Capital Region District – Municipalities and Electoral Areas

2007 Base Year and 2018 Reporting Year Energy & GHG Emissions Inventory

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SUMMARY

Climate change has emerged as the next unprecedented social, economic, and environmental challenge facing society today. It poses a serious threat to quality of life, jobs, and physical and natural assets. Scientists believe that the human-production of greenhouse gas (GHG) emissions since pre-industrial times have already surpassed the Earth's "carrying capacity" of natural systems and pose significant future risks to human well-being.

Recognizing the role that Capital Regional District (CRD) plays in achieving a significant and immediate reduction in global GHG emissions, the CRD set a regional GHG reduction target of 61% (from 2007 levels) by 2038. In February 2019, the CRD declared a climate emergency and committed to regional carbon neutrality. Local governments across the region have also set similar ambitious GHG reduction targets and commitments.

To meet these climate commitments, the CRD seeks a better understanding of the energy and GHG emissions at the regional level, as well as at the local government level which includes 13 municipalities and 3 electoral areas. The following document presents a summary of energy and GHG emissions at both the CRD and local government level for the 2007 and 2018 reporting years. This document compliments a 2018 inventory report which describes the methodologies and data sources applied to derive the estimate of GHG emissions for the CRD and local governments. A summary of the 2007 and 2018 energy and GHG emissions by local government is presented in **Table 1** and **Table 2**.

Table 1. Summary of GHG Emissions By CRD Local Government

Local Government	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
District of Central Saanich	80,648	73,995	-8.2%
City of Colwood	80,838	78,506	-2.9%
Township of Esquimalt	95,893	85,786	-10.5%
District of Highlands	7,776	9,373	20.5%
Juan de Fuca Electoral Area*	67,459	73,063	8.3%
City of Langford	133,247	169,775	27.4%
District of Metchosin	16,333	9,038	-44.7%
District of North Saanich	54,454	45,201	-17.0%
District of Oak Bay	89,140	77,178	-13.4%
District of Saanich	574,835	496,408	-13.6%
Salt Spring Island Electoral Area*	45,361	43,963	-3.1%
Town of Sidney	62,025	56,194	-9.4%
District of Sooke	46,616	46,574	-0.1%
City of Victoria	481,559	452,567	-6.0%
Town of View Royal	48,163	45,507	-5.5%
Southern Gulf Islands Electoral Area*	28,947	29,220	0.9%

* Land-use GHG emission estimates have been withheld due to limited land-use data.

Table 2. Summary of Energy Use By CRD Local Government

Local Government	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)
District of Central Saanich	1,865,308	1,941,408	4.1%
City of Colwood	1,527,213	1,573,838	3.1%
Township of Esquimalt	1,781,058	1,668,623	-6.3%
District of Highlands	220,027	274,687	24.8%
Juan de Fuca Electoral Area	1,992,655	1,912,583	-4.0%
City of Langford	2,590,548	3,491,537	34.8%
District of Metchosin	514,949	506,440	-1.7%
District of North Saanich	1,318,084	1,325,251	0.5%
District of Oak Bay	1,654,197	1,547,417	-6.5%
District of Saanich	11,004,052	10,308,380	-6.3%
Salt Spring Island Electoral Area	608,477	633,681	4.1%
Town of Sidney	1,229,020	1,188,309	-3.3%
District of Sooke	963,383	1,140,991	18.4%
City of Victoria	9,830,828	9,436,659	-4.0%
Town of View Royal	959,422	998,682	4.1%
Southern Gulf Islands Electoral Area	503,849	535,368	6.3%

1 INTRODUCTION

1.1 GHG Emissions & Climate Change

There is overwhelming evidence that global climate change resulting from emissions of carbon dioxide and other greenhouse gases (GHGs) is having a significant impact on the ecology of the planet. In addition, climate change is expected to have serious negative impacts on global economic growth and development. In 2005, the UK government commissioned an independent economic review called the Stern Review, which states that the *"costs of stabilizing the climate are significant but manageable; delay would be dangerous and much more costly"*.

Beyond the costs associated with delayed action, there are cost savings to be realized through efforts to conserve energy and to use it more efficiently, and economic opportunities available to communities that develop local energy supply and infrastructure. Actions to encourage energy efficiency and conservation and to promote implementation of renewable energy will assist local governments in developing energy resilient communities, in addition to mitigating climate change. Local governments are at the forefront of global action on climate change, setting both ambitious commitments and targets while going about the difficult task of reducing emissions. Per the latest report from the C40 Cities Climate Leadership Group, ICLEI Local Governments for Sustainability, UN Habitat, and others, most GHG reduction commitments are set for 2020 or 2050 and range from a 10% to 100% reduction (**Figure 1**).

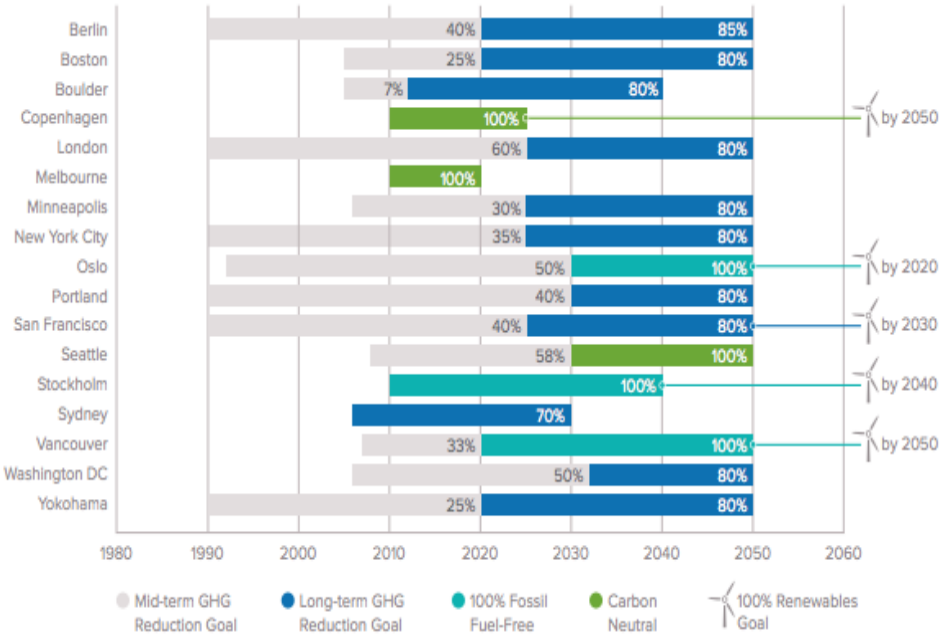

Figure 1. Summary of Long-Term Global GHG Emission Reduction Targets[1]

[1] http://www.c40.org/

1.2 GPC Protocol

To make informed decisions on reducing energy use and GHG emissions at the regional and local government scale, community managers must have a good understanding of these sources, the activities that drive them, and their relative contribution to the total. This requires the completion of an energy and GHG emissions inventory. To allow for credible and meaningful reporting locally and internationally, the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (the GPC Protocol) was developed as a partnership between ICLEI-Local Governments for Sustainability, The World Resources Institute (WRI) and C40 Cities Climate Leadership Group (C40), with additional collaboration by the World Bank, United Nations Environment Program (UNEP) and UN-Habitat. The GPC Protocol has now become recognized as the standardized way for local governments to collect and report their actions on climate change. Over 9,000 cities have committed to using the GPC Protocol.

The Protocol has two established levels of reporting: BASIC and BASIC+ which are defined as the following:

- The BASIC level covers scope 1 and scope 2 emissions from stationary energy and in-boundary transportation, as well as scope 1 and scope 3 emissions from waste.
- The BASIC+ level covers the same scopes as BASIC and includes more in-depth and data dependent methodologies. Specifically, it expands the reporting scope to include emissions from industrial process and product use (IPPU), agriculture, forestry and other land-use (AFOLU), and transboundary transportation.

1.3 Variance from Community Energy and Emissions Inventories (CEEI)

The CRD has historically relied on the Provincial 2007, 2010 and 2012 Community Energy and Emissions Inventories (CEEI) to baseline and track community GHG emissions. However, there have been some limitations to the CEEI in that it is an in-boundary inventory, the most recent version published is for 2012, and the CEEI Protocol does not fully meet the requirements of the GPC Protocol BASIC or BASIC+ reporting requirements which is the required reporting standard for local governments that have committed to the Global Covenant of Mayors—an agreement led by city networks to undertake a transparent and supportive approach to measure GHG emissions community-wide. A high-level summary of the differences between the CEEI and GPC Protocol inventories are presented in **Table 3**.

Table 3. Summary of GHG Inventory Scope Differences

Reporting Sector	CEEI	GPC BASIC	GPC BASIC+
Residential Buildings	✓	✓	✓
Commercial And Institutional Buildings And Facilities	✓	✓	✓
Manufacturing Industries And Construction	✓	✓	✓
Energy Industries		✓	✓
Energy Generation Supplied To The Grid		✓	✓
Agriculture, Forestry And Fishing Activities		✓	✓
Non-Specified Sources		✓	✓

Reporting Sector	CEEI	GPC BASIC	GPC BASIC+
Fugitive Emissions From Mining, Processing, Storage, And Transportation Of Coal		✓	✓
Fugitive Emissions From Oil And Natural Gas Systems		✓	✓
On-Road Transportation	✓	✓	✓
Railways		✓	✓
Waterborne Navigation		✓	✓
Aviation		✓	✓
Off-Road Transportation		✓	✓
Solid Waste	✓	✓	✓
Biological Waste	✓	✓	✓
Incinerated And Burned Waste		✓	✓
Wastewater		✓	✓
Emissions From Industrial Processes			✓
Emissions From Product Use			✓
Emissions From Livestock	✓		✓
Emissions From Land			✓
Emissions From Aggregate Sources And Non-CO_2 Emission Sources On Land	✓		✓

1.4 Purpose of Document

The purpose of this document is to provide the 2007 and 2018 GPC BASIC+ energy and GHG emissions inventories at the regional and local government level. This document compliments a 2018 inventory report which describes the methodologies and data sources applied to derive the estimate of GHG emissions for the CRD region and local governments.

2 INVENTORY SCOPE

2.1 GPC BASIC+ Inventory Scope

In accordance with the GPC Protocol, the 2007 and 2018 BASIC+ GHG inventories presented herein accounts for GHG emissions from the following Reporting Sectors:

- **Stationary Energy** – These are GHG emissions from fuel combustion, fugitive emissions, and some off-road transportation sources (e.g. construction equipment, residential mowers, etc.). They include the emissions from energy to heat and cool residential, commercial, institutional, and light/heavy industrial buildings, as well as the activities that occur within these residences and facilities.
- **Transportation** – These are GHG emissions from the combustion of fuels as a result of vehicular on-road, off-road, including marine, aviation, and other off-road, and trans-boundary journeys.
- **Waste** – These are GHG emissions from the disposal and management of solid waste, the biological treatment of waste, and wastewater treatment and discharge. Waste does not directly consume energy, but releases GHG emissions because of decomposition, burning, and other management methods.
- **Industrial Process and Product Use (IPPU)** – These are GHG emissions from products such as refrigerants, foams or aerosol cans can release potent GHG emissions, known as product use GHG emissions. There are no known industrial process emissions in the CRD.
- **Agriculture, Forestry and Other Land-Use (AFOLU)** – These are GHG emissions that are captured or released as a result of land-management activities. These activities can range from the preservation of forested lands to the development of crop land. This Sector includes GHG emissions from land-use change, manure management, livestock, and the direct and indirect release of nitrous oxides (N_2O) from soil management, urea application, fertilizer and manure application.

2.2 GHG Emissions Boundary

The GHG inventories are defined geographically by the CRD, which includes 13 municipalities and 3 electoral areas, as shown in Figure 2.

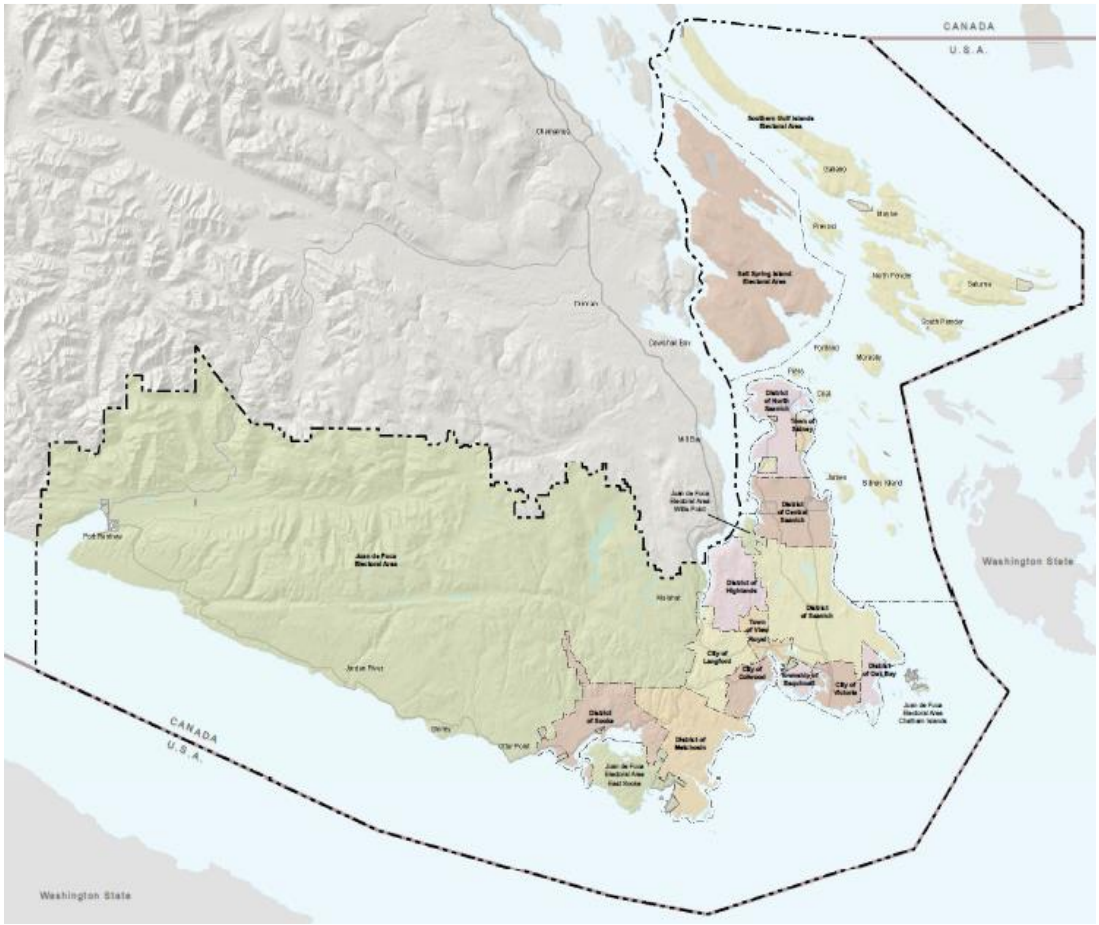

Figure 2 CRD GHG Boundary

2.3 Assumptions & Disclosures

The following inventories covers all GHG emissions for the 2007 and 2018 reporting years. Where data was not available, the most recent year's data have been used, and the timescale noted accordingly. These disclosures are as follows:

- **Global Warming Potentials (GWP)**. The BC government is currently applying GWPs from the fourth IPCC report in light of the fact that there are updated GWPs in available in the fifth IPCC report. On this basis, the following GHG emissions inventories apply GWPs from the fourth IPCC report.
- **Stationary Energy: Propane, Wood and Fuel Oil – Residential Buildings.** Propane, and wood GHG emissions were estimated using linear regression methods. The data used in the estimates included historical propane and wood energy data published in the 2007, 2010 and 2012 CEEIs, and heating degree days (HDD) published by Environment Canada. This approach was also applied to the estimate of heating oil for all local governments, except the City of Victoria and District of Saanich. For the District of

Saanich and the City of Victoria, heating oil GHG emissions were estimated based on the number of known tanks, average heated floor areas and estimated average fuel volumes.

- **Stationary Energy: Electricity and Natural Gas Consumption - All Buildings.** Prior to releasing the electricity and natural gas consumption data, the Province completes a series of quality assurance and control checks which has resulted in the re-allocation of energy between local governments. This data is then published on the Province's website. When the published 2007-2018 natural gas data was trended, several unexplained data anomalies and trends were identified for several local governments in the CRD. As these data anomalies and trends could not readily be explained, the raw natural gas data sets were acquired from FortisBC, reviewed and compared to the published data. In the 2007 and 2010 reporting years, the published data was under reporting natural gas volumes by upwards of 17% at the CRD level and had several large allocations between the City of Victoria and other local governments in 2012. Based on the issues with the published data, and on the basis the annual raw natural gas consumption trends align with the reported 2018 consumption data and align with historical raw data provided to the City of Victoria and the District of Saanich for their energy and GHG emissions inventories, the raw FortisBC dataset was used to estimate GHG emissions. A similar issue was noted for the Juan de Fuca electoral area and electricity data for the 2007, 2010 and 2012 reporting years (i.e., the under reporting of energy consumption) in the published data. As such, the raw electricity data from BC Hydro was used to estimate GHG emissions.
- **Stationary Energy: Fugitives.** FortisBC provided total fugitive emissions for the 2018 reporting year at the regional level. To estimate local government fugitive emissions, the value was prorated based on the number of reported natural gas connections (provided by Fortis BC). Since no historical numbers were provided, the 2018 value was applied to the 2007 base year as well. The estimate of fugitive emissions is an understatement of GHG emissions as FortisBC did not estimate the upstream GHG emissions as recommended by the GPC Protocol.
- **Transportation: On-Road.** The Province of BC provided Insurance Corporation of BC (ICBC) vehicle registration data from April 1, 2018 – March 31, 2019. When compared to local government population trends, there appears to be a high degree of uncertainty as to the accuracy of the 2018 vehicle registration data in terms of total registered vehicles. Without having reliable historical (e.g. 2011-2017) and current (2019) data to compare this dataset against, the reasonableness of the data was too uncertain to be applied in the estimation of GHG emissions for the 2018 reporting year. Therefore, to estimate on-road energy and GHG emissions for the 2018 reporting year, 2010 vehicle populations were grown in proportion to the reported changes in local government populations. Each of the local government vehicle profiles were then adjusted to match the proportion of vehicle classes reported in the 2018 ICBC data.
- **Transportation: On-Road.** In cases where vehicle registration counts were 10 or less, the Province assigned a value of "<10" rather than report the actual number. In these cases, the inventory assumes there was 10 vehicles of that particular classification. This is likely to result in an over-estimation of GHG emissions, but it will be immaterial to the overall GHG inventory.
- **Transportation: On-Road.** Vehicle fuel consumption rates and Vehicle Kilometer Travelled (VKT) were taken from the activity data summary for British Columbia on-road transportation from the 2018 National Inventory Report (1990-2018) as prepared by Environment Canada. Based on the clear diesel and clear gasoline consumption values

reported by the Province of BC for the Victoria region, the VKT and fuel efficiency values are reasonable and result in a similar estimate of fuel consumption for the Region.

- **Transportation: Aviation**. 2018 aviation GHG emissions were estimated using 2015 aircraft flight profiles (the last available data), and the total number of aircraft movements reported in 2018. The emissions were prorated to each local government on a per capita basis.
- **Transportation: Waterborne Recreational Watercraft**. GHG emissions from recreational watercraft and US/Canada ferries were estimated based on a publicly available year 2000 study for the Victoria, Vancouver, and Washington harbors. These GHG emissions were prorated to each local government on a per capita basis.
- **Transportation: Cruise Ships**. The Greater Victoria Harbour Authority reported on cruise ship emissions for the 2018 reporting year but did not provide an estimate for 2007. As a result, no cruise ship emissions are included in the 2007 base year inventory.
- **Waste**: **Solid Waste**. To quantify GHG emissions from the Hartland Landfill, the CRD utilized the waste-in-place (WIP) method which is accepted under the GPC Protocol. The WIP assigns landfill emissions based on total waste deposited during that year. It counts GHGs emitted that year, regardless of when the waste was disposed. Except for the City of Victoria, who claims 31% of the CRD's landfill GHG emission, the remaining landfill GHG emissions were allocated to each local government on a per capita basis. Using this allocation method, the CRD members may over, or underestimate associated solid waste GHG emissions as the current year landfill GHG emissions are based upon cumulative waste over time, and each member may have contributed more waste in past years than the current year (and vice versa).
- **AFOLU**: **Aggregate Sources And Non-CO_2 Emission Sources On Land.** These emissions are based on the 2019 NIR as prepared by ECCC and the total area of farmland BC in 2016 as reported by Statistics Canada. These GHG emissions were assigned to each local government on a per hectare (ha) of cropland basis.
- **AFOLU**: **Land-Use**. The land cover change analysis requires a consistent land-use category attribution and spatial resolution for the 2007 base and 2018 reporting years. For the land use change analysis, land cover data was available for the 2007, 2011 and 2017 years for only part of the CRD. Unfortunately, no more recent or higher quality data source was available to represent the land cover consistently for all three years. Furthermore, since annual data was not available, the change between land cover data years (2007-2011, 2011-2017) was averaged and may not represent actual changes in each year.
- **AFOLU**: Land-Use. There was limited land-use datasets for the Juan de Fuca, Salt Spring Island and Gulf Island Electoral Areas and this data was only available for 2007 and 2011. On this basis, land-use GHG emissions estimates for these electoral areas has been withheld.

Details surrounding all GHG emissions sources quantification methods, assumptions, and assessment of uncertainties are contained in a complimentary GHG emissions methodology document and are not be presented herein.

3 CAPITAL REGIONAL DISTRICT ENERGY & GHG EMISSIONS

3.1 Base Year (2007) Energy & GHG Emissions

In 2007, the CRD's GHG BASIC+ emissions totaled 1,715,814 tCO_2e. Excluding land use GHG emissions, buildings are the CRD's second largest GHG emissions source at 33%, with 42% of those GHG emissions coming from natural gas for heating and cooling, 22% from heating oil for heating, 12% from electricity use, 8% from wood and propane use for heating and the remainder from other-related off-road activities like residential lawn mowing. On-road transportation GHG emission sources contributed 46% to the GHG inventory, almost all of which came from passenger vehicles, light trucks, and SUVs (85%). Off-road transportation, which includes marine, aviation, and other off-road emission sources contributed 7% to the overall GHG inventory. Solid waste, organic waste treatment methods, and wastewater treatment and discharge accounted for 7% of the total community GHG emissions. IPPU emissions accounted for 4% of total GHG emissions while AFOLU GHG emissions resulted in a reduction of 13% of community GHG emissions through the sequestration and storage of carbon.

A summary of the GHG emissions by sector and energy use by source is presented in the following table and figures.

Table 4. Base Year (2007) CRD Regional GHG Energy & GHG Emissions by Source

Source	Type	Consumption	Units	Energy (GJ)	GHG Emissions (tCO_2e)
Stationary Energy					
Residential Buildings	Electricity	2,107,163	MWh	7,585,725	52,679
	Natural Gas	2,639,980	GJ	2,639,980	131,649
	Fuel Oil	83,335	L	2,147,821	146,859
	Propane	10,747	L	424,600	25,882
	Wood	1,144,369	GJ	1,144,369	26,872
	Diesel	6,507,150	L	251,697	19,468
Commercial & Industrial Buildings	Electricity	1,365,217	MWh	4,914,742	34,130
	Natural Gas	3,352,456	GJ	3,352,456	167,179
	Fuel Oil	6,272	L	161,638	11,052
	Diesel	11,734,206	L	453,879	35,106
Energy Industries	LFG Combustion				418
Agriculture, Forestry And Fishing Activities	Diesel	20,743,755	L	802,368	62,060
Natural Gas Fugitive Emissions					993
Total				**23,879,274**	**714,348**
On-Road Transportation					
Electric Vehicles	Electricity	6,622	MWh	23,840	0
Passenger Vehicles	Gasoline + Diesel + Propane	163,062,222	L	5,673,042	403,626
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	151,774,389	L	5,237,495	370,284

Source	Type	Consumption	Units	Energy (GJ)	GHG Emissions (tCO_2e)
Heavy Duty Vehicles	Gasoline + Diesel + Propane	53,493,257	L	2,012,033	140,949
Motorcycles	Gasoline + Diesel + Propane	1,208,124	L	41,874	2,885
Total On-Road Transportation				**12,964,443**	**917,744**
Off-Road Transportation					
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	45,492,152	L	1,719,352	130,172
Total Off-Road Transportation				**1,719,352**	**130,172**
Waste					
Wastewater					18,998
Composting					72
Solid Waste					111,234
Total Waste					**130,304**
Agriculture Forestry & Other Land Use (AFOLU)					
Land-Use					-259,033
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					4,930
Total AFOLU					**-254,103**
Industrial Process & Product Use (IPPU)					
Process Use Emissions					77,348
Total IPPU					**77,348**
TOTAL				**38,563,069**	**1,715,814**
TOTAL Per Capita				**109.7**	**4.9**

Energy consumption and GHG emissions by source are shown in **Figure 3**, **Figure 4** and **Figure 5**. On-road and transboundary transportation (82%) account for most of the energy consumption in the region.

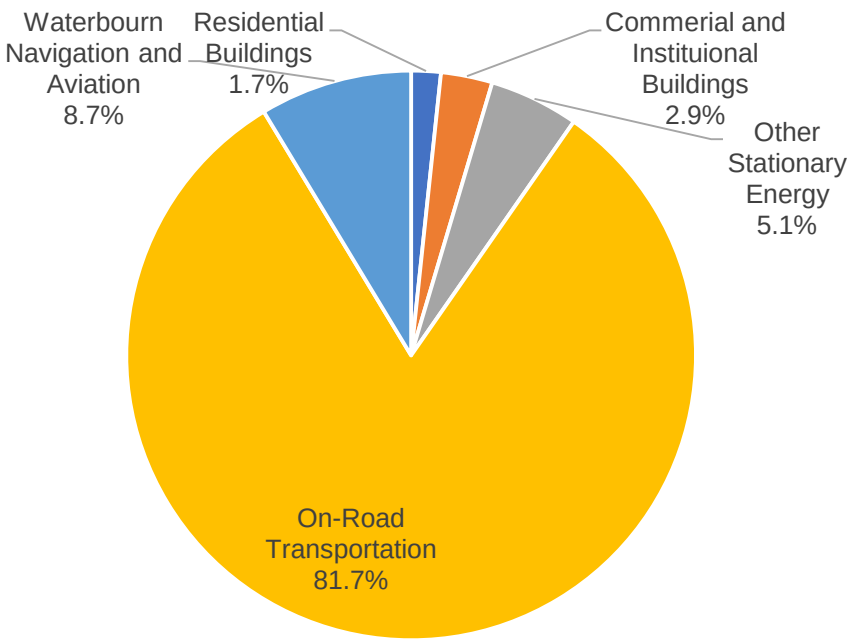

Figure 3. 2007 Regional Energy Consumption By Sector

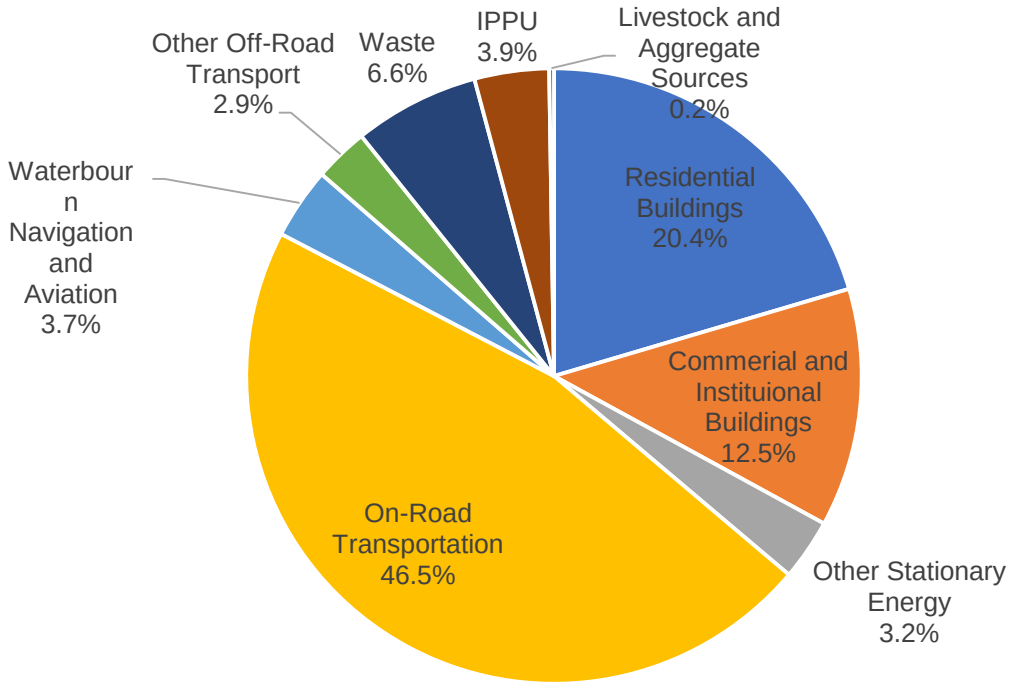

Figure 4. 2007 Regional GHG Emissions By Sector (Excluding Land Use)

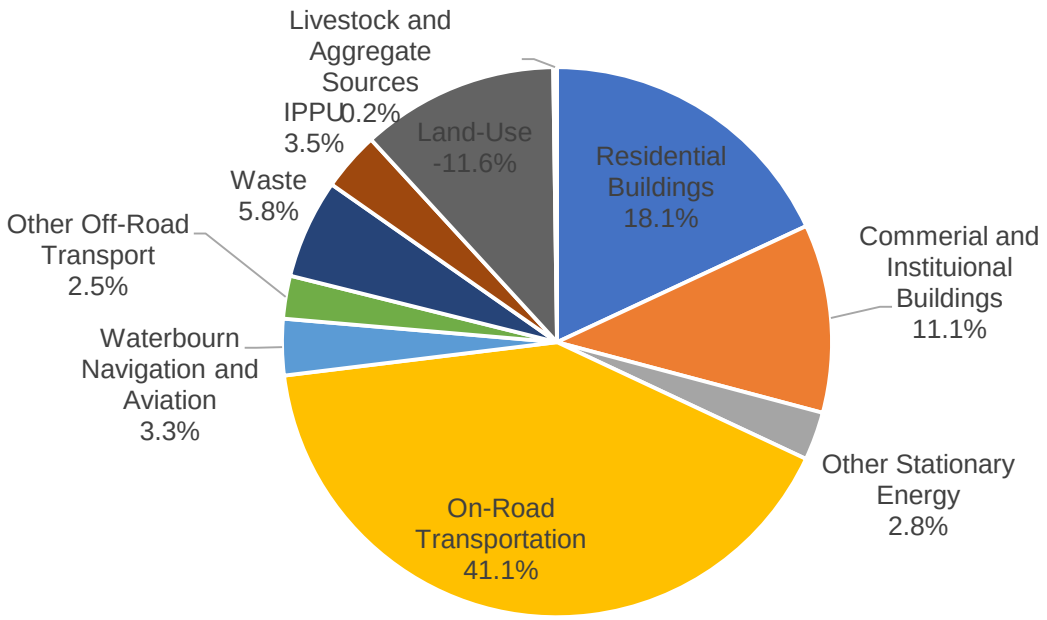

Figure 5. 2007 Regional GHG Emissions By Sector (Including Land Use)

GHG emissions by fuel type is presented in **Figure 6**.

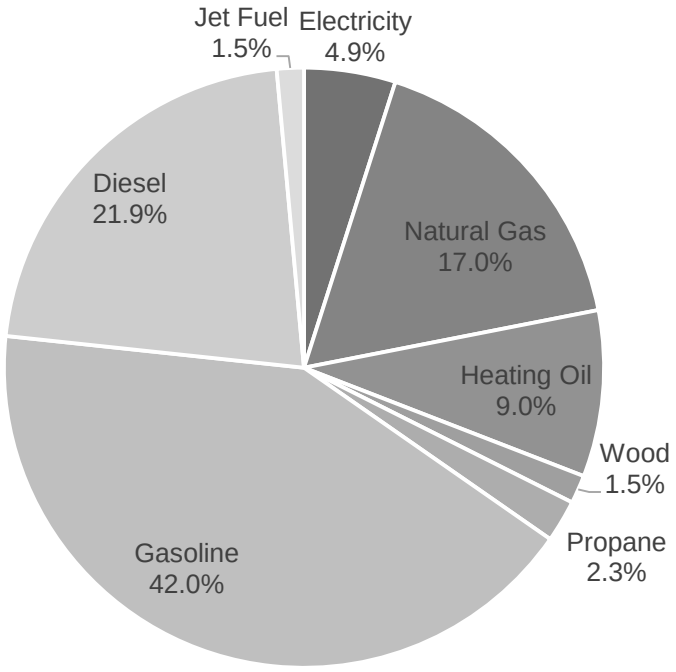

Figure 6. 2007 Regional GHG Emissions By Fuel Type

3.2 CRD GHG Reduction Target

Recognizing the role that the CRD plays in achieving a significant and immediate reduction in global GHG emissions, the CRD has set a regional GHG reduction target of 61% (from 2007 levels) by 2038. With the CRD's 2007 base year GHG emissions being 1,715,814 tCO_2e, a 39% reduction would require a reduction of approximately 669,168 tCO_2e. On a per capita basis, this amounts to reducing emissions from approximately 4.2 tCO_2e per person in 2018 to 2.6 tCO_2e per person by 2038.

In February 2019, the CRD declared a climate emergency and committed to regional carbon neutrality.

3.3 Reporting Year (2018) Energy & GHG Emissions

In 2018, the CRD's BASIC+ GHG emissions totaled 1,696,703 tCO_2. While this is a small decline of 1.1% from the 2007 base year GHG emissions, on an absolute basis, it is a decline of 14% on a per capita basis. Between 2007 and 2018, the CRD's population has grown 15% and thus this decline speaks to the efforts by the CRD and CRD local governments to reduce energy consumption and GHG emissions.

Similar to the 2007 base year, buildings are the second largest GHG emissions source at 32%, with 48% of those GHG emissions coming from natural gas for heating and cooling, 23% from heating oil for heating, 5% from electricity use, 8% from wood and propane use for heating and the remainder from other-related off-road activities like residential lawn mowing. On-road transportation GHG emission sources contributed 46%, almost all of which came from passenger vehicles, light trucks, and SUVs (86%). Off-road transportation, which includes marine, aviation, and other off-road emission sources contributed 7% to the overall GHG inventory. Solid waste, organic waste treatment methods, and wastewater treatment and discharge accounted for 5% of the total community GHG emissions. IPPU emissions accounted for 7% of total GHG emissions while AFOLU GHG emissions resulted in a reduction of 11% of community GHG emissions through the sequestration and storage of carbon.

A summary of the 2018 GHG emissions by sector and energy use by source is presented in the following table and figures.

Table 5. Reporting Year (2018) CRD Regional GHG Energy & GHG Emissions by Sector

Source	Type	Consumption	Units	Energy (GJ)	GHG Emissions (tCO_2e)
Stationary Energy					
Residential Buildings	Electricity	1,920,909	MWh	6,915,217	20,496
	Natural Gas	2,218,511	GJ	2,218,511	110,632
	Fuel Oil	80,580	L	2,076,809	142,004
	Propane	10,169	L	401,770	24,569
	Wood	1,100,555	GJ	1,100,555	25,843
	Diesel	5,434,847	L	210,220	15,252
Commercial & Industrial Buildings	Electricity	1,290,843	MWh	4,646,998	13,773
	Natural Gas	4,192,845	GJ	4,192,845	209,087
	Fuel Oil	5,549	L	143,003	9,778

Source	Type	Consumption	Units	Energy (GJ)	GHG Emissions (tCO_2e)
	Diesel	11,683,072	L	451,901	32,786
Energy Industries	LFG Combustion				7,658
Agriculture, Forestry And Fishing Activities	Diesel	19,879,416	L	768,936	55,787
Natural Gas Fugitive Emissions					1,510
Total				**23,126,766**	**669,175**
On-Road Transportation					
Electric Vehicles	Electricity	6,622	MWh	24	80
Passenger Vehicles	Gasoline + Diesel + Propane	146,887,432	L	5,104,833	328,408
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	190,281,535	L	6,653,532	426,624
Heavy Duty Vehicles	Gasoline + Diesel + Propane	49,689,669	L	1,863,143	121,922
Motorcycles	Gasoline	885,376	L	30,687	2,114
Total On-Road Transportation				**13,652,220**	**879,148**
Off-Road Transportation					
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	44,843,853	L	1,704,868	126,061
Total Off-Road Transportation				**1,704,868**	**126,061**
Waste					
Wastewater					19,859
Composting					5,307
Solid Waste					71,219
Total Waste					**96,386**
Agriculture Forestry & Other Land Use (AFOLU)					
Land-Use					-209,262
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					4,930
Total AFOLU					**-203,952**
Industrial Process & Product Use (IPPU)					
Process Use Emissions					129,884
Total IPPU					**129,884**
TOTAL				**38,483,853**	**1,696,703**
TOTAL Per Capita				**94.8**	**4.2**

Energy consumption and GHG emissions by source are shown in **Figure 7**, **Figure 8** and **Figure 9**. On-road and transboundary transportation (82%) account for most of the energy consumption in the region.

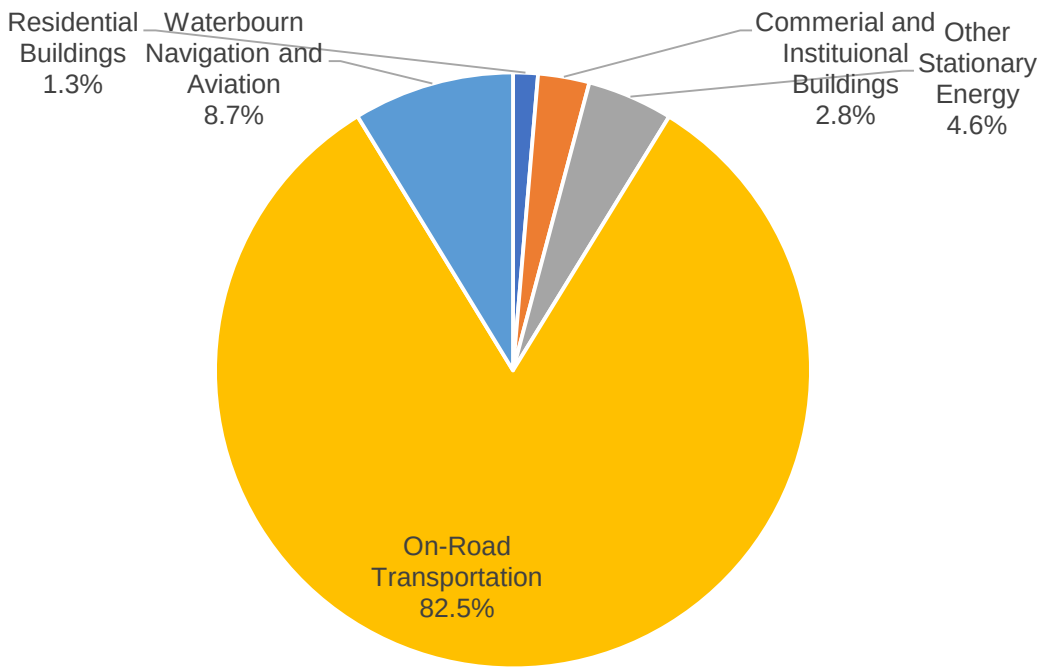

Figure 7. 2018 Regional Energy Consumption By Sector

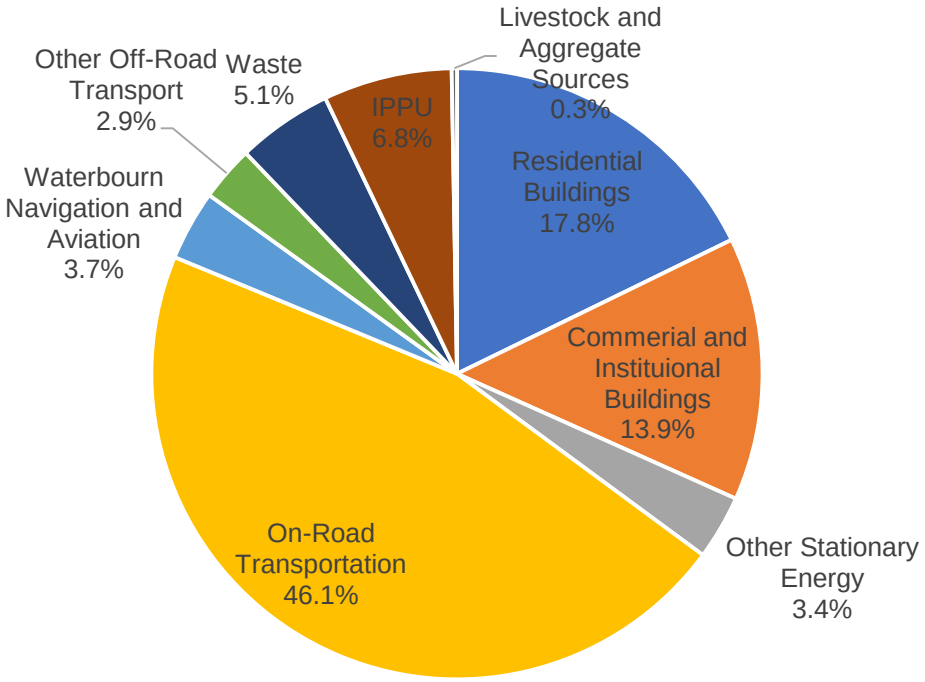

Figure 8. 2018 Regioanal GHG Emissions By Sector (Excluding Land Use)

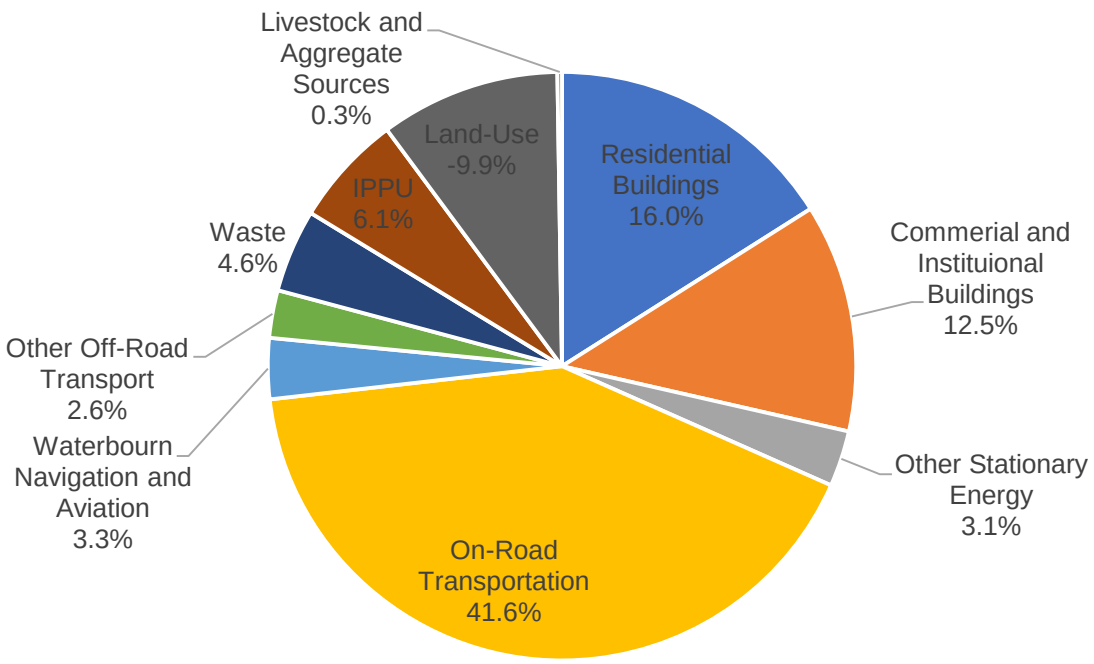

Figure 9. 2018 Regional GHG Emissions By Sector (Including Land Use)

GHG emissions by fuel type is presented in **Figure 10**.

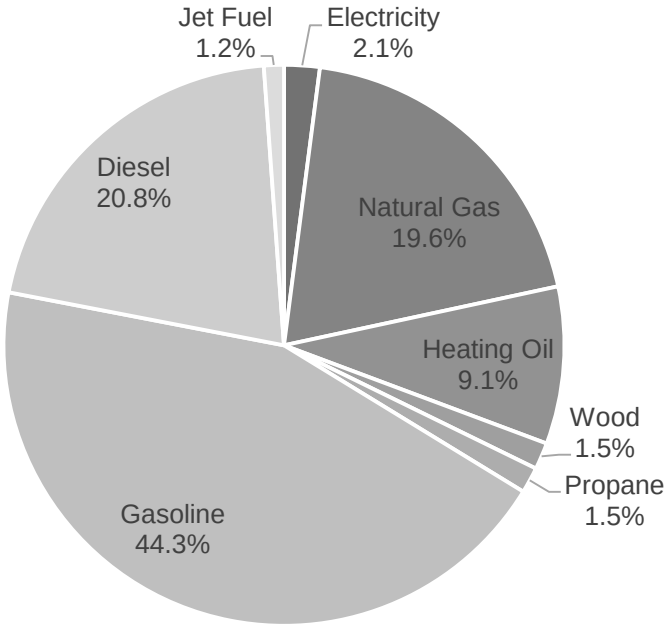

Figure 10. 2018 Regional GHG Emissions By Fuel Type

3.4 Energy & GHG Emissions Trends

Table 6 presents the changes between the 2007 and 2018 reporting years, showing that emissions decreased in most reporting sectors. There was an increase in commercial buildings natural gas consumption and building related natural gas fugitive emissions which is expected as the CRD population has grown. There was also an increase in process use emissions (67%) which is also driven by population. Lastly, there was an increase in composting emissions which is the direct result of waste diversion programs which result in some direct GHG emissions, but overall have a net reduction impact as the process avoids releasing more fugitive emissions from the landfill. Total waste emissions declined 26% from the base year as a result.

GHG emissions resulting from residential buildings have declined by 16% as a result of improved efficiency of appliances and lighting, energy efficiency upgrades, and a transition from heating oil to natural gas or electric heating. In contrast, GHG emissions from commercial and institutional buildings has increased 7% since the base year which is likely to the expanding population and the increased construction of multi-unit residential buildings in the region (which are classified by the utilities as commercial buildings). Overall, stationary energy emissions, which includes buildings, fugitives, and other off-road emission sources have declined by 6% since the base year.

On-road transportation GHG emissions have decreased 4% in light of a 15% increase in the number of registered vehicles and a trend away from light duty vehicles, like sedans, towards SUVs and light duty trucks which have lower fuel efficiencies. This increase has been mitigated by shifting preferences towards electric vehicles, Provincial renewable fuel requirements and people simply driving less. Overall, transportation GHG emissions have declined 4% since the base year.

Land-use GHG emissions increased 20% as a result of more infill and less greenspace development.

Table 6. Change in CRD GHG Energy & GHG Emissions

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	7,585,725	6,915,217	-8.8%	52,679	20,496	-61.1%
	Natural Gas	2,639,980	2,218,511	-16.0%	131,649	110,632	-16.0%
	Fuel Oil	2,147,821	2,076,809	-3.3%	146,859	142,004	-3.3%
	Propane	424,600	401,770	-5.4%	25,882	24,569	-5.1%
	Wood	1,144,369	1,100,555	-3.8%	26,872	25,843	-3.8%
	Diesel	251,697	210,220	-16.5%	19,468	15,252	-21.7%
Commercial & Industrial Buildings	Electricity	4,914,742	4,646,998	-5.4%	34,130	13,773	-59.6%
	Natural Gas	3,352,456	4,192,845	25.1%	167,179	209,087	25.1%
	Fuel Oil	161,638	143,003	-11.5%	11,052	9,778	-11.5%
	Diesel	453,879	451,901	-0.4%	35,106	32,786	-6.6%
Energy Industries	LFG Combustion			-	418	7,658	1731.0%
Agriculture, Forestry And Fishing Activities	Diesel	802,368	768,936	-4.2%	62,060	55,787	-10.1%
Natural Gas Fugitive Emissions				-	993	1,510	52.0%
Total		**23,879,274**	**23,126,766**	**-3.2%**	**714,348**	**669,175**	**-6.3%**
On-Road Transportation							
Electric Vehicles	Electricity	-	24	-	-	80	-
Passenger Vehicles	Gasoline + Diesel + Propane	5,673,042	5,104,833	-10.0%	403,626	328,408	-18.6%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	5,237,495	6,653,532	27.0%	370,284	426,624	15.2%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Heavy Duty Vehicles	Gasoline + Diesel + Propane	2,012,033	1,863,143	-7.4%	140,949	121,922	-13.5%
Motorcycles	Gasoline	41,874	30,687	-26.7%	2,885	2,114	-26.7%
Total On-Road Transportation		**12,964,443**	**13,652,220**	**5.3%**	**917,744**	**879,148**	**-4.2%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	1,719,352	1,704,868	-0.8%	130,172	126,061	-3.2%
Total Off-Road Transportation		**1,719,352**	**1,704,868**	**-0.8%**	**130,172**	**126,061**	**-3.2%**
Waste							
Wastewater					18,998	19,859	4.5%
Composting					72	5,307	7235.5%
Solid Waste					111,234	71,219	-36.0%
Total Waste					**130,304**	**96,386**	**-26.0%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-259,033	-209,262	-19.2%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land						4,930	5,310
Total AFOLU					**-254,103**	**-203,952**	**-19.7%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					77,348	129,884	67.9%
Total IPPU					**77,348**	**129,884**	**67.9%**
TOTAL		**38,563,069**	**38,483,853**	**-0.2%**	**1,715,814**	**1,696,703**	**-1.1%**

Table 7 presents the changes between the 2007 and 2018 years for each CRD local government.

Table 7. Change in Member GHG Energy & GHG Emissions

Member	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
District of Central Saanich	1,865,308	1,941,408	4.1%	80,648	73,995	-8.2%
City of Colwood	1,527,213	1,573,838	3.1%	80,838	78,506	-2.9%
Township of Esquimalt	1,781,058	1,668,623	-6.3%	95,893	85,786	-10.5%
District of Highlands	220,027	274,687	24.8%	7,776	9,373	20.5%
Juan de Fuca Electoral Area*	1,992,655	1,912,583	-4.0%	67,459	73,063	8.3%
City of Langford	2,590,548	3,491,537	34.8%	133,247	169,775	27.4%
District of Metchosin	514,949	506,440	-1.7%	16,333	9,038	-44.7%
District of North Saanich	1,318,084	1,325,251	0.5%	54,454	45,201	-17.0%
District of Oak Bay	1,654,197	1,547,417	-6.5%	89,140	77,178	-13.4%
District of Saanich	11,004,052	10,308,380	-6.3%	574,835	496,408	-13.6%
Salt Spring Island Electoral Area*	608,477	633,681	4.1%	45,361	43,963	-3.1%
Town of Sidney	1,229,020	1,188,309	-3.3%	62,025	56,194	-9.4%
District of Sooke	963,383	1,140,991	18.4%	46,616	46,574	-0.1%
City of Victoria	9,830,828	9,436,659	-4.0%	481,559	452,567	-6.0%
Town of View Royal	959,422	998,682	4.1%	48,163	45,507	-5.5%
Southern Gulf Islands Electoral Area*	503,849	535,368	6.3%	28,947	29,220	0.9%

* Land-use GHG emission estimates have been withheld due to limited land-use data.

4 DISTRICT OF CENTRAL SAANICH

4.1 2018 Profile

Profile	
Population	18,011
Dwellings	7,541
Registered Vehicles	14,552
Energy (Thousands of GJ)	1,941
GHG Emissions (tCO_2e)	73,995

4.2 Energy & GHG Emissions

Table 8 presents a summary comparison of the District of Central Saanich's 2007 and 2018 energy and GHG emissions.

Table 8. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	400,966	355,752	-11.3%	2,785	1,054	-62.1%
	Natural Gas	101,999	119,958	17.6%	5,086	5,982	17.6%
	Fuel Oil	18,644	22,717	21.8%	1,275	1,553	21.8%
	Propane	3,220	3,039	-5.6%	196	186	-5.3%
	Wood	7,150	6,825	-4.6%	168	160	-4.6%
	Diesel	11,564	9,326	-19.3%	894	677	-24.3%
Commercial & Industrial Buildings	Electricity	230,235	235,660	2.4%	1,599	698	-56.3%
	Natural Gas	152,986	141,268	-7.7%	7,629	7,045	-7.7%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	20,852	20,048	-3.9%	1,613	1,455	-9.8%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	55,164	50,184	-9.0%	4,267	3,641	-14.7%
Natural Gas Fugitive Emissions				-	57	81	43.4%
Total		**1,002,781**	**964,777**	**-3.8%**	**25,568**	**22,532**	**-11.9%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	3	-
Passenger Vehicles	Gasoline + Diesel + Propane	278,538	227,595	-18.3%	19,814	14,620	-26.2%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	340,633	395,683	16.2%	24,071	25,379	5.4%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	168,528	285,314	69.3%	11,841	18,590	57.0%
Motorcycles	Gasoline	2,245	1,298	-42.2%	155	89	-42.2%
Total On-Road Transportation		**789,944**	**909,891**	**15.2%**	**55,881**	**58,681**	**5.0%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	72,584	66,739	-8.1%	5,498	4,923	-10.5%
Total Off-Road Transportation		**72,584**	**66,739**	**-8.1%**	**5,498**	**4,923**	**-10.5%**
Waste							
Wastewater					668	787	17.9%
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					5,110	2,825	-44.7%
Total Waste					**5,778**	**3,612**	**-37.5%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-17,568	-23,720	35.0%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					1,937	2,205	13.8%
Total AFOLU					**-15,631**	**-21,515**	**37.6%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					3,554	5,762	62.2%
Total IPPU					**3,554**	**5,762**	**62.2%**
TOTAL		**1,865,308**	**1,941,408**	**4.1%**	**80,648**	**73,995**	**-8.2%**

5 CITY OF COLWOOD

5.1 2018 Profile

Profile	
Population	18,321
Dwellings	7,182
Registered Vehicles	12,397
Energy (Thousands of GJ)	1,574
GHG Emissions (tCO_2e)	78,506

5.2 Energy & GHG Emissions

Table 9 presents a summary comparison of the City of Colwood's 2007 and 2018 energy and GHG emissions.

Table 9. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	304,580	296,374	-2.7%	2,115	878	-58.5%
	Natural Gas	100,740	131,733	30.8%	5,024	6,569	30.8%
	Fuel Oil	65,936	80,342	21.8%	4,508	5,493	21.8%
	Propane	11,388	10,749	-5.6%	694	657	-5.3%
	Wood	25,284	24,133	-4.6%	594	567	-4.6%
	Diesel	11,059	9,487	-14.2%	855	688	-19.5%
Commercial & Industrial Buildings	Electricity	159,740	135,650	-15.1%	1,109	402	-63.8%
	Natural Gas	94,097	94,637	0.6%	4,692	4,719	0.6%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	19,942	20,393	2.3%	1,542	1,480	-4.1%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	52,757	51,047	-3.2%	4,081	3,704	-9.2%
Natural Gas Fugitive Emissions				-	61	91	49.7%
Total		**845,524**	**854,547**	**1.1%**	**25,276**	**25,249**	**-0.1%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	3	-
Passenger Vehicles	Gasoline + Diesel + Propane	233,329	206,853	-11.3%	16,594	13,280	-20.0%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	275,284	340,405	23.7%	19,487	21,821	12.0%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	101,516	102,552	1.0%	7,121	6,743	-5.3%
Motorcycles	Gasoline	2,145	1,593	-25.8%	148	110	-25.8%
Total On-Road Transportation		**612,274**	**651,403**	**6.4%**	**43,349**	**41,956**	**-3.2%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	69,416	67,888	-2.2%	5,258	5,007	-4.8%
Total Off-Road Transportation		**69,416**	**67,888**	**-2.2%**	**5,258**	**5,007**	**-4.8%**
Waste							
Wastewater					397	627	57.8%
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					4,887	2,874	-41.2%
Total Waste					**5,285**	**3,501**	**-33.8%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-1,732	-3,072	77.3%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					4	4	7.0%
Total AFOLU					**-1,728**	**-3,068**	**77.5%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					3,399	5,861	72.5%
Total IPPU					**3,399**	**5,861**	**72.5%**
TOTAL		**1,527,213**	**1,573,838**	**3.1%**	**80,838**	**78,506**	**-2.9%**

6 TOWNSHIP OF ESQUIMALT

6.1 2018 Profile

Profile	
Population	18,758
Dwellings	9,183
Registered Vehicles	11,720
Energy (Thousands of GJ)	1,669
GHG Emissions (tCO_2e)	85,786

6.2 Energy & GHG Emissions

Table 10 presents a summary comparison of the Township of Esquimalt's 2007 and 2018 energy and GHG emissions.

Table 10. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	283,988	251,073	-11.6%	1,972	744	-62.3%
	Natural Gas	133,315	78,594	-41.0%	6,648	3,919	-41.0%
	Fuel Oil	116,338	141,755	21.8%	7,955	9,693	21.8%
	Propane	20,190	19,058	-5.6%	1,231	1,165	-5.3%
	Wood	44,358	42,338	-4.6%	1,042	994	-4.6%
	Diesel	12,428	9,713	-21.8%	961	705	-26.7%
Commercial & Industrial Buildings	Electricity	166,547	148,757	-10.7%	1,157	441	-61.9%
	Natural Gas	323,843	332,138	2.6%	16,149	16,563	2.6%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	22,412	20,880	-6.8%	1,733	1,515	-12.6%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	0	0	-	0	0	-
Natural Gas Fugitive Emissions				-	44	67	51.2%
Total		**1,123,418**	**1,044,306**	**-7.0%**	**38,892**	**35,806**	**-7.9%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	2	-
Passenger Vehicles	Gasoline + Diesel + Propane	263,197	229,014	-13.0%	18,717	14,702	-21.5%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	228,974	278,401	21.6%	16,158	17,808	10.2%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	85,144	45,334	-46.8%	5,953	2,941	-50.6%
Motorcycles	Gasoline	2,312	2,061	-10.9%	159	142	-10.9%
Total On-Road Transportation		**579,628**	**554,810**	**-4.3%**	**40,987**	**35,595**	**-13.2%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	78,012	69,507	-10.9%	5,909	5,127	-13.2%
Total Off-Road Transportation		**78,012**	**69,507**	**-10.9%**	**5,909**	**5,127**	**-13.2%**
Waste							
Wastewater					1,388	1,470	5.9%
Composting					0	95	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					5,493	2,942	-46.4%
Total Waste					**6,880**	**4,507**	**-34.5%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-595	-1,250	110.0%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					0	0	-
Total AFOLU					**-595**	**-1,250**	**110.0%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					3,819	6,001	57.1%
Total IPPU					**3,819**	**6,001**	**57.1%**
TOTAL		**1,781,058**	**1,668,623**	**-6.3%**	**95,893**	**85,786**	**-10.5%**

7 DISTRICT OF HIGHLANDS

7.1 2018 Profile

Profile	
Population	2,437
Dwellings	901
Registered Vehicles	1,948
Energy (Thousands of GJ)	275
GHG Emissions (tCO_2e)	9,373

7.2 Energy & GHG Emissions

Table 11 presents a summary comparison of the District of Highland's 2007 and 2018 energy and GHG emissions.

Table 11. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	63,637	67,596	6.2%	442	200	-54.7%
	Natural Gas	69	4,110	5817.7%	3	205	5817.7%
	Fuel Oil	9,468	11,536	21.8%	647	789	21.8%
	Propane	1,633	1,541	-5.6%	100	94	-5.3%
	Wood	3,637	3,471	-4.6%	85	82	-4.6%
	Diesel	1,406	1,262	-10.2%	109	92	-15.8%
Commercial & Industrial Buildings	Electricity	6,447	14,442	124.0%	45	43	-4.4%
	Natural Gas	20,440	18,766	-8.2%	1,019	936	-8.2%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	2,535	2,713	7.0%	196	197	0.4%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	6,707	6,790	1.2%	519	493	-5.0%
Natural Gas Fugitive Emissions				-	0	2	925.8%
Total		**115,979**	**132,227**	**14.0%**	**3,166**	**3,131**	**-1.1%**
On-Road Transportation							
Electric Vehicles	Electricity	-	-	-	-	-	-
Passenger Vehicles	Gasoline + Diesel + Propane	25,510	24,270	-4.9%	1,822	1,547	-15.1%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	49,104	62,911	28.1%	3,435	4,042	17.7%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	20,280	46,022	126.9%	1,422	3,038	113.6%
Motorcycles	Gasoline	327	228	-30.4%	23	16	-30.4%
Total On-Road Transportation		**95,222**	**133,430**	**40.1%**	**6,702**	**8,643**	**29.0%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	8,825	9,030	2.3%	668	666	-0.4%
Total Off-Road Transportation		**8,825**	**9,030**	**2.3%**	**668**	**666**	**-0.4%**
Waste							
Wastewater					0	0	-
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					621	382	-38.5%
Total Waste					**621**	**382**	**-38.5%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-3,817	-4,233	10.9%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					3	4	18.1%
Total AFOLU					**-3,814**	**-4,229**	**10.9%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					432	780	80.4%
Total IPPU					**432**	**780**	**80.4%**
TOTAL		**220,027**	**274,687**	**24.8%**	**7,776**	**9,373**	**20.5%**

8 JUAN DE FUCA ELECTORAL AREA

8.1 2018 Profile

Profile	
Population	5,048
Dwellings	2,210
Registered Vehicles	5,773
Energy (Thousands of GJ)	1,913
GHG Emissions (tCO_2e)	73,063

8.2 Energy & GHG Emissions

Table 12 presents a summary comparison of Juan de Fuca Electoral Area's 2007 and 2018 energy and GHG emissions.

Table 12. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	841,926	617,741	-26.6%	5,847	1,831	-68.7%
	Natural Gas	0	0	-	0	0	-
	Fuel Oil	442,152	537,349	21.5%	30,233	36,742	21.5%
	Propane	82,743	78,102	-5.6%	5,044	4,776	-5.3%
	Wood	184,018	175,638	-4.6%	4,321	4,124	-4.6%
	Diesel	3,107	2,614	-15.9%	240	190	-21.1%
Commercial & Industrial Buildings	Electricity	185,345	157,020	-15.3%	1,287	465	-63.8%
	Natural Gas	0	0	-	0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	5,603	5,619	0.3%	433	408	-5.9%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	14,822	14,065	-5.1%	1,146	1,020	-11.0%
Natural Gas Fugitive Emissions				-	0	0	-
Total		**1,759,714**	**1,588,148**	**-9.7%**	**48,551**	**49,556**	**2.1%**
On-Road Transportation							
Electric Vehicles	Electricity	-	0	-	-	1	-
Passenger Vehicles	Gasoline + Diesel + Propane	7,521	87,329	1061.1%	587	5,632	860.0%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	132,576	175,037	32.0%	9,308	11,232	20.7%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	73,094	42,741	-41.5%	5,174	2,808	-45.7%
Motorcycles	Gasoline	247	622	151.5%	17	43	151.5%
Total On-Road Transportation		**213,439**	**305,730**	**43.2%**	**15,086**	**19,716**	**30.7%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	19,502	18,705	-4.1%	1,477	1,380	-6.6%
Total Off-Road Transportation		**19,502**	**18,705**	**-4.1%**	**1,477**	**1,380**	**-6.6%**
Waste							
Wastewater					0	1	378.0%
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					1,373	792	-42.3%
Total Waste					**1,373**	**792**	**-42.3%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					Withheld	Withheld	Withheld
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					18	4	-80.0%
Total AFOLU					**18**	**4**	**-80.0%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					955	1,615	69.1%
Total IPPU					**955**	**1,615**	**69.1%**
TOTAL		**1,992,655**	**1,912,583**	**-4.0%**	**67,459**	**73,063**	**8.3%**

9 CITY OF LANGFORD

9.1 2018 Profile

Profile	
Population	40,557
Dwellings	15,778
Registered Vehicles	28,121
Energy (Thousands of GJ)	3,492
GHG Emissions (tCO_2e)	169,775

9.2 Energy & GHG Emissions

Table 13 presents a summary comparison of the City of Langford's 2007 and 2018 energy and GHG emissions.

Table 13. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	514,845	649,121	26.1%	3,575	1,924	-46.2%
	Natural Gas	122,432	198,172	61.9%	6,105	9,882	61.9%
	Fuel Oil	103,002	125,506	21.8%	7,043	8,582	21.8%
	Propane	17,793	16,795	-5.6%	1,085	1,027	-5.3%
	Wood	39,489	37,690	-4.6%	927	885	-4.6%
	Diesel	17,629	21,001	19.1%	1,364	1,524	11.7%
Commercial & Industrial Buildings	Electricity	343,895	419,190	21.9%	2,388	1,242	-48.0%
	Natural Gas	186,387	261,641	40.4%	9,295	13,047	40.4%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	31,789	45,144	42.0%	2,459	3,275	33.2%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	84,097	113,003	34.4%	6,505	8,198	26.0%
Natural Gas Fugitive Emissions				-	81	160	98.7%
Total		**1,461,358**	**1,887,265**	**29.1%**	**40,826**	**49,747**	**21.9%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	5	-
Passenger Vehicles	Gasoline + Diesel + Propane	364,717	482,675	32.3%	25,932	31,008	19.6%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	455,816	763,799	67.6%	32,189	48,965	52.1%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	194,516	204,369	5.1%	13,673	13,422	-1.8%
Motorcycles	Gasoline	3,488	3,146	-9.8%	240	217	-9.8%
Total On-Road Transportation		**1,018,538**	**1,453,990**	**42.8%**	**72,034**	**93,616**	**30.0%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	110,653	150,282	35.8%	8,381	11,084	32.3%
Total Off-Road Transportation		**110,653**	**150,282**	**35.8%**	**8,381**	**11,084**	**32.3%**
Waste							
Wastewater					621	1,298	109.0%
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					7,791	6,361	-18.3%
Total Waste					**8,412**	**7,659**	**-8.9%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-1,878	-5,373	186.0%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					56	65	17.5%
Total AFOLU					**-1,823**	**-5,308**	**191.2%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					5,417	12,975	139.5%
Total IPPU					**5,417**	**12,975**	**139.5%**
TOTAL		**2,590,548**	**3,491,537**	**34.8%**	**133,247**	**169,775**	**27.4%**

10 DISTRICT OF METCHOSIN

10.1 2018 Profile

Profile	
Population	5,117
Dwellings	1,985
Registered Vehicles	4,387
Energy (Thousands of GJ)	506
GHG Emissions (tCO_2e)	9,038

10.2 Energy & GHG Emissions

Table 14 presents a summary comparison of the District of Metchosin's 2007 and 2018 energy and GHG emissions.

Table 14. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	136,761	130,722	-4.4%	950	387	-59.2%
	Natural Gas	8,173	8,378	2.5%	408	418	2.5%
	Fuel Oil	9,003	10,970	21.8%	616	750	21.8%
	Propane	1,553	1,466	-5.6%	95	90	-5.3%
	Wood	3,457	3,299	-4.6%	81	77	-4.6%
	Diesel	3,471	2,650	-23.7%	268	192	-28.4%
Commercial & Industrial Buildings	Electricity	38,169	43,165	13.1%	265	128	-51.7%
	Natural Gas	33,858	27,903	-17.6%	1,688	1,391	-17.6%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	6,260	5,696	-9.0%	484	413	-14.7%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	16,560	14,257	-13.9%	1,281	1,034	-19.2%
Natural Gas Fugitive Emissions				-	4	5	25.7%
Total		**257,264**	**248,506**	**-3.4%**	**6,140**	**4,887**	**-20.4%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	2	-
Passenger Vehicles	Gasoline + Diesel + Propane	80,035	65,936	-17.6%	5,705	4,251	-25.5%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	118,246	132,722	12.2%	8,346	8,551	2.5%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	36,947	39,882	7.9%	2,590	2,619	1.1%
Motorcycles	Gasoline	668	433	-35.2%	46	30	-35.2%
Total On-Road Transportation		**235,896**	**238,973**	**1.3%**	**16,688**	**15,453**	**-7.4%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	21,789	18,961	-13.0%	1,650	1,399	-15.3%
Total Off-Road Transportation		**21,789**	**18,961**	**-13.0%**	**1,650**	**1,399**	**-15.3%**
Waste							
Wastewater					0	0	-
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					1,534	803	-47.7%
Total Waste					**1,534**	**803**	**-47.7%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-11,114	-15,562	40.0%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					369	422	14.6%
Total AFOLU					**-10,746**	**-15,140**	**40.9%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					1,067	1,637	53.5%
Total IPPU					**1,067**	**1,637**	**53.5%**
TOTAL		**514,949**	**506,440**	**-1.7%**	**16,333**	**9,038**	**-44.7%**

11 DISTRICT OF NORTH SAANICH

11.1 2018 Profile

Profile	
Population	11,745
Dwellings	5,047
Registered Vehicles	10,009
Energy (Thousands of GJ)	1,325
GHG Emissions (tCO_2e)	45,201

11.2 Energy & GHG Emissions

Table 15 presents a summary comparison of the District of North Saanich's 2007 and 2018 energy and GHG emissions.

Table 15. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	375,159	336,973	-10.2%	2,605	999	-61.7%
	Natural Gas	41,591	63,071	51.6%	2,074	3,145	51.6%
	Fuel Oil	5,953	7,254	21.8%	407	496	21.8%
	Propane	1,027	969	-5.6%	63	59	-5.3%
	Wood	2,286	2,182	-4.6%	54	51	-4.6%
	Diesel	7,844	6,082	-22.5%	607	441	-27.3%
Commercial & Industrial Buildings	Electricity	156,437	182,658	16.8%	1,086	541	-50.2%
	Natural Gas	99,927	106,311	6.4%	4,983	5,301	6.4%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	14,145	13,073	-7.6%	1,094	948	-13.3%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	37,419	32,725	-12.5%	2,894	2,374	-18.0%
Natural Gas Fugitive Emissions				-	21	30	43.2%
Total		**741,787**	**751,297**	**1.3%**	**15,888**	**14,387**	**-9.4%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	5	-
Passenger Vehicles	Gasoline + Diesel + Propane	208,096	173,125	-16.8%	14,821	11,151	-24.8%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	234,970	267,260	13.7%	16,653	17,186	3.2%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	82,311	88,897	8.0%	5,736	5,821	1.5%
Motorcycles	Gasoline	1,684	1,150	-31.7%	116	79	-31.7%
Total On-Road Transportation		**527,061**	**530,433**	**0.6%**	**37,326**	**34,242**	**-8.3%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	49,235	43,521	-11.6%	3,729	3,210	-13.9%
Total Off-Road Transportation		**49,235**	**43,521**	**-11.6%**	**3,729**	**3,210**	**-13.9%**
Waste							
Wastewater					196	302	53.8%
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					3,467	1,842	-46.9%
Total Waste					**3,663**	**2,144**	**-41.5%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-9,360	-13,428	43.5%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					797	888	11.5%
Total AFOLU					**-8,564**	**-12,540**	**46.4%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					2,410	3,758	55.9%
Total IPPU					**2,410**	**3,758**	**55.9%**
TOTAL		**1,318,084**	**1,325,251**	**0.5%**	**54,454**	**45,201**	**-17.0%**

12 DISTRICT OF OAK BAY

12.1 2018 Profile

Profile	
Population	18,564
Dwellings	8,168
Registered Vehicles	11,502
Energy (Thousands of GJ)	1,547
GHG Emissions (tCO_2e)	77,178

12.2 Energy & GHG Emissions

Table 16 presents a summary comparison of the District of Oak Bay's 2007 and 2018 energy and GHG emissions.

Table 16. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	370,817	312,380	-15.8%	2,575	926	-64.0%
	Natural Gas	276,642	267,844	-3.2%	13,795	13,357	-3.2%
	Fuel Oil	66,466	80,987	21.8%	4,545	5,538	21.8%
	Propane	11,487	10,843	-5.6%	700	663	-5.3%
	Wood	25,469	24,309	-4.6%	598	571	-4.6%
	Diesel	13,158	9,613	-26.9%	1,018	697	-31.5%
Commercial & Industrial Buildings	Electricity	106,275	102,012	-4.0%	738	302	-59.0%
	Natural Gas	83,140	127,799	53.7%	4,146	6,373	53.7%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	23,727	20,664	-12.9%	1,835	1,499	-18.3%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	0	0	-	0	0	-
Natural Gas Fugitive Emissions				-	83	115	38.6%
Total		**977,180**	**956,449**	**-2.1%**	**30,033**	**30,041**	**0.0%**
On-Road Transportation							
Electric Vehicles	Electricity	-	2	-	-	5	-
Passenger Vehicles	Gasoline + Diesel + Propane	322,115	248,704	-22.8%	22,936	16,042	-30.1%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	205,060	248,590	21.2%	14,538	15,975	9.9%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	65,480	23,549	-64.0%	4,572	1,519	-66.8%
Motorcycles	Gasoline	1,771	1,334	-24.7%	122	92	-24.7%
Total On-Road Transportation		**594,426**	**522,180**	**-12.2%**	**42,169**	**33,633**	**-20.2%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	82,591	68,788	-16.7%	6,256	5,074	-18.9%
Total Off-Road Transportation		**82,591**	**68,788**	**-16.7%**	**6,256**	**5,074**	**-18.9%**
Waste							
Wastewater					1,968	1,698	-13.7%
Composting					0	95	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					5,815	2,912	-49.9%
Total Waste					**7,783**	**4,704**	**-39.6%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-1,145	-2,213	93.3%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					0	0	-100.0%
Total AFOLU					**-1,145**	**-2,213**	**93.3%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					4,044	5,939	46.9%
Total IPPU					**4,044**	**5,939**	**46.9%**
TOTAL		**1,654,197**	**1,547,417**	**-6.5%**	**89,140**	**77,178**	**-13.4%**

13 THE DISTRICT OF SAANICH

13.1 2018 Profile

Profile	
Population	121,055
Dwellings	49,986
Registered Vehicles	80,052
Energy (Thousands of GJ)	10,308
GHG Emissions (tCO_2e)	496,408

13.2 Energy & GHG Emissions

Table 17 presents a summary comparison of the District of Saanich's 2007 and 2018 energy and GHG emissions.

Table 17. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	2,368,284	2,080,838	-12.1%	16,447	6,167	-62.5%
	Natural Gas	743,960	731,870	-1.6%	37,099	36,497	-1.6%
	Fuel Oil	518,953	400,458	-22.8%	35,484	27,382	-22.8%
	Propane	97,519	92,049	-5.6%	5,944	5,629	-5.3%
	Wood	216,161	206,317	-4.6%	5,076	4,845	-4.6%
	Diesel	79,524	62,683	-21.2%	6,151	4,548	-26.1%
Commercial & Industrial Buildings	Electricity	1,173,713	1,076,395	-8.3%	8,151	3,190	-60.9%
	Natural Gas	759,454	825,369	8.7%	37,872	41,159	8.7%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	38,936	20,302	-47.9%	2,662	1,388	-47.9%
	Diesel	143,403	134,747	-6.0%	11,092	9,776	-11.9%
Energy Industries	LFG Combustion			-	418	7,658	1731.0%
Agriculture, Forestry And Fishing Activities	Diesel	379,367	337,293	-11.1%	29,343	24,471	-16.6%
Natural Gas Fugitive Emissions				-	314	432	37.5%
Total		**6,519,275**	**5,968,321**	**-8.5%**	**196,053**	**173,142**	**-11.7%**
On-Road Transportation							
Electric Vehicles	Electricity	-	8	-	-	26	-
Passenger Vehicles	Gasoline + Diesel + Propane	1,877,530	1,569,407	-16.4%	133,584	101,091	-24.3%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	1,608,977	1,937,746	20.4%	113,867	124,245	9.1%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	487,735	376,512	-22.8%	34,114	24,631	-27.8%
Motorcycles	Gasoline	11,374	7,822	-31.2%	784	539	-31.2%
Total On-Road Transportation		**3,985,616**	**3,891,494**	**-2.4%**	**282,348**	**250,532**	**-11.3%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	499,161	448,564	-10.1%	37,808	33,085	-12.5%
Total Off-Road Transportation		**499,161**	**448,564**	**-10.1%**	**37,808**	**33,085**	**-12.5%**
Waste							
Wastewater					4,989	5,340	7.0%
Composting					0	3,923	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					35,144	18,988	-46.0%
Total Waste					**40,134**	**28,252**	**-29.6%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-6,820	-28,395	316.3%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					874	1,063	21.7%
Total AFOLU					**-5,947**	**-27,332**	**359.6%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					24,438	38,729	58.5%
Total IPPU					**24,438**	**38,729**	**58.5%**
TOTAL		**11,004,052**	**10,308,380**	**-6.3%**	**574,835**	**496,408**	**-13.6%**

The District of Saanich has previously completed 2007 base and 2017 reporting year GHG emissions inventories to which there are several differences between the District of Saanich's reported GHG emissions and those presented herein. These differences between the two inventories are presented in Appendix A.

14 SALT SPRING ELECTORAL AREA

14.1 2018 Profile

Profile	
Population	11,115
Dwellings	5,102
Registered Vehicles	8,722
Energy (Thousands of GJ)	634
GHG Emissions (tCO_2e)	43,963

14.2 Energy & GHG Emissions

Table 18 presents a summary comparison of Salt Spring Island Electoral Area's 2007 and 2018 energy and GHG emissions.

Table 18. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	4,990	3,989	-20.0%	35	12	-65.9%
	Natural Gas	0	0	-	0	0	-
	Fuel Oil	9,967	12,520	25.6%	682	856	25.6%
	Propane	9,006	8,764	-2.7%	549	536	-2.4%
	Wood	75,133	73,930	-1.6%	1,764	1,736	-1.6%
	Diesel	7,079	5,755	-18.7%	548	418	-23.7%
Commercial & Industrial Buildings	Electricity	85	75	-11.9%	1	0	-62.4%
	Natural Gas	0	0	-	0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	12,765	12,372	-3.1%	987	898	-9.1%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	33,769	30,970	-8.3%	2,612	2,247	-14.0%
Natural Gas Fugitive Emissions				-	0	0	-
Total		**152,793**	**148,375**	**-2.9%**	**7,177**	**6,702**	**-6.6%**
On-Road Transportation							
Electric Vehicles	Electricity	-	2	-	-	7	-
Passenger Vehicles	Gasoline + Diesel + Propane	166,502	140,264	-15.8%	11,828	9,050	-23.5%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	197,189	244,847	24.2%	13,963	15,719	12.6%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	45,823	58,212	27.0%	3,148	3,794	20.5%
Motorcycles	Gasoline	1,737	795	-54.2%	120	55	-54.2%
Total On-Road Transportation		**411,252**	**444,119**	**8.0%**	**29,059**	**28,625**	**-1.5%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	44,432	41,186	-7.3%	3,365	3,038	-9.7%
Total Off-Road Transportation		**44,432**	**41,186**	**-7.3%**	**3,365**	**3,038**	**-9.7%**
Waste							
Wastewater					49	10	-79.8%
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					3,128	1,743	-44.3%
Total Waste					**3,177**	**1,753**	**-44.8%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					Withheld	Withheld	Withheld
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					407	288	-29.2%
Total AFOLU					**407**	**288**	**-29.2%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					2,175	3,556	63.5%
Total IPPU					**2,175**	**3,556**	**63.5%**
TOTAL		**608,477**	**633,681**	**4.1%**	**45,361**	**43,963**	**-3.1%**

15 TOWN OF SIDNEY

15.1 2018 Profile

Profile	
Population	12,172
Dwellings	6,099
Registered Vehicles	8,435
Energy (Thousands of GJ)	1,188
GHG Emissions (tCO_2e)	56,194

15.2 Energy & GHG Emissions

Table 19 presents a summary comparison of the Town Sidney's 2007 and 2018 energy and GHG emissions.

Table 19. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	243,260	215,028	-11.6%	1,689	637	-62.3%
	Natural Gas	70,155	78,015	11.2%	3,498	3,890	11.2%
	Fuel Oil	58,189	70,903	21.8%	3,979	4,848	21.8%
	Propane	10,069	9,505	-5.6%	614	581	-5.3%
	Wood	22,263	21,249	-4.6%	523	499	-4.6%
	Diesel	8,167	6,303	-22.8%	632	457	-27.6%
Commercial & Industrial Buildings	Electricity	186,594	177,767	-4.7%	1,296	527	-59.3%
	Natural Gas	80,240	82,300	2.6%	4,001	4,104	2.6%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	14,728	13,549	-8.0%	1,139	983	-13.7%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	38,963	33,915	-13.0%	3,014	2,461	-18.4%
Natural Gas Fugitive Emissions				-	47	66	38.7%
Total		**732,630**	**708,533**	**-3.3%**	**20,432**	**19,054**	**-6.7%**
On-Road Transportation							
Electric Vehicles	Electricity	-	0	-	-	1	-
Passenger Vehicles	Gasoline + Diesel + Propane	199,863	162,372	-18.8%	14,217	10,424	-26.7%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	169,345	207,065	22.3%	11,986	13,268	10.7%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	74,639	64,524	-13.6%	5,221	4,215	-19.3%
Motorcycles	Gasoline	1,276	711	-44.3%	88	49	-44.3%
Total On-Road Transportation		**445,124**	**434,672**	**-2.3%**	**31,511**	**27,957**	**-11.3%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	51,266	45,103	-12.0%	3,883	3,327	-14.3%
Total Off-Road Transportation		**51,266**	**45,103**	**-12.0%**	**3,883**	**3,327**	**-14.3%**
Waste							
Wastewater					612	820	33.9%
Composting					0	170	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					3,610	1,909	-47.1%
Total Waste					**4,222**	**2,900**	**-31.3%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-536	-939	75.1%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					3	2	-33.2%
Total AFOLU					**-534**	**-937**	**75.6%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					2,510	3,894	55.1%
Total IPPU					**2,510**	**3,894**	**55.1%**
TOTAL		**1,229,020**	**1,188,309**	**-3.3%**	**62,025**	**56,194**	**-9.4%**

16 DISTRICT OF SOOKE

16.1 2018 Profile

Profile	
Population	14,300
Dwellings	5,715
Registered Vehicles	9,498
Energy (Thousands of GJ)	1,141
GHG Emissions (tCO_2e)	46,574

16.2 Energy & GHG Emissions

Table 20 presents a summary comparison of the District of Sooke's 2007 and 2018 energy and GHG emissions.

Table 20. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	257,386	290,702	12.9%	1,787	862	-51.8%
	Natural Gas	13,108	43,147	229.2%	654	2,152	229.2%
	Fuel Oil	56,455	68,789	21.8%	3,860	4,704	21.8%
	Propane	9,744	9,197	-5.6%	594	562	-5.3%
	Wood	21,667	20,680	-4.6%	509	486	-4.6%
	Diesel	7,358	7,405	0.6%	569	537	-5.6%
Commercial & Industrial Buildings	Electricity	68,790	82,948	20.6%	478	246	-48.5%
	Natural Gas	16,506	33,344	102.0%	823	1,663	102.0%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	13,268	15,917	20.0%	1,026	1,155	12.5%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	35,100	39,844	13.5%	2,715	2,891	6.5%
Natural Gas Fugitive Emissions				-	13	31	142.3%
Total		**499,382**	**611,972**	**22.5%**	**13,028**	**15,287**	**17.3%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	3	-
Passenger Vehicles	Gasoline + Diesel + Propane	141,887	157,500	11.0%	10,099	10,113	0.1%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	201,042	267,290	33.0%	14,166	17,140	21.0%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	73,397	50,131	-31.7%	5,152	3,272	-36.5%
Motorcycles	Gasoline	1,490	1,109	-25.6%	103	76	-25.6%
Total On-Road Transportation		**417,817**	**476,031**	**13.9%**	**29,520**	**30,605**	**3.7%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	46,184	52,988	14.7%	3,498	3,908	11.7%
Total Off-Road Transportation		**46,184**	**52,988**	**14.7%**	**3,498**	**3,908**	**11.7%**
Waste							
Wastewater					0	0	-
Composting					0	0	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					3,252	2,243	-31.0%
Total Waste					**3,252**	**2,243**	**-31.0%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-5,018	-10,105	101.4%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					75	60	-19.9%
Total AFOLU					**-4,943**	**-10,044**	**103.2%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					2,261	4,575	102.3%
Total IPPU					**2,261**	**4,575**	**102.3%**
TOTAL		**963,383**	**1,140,991**	**18.4%**	**46,616**	**46,574**	**-0.1%**

17 CITY OF VICTORIA

17.1 2018 Profile

Profile	
Population	92,689
Dwellings	49,115
Registered Vehicles	50,789
Energy (Thousands of GJ)	9,437
GHG Emissions (tCO_2e)	452,567

17.2 Energy & GHG Emissions

Table 21 presents a summary comparison of the City of Victoria's 2007 and 2018 energy and GHG emissions.

Table 21. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	1,233,158	1,126,962	-8.6%	8,564	3,340	-61.0%
	Natural Gas	952,641	417,084	-56.2%	47,506	20,799	-56.2%
	Fuel Oil	617,245	443,708	-28.1%	42,205	30,339	-28.1%
	Propane	118,617	111,964	-5.6%	7,230	6,847	-5.3%
	Wood	259,255	247,448	-4.6%	6,088	5,811	-4.6%
	Diesel	57,916	47,995	-17.1%	4,480	3,482	-22.3%
Commercial & Industrial Buildings	Electricity	1,978,652	1,741,286	-12.0%	13,741	5,161	-62.4%
	Natural Gas	1,377,709	1,994,378	44.8%	68,703	99,455	44.8%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	122,702	122,702	0.0%	8,390	8,390	0.0%
	Diesel	104,439	103,172	-1.2%	8,078	7,485	-7.3%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	0	0	-	0	0	-
Natural Gas Fugitive Emissions				-	231	370	60.6%
Total		**6,822,334**	**6,356,700**	**-6.8%**	**215,214**	**191,479**	**-11.0%**
On-Road Transportation							
Electric Vehicles	Electricity	-	4	-	-	13	-
Passenger Vehicles	Gasoline + Diesel + Propane	1,250,314	1,133,396	-9.4%	88,915	72,852	-18.1%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	815,264	1,028,566	26.2%	57,587	65,860	14.4%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	430,934	366,973	-14.8%	30,235	24,054	-20.4%
Motorcycles	Gasoline	8,968	7,051	-21.4%	618	486	-21.4%
Total On-Road Transportation		**2,505,480**	**2,535,989**	**1.2%**	**177,355**	**163,265**	**-7.9%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	503,013	543,969	8.1%	38,042	40,436	6.3%
Total Off-Road Transportation		**503,013**	**543,969**	**8.1%**	**38,042**	**40,436**	**6.3%**
Waste							
Wastewater					7,699	7,026	-8.7%
Composting					72	854	1080.1%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					25,595	22,078	-13.7%
Total Waste					**33,367**	**29,957**	**-10.2%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-217	-2,224	927.0%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					0	0	-
Total AFOLU					**-217**	**-2,224**	**927.0%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					17,798	29,654	66.6%
Total IPPU					**17,798**	**29,654**	**66.6%**
TOTAL		**9,830,828**	**9,436,659**	**-4.0%**	**481,559**	**452,567**	**-6.0%**

The City of Victoria has previously completed 2007 base and 2018 reporting year GHG emissions inventories to which there are several differences between the City of Victoria's reported GHG emissions and those presented herein. These differences between the two inventories are presented in Appendix B.

18 TOWN OF VIEW ROYAL

18.1 2018 Profile

Profile	
Population	11,283
Dwellings	4,637
Registered Vehicles	7,268
Energy (Thousands of GJ)	999
GHG Emissions (tCO_2e)	45,507

18.2 Energy & GHG Emissions

Table 22 presents a summary comparison of the Town of View Royal's 2007 and 2018 energy and GHG emissions.

Table 22. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	185,764	179,782	-3.2%	1,290	533	-58.7%
	Natural Gas	75,155	76,534	1.8%	3,748	3,817	1.8%
	Fuel Oil	22,724	27,689	21.8%	1,554	1,893	21.8%
	Propane	3,926	3,706	-5.6%	239	227	-5.3%
	Wood	8,710	8,314	-4.6%	205	195	-4.6%
	Diesel	6,462	5,842	-9.6%	500	424	-15.2%
Commercial & Industrial Buildings	Electricity	113,772	129,927	14.2%	790	385	-51.3%
	Natural Gas	123,868	146,990	18.7%	6,177	7,330	18.7%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
	Fuel Oil	0	0	-	0	0	-
	Diesel	11,652	12,559	7.8%	901	911	1.1%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	30,825	31,438	2.0%	2,384	2,281	-4.3%
Natural Gas Fugitive Emissions				-	38	60	58.1%
Total		**582,858**	**622,780**	**6.8%**	**17,826**	**18,055**	**1.3%**
On-Road Transportation							
Electric Vehicles	Electricity	-	1	-	-	2	-
Passenger Vehicles	Gasoline + Diesel + Propane	138,335	138,673	0.2%	9,846	8,929	-9.3%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	141,783	182,230	28.5%	10,031	11,666	16.3%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	54,665	12,295	-77.5%	3,828	785	-79.5%
Motorcycles	Gasoline	1,223	895	-26.8%	84	62	-26.8%
Total On-Road Transportation		**336,005**	**334,094**	**-0.6%**	**23,789**	**21,443**	**-9.9%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	40,558	41,809	3.1%	3,072	3,084	0.4%
Total Off-Road Transportation		**40,558**	**41,809**	**3.1%**	**3,072**	**3,084**	**0.4%**
Waste							
Wastewater					386	475	23.1%
Composting					0	170	-

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Solid Waste					2,856	1,770	-38.0%
Total Waste					**3,242**	**2,416**	**-25.5%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					-1,753	-3,102	76.9%
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					2	2	-11.0%
Total AFOLU					**-1,751**	**-3,100**	**77.0%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					1,986	3,610	81.8%
Total IPPU					**1,986**	**3,610**	**81.8%**
TOTAL		**959,422**	**998,682**	**4.1%**	**48,163**	**45,507**	**-5.5%**

19 SOUTHERN GULF ISLANDS ELECTORAL AREA

19.1 2018 Profile

The Southern Gulf Islands Electoral Area consists of: Galiano, Mayne, North Pender, Saturna and South Pender.

Profile	
Population	4,811
Dwellings	2,487
Registered Vehicles	4,023
Energy (Thousands of GJ)	535
GHG Emissions (tCO_2e)	29,220

19.2 Energy & GHG Emissions

Table 23 presents a summary comparison of the Southern Gulf Islands Electoral Area 2007 and 2018 energy and GHG emissions.

Table 23. Estimated Energy and GHG Emissions By Reporting Source

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Stationary Energy							
Residential Buildings	Electricity	205	183	-10.7%	1	1	-61.9%
	Natural Gas	0	0	-	0	0	-
	Fuel Oil	27,326	34,326	25.6%	1,868	2,347	25.6%
	Propane	24,684	24,021	-2.7%	1,505	1,469	-2.4%
	Wood	206,032	202,732	-1.6%	4,838	4,761	-1.6%
	Diesel	3,526	2,491	-29.3%	273	181	-33.7%

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Commercial & Industrial Buildings	Electricity	45	47	4.1%	0	0	-55.6%
	Natural Gas	0	0	-	0	0	-
	Fuel Oil	0	0	-	0	0	-
	Diesel	6,358	5,355	-15.8%	492	389	-21.0%
Energy Industries	LFG Combustion			-	0	0	-
Agriculture, Forestry And Fishing Activities	Diesel	16,819	13,405	-20.3%	1,301	973	-25.2%
Natural Gas Fugitive Emissions				-	0	0	-
Total		**284,996**	**282,561**	**-0.9%**	**10,278**	**10,119**	**-1.5%**
On-Road Transportation							
Electric Vehicles	Electricity	-	0	-	-	1	-
Passenger Vehicles	Gasoline + Diesel + Propane	115,551	57,721	-50.0%	8,207	3,716	-54.7%
Light Trucks, Vans, SUVs	Gasoline + Diesel + Propane	63,232	120,980	91.3%	4,498	7,768	72.7%
Heavy Duty Vehicles	Gasoline + Diesel + Propane	17,024	55,838	228.0%	1,170	3,669	213.5%
Motorcycles	Gasoline	916	439	-52.1%	63	30	-52.1%
Total On-Road Transportation		**196,723**	**234,979**	**19.4%**	**13,939**	**15,184**	**8.9%**
Off-Road Transportation							
Marine, Aviation and Other Off-Road Vehicles	Marine Gasoline + Marine Diesel + Jet Fuel	22,131	17,827	-19.4%	1,676	1,315	-21.6%
Total Off-Road Transportation		**22,131**	**17,827**	**-19.4%**	**1,676**	**1,315**	**-21.6%**
Waste							

Source	Type	2007 Energy (GJ)	2018 Energy (GJ)	Change (%)	2007 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)	Change (%)
Wastewater					24	6	-76.1%
Composting					0	0	-
Solid Waste					1,558	755	-51.6%
Total Waste					**1,582**	**760**	**-51.9%**
Agriculture Forestry & Other Land Use (AFOLU)							
Land-Use					Withheld	Withheld	Withheld
Livestock, Aggregate Sources and Non-CO_2 Emission Sources on Land					387	302	-21.8%
Total AFOLU					**387**	**302**	**-21.8%**
Industrial Process & Product Use (IPPU)							
Process Use Emissions					1,083	1,539	42.1%
Total IPPU					**1,083**	**1,539**	**42.1%**
TOTAL		**503,849**	**535,368**	**6.3%**	**28,947**	**29,220**	**0.9%**

APPENDIX A

Comparison of the District of Saanich's and the CRD's GHG calculation of the 2007 and 2017/2018 GHG emissions is presented in Table A1 and Table A2 below. It should be noted that the District of Saanich has not prepared a 2018 GHG emissions inventory and as such, the reported 2017 GHG emissions inventory is used as a proxy for comparison.

Table A1. Comparision of 2007 GHG Emissions Inventories

Sector	Sub-Sector	2007 SAANICH GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
Stationary Energy	Residential Buildings	93,458	106,201	12,743	• *Due to concerns around the published energy data (see Section 2.3), the raw energy values for electricity and natural gas were used in the CRD inventory. Results in a ~7,500 tCO_2e increase.* • *ECCC NIR updated 2007 (Original 33,000 tCO_2e; Updated 183,000 tCO_2e) numbers for other off-road residential emissions. This is a common occurrence for ECCC. They will typically update historical numbers based on new data and methodological changes. Results in an ~5,200 tCO_2e increase.*
	Agriculture, Forestry, And Fishing Activities	13,550	29,343	15,793	• *ECCC NIR updated 2007 numbers for this source of GHG emissions (Original 500,000 tCO_2e; Updated 873,000 tCO_2e). Results in the increase in GHG emissions.*
	Commercial / Institutional Buildings	52,835	59,777	6,942	• *Due to concerns around the published energy data (see Section 2.3), the raw energy values for electricity and natural gas were used in the CRD inventory. Results in an ~1,000 tCO_2e increase.* • *ECCC NIR updated 2007 numbers for other off-road commercial and manufacturing emissions. (Original 210,000 tCO_2e; Updated 330,000 tCO_2e). Results in an ~6,000 tCO_2e increase.*
	Energy Industries		418	418	• *2007 flaring data was not available to Saanich at the time of reporting.*
	Fugitive Emissions: Oil and Natural Gas Systems	1,800	314	(1,486)	• *For the CRD project, FORTISBC provided 2018 fugitive numbers for the CRD which did not include upstream GHG emissions. This value was then prorated to each CRD member based on the number of natural gas connections. The original value in the reported inventory*

Sector	Sub-Sector	2007 SAANICH GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
					was estimated by FORTISBC for the District and includes upstream emissions. To be consistent in terms of methodology across the CRD, the new value was applied.
Transportation	On-Road Transportation	88,486	105,898	17,413	• *The CRD calculator uses the original 2007 and 2010 vehicle registration data, whereas the original inventory used the published 2012 data (which contained the 2007 and 2010 data which was modified based on changes to the 2012 methodology). During the preparation of the CRD calculator, it was brought to light there are concerns with the 2012 data which impacted the 2007 and 2010 values. As such, the original CEEI 2007 and 2010 data was used in the CRD calculator The original inventory used the estimated Vehicle Kilometer Travelled (VKT) data and fuel efficiency factors that were used in the BC CEEIs which were derived from AirCare data. As the AirCare data program ended in 2014, the CRD inventory uses VKT data and fuel efficiency factors that are generated and used by Environment Canada (EC) in their calculation of Provincial and Federal GHG emissions. The fuel consumption values, on average, in the EC dataset are higher than the CEEI estimates. Some of the original vehicle registrations were also reclassed to align with the EC dataset. Results in a ~46,000 tCO_2e increase.* • *BC Transit GHG emissions were allocated based on total service population, rather than the CRD population as was done in the original inventory. Results in an ~6,000 tCO_2e decline.*
	Transboundary Transportation	151,977	176,450	24,473	• *See above note.*
	Off-Road Transportation: Aviation, Waterborne, and Other Off-Road	14,562	37,808	23,246	• *Land and marine based aviation GHG emissions were assigned on a per capita basis. There were some changes to the Provinces population counts between inventories resulting in a decline of aviation emissions by ~1,700 tCO_2e* • *In the original inventory, the BC Ferries GHG emissions was allocated based on a per capita basis based on total*

Sector	Sub-Sector	2007 SAANICH GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
					passengers. Since BC Ferries also serves the Vancouver coast population, the methodology was changed and the BC ferries value was prorated based on the Vancouver Island and Vancouver South Coast population in the CRD inventory. Results in an increase of ~10,000 tCO_2e. • *ECCC NIR updated 2007 numbers for other off-road emissions. (Original 110,000 tCO_2e; Updated 687,000 tCO_2e). Results in an ~15,000 tCO_2e increase.*
Waste	Waste: Solid Waste Disposal, Biological Treatment of Waste, Wastewater Treatment and Discharge	34,121	40,134	6,013	• *In the original inventory, wastewater volumes were allocated based on a 2015 study whereas the CRD values are based on Total annual volume of wastewater by municipality. Results in an ~500 tCO_2e increase.* • *The original inventory pro-rated Hartland Landfill GHG emissions based on total volume of waste (estimated by the District) sent to landfill. The CRD inventory assigns 31% of waste emissions to the City of Victoria (which was a lower claim than what was estimated in the original inventory) and assigns the rest of the landfill emissions on a per capita basis. Results in an increase of ~6,500 tCO_2e.*
AFOLU	AFOLU: Livestock, Land, and Other Agriculture	20,071	(5,947)	(26,018)	• *For the CRD inventory, the BC MOE provided BC based land-use emissions factors and there was a change in the calculation methodologies based on land-use data at the CRD level. Results in a decrease of GHG emissions by ~15,000 tCO_2e.* • *The Saanich inventory was also using livestock GHG estimates from the Agriculture and Agri-Food Canada (AAFC) Holos GHG emissions model (V3.1) using 2016 Statistics Canada Agriculture Census Data which conservatively over estimated livestock emissions, but this approach was not used in the CRD estimates as the livestock census data is from 2006 and not complete for all CRD members. As such, in the CRD calculator all livestock and direct/indirect manure and soil GHG estimates are based on the ECCC NIR and prorated based on hectares of agricultural land. Results in a decline of GHG emissions by 11,000 tCO_2e.*
IPPU	IPPU: Industrial Processes, and Product Use	24,524	24,438	(86)	• *ECCC NIR updated 2007 numbers for IPPU GHG emissions. Results in a decline of ~100 tCO_2e.*

Sector	Sub-Sector	2007 SAANICH GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
Total GHG Emissions		**495,384**	**574,835**	**79,451**	

Table A2. Comparision of 2017 and 2018 GHG Emissions Inventories

Sector	Sub-Sector	2017 SAANICH GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
Stationary Energy	Residential Buildings	89,308	85,067	(4,241)	• *The CRD inventory is using 2018 energy data whereas the Saancih calculator is based on 2017.* • *To estimate wood and propane use, the linear regression equation was based on the CRD total consumption and HDD days (instead of the reporter's consumption) which resulted in immaterial changes to the values.* • *ECCC NIR updated 2018 (Original 140,000 tCO_2e; Updated 147,000 tCO_2e) numbers for other off-road residential emissions. The difference is also due to different reporting years being reported in this table (values are assigned on a per capita basis).*
	Agriculture, Forestry, And Fishing Activities	13,314	24,471	11,157	• *ECCC NIR updated 2018 numbers for this source of GHG emissions (Original 540,000 tCO_2e; Updated 791,000 tCO_2e). The difference is also due to different reporting years being reported in this table (values are assigned on a per capita basis).*
	Commercial / Institutional Buildings	56,819	55,514	(1,305)	• *ECCC NIR updated 2018 numbers for other off-road commercial and manufacturing emissions. (Original 290,000 tCO_2e; Updated 316,000 tCO_2e). The difference is also due to different reporting years being reported in this table (values are assigned on a per capita basis).*
	Energy Industries		7,658	7,658	• *Flaring data was not available to Saanich at the time of reporting.*
	Fugitive Emissions: Oil and Natural Gas Systems	1,206	432	(774)	• *For the CRD project, FORTISBC provided 2018 fugitive numbers for the CRD which did not include upstream GHG emissions. This value was then prorated to each CRD member based on the number of natural gas connections. The original value in the reported inventory was estimated by FORTISBC for the District and included upstream emissions. To be consistent in terms*

Sector	Sub-Sector	2017 SAANICH GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
					of methodology across the CRD, the new value was applied.
Transportation	On-Road Transportation	102,580	98,176	(4,404)	• *The CRD calculator uses the original 2007 and 2010 vehicle registration data, whereas the original inventory used the published 2012 data (which contained the 2007 and 2010 data which was modified based on changes to the 2012 methodology). During the preparation of the CRD calculator, it was brought to light there are concerns with the 2012 data which impacted the 2007 and 2010 values. As such, the original CEEI 2007 and 2010 data was used in the CRD calculator. In the original inventory, transportation GHG emissions were estimated based on population growth and the number of registered vehicles in 2012 whereas the CRD inventory uses 2010 vehicle registration data. The original inventory used the estimated Vehicle Kilometer Travelled (VKT) data and fuel efficiency factors that were used in the BC CEEIs which were derived from AirCare data. As the AirCare data program ended in 2014, the CRD inventory uses VKT data and fuel efficiency factors that are generated and used by Environment Canada (EC) in their calculation of Provincial and Federal GHG emissions. The fuel consumption and VKT values, on average, in the EC dataset are lower than those used in the GHG calculator. Results in a ~15,300 tCO_2e decline in GHG emissions.* • *BC Transit GHG emissions were allocated based on total service population, rather than the CRD population as was done in the original inventory. Results in an ~6,700 tCO_2e decline.*
	Transboundary Transportation	169,961	152,356	(17,605)	• *See above comment.*
	Off-Road Transportation:	26,273	33,085	6,812	• *Airport GHG emissions were assigned on a per capita basis. There were some changes to the Provinces*

Sector	Sub-Sector	2017 SAANICH GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
	Aviation, Waterborne, and Other Off-Road				*population counts between inventories resulting in a decline of aviation emissions by ~200 tCO_2e* • *In the original inventory, the BC Ferries GHG emissions was allocated based on a per capita basis based on total passengers. Since BC Ferries also serves the Vancouver coast population, the methodology was changed and the BC ferries value was prorated based on the Vancouver Island and Vancouver South Coast population in the CRD inventory. Results in an increase of ~8,000 tCO_2e.* • *ECCC NIR updated 2018 numbers for other off-road emissions. (Original 750,000 tCO_2e; Updated 682,000 tCO_2e). Results in an ~2,000 tCO_2e decline. The difference is also due to different reporting years being reported in this table (values are assigned on a per capita basis).*
Waste	Waste: Solid Waste Disposal, Biological Treatment of Waste, Wastewater Treatment and Discharge	23,819	28,252	4,433	• *In the original inventory, wastewater volumes were allocated based on a 2015 study whereas the CRD values are based on Total annual volume of wastewater by municipality. Results in an ~100 tCO_2e decline.* • *The original inventory pro-rated Hartland Landfill GHG emissions based on total volume of waste (estimated by the District) sent to landfill. The CRD inventory assigns 31% of waste emissions to the City of Victoria (which was a lower claim than what was estimated in the original inventory) and assigns the rest of the landfill emissions on a per capita basis. Results in an increase of ~4,400 tCO_2e.*
AFOLU	AFOLU: Livestock, Land, and Other Agriculture	(10,257)	(27,332)	(17,075)	• *For the CRD inventory, the BC MOE provided BC based land-use emissions factors and there was a change in the calculation methodologies based on land-use data at the CRD level. Results in a decrease of GHG emissions by ~7,000 tCO_2e.* • *The Saanich inventory was also using livestock GHG estimates from the Agriculture and Agri-Food Canada (AAFC) Holos GHG emissions model (V3.1) using 2016 Statistics Canada Agriculture Census Data which conservatively over estimated livestock emissions, but this approach was not used in the CRD estimates as the*

Sector	Sub-Sector	2017 SAANICH GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
					livestock census data is from 2006 and not complete for all CRD members. As such, in the CRD calculator all livestock and direct/indirect manure and soil GHG estimates are based on the ECCC NIR and prorated based on hectares of agricultural land. Results in a decline of GHG emissions by 10,000 tCO_2e
IPPU	IPPU: Industrial Processes, and Product Use	39,883	38,729	(1,155)	• *IPPU is allocated on a per capita basis. The difference is due to different reporting years being reported in this table.*
Total GHG Emissions		**512,906**	**496,408**	**-16,498**	

APPENDIX B

Comparison of the City of Victoria's and the CRD's GHG calculation of the 2007 and /2018 GHG emissions is presented in Table B1 and Table B2 below.

Table B1. Comparision of 2007 GHG Emissions Inventories

Sector	Sub-Sector	2007 VICTORIA GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference	Explanation for Difference
Stationary Energy	Residential Buildings	84,187	116,072	31,885	• *Due to concerns around the published energy data (see Section 2.3), the raw energy values for electricity and natural gas were used in the CRD inventory. Results in a ~28,000 tCO_2e increase. This effect is nearly netted out with the decrease in commercial building natural gas consumption (see below).* • *ECCC NIR updated 2007 (Original 33,000 tCO_2e; Updated 183,000 tCO_2e) numbers for other off-road residential emissions. This is a common occurrence for ECCC. They will typically update historical numbers based on new data and methodological changes. Results in a ~3,800 tCO_2e increase.*
	Commercial / Institutional Buildings	120,528	98,912	-21,616	• *Due to concerns around the published energy data (see Section 2.3), the raw energy values for electricity and natural gas were used in the CRD inventory. Results in a ~25,000 tCO_2e decline. This effect is nearly netted out with the increase in residential building natural gas consumption (see above).* • *ECCC NIR updated 2007 numbers for other off-road commercial and manufacturing emissions. (Original 210,000 tCO_2e; Updated 330,000 tCO_2e). Results in an ~4,000 tCO_2e increase.*
	Fugitive Emissions: Oil and Natural Gas Systems	1,370	231	-1,139	• *For the CRD project, FORTISBC provided 2018 fugitive numbers for the CRD which did not include upstream GHG emissions. This value was then prorated to each CRD member based on the number of natural gas connections. The original value in the reported inventory was estimated by FORTISBC for the City and includes upstream emissions. To be consistent in terms of*

Sector	Sub-Sector	2007 VICTORIA GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference	Explanation for Difference
					methodology across the CRD, the new value was applied.
Transportation	On-Road Transportation	40,274	50,420	10,146	• *The CRD calculator uses the original 2007 and 2010 vehicle registration data, whereas the original inventory used the published 2012 data (which contained the 2007 and 2010 data which was modified based on changes to the 2012 methodology). During the preparation of the CRD calculator, it was brought to light there are concerns with the 2012 data which impacted the 2007 and 2010 values. As such, the original CEEI 2007 and 2010 data was used in the CRD calculator. In the original inventory, transportation GHG emissions were estimated based on population growth and the number of registered vehicles in 2012. The original inventory used the estimated Vehicle Kilometer Travelled (VKT) data and fuel efficiency factors that were used in the BC CEEIs which were derived from AirCare data. As the AirCare data program ended in 2014, the CRD inventory uses VKT data and fuel efficiency factors that are generated and used by Environment Canada (EC) in their calculation of Provincial and Federal GHG emissions. The fuel consumption values, on average, in the EC dataset are higher than those used in the original inventory calculator. Results in a ~41,500 tCO_2e increase in GHG emissions.* • *BC Transit GHG emissions were allocated based on total service population, rather than the CRD population as was done in the original inventory. Results in an ~4,700 tCO_2e decline.*
	Transboundary Transportation	100,290	126,935	26,645	• *See above note.*
	Off-Road Transportation: Aviation,	56,959	38,042	-18,917	• *Land and marine based aviation GHG emissions were assigned on a per capita basis. There were some changes to the Provinces population counts between inventories resulting in a decline of aviation emissions.*

Sector	Sub-Sector	2007 VICTORIA GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference	Explanation for Difference
	Waterborne, and Other Off-Road				*There was also a methodology change in the assignment in marine aviation GHG emissions. The GPC Protocol provided updated guidance on the assignment of aviation emissions allowing these to be assigned as Scope 3 GHG emissions regardless of the location of the airport(s). On this basis, all marine aviation emissions were assigned on a per capita basis to all municipalities. This resulted in a decline of ~8,000 tCO_2e.* • *In the original inventory, the BC Ferries GHG emissions were allocated based on a per capita basis for Vancouver Island. Since BC Ferries also serves the Vancouver coast population, the methodology was changed and the BC ferries value was prorated based on the Vancouver Island and Vancouver South Coast population in the CRD inventory. Results in a decline of ~23,000 tCO_2e* • *The CRD inventory includes an estimate of ~7,000 tCO_2e of cruise ship emissions not included in the original inventory.* • *ECCC NIR updated 2007 numbers for other off-road emissions. (Original 110,000 tCO_2e; Updated 687,000 tCO_2e). Results in an ~10,000 tCO_2e increase.*
Waste	Waste: Solid Waste Disposal, Biological Treatment of Waste, Wastewater Treatment and Discharge	58,072	33,367	-24,705	• *In the original inventory, wastewater volumes were allocated based on a 2015 study whereas the CRD values are based on Total annual volume of wastewater by municipality. Results in an ~600 tCO_2e increase.* • *The original inventory pro-rated Hartland Landfill GHG emissions based on total volume of waste (estimated by the City) sent to landfill. The CRD inventory assigns 31% of waste emissions to the City of Victoria. Results in a decrease of ~23,000 tCO_2e.* • *The CRD inventory does not include Tervia Landfill GHG emissions (2,800 tCO_2e not accounted for).*
AFOLU	AFOLU: Livestock, Land, and Other Agriculture	822	-217	-1,039	• *For the CRD inventory, the BC MOE provided BC based land-use emissions factors and there was a change in the calculation methodologies based on land-use data at the CRD level. Results in a decrease of GHG emissions by ~1,000 tCO_2e.*

Sector	Sub-Sector	2007 VICTORIA GHG (tCO_2e)	2007 CRD GHG (tCO_2e)	Difference	Explanation for Difference
IPPU	IPPU: Industrial Processes, and Product Use	17,859	17,798	-61	• *IPPU is allocated on a per capita basis. The difference is due to different reporting years being reported in this table.*
Total GHG Emissions		**480,361**	**481,559**	**1,198**	

Table B2. Comparision of 2018 GHG Emissions Inventories

Sector	Sub-Sector	2018 VICTORIA GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
Stationary Energy	Residential Buildings	66,576	70,618	4,042	• *ECCC NIR updated 2018 (Original 140,000 tCO_2e; Updated 147,000 tCO_2e) numbers for other off-road residential emissions. Results in the increase in GHG emissions.*
	Commercial / Institutional Buildings	118,206	120,491	2,285	• *ECCC NIR updated 2018 numbers for this source of GHG emissions (Original 540,000 tCO_2e; Updated 791,000 tCO_2e). Results in the increase in GHG emissions.*
	Fugitive Emissions: Oil and Natural Gas Systems	1,200	370	-830	• *For the CRD project, FORTISBC provided 2018 fugitive numbers for the CRD which did not include upstream GHG emissions. This value was then prorated to each CRD member based on the number of natural gas connections. The original value in the reported inventory was estimated by FORTISBC for the City and includes upstream emissions. To be consistent in terms of methodology across the CRD, the new value was applied.*
Transportation	On-Road Transportation	42,580	47,383	4,803	• *The CRD calculator uses the original 2007 and 2010 vehicle registration data, whereas the original inventory used the published 2012 data (which contained the 2007 and 2010 data which was modified based on changes to the 2012 methodology). During the preparation of the CRD calculator, it was brought to light there are concerns with the 2012 data which impacted the 2007 and 2010 values. As such, the original CEEI 2007 and 2010 data was used in the CRD calculator. In the original inventory, transportation GHG emissions were estimated based on population growth and the number of registered vehicles in 2012 whereas the CRD inventory uses 2010 vehicle*

Sector	Sub-Sector	2018 VICTORIA GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
					registration data. The original inventory used the estimated Vehicle Kilometer Travelled (VKT) data and fuel efficiency factors that were used in the BC CEEIs which were derived from AirCare data. As the AirCare data program ended in 2014, the CRD inventory uses VKT data and fuel efficiency factors that are generated and used by Environment Canada (EC) in their calculation of Provincial and Federal GHG emissions. Results in a ~8,500 tCO_2e increase in GHG emissions. • *BC Transit GHG emissions were allocated based on total service population, rather than the CRD population as was done in the original inventory. Results in an ~5,000 tCO_2e decline.*
	Transboundary Transportation	106,745	115,881	9,136	• *See above note.*
	Off-Road Transportation: Aviation, Waterborne, and Other Off-Road	57,732	40,436	-17,296	• *Land and marine based aviation GHG emissions were assigned on a per capita basis. There were some changes to the Provinces population counts between inventories resulting in a decline of aviation emissions. There was also a methodology change in the assignment in marine aviation GHG emissions. The GPC Protocol provided updated guidance on the assignment of aviation emissions allowing these to be assigned as Scope 3 GHG emissions regardless of the location of the airport(s). On this basis, all marine aviation emissions were assigned on a per capita basis to all municipalities. This resulted in a decline of ~2,500 tCO_2e.* • *In the original inventory, the BC Ferries GHG emissions were allocated based on a per capita basis for Vancouver Island. Since BC Ferries also serves the Vancouver coast population, the methodology was changed and the BC ferries value was prorated based on the Vancouver Island and Vancouver South Coast population in the CRD inventory. Results in a decline of ~27,500 tCO_2e.*

Sector	Sub-Sector	2018 VICTORIA GHG (tCO_2e)	2018 CRD GHG (tCO_2e)	Difference (tCO_2e)	Explanation for Difference
					• *The GVHA reported on cruise ship emissions which increased the City's GHG emissions by ~11,600 tCO_2e.* • *ECCC NIR updated 2018 numbers for other off-road emissions. (Original 750,000 tCO_2e; Updated 682,000 tCO_2e). A slightly higher population value (produced by the Province was used which results in an ~1,200 tCO_2e increase.*
Waste	Waste: Solid Waste Disposal, Biological Treatment of Waste, Wastewater Treatment and Discharge	31,078	29,957	-1,121	• *In the original inventory, wastewater volumes were allocated based on a 2015 study whereas the CRD values are based on Total annual volume of wastewater by municipality. Results in an ~600 tCO_2e increase.* • *The original inventory pro-rated Hartland Landfill GHG emissions based on total volume of waste (estimated by the City) sent to landfill. The CRD inventory assigns 31% of waste emissions to the City of Victoria. Results in a decrease of ~1,700 tCO_2e.*
AFOLU	AFOLU: Livestock, Land, and Other Agriculture	-548	-2,224	-1,676	• *For the CRD inventory, the BC MOE provided BC based land-use emissions factors and there was a change in the calculation methodologies based on land-use data at the CRD level. Results in a decrease of GHG emissions by ~1,700 tCO_2e.*
IPPU	IPPU: Industrial Processes, and Product Use	29,919	29,654	-265	• *ECCC NIR updated 2018 numbers for IPPU GHG emissions. Results in a decline of ~300 tCO_2e.*
Total GHG Emissions		**453,488**	**452,567**	**-921**	