience to share with their colleagues but were not being given the opportunity to do so. The workshops were therefore designed to allow staff to present and discuss their projects, successes, and challenges in addition to allowing external experts to deliver training. The over-riding intent of both webinars and workshops has been to elevate the skills and knowledge of FMO staff so they are better equipped when they return to their facility to do more to improve energy efficiency. A common sentiment from training of past years has been that the information was interesting, but not necessarily useful or applicable to existing operations. This is the reason we have strived to make the content of the training material such that is could be put to use the very next day on the shop floor.

Prism Engineering was contracted to prepare, with our input, and deliver the webinar material as well as the keynote presentation during the in-person workshops.

<u>Topics Covered in F2020</u>

First Webinar:

- Thermal Opportunities from HVAC Systems, including
    - Air Handling and Ventilation
    - Applications for variable speed technology
    - Understanding waste heat sources
    - Heat recovery systems
    - Metering and performance monitoring
    - O&M

Second Webinar:

- Thermal Opportunities from Heating Equipment, including
    - How to identify efficiency opportunities for optimum operation
    - Checking and improving boiler thermal efficiency
    - When does it make sense to retrofit heating plants with condensing boilers
    - Condensing technologies (makeup air units, furnaces, etc.)
    - Metering and performance monitoring
    - O&M

Workshop Agenda:
Topics Covered:

- Thermal Energy Saving Opportunities, by Prism Engineering
- Recent Code Changes, Lesson's Learned and What-Not-to-Do, by Technical Safety BC
- Legionella: Guidelines and What LMH Did, by VIHA's OH&S team

- Open Forum for FMO to Share Pains and Gains

Results

Approximately 80 people were invited to the webinars and at least 50% dialed in to participate. We had a total of 32 people attend the in-person workshop.

All participants were given surveys to complete after each session. We received a total of 36 completed surveys with the majority of responses being either “Very Good” or “Excellent” on the question of overall quality of the training. Only three responses were “Good” and we had no responses with ratings lower than that.

Going forward, our focus will be to continue to deliver training in a similar manner that is as relevant and useful to our FMO staff as possible in an environment that is as inclusive and conducive to learning as possible.

10. Energy Management Assessment (EMA)

The last EMA workshop held in February of 2020 identified five areas of focus to improve our energy management program and practices across all of Facilities Management. These are listed below. Detailed action items in each of the five areas are currently being identified that will shore-up weaknesses identified by the EMA. These will be finalized and reported on in the 2021 SEMP.

A very positive change in this year's session was the inclusion of our FMO Managers to the discussion. The EMA is really all about how we can operationalize energy management and for that, it's essential we ensure FMO Managers are included in planning and execution of the steps required to do just that.

1	**Scope & Charter**
	**Establish an energy management program charter** that can be supported by top management.
2	**Accountability Structure**
	**Establish an accountability structure** for energy performance improvement targets.
3	**Operational Integration**
	**Update standard operating procedures** to include energy-efficient operating instructions in areas with significant energy-using equipment.
4	**Performance Tracking**
	**Provide operating personnel with regular visibility to energy performance** and **establish troubleshooting protocols** that require prompt responses to variations in energy intensity.
5	**Resource Planning**
	**Address utilization and capacity constraints** across the energy management program for each key resource role.

11. Opportunities

Optimize Existing Assets

Recommissioning and Continuous Optimization (C-Op)

Recommissioning and continuous optimization are the highest priority strategies because benefits are achieved without incurring major capital expense. Our studies have repeatedly shown there are significant opportunities to save energy simply by optimizing existing building systems. We have plenty of low hanging fruit left to pick but it takes skilled staff, diligence, and a continuous improvement approach to achieve and sustain results.

Scheduling & Zoning Upgrades

Island Health provides a wide array of services to patients. Typically, a facility will have some services available 24/7 while other services are offered only Monday to Friday during regular business hours. As a result, much of the space within our buildings is not occupied all the time so this presents an opportunity to reduce or eliminate ventilation and save substantial amounts of energy. Our facilities can therefore benefit from zoning and scheduling retrofits that ensure we only ventilate spaces as needed and when occupied. Zoning breaks out the building into discrete areas with a specific operating schedule and supplies the right amount of conditioned air only when needed, thus substantially reducing energy consumption. Some spaces, like conference and meeting rooms, are ventilated only when occupancy sensors detect people.

Efficiency & Electrification

Heat Recovery

Heat recovery will continue to be a primary means of reducing energy and GHG emissions in both retrofit and new construction projects. By harvesting waste heat from building exhaust and other sources such as medical imaging and computer equipment with heat pumps, we can substantially lower natural gas consumption and GHG emissions.

High Efficiency Heating Plants

Island Health continues to invest in high efficiency heating plants for space heating and domestic hot water (DHW). High efficiency condensing boilers, coupled or de-coupled DHW systems, and thermal energy exchange systems (i.e. thermal gradient header) will continue to be investigated and evaluated on a site-by-site basis.

Deep Retrofits

Converting existing high-temperature HVAC systems, present in all but the newest facilities, to lower temperature designs would allow for existing boiler plants to be replaced with air or ground-source heat pumps for example. Upgrading building envelopes presents another opportunity to lower energy consumption and GHG emissions and can also provide benefit in terms of climate change resiliency by delaying the time it takes for extreme exterior temperatures to impact the indoor environment. Envelope retrofits however have limited benefits in acute care facilities where very high outdoor air volumes are required to meet CSA specifications.

New Construction Programs

All new Island Health facility designs strive for the highest levels of patient care at the lowest possible energy use and GHG emissions. It is our intent that all new construction and major renovation projects participate in all available new construction incentive funding programs to help ensure we achieve the highest levels of performance possible.

Benefits of using a collaborative, integrated design process, fostered in part by new construction incentive programs, can be seen in the design of The Summit at Quadra Village long term care facility – our most recently completed project. Island Health, along with all public sector organizations, has been mandated by the provincial government to take steps in new construction to reduce greenhouse gas emissions; this is indicated in the government's original 2008 Climate Action Plan, the 2016 Climate Leadership Plan, and latest CleanBC plan.

Renewables

Solar thermal and solar electric panels have been installed at several Island Health sites. These systems do offset natural gas and purchased electricity but are costly to install. Solar thermal has an unacceptably long payback so is not a viable option at present. These were installed at a time when the provincial government was covering nearly 100% of the capital cost. Solar electric systems however are becoming attractive with reasonable paybacks, currently around 15 years, which continue to improve as system costs decline and BC Hydro rates increase.

Island Health has also spent several years designing and assessing the costs and benefits of installing biomass boilers at a number of sites. In spite of a good business case, it has not been possible yet to secure funding for a biomass boiler in part due to overall financial constraints, as well as increased risk associated with fuel quality and supply. Based on our knowledge to date, biomass boilers appear to make the most sense at our off-gas-grid sites where the cost of fossil fuel is 400% higher than it is for those sites on the gas grid. Smaller sites also present a lower risk so will be a focus going forward as we take a closer look at biomass – a low/no carbon source of fuel.

Renewable natural gas also provides another low carbon fuel for our boiler plants but the cost is $7/GJ more, or 300% more than regular natural gas and production is limited in BC. At present supply isn't even available.

Stakeholders for Success with Acknowledgements

The Government of British Columbia

The Government of British Columbia is a leader in promoting a greener economy and one of the first jurisdictions in the world to establish carbon pricing and reduction targets. The Government's Carbon Neutral Capital Program (CNCP) has been providing funding to the BC Health Authorities since F2015 for GHG reduction projects. To date, Island Health has secured nearly $7M from the program.

Island Health Executive

The Executive leadership is critical to Island Health being successful in energy management and meeting our organization's carbon reduction targets. We thank Island Health's Executive and Board for their support of the Energy Team, access to capital, and the priority given to energy conservation and GHG emissions reduction.

BC Hydro

We thank BC Hydro for their support in providing Island Health incentive funds for energy managers, studies, capital projects, the EWN program, and access to their technical experts. The funding provided by BC Hydro for our Energy Manager positions is critical to the success of our program. We also appreciate the ongoing training at Energy Manager meetings, workshops and monthly webinars, as well as recognition of our accomplishments by way of awards and newspaper ads showcasing the fruits of our team's efforts to the community and province.

BC Hydro Key Account Manager

Thank you to Jeff Whitson for his guidance and leadership in the healthcare sector. Jeff's insights and unwavering support to FMO and the Energy Management team is invaluable.

FortisBC

We also thank FortisBC for substantially increased funding they are now providing to support our energy specialist position and two new positions: Thermal Energy Manager and Energy Analyst, as well as energy studies, capital projects, equipment purchase rebates, and training programs.

FortisBC Key Account Manager

Our appreciation and gratitude also goes to Jennifer Coulthard for continued support and advocacy on behalf of Island Health at FortisBC. Helping us navigate all the new programs FortisBC has to offer has been very much needed and appreciated.

Corporate Director Facilities Management

Thanks to Dean Anderson who brings a new vision and focus to the Energy Management team. We look forward to his leadership and continued support in the years to come.

Facilities Maintenance and Operations (FMO)

As best practices in energy management become more embedded in building maintenance, operations and project management, we applaud FMO for their willingness to collaborate and share expertise. FMO provides the insight and resources to successfully implement energy projects while ensuring patients, residents and staff are comfortable and safe. Without their knowledge and support, the Energy Management Program could not exist.

Facilities Capital Development

The Facilities Capital Development Department focuses on design, construction and commissioning of major capital projects including new buildings and major renovations. They have a great deal of influence on the future energy performance of our sites. We thank them for their support and collaboration.

Capital Planning and Finance

Thank you to Capital Planning and Capital Finance for the support of the Energy Management team. These departments are essential to securing and managing capital funds from the Ministry of Health and Regional Hospital Districts (RHDs).

Sustainability & Business Continuity

Behind the scenes our closest partner in advancing energy efficiency and GHG reduction is of course the Sustainability & Business Continuity Department. Their passion, knowledge, support and advocacy has provided the energy management team with the most encouragement of all so we thank them for that and look forward to the continued partnership.

Island Health Employees

Thanks to all Island Health employees for the actions you take - such as turning off lights and computer monitors and contributing to a culture of sustainability.

Senior Management Approval

By signing below, Island Health's senior management acknowledges receipt and approval of this Strategic Energy Management Plan.

Brett Street Digitally signed by Brett Street DN: cn=Brett Street, o=Vancouver Island Health Authority, ou=Facilities Maintenance & Operations, email=Brett.Street@viha.ca, c=CA Date: 2020.11.16 10:47:41 -08'00'

_____ date: _____, 2020

Brett Street, Director, Facilities Maintenance and Operations (South Island)

Dean Anderson Digitally signed by Dean Anderson DN: cn=Dean Anderson, o=Vancouver Island Health Authority, ou=Facilities Management, email=dean.anderson@viha.ca, c=CA Date: 2020.11.16 09:49:23 -08'00'

_____, date: Nov 16, 2020

Dean Anderson, Corporate Director, Facilities Management

_____, date: Nov. 13, 2020

Kim Kerrone, CFO and Vice President, Operations and Support Services

Appendix A – Environmental Sustainability Policy (Sept 2020 DRAFT)

Purpose:	Island Health recognizes the link between a healthy environment and a healthy population. Island Health's commitment to minimize negative environmental and climate impacts is part of the organizations responsibility to create healthier, stronger communities. As such, individual and collective actions can make important contributions to protect and enhance our ecological environment now and into the future while being socially and fiscally responsible. Island Health envisions a resilient health care system that is adapted for future climate and has a minimal environmental impact. We can achieve this by advancing environmental stewardship best practices in our buildings, services, processes, culture and communities. Through this policy, Island Health establishes a commitment to environmental sustainability and climate change response. This policy provides the framework for developing supporting protocols and procedures for specific areas and departments.
Scope:	This policy applies to all functions of the organization and is relevant for all Island Health employees, physicians, volunteers, students, contractors and others who carry out business for the organization.

1.0 Policy

1.1 Environmental Sustainability

1. Island Health will achieve environmental sustainability through conservation of energy, resources, water and materials as well as using healthy building products, supplies and energy resources. By following the principals of reducing energy or materials consumption, reusing resources where applicable, and finally recycling materials and products of business when feasible environmental stewardship is practised. Any new materials or products should take into consideration the environmental impact of the product over its lifecycle and must ensure safety of employees, patients and the community.
2. Island Health shall enhance climate change resilience by planning for future climate extremes and mitigating its climate impact through greenhouse gas emissions reduction, as required by the Province of British Columbia's Climate Change Accountability Act 6.1.

1.2 Environmentally Sustainable Facilities

1. Island Health will design, construct, and operate facilities with minimal environmental impact and achieve long-term greenhouse gas emissions, energy, water and waste reduction targets. When

constructing or renovating facilities use durable, non-toxic, low-carbon materials and where possible products with environmental product declarations.

2. Island Health facilities and infrastructure shall be designed and constructed with consideration of future climate conditions. Climate change information shall inform resilience and adaptation strategies within existing building systems.
3. New buildings or additions will achieve a "Green Building" rating system certification (Canada Green Building Council LEED, LEED for Existing Buildings; Operations and Maintenance, Green Guide for Health Care, Passive House).
4. Construction, renovation and retrofit projects not registered for green building certification will follow sustainability best practices including the minimization of waste, toxins and emissions.
5. Island Health facilities should promote occupant health and wellbeing through the indoor environment, including healthy air quality, lighting, and acoustics.
6. Island Health facilities should contribute to healthy communities through transportation networks, healthy neighbourhood design principles, and enhanced nature through landscaping and grounds.

1.3 Environmentally Sustainable Operations

1. Island Health will develop and adopt sustainable best practices and processes in all operations and departments, including minimizing solid, organic and hazardous waste, exposure to toxins, and consumption of water and energy resources.
2. Island Health should reduce waste and material use, including paper, and where possible shall use environmental-friendly products.
3. Island Health will promote green and active transportation.

1.4 Environmentally Sustainable Purchasing

1. Island Health will reduce environmental impacts from its supply chain through waste minimization and the purchase of environmentally preferable goods and services.

1.5 Green House Gas Emissions Reduction

1. Island Health shall meet the government-mandated greenhouse gas reduction targets for buildings, fleet and office paper, as outlined in BC's Climate Change Accountability Act 6.1.
2. Island Health must purchase carbon offsets for emissions and declare carbon neutrality by July 1st as per relevant legislation.
3. Island Health should minimize its climate impact by reducing greenhouse gas emissions that are out-of-scope in provincial legislation, including emissions from anesthetic gas, business travel, refrigerants, and food waste.
4. Island Health should consider renewable energy sources when feasible and as indicated in the Strategic Energy Management Plan.

1.6 Partnerships

1. Island Health shall exemplify environmental and climate leadership by collaborating with community stakeholders and other partners (including health authorities, public sector organizations, utility providers, crown corporations, indigenous communities, non-governmental organizations, private sector businesses, local and provincial governments) towards common environmental sustainability and climate resiliency goals.

1.7 Accountability

1. Island Health must measure and report its environmental sustainability efforts and shall participate in annual government reporting programs such as the Climate Change Accountability Report as required in the Climate Change Accountability Act, and the Strategic Energy Management Plan.

2.0 Roles and Responsibilities

2.1 Executive Leadership

1. Will lead and support the organization's overall commitment to environmental sustainability, greenhouse gas emissions reduction, waste reduction and climate change adaptation.
2. Will incorporate environmental considerations and sustainability values in decision-making processes, while supporting environmental sustainability and climate change response through appropriate budget and needs-based planning.
3. Will consider sustainability targets within decision-making processes.

2.2 Management

1. Will include environmentally considerations and climate change adaptation into decision-making processes.
2. Will endeavor to reduce greenhouse gas emissions and waste, as well as energy and water consumption, to minimize environmental impacts.

2.3 Island Health Employees, Physicians, Volunteers, Students, and Contractors

1. Will incorporate environmental stewardship best practices into their work and decision-making processes.
2. Are encouraged to promote new ways of implementing environmentally sustainable programs and practices in the workplace.

3.0 Monitoring and Evaluation

The Sustainability and Business Continuity Department will evaluate the outcomes of environmentally sustainability initiatives by developing and monitoring metrics and targets. The Energy Department will evaluate metrics related to energy and water use of Island Health facilities.

	Responsible Party	Reporting
Greenhouse gas emissions	Sustainability & Business Continuity Department Energy Department	Climate Change Accountability Report
Climate change adaptation	Sustainability & Business Continuity Department	Public Sector Climate Risk Management Report
Energy	Energy Department	Strategic Energy Management Plan
Water	Energy Department	Strategic Energy Management Plan
Waste/Recycling	Purchasing, Logistics, Environmental Support Services, P3 Operations, Sustainability Department, FMO, Biomed, IMIT	Green Hospital Scorecard

4.0 Definitions

- **Environment:** The environment comprises of natural and human-built surroundings, extending from the local community to global systems, and includes air, water, land, flora, fauna, buildings, infrastructure, as well as human beings.
- **Environmental sustainability:** Environmental sustainability refers to the actions necessary to minimize harm to both natural systems and human health through conservation, preservation or enhancement of the natural environment, as well as the built environment.
- **Environmentally-preferable goods and services:** Goods and services that have a lesser or reduced impact on the environment over the life-cycle of the good or service, when compared with competing goods or services serving the same purpose.
- **Climate change:** "A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods." (Infrastructure Canada)

5.0 Related Island Health Standards

- 20.1.2 Strategic Procurement
- 5.8.1 Wellness & Safety: General Policy
- Island Health Strategic Framework Objective 3.3

6.0 References

- Climate Change Accountability Act, Province of British Columbia
- Carbon Neutral Government Regulation, Province of British Columbia

- Zero Emission Vehicle Act, Province of British Columbia
- Climate Change Policy, Legislation & Programs, Province of British Columbia
- Carbon Neutral Government, Province of British Columbia
- Managing Climate Risk for Public Sector Organizations, Province of British Columbia
- CleanBC, Government of British Columbia

7.0 Resources

- Health Authority Carbon Neutral Action Reports (CNAR), Province of British Columbia
- Strategic Energy Management Plan (SEMP), Island Health
- BC Guiding Framework for Public Health, Province of British Columbia
- Healthy Built Environment Linkages Toolkit, BC Centre for Disease Control
- Health Care Climate Footprint Report, Health Care Without Harm
- Safe Health Care Waste Management Policy Paper, World Health Organization
- Chemical Footprint of Products Commonly Used in Pediatrics Departments, Clean Production Action
- Green Hospital Scorecard, Canadian Coalition for Green Health Care

Appendix B - Site Acronyms

Aberdeen Hospital	ABER
Bamfield Outpost Hospital	BAM
Bamfield Outpost Hospital Nurse Residence	BAM-Res
Cairnsmore Place Residential Care	CPRC
Campbell River Hospital	CRH
Chemainus Health Care Centre	CHCC
Comox Valley Hospital	CVH
Cormorant Island Community Health Clinic	CICHC
Cowichan District Hospital	CDH
Cowichan Lodge	CLRC
Cumberland Health Centre	CHC
Cumberland Regional Laundry	CRL
Drug & Alcohol Rehab Society	DARS
Dufferin Place (Extended Care at NRGH)	DPRC
Eagle Park Lodge	EPLTC
Glengarry Hospital	GLEN
Gold River Health Clinic	GRHC
Gorge Road Hospital	GRH
Hillside Seniors Health Centre	HSHC
Lady Minto Hospital	LMH
Ladysmith Community Health Centre	LCHC
Mount Tolmie Hospital	TOLM
Nanaimo Regional General Hospital	NRGH
Nanaimo Wentworth Street	NWWS
Oceanside Health Centre	OHC
Oak Bay Lodge	OBL
Port Alice Health Centre	PAH
Port Hardy Hospital	PHH
Port McNeill Hospital	PMH
Priory Hospital	PRIO
Queen Alexandra Centre - Ledger House	QAC-Ledger
Queen Alexandra Centre - Main/Fisher	QAC-Main
Queen Alexandra Centre - Pearkes	QAC-Pearkes
Royal Jubilee Hospital	RJH
Saanich Peninsula Hospital	SPH
Seven Oaks Tertiary Mental Health Facility	SOMH
Tahsis Health Centre	THC
Tofino General Hospital	TGH
Trillium Lodge	TLLTC
VGH - Victoria Regional Laundry	VGHL
Victoria General Hospital	VGH
Victoria Pandora Avenue Health Centre	VPAHC
West Coast General Hospital	WCGH

Appendix C - Reducing GHG Emissions 50% by 2030 – What Will It Take?

1. $115K/year increase in operational funding for new Building Controls Engineer, plus $250K/year for parts & labour to optimize existing building systems. This has an ROI of about 10%, often improves occupant comfort and reduces maintenance costs.

2. Increased annual capital from $2.8M to $4.1M or $41M total for retrofits like heat recovery systems ($75M over 10 years after escalation). With an ROI of 5% or more, these also provide benefits including infrastructure renewal and climate change adaptation. Additional considerations:
   - Change funding from Routine Capital that must be spent in one fiscal to Priority Investment to provide flexibility in choosing better projects.
   - Assumes sufficient design and construction resources will be available and at reasonable rates.

3. Additional $10M capital spread over 10 years to electrify our fleet vehicles. Benefits include a new fleet, lower operating and maintenance costs, and contributing to improved air quality.

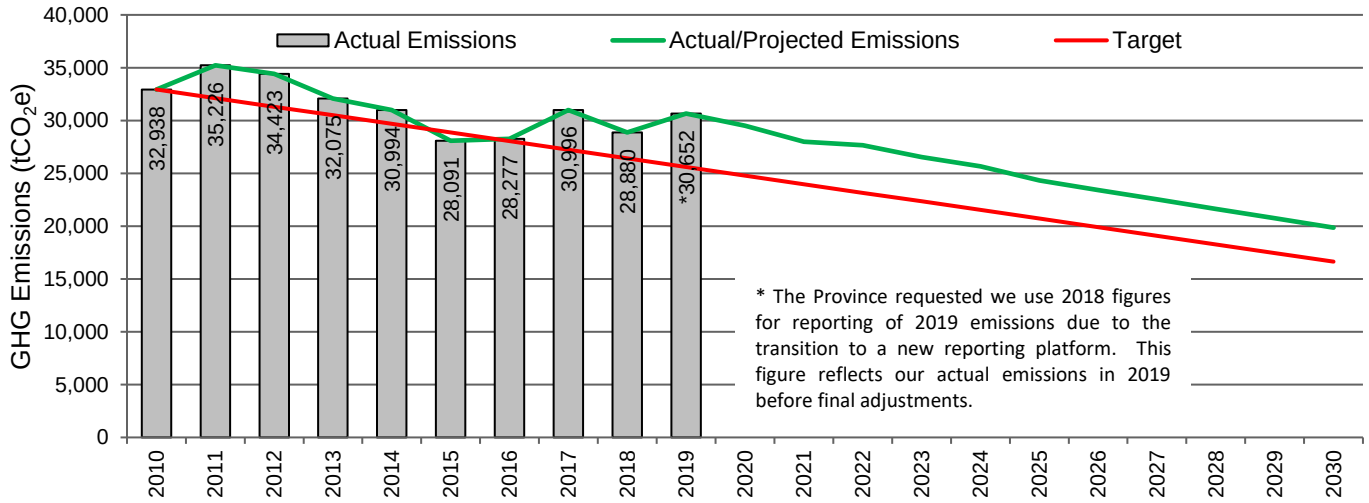
4. If necessary, increase operational funding to buy renewable natural gas (RNG) in 2030 at $115,000/year for every 1,000 tCO_2e shortfall.

Note: all costs shown are in current dollars.

Background

This briefing outlines how far we've come in ten years and how much farther we need to go to meet Provincial policy for PSOs, and our own MYP (Strategy 3.3.1), with respect to reduced GHG emissions and ultimately what it will take in financial and human resources to get there.

In 2018 the Province released its CleanBC plan to put us on the path to a cleaner low carbon economy that also protects our land, water and air. This plan sets a target of 50% reduction for buildings and 40% for fleet by 2030 from 2010.



This chart shows total emissions since 2010. We've been trending down with an overall reduction of 7% thus far in spite of a 25% increase in floor area and 38% increase in FTEs. The green line shows the projected trend to 2030, assuming no further increase in floor area or FTEs, based on an annual capital investment of at least $2.8M for building retrofit projects. This is in place now through the MoH's Carbon Neutral Capital Program. An increase to $4.1M would close the gap assuming the efficacy of retrofits remains as good as in the past, but it will become more difficult and expensive as we pick the lowest hanging fruit first so additional measures are required. It's clear a substantial increase in resources is needed in light of the increased challenge and strong head-winds.

The details of changes required in facilities remains under development but the core energy management principles being used to lower emissions, in order of priority are:

1. minimize energy waste by optimizing existing building systems,

2. lower fossil fuel use by retrofitting existing facilities with more energy efficient equipment and system designs,

3. switch to cleaner renewable energy sources.

The first principle is already in play but we require a dedicated controls engineer with a budget to accelerate the work of fine-tuning buildings and eliminating every bit of energy waste possible. This work focuses on continuously finding ways to reduce energy within the limits of existing systems so is like a "tune-up" on an old car but goes much farther. It would be like programming the car's engine to shut down at intersections until you're ready to move on – a feature not in the original design. Changes the engineer will implement, for example, include programming that automatically lowers ventilation rates and shuts off lights in unoccupied spaces. This initiative will add $115K/year to our annual operating budget for salary and benefits, plus another $250K/year for associated parts and labour (contractor).

The second principle is also in play in our energy management program, partially funded by BC Hydro and FortisBC and employed since before 2010 to find ways of reducing energy consumption and lower utility costs. Our progress to date is a direct result of this program but we need to do much more. Increased capital funding will provide the financial resources to carry out many more retrofits to buildings needed to close the gap.

Even stepping up our efforts in this way there's no guarantee we will achieve the target, in large part because Island Health continues to grow. After doing all we can using the first two, the third principle of switching to renewable energy sources would be used to close any remaining gap. The recommended and easiest option would be to purchase some RNG to displace regular natural gas because RNG is a clean low-carbon fuel. Renewable energy, including RNG, is currently more expensive which is why it makes sense to first minimize waste and increase efficiency.

<u>Other Considerations</u>

New facilities offer a unique opportunity because they're generally less costly to make low emitting, and will be in use longer than existing ones. However, only 5% of existing stock will be replaced by 2030 with an additional 5% to 6% net-new area added by then so there is limited ability to meet our 2030 target through new construction. Facility design should still strive to reduce emissions to zero because new buildings will have replaced much more of our existing stock by 2050, at which point Provincial legislation requires an 80% reduction in emissions, so let's get it right the first time.

Emissions from buildings overshadow that from fleet and paper, which account for 3.5% and 2.0% respectively of our total. That said, electrifying the fleet as older vehicles are retired should continue but will need increased

capital to cover the marginal cost of more expensive models. Emissions from paper should be reduced through behavior change so we simply use less, therefore, no increase in funding is warranted.

In parallel to reducing GHG emissions, we need to adapt to the changing climate so the services we provide continue uninterrupted in the face of more extreme weather events and climate related changes to our health. This effort will require additional financial and human resources as well as a shift in thinking and an added lens on decision-making. What the priorities will be and the requisite investment dollars needed is to be determined through an integrated approach that assesses all risks to our facilities and services.

For more information, please contact: Deanna Fourt - Director, Sustainability & Business Continuity at deanna.fourt@viha.ca or Joe Ciarniello – Manager, Energy Management at joe.ciarniello@viha.ca. (June 10, 2020)

Appendix D – BC Hydro and FortisBC Booked Energy Savings

BC Hydro Booked Energy Savings

Fiscal Year	Booked Savings (MWh)	Cumulative Booked Savings (MWh)	Annual Target Booked Savings (MWh)	Cumulative Sum of Target Savings (MWh)
2007	1,722	1,722	1,000	1,000
2008	886	2,608	1,000	2,000
2009	767	3,375	1,000	3,000
2010	3,798	7,173	2,000	5,000
2011	581	7,754	2,000	7,000
2012	1,890	9,644	2,000	9,000
2013	2,750	12,394	1,600	10,600
2014	1,613	14,007	1,200	11,800
2015	1,602	15,609	1,600	13,400
2016	2,280	17,889	1,600	15,000
2017	1,506	19,395	1,300	16,300
2018	5,098	24,493	1,200	17,500
2019	1,393	25,886	1,200	18,700
2020	804	26,690	600	19,300
2021*	**1,743**	**28,433**	**1,200**	**20,500**
2022*	**721**	**29,154**	**1,200**	**21,700**
2023*	**600**	**29,754**	**1,200**	**22,900**

*Projected in Multi-Year Plan – based on anticipated credits from BC Hydro for applicable projects listed.

FortisBC Booked Energy Savings

Fiscal Year	Booked Savings (MWh)	Cumulative Booked Savings (MWh)	Annual Target Booked Savings (MWh)	Cumulative Sum of Target Savings (MWh)
2011	2,206	2,206	0	2,206
2012	10,171	12,377	0	12,377
2013	14,221	26,598	0	26,598
2014	11,226	37,824	0	37,824
2015	13,048	50,872	12000	49,824
2016	18,149	69,021	12000	61,824
2017	31,988	101,009	12000	73,824
2018	11,305	112,314	12000	85,824
2019	11,777	124,091	13800	99,624
2020	14,005	138,096	13900	113,524
2021*	**20,682**	**158,778**	**19000**	**132,524**
2022*	**13,884**	**172,662**	**19000**	**151,524**
2023*	**10,000**	**182,662**	**19000**	**170,524**

*Projected in Multi-Year Plan – based on anticipated credit from FortisBC for applicable projects listed.

End of report.