November 2019

2017/18

Corporate Greenhouse Gas Inventory

The Corporation of the County of Huron | Climate Change & Energy

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Units & Abbreviations

CDM	Conservation and Demand Management
CO_2e	Carbon dioxide equivalent
EMS	Emergency medical services
FCM	Federation of Canadian Municipalities
GHG	Greenhouse gas
GJ	Gigajoule
ICLEI	Local Governments for Sustainability
kWh	Kilowatt hour
L	Litres
LTC	Long-term care
m^3	Metres cubed
PCP	Partners for Climate Protection
PW	Public works
SH	Social housing
t	Tonne

Glossary

Carbon dioxide equivalent (CO_2e): A unit of measure that allows the comparison of emissions from different types of greenhouse gases.

Corporate sector: Refers to where emissions are being generated within the County. The corporate sectors included in this inventory are the County's facilities and fleet.

Greenhouse gas: Any gas emit from a source (natural and/or anthropogenic) that absorbs heat in the atmosphere.

Energy source: Refers to the various types of energy and fuel used within the County's corporate facilities and fleet. This includes electricity, natural gas, propane, gasoline, and diesel.

1. Introduction

In July 2019, the County of Huron joined the Partners for Climate Protection (PCP) program. This program, jointly established by the Federation of Canadian Municipalities (FCM) and ICLEI – Local Governments for Sustainability, encourages municipalities to take action against climate change, and more specifically the reduction of greenhouse gas (GHG) emissions. The PCP program is comprised of a 5-milestone framework that works to reduce GHG emissions through the development of an emissions inventory, reduction targets, and an action plan.

As part of the commitment to the PCP program, the County of Huron developed the following inventory in order to fulfill the corporate requirements of Milestone 1. Additionally, the County was interested in completing an emissions inventory, as one had not previously been compiled. Completing a corporate inventory was necessary, as it provides an emissions baseline, which will allow the County to track their emissions progress moving forward. This is integral to the County's long-term climate mitigation and adaptation efforts.

The County has also made a commitment to energy conservation through the Conservation and Demand Management (CDM) Plan. This inventory will provide a greater understanding of the County's corporate facilities and fleet, which will jointly benefit energy reduction and GHG mitigation.

2. Methods

The compiled emissions inventory encompasses the 2017 and 2018 energy and fuel use within the County's corporate facilities and fleet. The GHG emissions associated with the County's energy use were calculated using the PCP Milestone Tool. This online database assists municipalities in creating GHG inventories, as it provides a simple, accurate, and consistent methodology for determining emissions.

The energy data used for this analysis was obtained from the County's utility accounts and fuel invoices. The cost of the associated energy was also analyzed for the County's facilities and fleet, however given the available data, fuel prices were estimated using averages from Statistics Canada (Table 2, Appendix 2). It should be noted that given the upper-tier level of the County, variables applicable to other municipalities (ie. streetlights and water usage) were not included within the scope of this inventory.

In order to simplify the results, the County's facilities were categorized by facility type, and include the County's long-term care (LTC) facilities, museums, public works (PW) yards, emergency medical services (EMS), offices, social housing (SH) buildings, and other (an airport

storage facility and fire pump station). This inventory also involves the County's fleet vehicles within the EMS and Public Work's departments. For the purposes of this inventory, the fleet vehicles have been classified by vehicle type and fuel source. This classification system, as well as the full inventory of County facilities, is located in Appendix 1 and 2.

3. Corporate Inventory

3.1 Inventory Summary

The following section provides an overview of the County's 2017 and 2018 corporate GHG emissions. The emissions are presented as annual totals and compared by corporate sector (ie. facilities and fleet), as well as the total energy consumed by source (ie. electricity, natural gas, and diesel). The information summarized in this section is further outlined in Appendix 3.

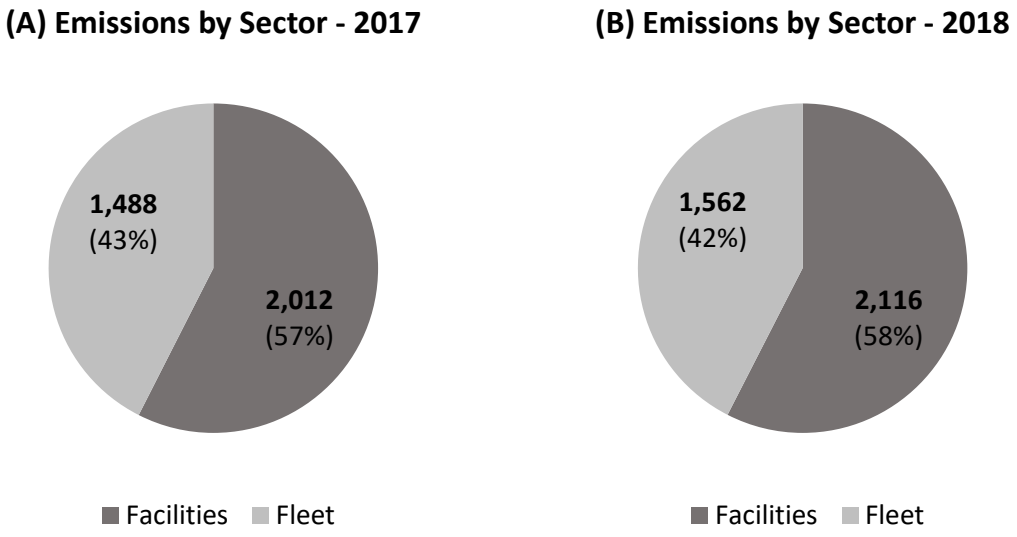

Figure 1. 2017 (A) and 2018 (B) greenhouse gas emissions (tCO_2e) by corporate sector.

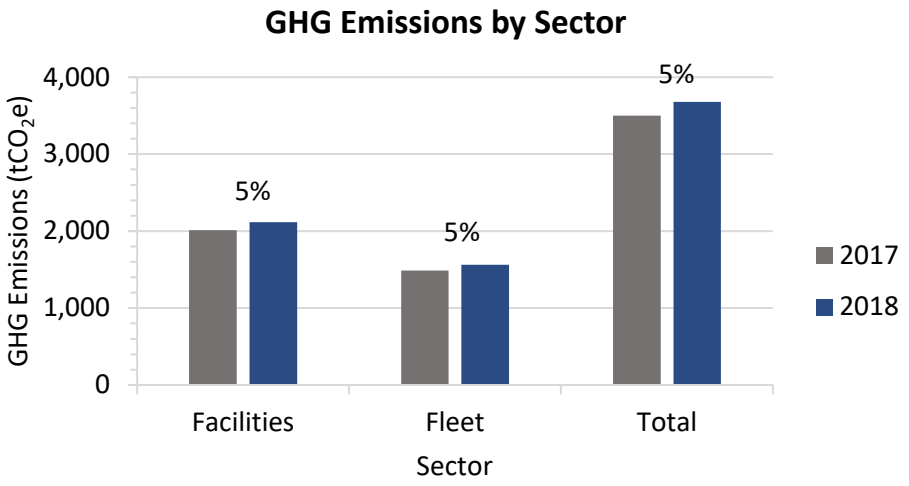

Figure 2. Greenhouse gas emissions (tCO_2e) by sector, with values representing the percentage change between 2017 and 2018.

In comparing the County's GHG emissions by sector (Figure 1), it can be seen that the County's total emissions increased by 5% (Figure 2) between 2017 and 2018. Of the annual totals, the County's facilities account for the largest proportion, representing approximately 60% of corporate emissions. This is followed by the County's fleet, which is responsible for the remaining 40%. The proportion of GHG emissions from each sector varied slightly between 2017 and 2018 (Figure 1), however both the facilities and fleet saw a 5% increase in emissions between the two years (Figure 2).

When examining the energy consumption associated with corporate emissions, it can be seen that natural gas represents the largest percentage, accounting for almost half of the annual totals (Figure 3 and 4). This is followed by electricity, which represents approximately one quarter of the total energy consumed. Diesel accounted for 18% of corporate energy use for both 2017 and 2018, while gasoline and propane made up the remaining 10% (Figure 4).

The amount of energy consumed by source varied between 2017 and 2018. All types of energy saw increases, expect for electricity which declined by 3% (Figure 3). The use of propane increased most significantly among all energy sources, rising 28% from 2017 to 2018. Overall, the total amount of energy consumed in the County's corporate facilities and fleet increased by 3% between the two years.

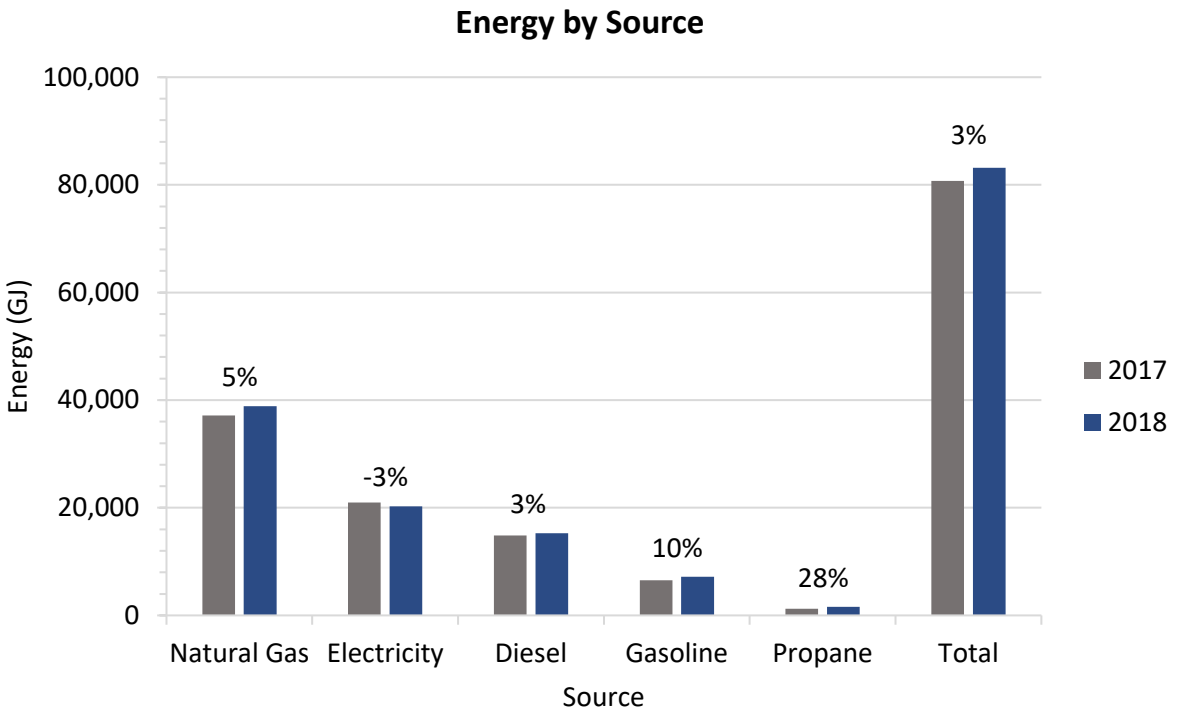

Figure 3. Total energy consumption (GJ) by source, with values representing the percentage change between 2017 and 2018.

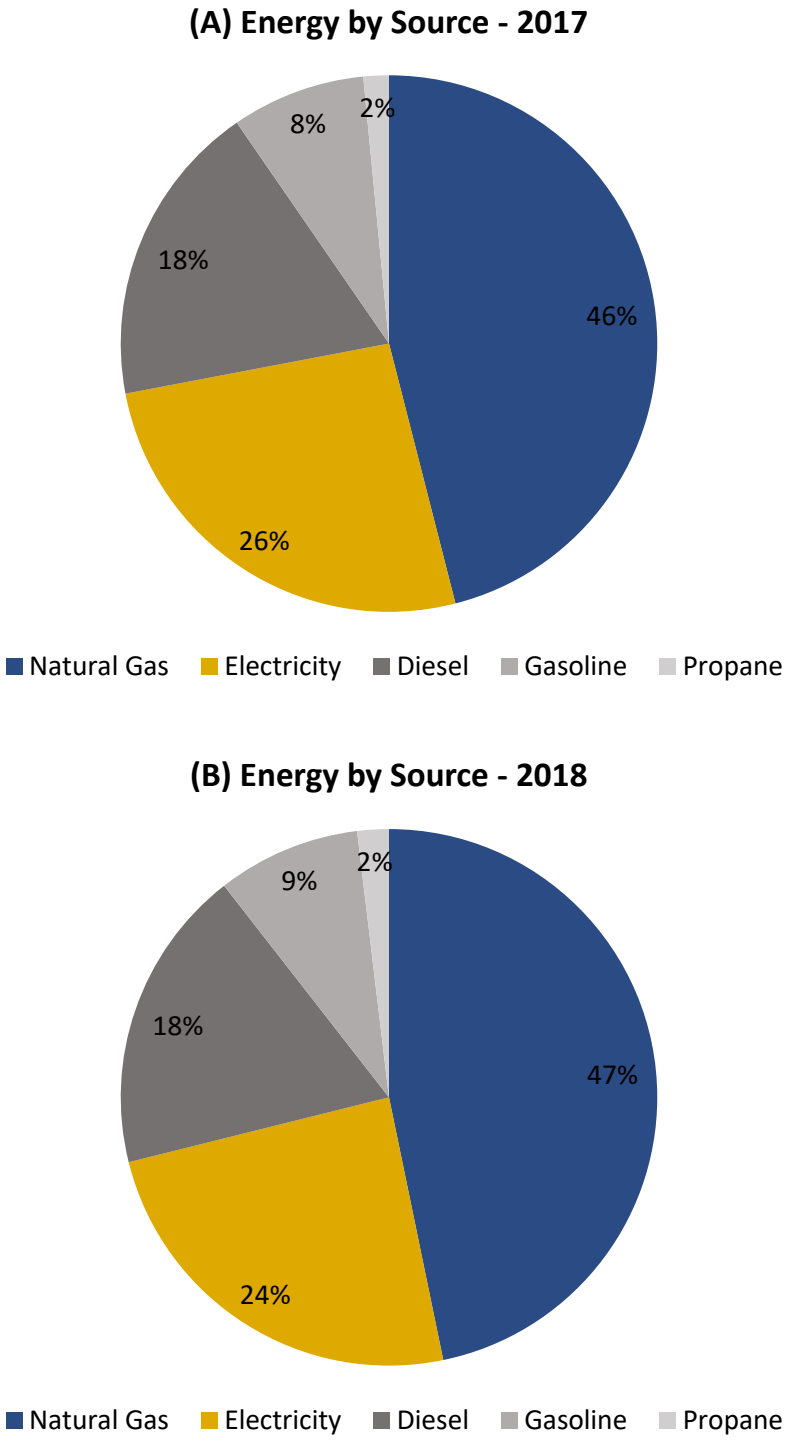

Figure 4. Total 2017 (A) and 2018 (B) energy consumption (GJ) represented as percentages by source.

3.2 Facilities Comparison

This section analyzes the 2017 and 2018 GHG emissions from the County's corporate facilities. The energy use and resulting emissions are expressed as totals by facility type. The information summarized in this section is further detailed in Appendix 4.

Table 1. Greenhouse gas (GHG) emissions (tCO_2e) and cost ($) associated with 2017 and 2018 annual energy consumption (GJ) by facility type. **'Other' category represents a small percentage of overall emissions and is therefore not visually represented in the corresponding figures.*

A. Energy Consumption

Facility	2017 Energy (GJ)	2018 Energy (GJ)
Long-Term Care	25,633	23,990
Museums	4,060	4,429
Public Works	3,046	3,695
EMS	1,140	1,362
Offices	9,313	10,323
Social Housing	16,070	16,823
Other	99	96
Total	**59,361**	**60,718**

B. GHG Emissions

Facility	2017 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)
Long-Term Care	946	899
Museums	130	160
Public Works	123	160
EMS	41	52
Offices	313	367
Social Housing	459	476
Other	*0.5	*0.5
Total	**2,012**	**2,116**

C. Cost

Facility	2017 Cost ($)	2018 Cost ($)
Long-Term Care	523,572	485,799
Museums	105,415	85,424
Public Works	86,131	88,261
EMS	26,086	24,042
Offices	231,525	222,544
Social Housing	458,996	430,799
Other	6,323	5,137
Total	**1,438,048**	**1,342,005**

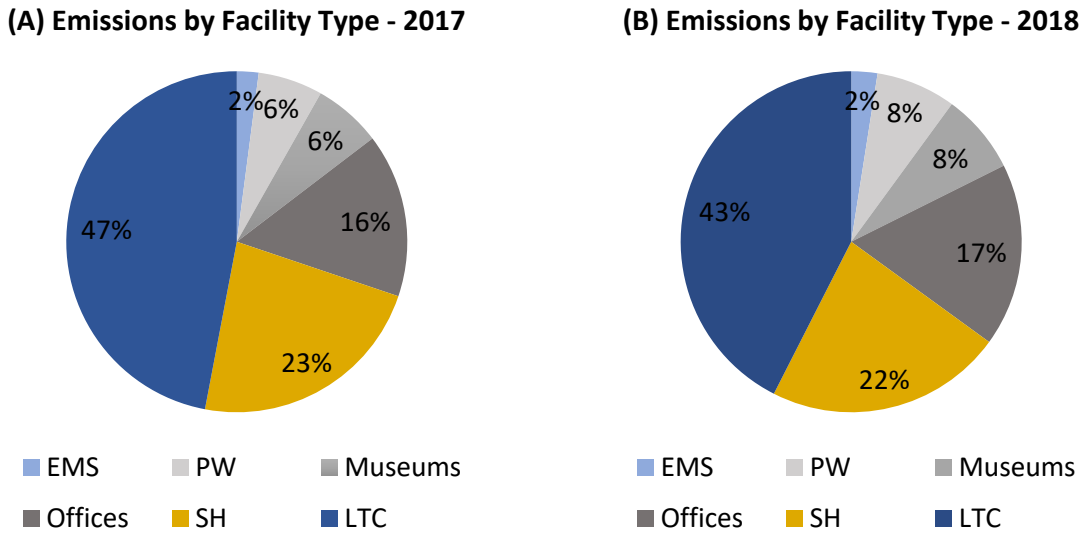

Figure 5. 2017 (A) and 2018 (B) greenhouse gas emissions (tCO_2e) represented as percentages of annual totals by facility type.

In comparing the GHG emissions from the County's facilities, it can be seen that the proportion of emissions by facility type remained relatively consistent between 2017 and 2018, even though total emissions increased between the two years (Table 1 and Figure 5). The above data indicates that the County's long-term care facilities consume the greatest amount of energy and thereby emit the largest proportion of GHG emissions. This is followed by the County's social housing buildings, which contributed almost a quarter of total emissions for both years. The County's offices are the third greatest contributor of overall emissions, responsible for 16-17% of emissions for 2017 and 2018. The remaining emissions are a result of energy use in the County's museums, public works yards, and emergency medical services.

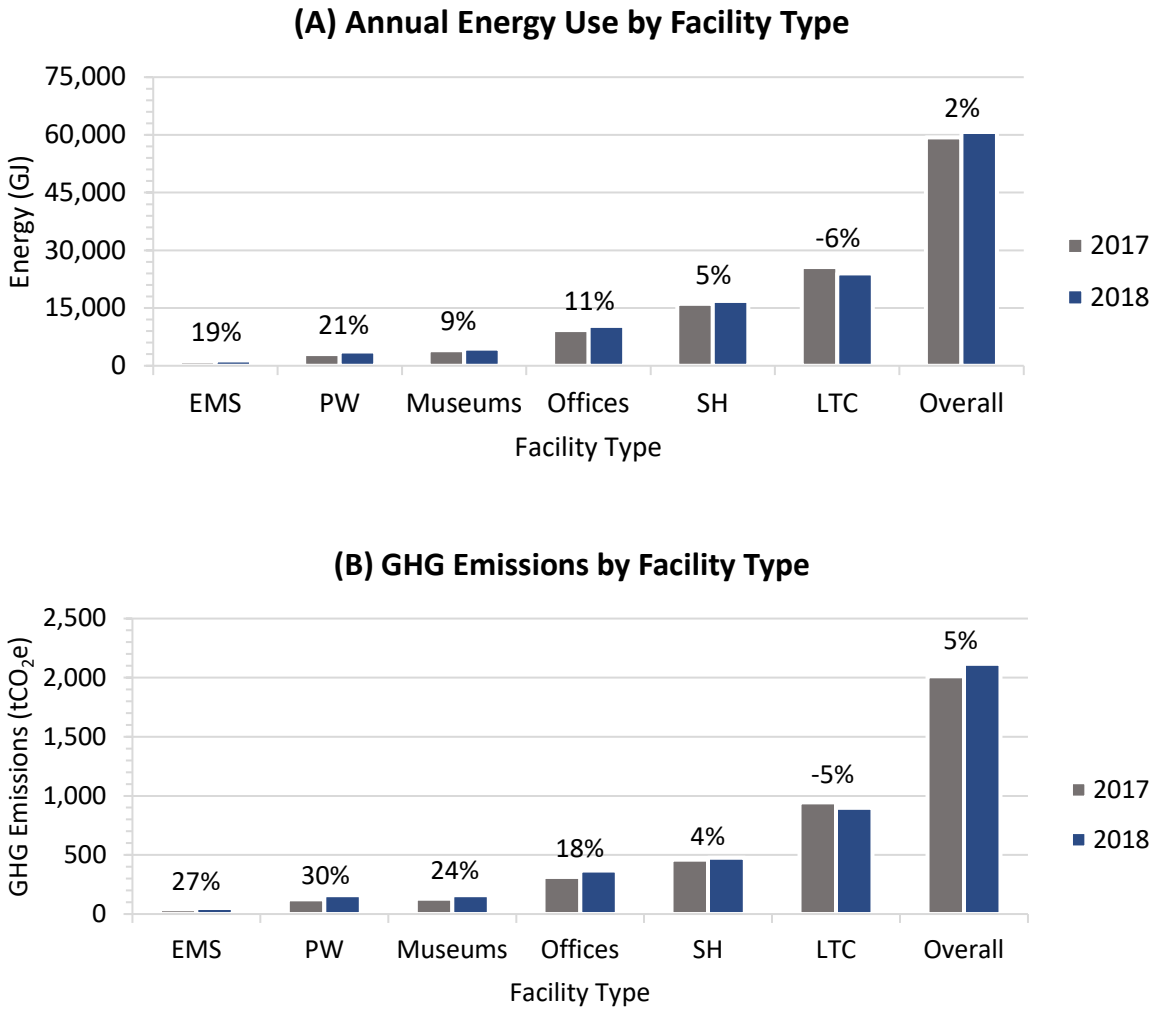

Figure 6. Energy use (GJ) (A) and the associated greenhouse gas (GHG) emissions (tCO_2e) (B) by facility type, with values representing the difference in percentage between 2017 and 2018.

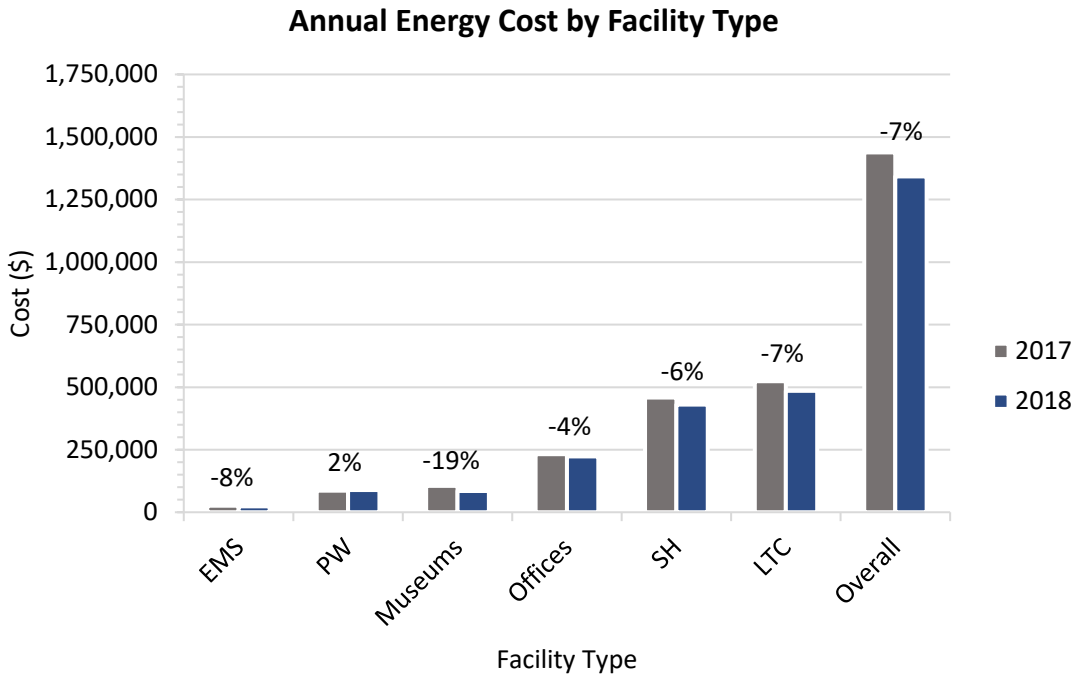

Figure 7. Annual cost ($) of energy consumption by facility type, with values representing the difference in percentage between 2017 and 2018.

When analyzing the County's facilities by total energy consumption and GHG emissions, more variation is noticed between the two years (Figure 6). The data indicates that total energy use increased in all categories, except for the long-term care facilities, which saw a 6% decrease from 2017 to 2018. Overall, this resulted in a 2% increase in annual energy use in the County's facilities. The associated GHG emissions also increased across all categories, except for the long-term care facilities. When expressed as annual totals, this indicates that total GHG emissions increased by 5% between 2017 and 2018.

Table 2. Total annual greenhouse gas (GHG) emissions (tCO_2e) by energy source, with the difference in percentage between 2017 and 2018.

Year	Electricity Emissions (tCO_2e)	Natural Gas Emissions (tCO_2e)	Propane Emissions (tCO_2e)	Total Emissions (tCO_2e)
2017	101	1,836	76	2,012
2018	97	1,922	97	2,116
Difference (%)	-4	5	28	5

Despite an increase in the energy use and GHG emissions in the County's corporate facilities from 2017 to 2018, the total cost of energy consumption declined by 7% (Figure 7). This is likely a result of a shift in the sources of energy contributing to the total use. This is indicated when GHG emissions are represented by energy source (Table 2 and Figure 8), as there was an increase in emissions from natural gas and propane and a decrease in emissions from electricity in 2018. This is consistent with trends of consumption within each facility, which suggest that less electricity was consumed between the two years (Table 2, Appendix 4).

This may have contributed to cost savings, as electricity is more expensive than other sources of energy. GHG emissions rose despite a reduction in cost, as a result of an increase in the use of natural gas and propane, which are more energy intensive per kilowatt hour than electricity. As an example, the County museums had the greatest cost savings between 2017 and 2018 (Figure 7), however GHG emissions increased by 24% (Figure 6). This is a result of a reduction in electricity consumption, but a rise in natural gas usage between the two years (Table 2, Appendix 4).

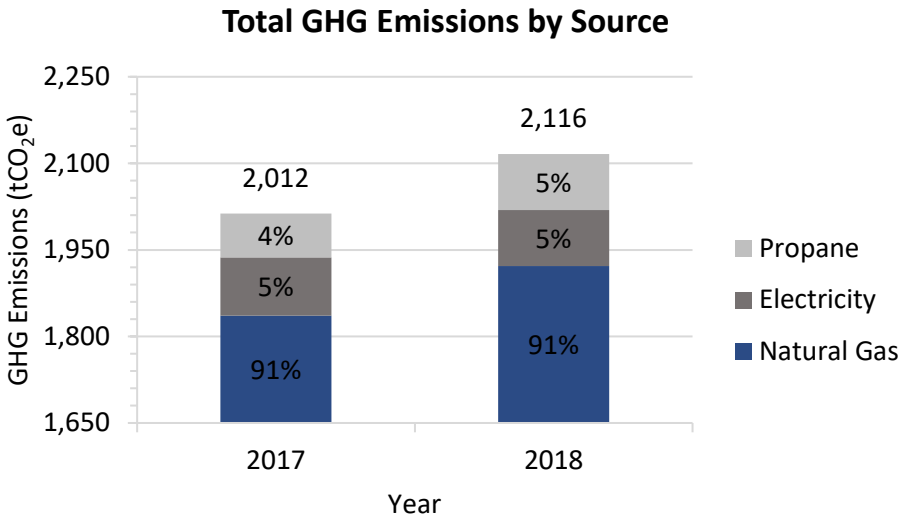

Figure 8. 2017 and 2018 greenhouse gas (GHG) emissions (tCO_2e) represented as percentages of the overall total by energy source. The bolded values denote the annual emissions for each year.

3.3 Fleet Analysis

This section examines the GHG emissions from the County's corporate fleet for 2017 and 2018. The emissions associated with the fleet's fuel consumption are expressed as totals by vehicle and fuel type. The information summarized in this section is further outlined in Appendix 5.

In examining the County's fleet by vehicle type (Table 3 and Figure 9), the data indicates that the proportion of emissions changed slightly between 2017 and 2018. In 2017, heavy-duty

vehicles contributed almost half of the total emissions, followed by light-duty trucks, which were responsible for 38%. In 2018, this trend remained the same, however heavy-duty vehicles accounted for a greater percentage of total emissions. In both years, light-duty vehicles and off-road vehicles accounted for a combined total of 12-13% of annual emissions.

Table 3. Greenhouse gas (GHG) emissions (tCO_2e) and cost ($) associated with 2017 and 2018 annual fuel consumption (L) by fuel and vehicle type.

A. Fuel Consumption

Fuel Type	Vehicle Type	2017 Fuel Consumption (L)	2018 Fuel Consumption (L)
Gasoline	Light-Duty	29,180	27,175
Gasoline	Light-Duty Truck	156,722	177,988
Diesel	Light-Duty Truck	72,904	50,019
Diesel	Heavy Duty	268,964	300,818
Coloured Diesel	Off-road	45,623	47,659
N/A	**Total**	**573,393**	**603,659**

B. GHG emissions

Fuel Type	Vehicle Type	2017 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)
Gasoline	Light-Duty	67	63
Gasoline	Light-Duty Truck	363	412
Diesel	Light-Duty Truck	200	137
Diesel	Heavy Duty	733	821
Coloured Diesel	Off-road	122	129
N/A	**Total**	**1,485**	**1,562**

C. Cost

Fuel Type	Vehicle Type	2017 Cost ($)	2018 Cost ($)
Gasoline	Light-Duty	33,119	34,403
Gasoline	Light-Duty Truck	177,879	225,333
Diesel	Light-Duty Truck	78,517	62,674
Diesel	Heavy Duty	289,674	376,925
Coloured Diesel	Off-road	49,136	59,717
N/A	**Total**	**628,326**	**759,052**

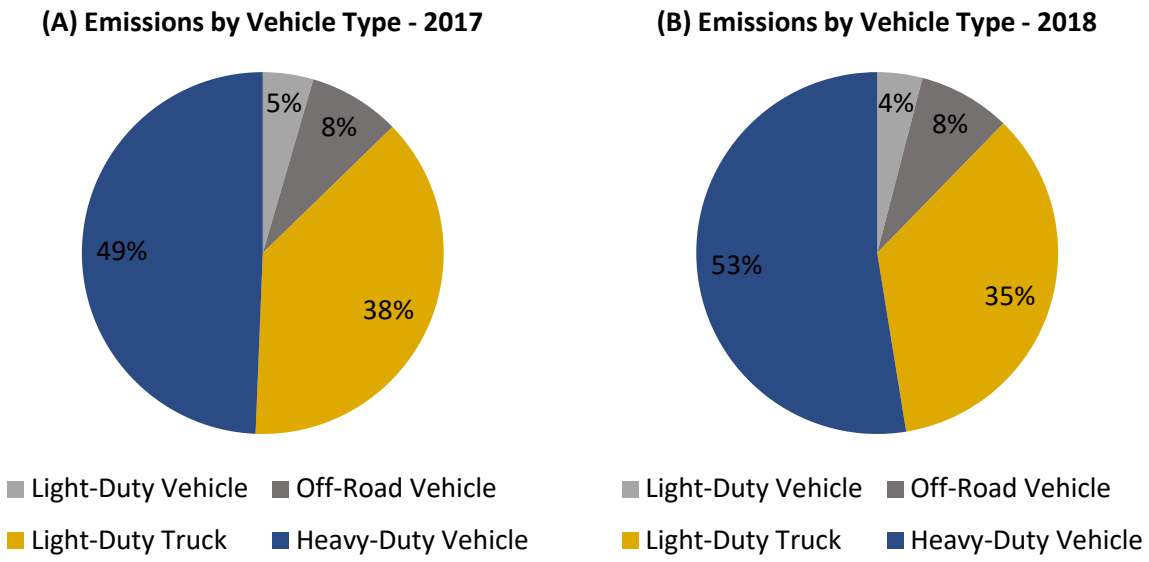

Figure 9. 2017 (A) and 2018 (B) greenhouse gas emissions (tCO_2e) represented as percentages of annual totals by vehicle type.

When analyzing the County's fleet by total fuel consumption and GHG emissions (Table 2 and Figure 10), it can be seen that fuel use increased by 5% from 2017 to 2018, resulting in an increase in overall emissions between the two years. Among all vehicle types, heavy-duty vehicles saw the largest increase in fuel use and thereby GHG emissions. Off-road vehicles also consumed more fuel, but to a lesser extent than heavy-duty vehicles. Both light-duty vehicles and light-duty trucks used less fuel between 2017 and 2018, therefore resulting in a decrease in GHG emissions within these two categories.

In order to understand the changes in fuel use between 2017 and 2018, it is important to consider how different types of vehicles are used within the County's corporate fleet. As stated, there was a rise in fuel consumption in heavy-duty and off-road vehicles, both of which are used by the County's Public Works department. An increase in fuel use could indicate that the Public Work's fleet has expanded, or given the role of these vehicles, it could suggest an increase in road maintenance in 2018 (Table 1, Appendix 2).

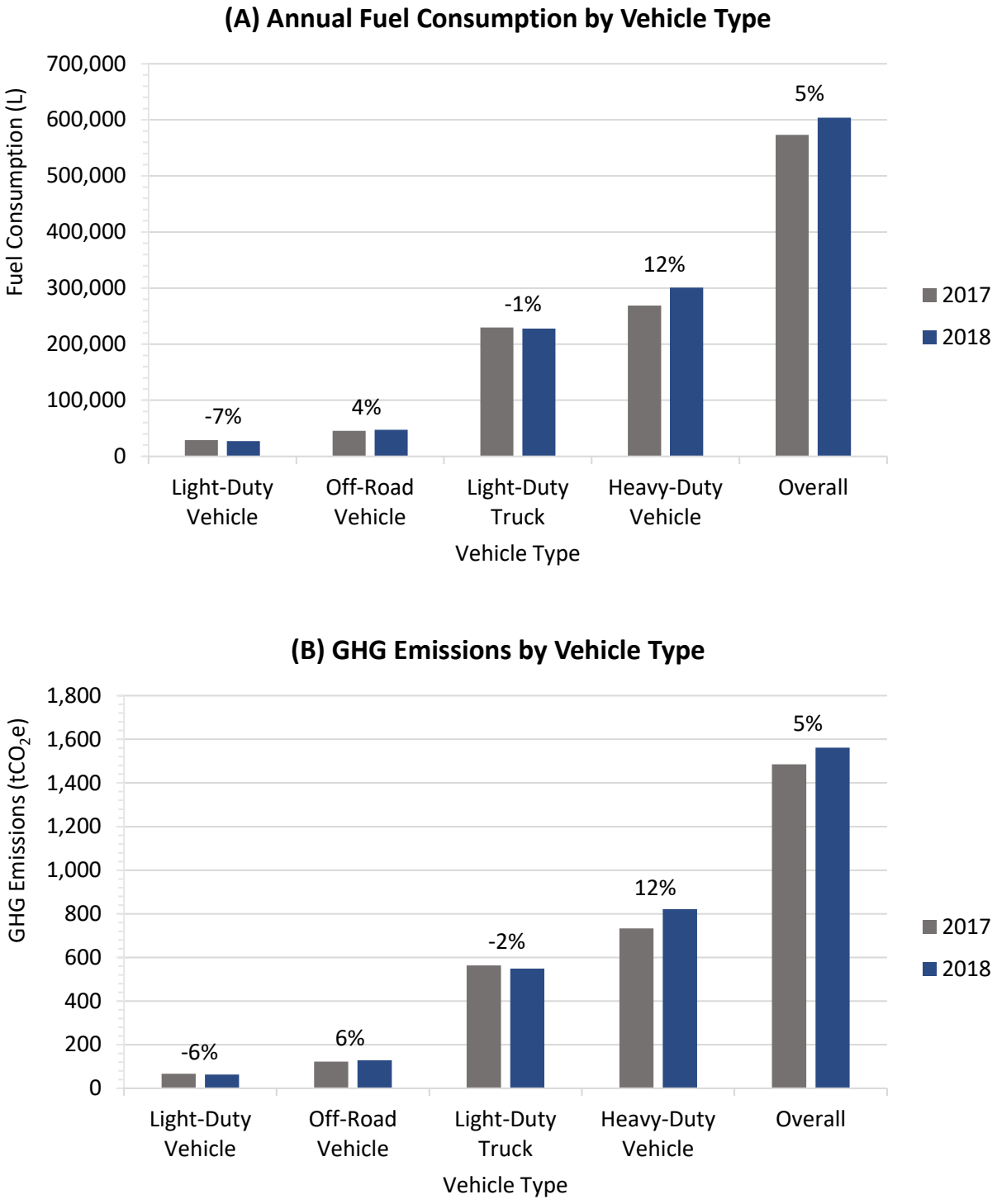

Figure 10. Fuel consumption (L) (A) and the associated greenhouse gas (GHG) emissions (tCO_2e) (B) by vehicle type, with values representing the difference in percentage between 2017 and 2018.

In regards to light-duty vehicles and light-duty trucks, total fuel consumption declined between 2017 and 2018, which may indicate a reduced demand for these vehicles in the Public Works

and EMS departments. The reduction in fuel use and GHG emissions in light-duty trucks is largely a result of the EMS department shifting from diesel to more gasoline powered ambulances in 2018 (Table 1, Appendix 5).

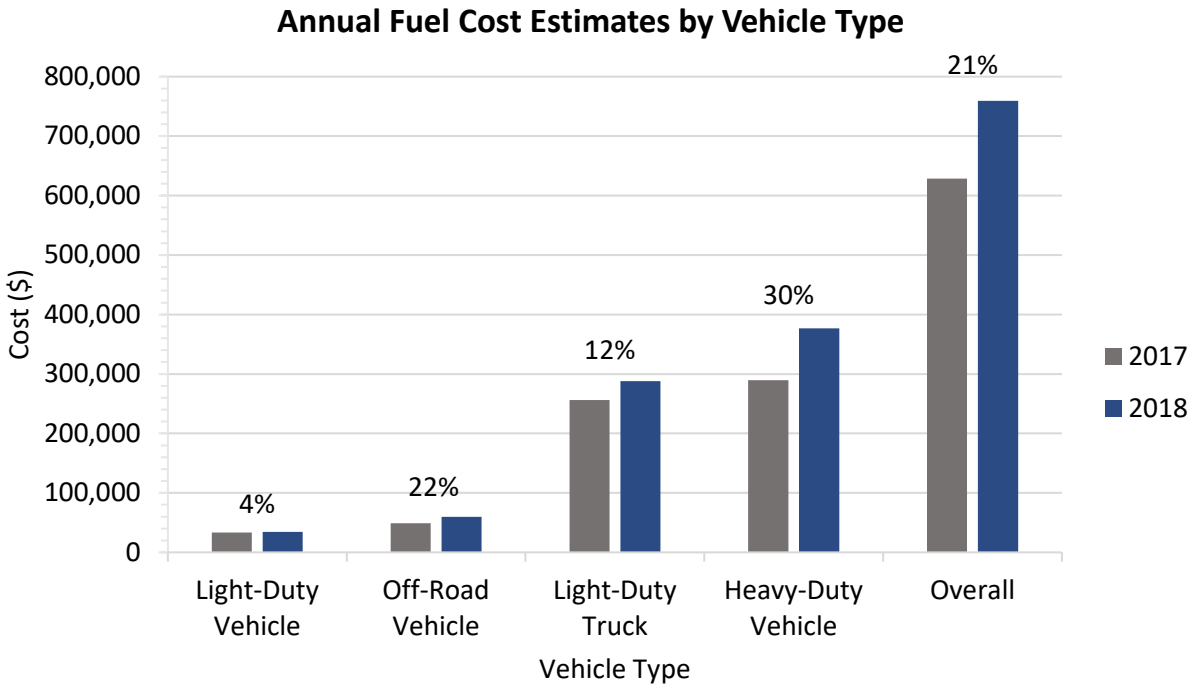

Figure 11. Estimated annual cost ($) of fuel consumption by vehicle type, with values representing the difference in percentage between 2017 and 2018.

As a result of increased consumption and a rise in the price of fuel, all vehicle types within the County's fleet saw an increase in cost between 2017 and 2018 (Figure 11). As stated, heavy-duty and off-road vehicles experienced the greatest increase in fuel use and consequently saw the largest rise in cost. Overall, it is estimated that the total cost of fuel in the County's fleet increased by 21% from 2017 to 2018.

Table 4. Total annual greenhouse gas (GHG) emissions (tCO_2e) by energy source, with the difference in percentage between 2017 and 2018.

Year	Gasoline Emissions (tCO_2e)	Diesel Emissions (tCO_2e)	Total Emissions (tCO_2e)
2017	430	1055	1485
2018	475	1087	1562
Difference (%)	10	3	5

When analyzing the fleet by fuel type, it can be seen that emissions from gasoline increased more than emissions from diesel (Table 4 and Figure 12). This may seem incorrect given that heavy-duty and off-road vehicles use diesel, and both experienced increases in fuel use, which exceeded the other types of vehicles that use gasoline. However, light-duty trucks encompass the County's ambulances, which as stated, experienced a shift from diesel to gasoline in 2018. When expressed as a sum by vehicle type, this shows a decrease in fuel use and GHG emissions (Figure 10). However, by fuel type, it is evident that more gasoline is being used in 2018, compared to consumption in 2017 (Table 4). With that said, it is evident that diesel contributes most significantly to overall emissions from the County's fleet.

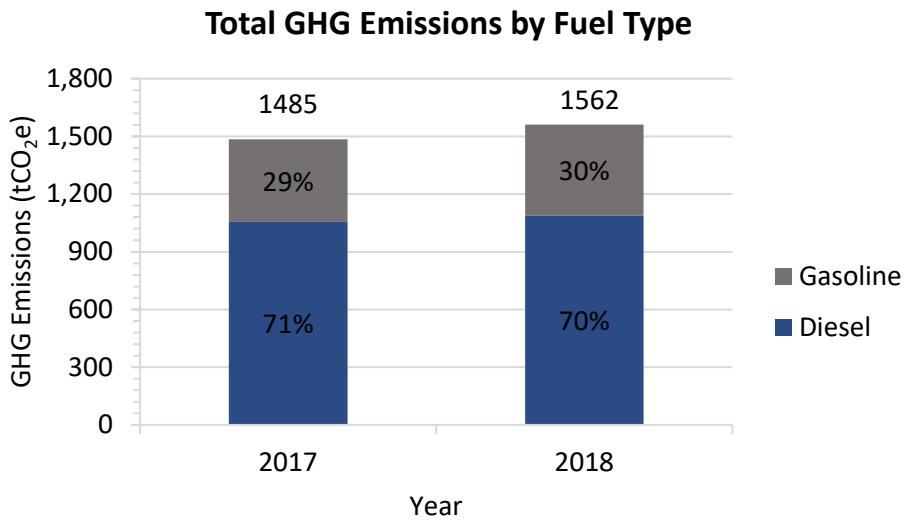

Figure 12. 2017 and 2018 greenhouse gas (GHG) emissions (tCO_2e) represented as percentages of the overall total by fuel type. The bolded values denote the annual emissions for each year.

3.4 Emissions Forecast

As part of the Milestone 1 requirement of the PCP program, the County must develop a forecast for their corporate emissions. This forecast represents a business as usual scenario for

the County, which indicates that emissions would continue to rise by 5% each year, in the absence of efforts to reduce emissions.

Table 5. Greenhouse gas (GHG) emissions forecast under a business as usual scenario for the County's corporate sectors, showing the difference in percentage between years.

Year	Facilities Emissions (tCO_2e)	Fleet Emissions (tCO_2e)	Total Emissions (tCO_2e)	Difference (%)
2017 (Baseline)	2,012	1,488	3,500	N/A
2027	3,283	2,423	5,706	63
2029	3,619	2,672	6,291	80

The following forecast (Figure 13) represents the possible emissions scenario for the County's corporate facilities and fleet over the next 10 years. When compared to baseline emissions for 2017 (Table 5), the County is projected to emit 63% more emissions by 2027 (10 years from the baseline), and 80% more by 2029 (10 years from today).

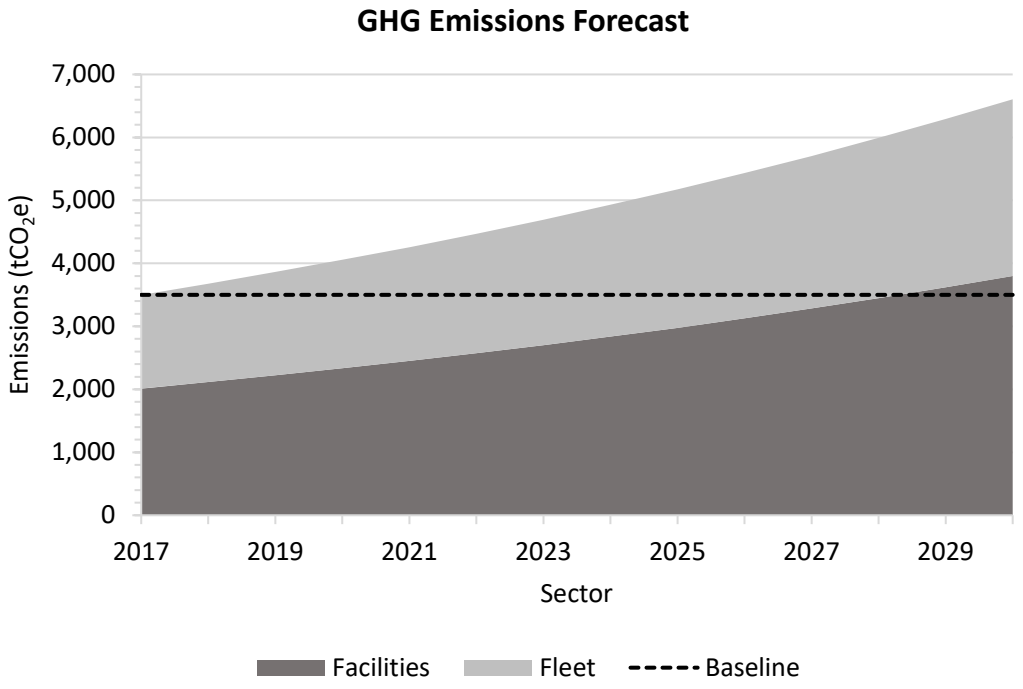

Figure 13. Business as usual greenhouse gas (GHG) emissions forecast for the County's facilities and fleet, compared to the 2017 emissions baseline.

4. Moving Forward

In summary, the County of Huron's corporate emissions increased slightly between 2017 and 2018. This is to be expected, given that this is the County's first emissions inventory.

Although emissions increased, the total cost of energy decreased between the two years. This may be a result of a reduction in electricity use in the County's facilities, due to improvements in energy management. However, it is important to recognize that other sources of energy increased over the observed period. Given that this inventory encompasses two years of data, yearly variations in weather patterns could have had an influence on heating and cooling demands in corporate facilities, as well as the use of fuel in vehicles required for road maintenance.

Overall, it is important that the County has this information, as it will allow us to continue to monitor our corporate emissions moving forward. This will help us to advance our partnership in the PCP initiative by developing goals and strategies to reduce our emissions. Furthermore, the added knowledge of GHG emissions will further the County's energy conservation efforts, and support the County's ongoing climate adaptation work.

5. Appendices

Appendix 1: Facilities Inventory

Table 1. Corporate facilities categorized by facility type.

Category	Facilities
Long-Term Care (LTC)	• Huronview Home for the Aged • Huronlea Home for the Aged
Museums	• Historic Gaol • Huron County Museum
Public Works (PW)	• Auburn Public Works Yard • Wingham Public Works Yard • Wroexter Public Works Yard • Zurich Public Works Yard
Emergency Medical Services (EMS)	• Exeter EMS • Goderich EMS • Tuckersmith EMS • Wingham EMS
Offices	• Courthouse • Assessment Office • Registry Office • Health and Library Complex • Jacob Memorial Building
Social Housing (SH)	• 134 King Street, Clinton • 135 James Street, Clinton • 250 Picton Street, Goderich • 359 Edward Street, Wingham • 45 Alfred Street East, Wingham • 50 Alfred Street East, Wingham • 52 Bristol terrace, Wingham • 85 West Street, Goderich • 9 Jane Street, Bayfield • 31 Main Street, Zurich • 34 John Street, Seaforth • 50 Market Street, Seaforth • 134 Sanders Street, Exeter • 299 Queen Street, Blyth • 400 Alexander Street, Brussels • County View, Clinton • Vacant Units, Clinton • Vacant Units, Goderich • Vacant Units, Wingham
Other	• Airport Storage • Fire Pump House

Appendix 2: Fleet Classification

Table 1. Corporate fleet classified by vehicle type and fuel source for the EMS (A) and Public Works (B) departments.

A. EMS

Vehicle Type	Fuel Source	Examples of Included Vehicles
Light-Duty Vehicle	Unleaded/Gasoline	• Radio Response Units (RRU's) • Administrative Vehicles
Light-Duty Truck	Unleaded/Gasoline	• Ambulances
Light-Duty Truck	Diesel	• Ambulances

B. Public Works

Vehicle Type	Fuel Source	Examples of Included Vehicles
Light-Duty Truck	Unleaded/Gasoline	• Pick-up Trucks
Heavy-Duty Vehicle	Diesel	• Snow Plows/Sanders • Dump Trucks
Off-Road Vehicle	Diesel (Coloured)	• Graders • Loaders • Street Sweepers

Table 2. Average annual retail prices ($/L) for gasoline and diesel fuel in Ontario. This information was obtained from Statistics Canada.

Year	Gasoline Cost ($/L)	Diesel Cost ($/L)
2017	1.14	1.08
2018	1.27	1.25

Appendix 3: Inventory Results – Summary

Table 1. Summary of greenhouse gas emissions by corporate sector (A) and energy source (B), represented as percentages of the total emissions and the difference between the annual sums for 2017 and 2018.

A. Corporate Sector

Sector	2017 Emissions (tCO_2e)	2017 % of Total Emissions	2018 Emissions (tCO_2e)	2018 % of Total Emissions	Difference (%)
Facilities	2,012	57	2,116	58	5
Fleet	1,488	43	1,562	43	5
Total	**3,500**	**100**	**3,678**	**100**	**5**

B. Energy Source

Source	2017 Energy (GJ)	2017 % of Total Energy	2018 Energy (GJ)	2018 % of Total Energy	Difference (%)
Natural Gas	37,141	46	38,884	47	5
Electricity	20,982	26	20,252	24	-3
Diesel	14,840	18	15,262	18	3
Gasoline	6,515	8	7,181	9	10
Propane	1,238	2	1,582	2	28
Total	**80,716**	**100**	**83,161**	**100**	**3**

Appendix 4: Inventory Results – Facilities

Table 1. 2017 and 2018 energy (GJ), greenhouse gas (GHG) emissions (tCO_2e) and cost ($) by facility.

A. Long-Term Care

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Huronlea Home for the Aged	9,820	8,963	365	342	198,706	181,549
Huronview Home for the Aged	15,813	15,027	581	557	324,865	304,250
Subtotal	**25,633**	**23,990**	**946**	**899**	**523,572**	**485,799**

B. Museums

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Historic Gaol	425	507	18	23	7,043	5,815
Huron County Museum	3,635	3,922	112	137	98,372	79,609
Subtotal	**4,060**	**4,429**	**130**	**160**	**105,415**	**85,424**

C. Public Works

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Auburn	1,211	1530	49	71	41,510	44,007
Wingham	393	588	16	25	7,681	8,064
Wroxeter	687	666	30	29	21,114	20,132
Zurich	755	911	29	35	15,826	16,058
Subtotal	**3,046**	**3,695**	**123**	**160**	**86,131**	**88,261**

D. EMS

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Exeter EMS	286	344	11	14	6,355	6,115
Goderich EMS	311	379	12	15	6,902	5,998
Tuckersmith EMS	313	377	11	14	7,628	7,077
Wingham EMS	230	262	8	10	5,201	4,852
Subtotal	**1,140**	**1,362**	**41**	**52**	**26,086**	**24,042**

E. Offices

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Courthouse	2,949	3396	100	122	73,702	68,967
Assessment Office	802	758	25	24	18,635	14,544
Registry Office	364	401	13	15	7,524	6,782
Health & Library Complex	2,707	2951	81	95	79,997	79,577
Jacob Memorial Building	2,491	2817	94	111	51,668	52,674
Subtotal	**9,313**	**10,323**	**313**	**367**	**231,525**	**222,544**

F. Social Housing

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
134 King Street, Clinton	814	874	20	20	22,736	21,071
134 Sanders Street, Exeter	1,365	1431	46	49	31,190	30,005
135 James Street, Clinton	476	537	8	9	18,632	15,134
250 Picton Street, Goderich	378	425	7	8	22,980	22,124
299 Queen Street, Blyth	1,022	1018	26	21	32,660	31,950
31 Main Street, Zurich	987	982	19	20	30,530	25,687
34 John Street, Seaforth	462	530	8	10	13,663	13,920
359 Edward Street, Wingham	471	478	16	17	9,340	8,363
400 Alexander Street, Brussels	1,508	1597	34	39	38,584	34,858
45 Alfred Street E, Wingham	1,178	1314	31	36	29,414	27,890
50 Alfred Street E, Wingham	342	408	13	17	6,056	5,718
50 Market Street, Seaforth	1,071	989	31	21	22,971	23,768
52 Bristol Terrace, Wingham	456	555	8	10	15,201	15,193
85 West Street, Goderich	2,864	2751	93	88	103,663	94,886
9 Jane Street, Bayfield	999	1029	27	28	30,744	28,694
County View, Clinton	1,486	1636	62	71	23,649	21,176
Vacant Units Clinton	17	21	1	1	449	221
Vacant Units Goderich	154	152	7	7	5,987	7,940
Vacant Units Wingham	20	96	1	4	549	2,200
Subtotal	**16,070**	**16,823**	**459**	**476**	**458,996**	**430,799**

G. Other

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Airport Storage	20	15	0.1	0.1	1,598	947
Fire Pump House	79	81	0.4	0.4	4,725	4,190
Subtotal	**99**	**96**	**0.5**	**0.5**	**6,323**	**5,137**

H. Grand Total

Facility	2017 Energy (GJ)	2018 Energy (GJ)	2017 GHGs (tCO_2e)	2018 GHGs (tCO_2e)	2017 Cost ($)	2018 Cost ($)
All Facilities	59,361	60,718	2,012	2,116	1,438,048	1,342,005

Table 2. Energy (GJ), greenhouse gas (GHG) emissions (tCO_2e) and cost ($) associated with 2017 and 2018 energy consumption [electricity (kWh), natural gas (m^3), and propane (L)], by facility type and utility.

A. Long-Term Care

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	2,000,224	1,783,776	7,200	6,421	35	31	375,498	349,711
Natural Gas (m^3)	479,667	457,167	18,433	17,569	911	868	148,074	136,088
Subtotal	**2,479,891**	**2,240,943**	**25,633**	**23,990**	**946**	**899**	**523,572**	**485,799**

B. Museums

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	440,722	363,520	1,586	1,309	8	6	85,052	61,049
Natural Gas (m^3)	64,387	81,167	2,474	3,120	122	154	20,363	24,375
Subtotal	**505,109**	**444,687**	**4,060**	**4,429**	**130**	**160**	**105,415**	**85,424**

C. Public Works

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	260,632	255,339	938	919	5	4	55,243	46,663
Natural Gas (m^3)	22,640	31,069	870	1,194	43	59	7,375	8,938
Propane (L)	48,926	62,482	1,238	1,582	76	97	23,513	32,661
Subtotal	**332,198**	**348,890**	**3,046**	**3,695**	**123**	**160**	**86,131**	**88,261**

D. EMS

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	92,886	92,639	335	333	2	2	18,628	15,517
Natural Gas (m^3)	20,958	26,768	805	1,029	40	51	7,458	8,525
Subtotal	**113,844**	**119,407**	**1,140**	**1,362**	**41**	**52**	**26,086**	**24,042**

E. Offices

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	919,611	889,643	3,311	3,203	16	15	181,469	167,853
Natural Gas (m^3)	156,179	185,302	6,002	7,120	297	352	50,056	54,691
Subtotal	**1,075,790**	**1,074,945**	**9,313**	**10,323**	**313**	**367**	**231,525**	**222,544**

F. Social Housing

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	2,086,942	2,214,440	7,513	7,971	36	38	385,162	360,769
Natural Gas (m^3)	222,665	230,360	8,557	8,852	423	438	73,833	70,030
Subtotal	**2,309,607**	**2,444,800**	**16,070**	**16,823**	**459**	**476**	**458,996**	**430,799**

G. Other

Utility	2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Electricity (kWh)	27,557	26,505	99	96	0.5	0.5	6,323	5,137
Subtotal	**27,557**	**26,505**	**99**	**96**	**0.5**	**0.5**	**6,323**	**5,137**

H. Grand Total

2017 Quantity	2018 Quantity	2017 Energy (GJ)	2018 Energy (GJ)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
6,843,995	6,700,177	59,361	60,718	2,012	2,116	1,438,048	1,342,005

Table 3. 2017 and 2018 greenhouse gas (GHG) emissions (tCO_2e) by energy source and facility type.

A. 2017

Facility Type	Electricity Emissions (tCO_2e)	Natural Gas Emissions (tCO_2e)	Propane Emissions (tCO_2e)
EMS	2	40	0
PW	5	43	76
Museums	8	122	0
Offices	16	297	0
SH	36	423	0
LTC	35	911	0
Grand Total	**101**	**1836**	**76**

B. 2018

Facility Type	Electricity Emissions (tCO_2e)	Natural Gas Emissions (tCO_2e)	Propane Emissions (tCO_2e)
EMS	2	51	0
PW	4	59	97
Museums	6	154	0
Offices	15	352	0
SH	38	438	0
LTC	31	868	0
Grand Total	**97**	**1922**	**97**

Appendix 5: Inventory Results – Fleet

Table 1. 2017 and 2018 fuel consumption (L), greenhouse gas (GHG) emissions (tCO2e) and cost ($) by fuel and vehicle type for the EMS department.

A. Fuel Consumption

Vehicle	Fuel Type	Vehicle Type	2017 Fuel Consumption (L)	2018 Fuel Consumption (L)
Ambulances	Gasoline	Light-Duty Truck	26,916	50,621
Ambulances	Diesel	Light-Duty Truck	72,904	50,019
RRU's	Gasoline	Light-Duty Vehicle	26,924	25,933
Administrative	Gasoline	Light-Duty Vehicle	2,256	1,241
N/A	**N/A**	**Total**	**129,000**	**127,815**

B. GHG Emissions

Vehicle	Fuel Type	Vehicle Type	2017 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)
Ambulances	Gasoline	Light-Duty Truck	62	117
Ambulances	Diesel	Light-Duty Truck	200	137
RRU's	Gasoline	Light-Duty Vehicle	62	60
Administrative	Gasoline	Light-Duty Vehicle	5	3
N/A	**N/A**	**Total**	**329**	**317**

C. Cost

Vehicle	Fuel Type	Vehicle Type	2017 Cost ($)	2018 Cost ($)
Ambulances	Gasoline	Light-Duty Truck	30,550	64086
Ambulances	Diesel	Light-Duty Truck	78,517	62674
RRU's	Gasoline	Light-Duty Vehicle	30,559	32832
Administrative	Gasoline	Light-Duty Vehicle	2,560	1572
N/A	**N/A**	**Total**	**142,186**	**161,163**

Table 2. 2017 and 2018 fuel consumption (L), greenhouse gas (GHG) emissions (tCO2e) and cost ($) by fuel and vehicle type for the Public Works (PW) department. **Indicates coloured diesel.*

A. Fuel Consumption

PW Yard	Fuel Type	Vehicle Type	2017 Fuel Consumption (L)	2018 Fuel Consumption (L)
Wroxeter	Gasoline	Light-Duty Truck	54,697	51,395
Wroxeter	Diesel	Heavy-Duty Vehicle	72,326	84,578
Wroxeter	*Diesel	Off-Road Vehicle	22,852	25,902
Zurich	Gasoline	Light-Duty Truck	28,698	31,184
Zurich	Diesel	Heavy-Duty Vehicle	63,834	78,525
Auburn	Gasoline	Light-Duty Truck	46,411	44,788
Auburn	Diesel	Heavy-Duty Vehicle	132,804	137,715
Auburn	*Diesel	Off-Road Vehicle	22,771	21,757
N/A	**N/A**	**Total**	**444,393**	**475,844**

B. GHG Emissions

PW Yard	Fuel Type	Vehicle Type	2017 GHG Emissions (tCO_2e)	2018 GHG Emissions (tCO_2e)
Wroxeter	Gasoline	Light-Duty Truck	127	119
Wroxeter	Diesel	Heavy-Duty Vehicle	197	231
Wroxeter	*Diesel	Off-Road Vehicle	61	70
Zurich	Gasoline	Light-Duty Truck	66	72
Zurich	Diesel	Heavy-Duty Vehicle	174	214
Auburn	Gasoline	Light-Duty Truck	108	104
Auburn	Diesel	Heavy-Duty Vehicle	362	376
Auburn	*Diesel	Off-Road Vehicle	61	59
N/A	**N/A**	**Total**	**1,156**	**1,245**

C. Cost

PW Yard	Fuel Type	Vehicle Type	2017 Cost ($)	2018 Cost ($)
Wroxeter	Gasoline	Light-Duty Truck	62,081	65,066
Wroxeter	Diesel	Heavy-Duty Vehicle	77,895	105,976
Wroxeter	*Diesel	Off-Road Vehicle	24,611	32,455
Zurich	Gasoline	Light-Duty Truck	32,572	39,479
Zurich	Diesel	Heavy-Duty Vehicle	68,749	98,392
Auburn	Gasoline	Light-Duty Truck	52,677	56,701
Auburn	Diesel	Heavy-Duty Vehicle	143,030	172,557
Auburn	*Diesel	Off-Road Vehicle	24,525	27,262
N/A	**N/A**	**Total**	**486,140**	**597,889**

Table 3. 2017 and 2018 fuel consumption (L), greenhouse gas (GHG) emissions (tCO_2e) and cost ($) summed by vehicle type (A) and fuel type (B).

A. Vehicle Type

Vehicle Type	2017 Fuel Consumption (L)	2018 Fuel Consumption (L)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Light-Duty Vehicle	29,180	27,175	67	63	33,119	34,403
Off-Road Vehicle	45,623	47,659	122	129	49,136	59,717
Light-Duty Truck	229,626	228,007	563	549	256,396	288,007
Heavy-Duty Vehicle	268,964	300,818	733	821	289,674	376,925
Total	**573,393**	**603,659**	**1,485**	**1,562**	**628,326**	**759,052**

B. Fuel Type

Fuel Type	2017 Fuel Consumption (L)	2018 Fuel Consumption (L)	2017 Emissions (tCO_2e)	2018 Emissions (tCO_2e)	2017 Cost ($)	2018 Cost ($)
Gasoline	185,902	205,163	430	475	210,998	259,736
Diesel	387,491	398,497	1,055	1,087	417,328	499,316
Total	**573,393**	**603,659**	**1,485**	**1,562**	**628,326**	**759,052**