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# Village of Blacks Harbour Partners for Climate Protection: Milestone 1

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Prepared by Danielle St. Louis

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**Village of Blacks Harbour Partners for Climate Protection: Milestone 1**

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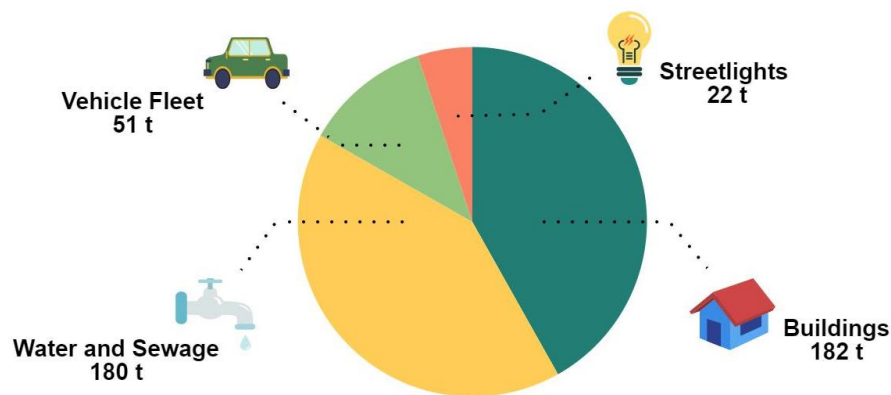
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## Executive Summary

The Village of Blacks Harbour began participating in the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program in August of 2016. The PCP program consists of a five milestone approach that begins by developing a greenhouse gas (GHG) emission inventory for both the municipality (corporation), and the homes and businesses therein (community).

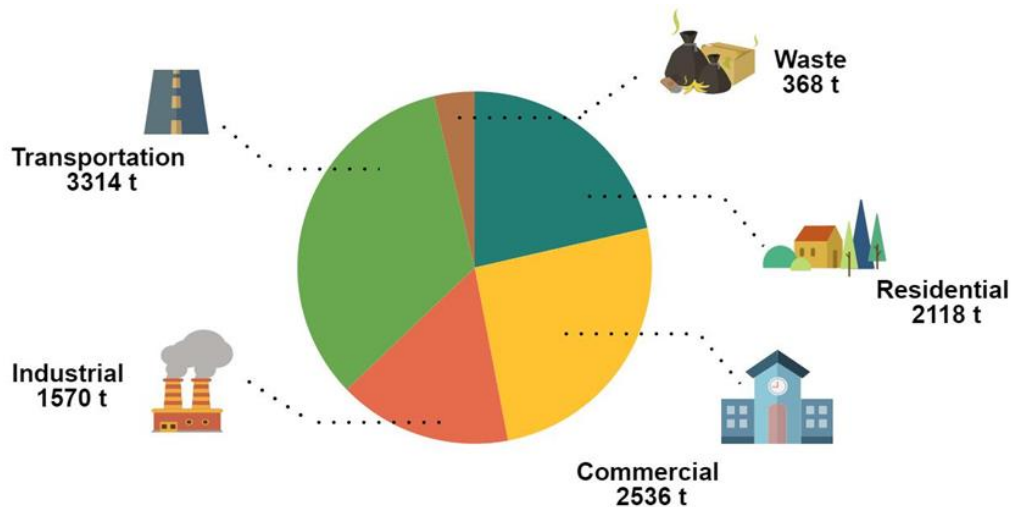
Eastern Charlotte Waterways Inc. received funding from the New Brunswick Environmental Trust Fund (ETF) to commence work on behalf of the Village of Blacks Harbour under the PCP program by developing the Village's GHG emissions inventory, a forecast of GHG emissions, emissions reduction targets, and to initiate the development of a Local Action Plan for both the corporation and the community.

The corporate GHG inventory was developed by gathering various datasets for buildings, streetlights, vehicle fleet, water and sewage, and solid waste. In total, these five sectors produced 434 tonnes of CO<sub>2</sub>e in 2015 (**Figure A**). The Village's buildings, and water & sewage systems generated the greatest volume of greenhouse gas emissions.



**Figure A** Corporate CO<sub>2</sub>e Greenhouse Gas Emissions by Sector (2015)

The community GHG inventory was developed by gathering various datasets for the residential, commercial, industrial, transportation and waste sectors within the Village of Blacks Harbour. These emissions are under the direct control of community stakeholders, however the Village can influence these sectors by providing education and outreach, and program and policy support for reduction measures in each sector. In total, these five sectors produced 9,906 tonnes of CO<sub>2</sub>e in 2015 (**Figure B**). The transportation, and commercial sectors contributed to the greatest proportion of total emissions.



**Figure B** Community CO<sub>2</sub>e Greenhouse Gas Emissions by Sector (2015)

## 1.0 Introduction

Human activity has dramatically increased emissions of greenhouse gases (GHGs) in the atmosphere. The build-up of GHGs in the atmosphere has led to an enhancement of the natural greenhouse effect and ongoing emissions of GHGs have the potential to warm the planet to levels that have never been experienced in the history of human civilization. Such climate change could have far-reaching and/or unpredictable environmental, social, and economic consequences. These consequences have motivated governments to reduce greenhouse gas emissions and act on climate change.

In 2016, more than 190 countries, including Canada, signed the Paris Agreement. Under the agreement, countries set their own targets for reducing emissions, with a goal to limit the global temperature increase to below 2°C and to pursue efforts to limit this increase to 1.5°C, in order to avoid the most severe climate change impacts.

The Government of Canada has set a GHG emission reduction target of 523 Mt by 2030, and the Government of New Brunswick has set a target of 10.7 Mt by 2030. These targets represent a reduction of 30% below 2005 levels by 2030. New Brunswick has also set a GHG emission target of 5 Mt by 2050.

Local governments will play a crucial role in helping to reach these targets as up to half of Canada's GHG emissions are under the direct or indirect control or influence of municipal governments. In response, the Federation of Canadian Municipalities (FCM) designed its Partners for Climate Protection (PCP) program to encourage and assist municipalities to manage their contributions to climate change and encourage their communities to participate in local reduction initiatives. At the same time, it was recognized that municipalities are on the front line of this issue; and that they have an opportunity to save money while leading the development of much more sustainable communities. Local governments can drive systemic low-carbon practices, including: building high-efficiency buildings, undertaking building retrofits and developing district heating; building active transit, electric vehicle infrastructure and electrified public transit; implementing near-zero GHG waste plans; and delivering high-efficiency water and wastewater services.

Investments in these types of measures also reduce operating costs, help municipalities maintain and plan for future community services, protect public health, support sustainable community development, increase community resilience and reduce a community's vulnerability to environmental, economic and social stresses.

The PCP program commits members to adopt a community GHG reduction target of 30 per cent below 2005 levels by 2030, in line with the Government of Canada's target, and to adopt a corporate GHG reduction target that is similar or more ambitious, and to consider adopting a deeper community and corporate emissions reduction target of 80 per cent by 2050.

## **2.0 Community Profile**

Blacks Harbour is located on the shores of the Bay of Fundy and boasts a strong fishing industry based, almost exclusively, on herring in addition to multiple aquaculture sites for the production of Atlantic salmon (Village of Blacks Harbour, 2017). Two companies play a major role in the community, Connors Bros. and Cooke Aquaculture. Each has a longstanding relationship in the village. Blacks Harbour is a small, rural community. The population of Blacks Harbour was 982 in 2011 and dropped to 894 in 2016. An annual population decline of 1.8% (Statistics Canada, 2017). The Village serves as the only ferry point to the island of Grand Manan. Blacks Harbour was incorporated in 1972.

### **2.1 Joining the Partners for Climate Protection Program**

In 2016, Eastern Charlotte Waterways Inc. (ECW), a local not-for-profit environmental resource and research centre, was granted funding from the New Brunswick Environmental Trust Fund (ETF) to quantify the Village of Black Harbour's GHG emissions, set a reduction target, and develop a local action plan following PCP program framework. In July, ECW presented the details of the PCP Program to the Village of Blacks Harbour council, highlighting the benefits, and requested that council join the program.

The Mayor and Council of the Village of Blacks Harbour resolved, on August 3, 2016, that Village of Blacks Harbour join the FCM PCP Program by completing the National Resolution form.

The PCP program allows flexibility in the progression through it, but recommends that GHG inventories be developed as a first step. A GHG inventory is an audit of activities that contribute to the release of emissions. The program requires that a baseline GHG emission inventory be developed, and that a 10 year forecast of the Village's GHG emissions from the baseline be estimated for both the municipality and for the community as a whole. Based on the availability of accurate data, the Village, in consultation with Eastern Charlotte Waterways Inc., selected a base year of 2015.

### **2.2 Partners for Climate Protection Process**

The PCP program is administered through the FCM, and prescribes a five milestone framework used to assist local governments and municipalities in a process intended to reduce greenhouse gas emissions.

Over 300 municipal governments across Canada representing more than 65 per cent of the population have already committed to reducing corporate and community GHG emissions through the PCP program since its inception in 1994. To date, 44 municipal governments in New Brunswick have joined the program.



This project will enable the Village to complete Milestones #1 and #2. In addition, the outcome of this project serves as the foundation for the development of the Local Action Plan (LAP) required to fulfill Milestone #3. The five program milestones include:

- Milestone 1: Creating a greenhouse gas emissions inventory and forecast;
- Milestone 2: Set an emissions reductions target;
- Milestone 3: Develop a LAP to reduce GHG emissions;
- Milestone 4: Implement the local action plan or a set of activities; and
- Milestone 5: Monitor progress and report results.

### **3.0 Methodology**

The following guidance and standards documentation was considered when developing the GHG emission inventory:

- Developing Inventories for Greenhouse Gas Emissions and Energy Consumption (Partners for Climate Protection);
- Cities for Climate Protection Guidelines (International Council for Local Environmental Initiatives (ICLEI));
- Canadian Standards Association (CSA) ISO 14064 Standards;

Real energy consumption (RC) data was used as the preferred input for GHG emission calculations. A data set is considered real consumption data when a vendor can provide accounting records that adhere to rigorous, third party scrutiny in accord with standard accounting principles. Where these data sets were not available, activity data (AD) from authoritative, defensible sources were used to estimate the inputs required for GHG emission calculations. A data set is considered activity data when indicators, averages, survey results, or national, provincial, or regional data is employed to estimate consumption (Table 1).

**Table 1** Summary of Data Type Sources - Real Consumption (RC) or Activity Data (AD)

Operational Category or Sector Category	Type of Data Source					
	Electricity	Natural Gas	Fuel Oil	Gasoline /Diesel	Other Fuels	Waste
<b>CORPORATE INVENTORY</b>						
Buildings	RC	RC	RC	-	-	-
Wastewater & Potable Water	RC	-	RC	-	-	-
Fleet	-	-	-	RC	-	-
Solid Waste	-	-	-	-	-	-
Street & Area Lighting	RC	-	-	-	-	-
<b>COMMUNITY INVENTORY</b>						
Residential	RC	AD	AD	-	AD	-
Commercial	RC	AD	AD	-	AD	-
Industrial	RC	AD	AD	-	AD	-
Transportation	-	-	-	AD	AD	-
Solid Waste	-	-	-	-	-	RC

#### 4.0 Corporate Greenhouse Gas Emissions Inventory - Milestone 1

The Corporate GHG emission inventory includes energy consumption and contributions from:

- Buildings;
- Vehicle Fleet;
- Street, Traffic and Area Lights;
- Water and Waste Water Systems (e.g., lift stations, water pumps); and
- Corporate Solid Waste.

The energy consumption data was converted into a GHG emissions inventory using the web-based PCP Milestone Tool. The Milestone Tool includes the ability to input energy and emissions data for multiple inventory years, and track progress over time.

Overall, the Village of Blacks Harbour operation's consumed 5,721 GJ of energy and produced 434 tonnes of CO<sub>2</sub>e in 2015 (**Table 2**). Approximately 85% of the emissions were produced by electricity consumption, and the remainder by diesel, gasoline and propane consumption. A more detailed look into emissions can be found in the following sections.

**Table 2 Corporate Greenhouse Gas Emission Summary for 2015**

<b>GHG EMISSIONS (TONNES OF CO<sub>2</sub>E)</b>	<b>2015</b>
BUILDINGS	182
VEHICLE FLEET	51
STREETLIGHTS	22
WATER AND WASTEWATER	180
SOLID WASTE	-
<b>TOTAL GHG EMISSIONS</b>	<b>434</b>

#### 4.1 Buildings

The building sector traditionally accounts for a significant proportion of local government operations emissions. Corporate building electricity consumption data was retrieved from monthly NB Power bills provided by the Village. Propane consumption data was retrieved from monthly Irving Ltd. invoices provided by the Village.

**Table 3 Energy Consumption and GHG Emissions from Village Buildings in 2015**

<b>Building</b>	<b>Electricity (kWh)</b>	<b>Propane (L)</b>	<b>Total Emissions (t of CO<sub>2</sub>e)</b>
Municipal Building	26,593	-	7.45
Public Works Garage	20,189	2,971	10.24
Fire Hall	30,430	6,911	19.19
Arena n. 1	390,900	-	109.45
Arena n. 2	122,760	-	34.37
Band Stand	1,823	-	0.51
Visitor Information Centre	251	-	0.07
Storage Garage	557	-	0.16
<b>Total</b>	<b>593,503</b>	<b>9,882</b>	<b>181.44</b>

In total, the GHG emission's associated with operating the Village's buildings in 2015 were 182 tonnes of CO<sub>2</sub>e. This represents 42% of all corporate sector emissions.

## 4.2 Vehicle Fleet

The vehicle fleet includes all motorized vehicles operated by the Village of Blacks Harbour. Vehicle fleet fuel consumption data was retrieved from monthly Irving Ltd. fuel purchase records provided by the Village (**Table 4**). In 2015, the Village's vehicles (including one employee vehicle) produced 51 tonnes of CO<sub>2</sub>e.

**Table 4** Fuel Consumption and GHG Emissions for Village Owned Vehicles in 2015

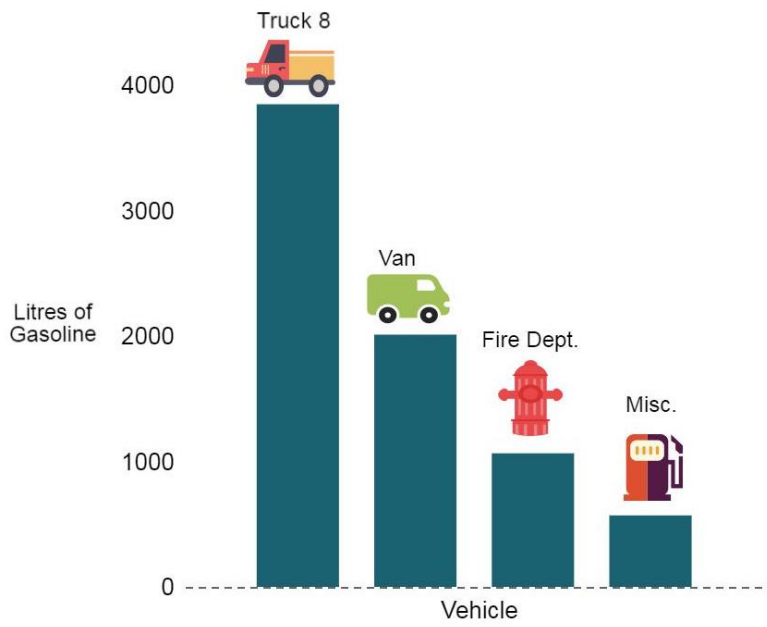
Fuel	Amount (L)	Total Emissions (t of CO <sub>2</sub> e)
Regular Gasoline	7652.05	17.59
Diesel	11,090.38	30.08
Supreme Gasoline	832.98	1.96
Personal Vehicle (2013 Ford Escape)	599.52	1.38
<b>Total</b>		<b>51</b>

**Figure C** provides a breakdown of gasoline consumed by vehicle based on fuel receipts for 2015 provided by the Village of Blacks Harbour. All receipts were not collected, and/or labelled properly, however, receipts available provided insight into fuel consumption by each vehicle owned by the Village of Blacks Harbour. Based on the available receipts, it is estimated that "Truck #8" accounted for approximately 51%, and the 2013 Ford E-Series 250 Utility Van accounted for approximately 27%, and the "Fire Department" accounted for approximately 14% of the emissions generated from gasoline consumption.

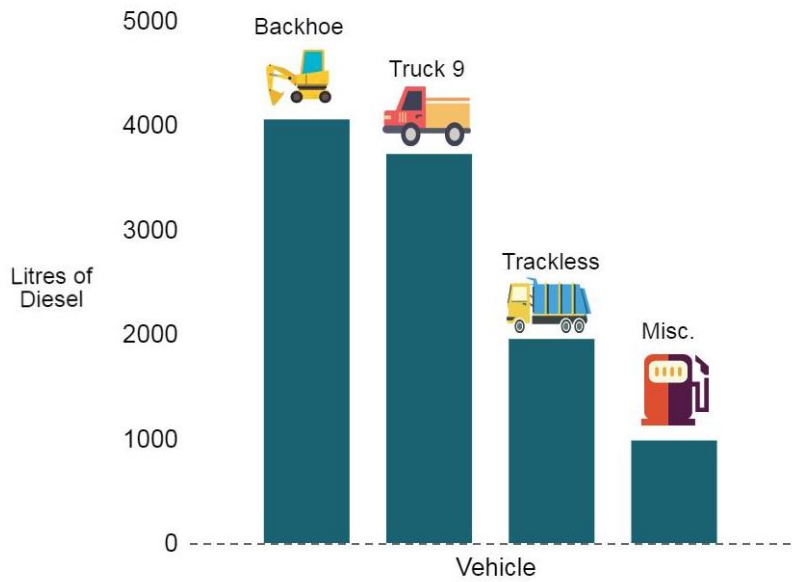
**Figure D** provides a breakdown of diesel consumed by vehicle based on fuel receipts for 2015 provided by the Village of Blacks Harbour. It is assumed that "Truck #9" accounted for approximately 35%, the 2007 JCB Backhoe accounted for approximately 38%, and 2003 MT5T Trackless accounted for approximately 18% of the emissions generated from diesel consumption.

There may be error in the calculation of personal vehicle use since only vehicle kilometers travelled (VKT) was available. VKT was converted to gasoline volume using the fuel efficiency factor of 6.0 L/100 km highway driving for a 2013 Ford Escape.

In total, the GHG emission's associated fuel combustion in the Village's vehicle fleet were 51 tonnes of CO<sub>2</sub>e. This represents 11.8% of all corporate sector emissions.



**Figure C** Gasoline Consumption by Village Owned Vehicles in 2015



**Figure D** Diesel Consumption by Village Owned Vehicles in 2015

### 4.3 Street, Traffic and Area Lights

This sector includes all outdoor lighting, such as streetlights and ornamental lights. Overall, the Village's streetlights consumed and estimated 275 GJ of electricity (76, 444 kWh). Street light electricity consumption data was retrieved from monthly NB Power bills provided by the Village for which detailed streetlights and unmetered services in the Village. The first two light groups (i.e., 100 W/HPS Light only and 400 W/MH Floodlight only) were billed on the basis of monthly estimates of electricity used. To determine total kWh used, it was assumed that the Village of Blacks Harbour was charged 0.1295\$/kWh from January to September, and 0.1316\$/kWh as indicated on the bill. Based on the total monthly cost, kWh used were determined.

The remaining light groups were billed at yearly rates. To determine kWh, a conversion factor of 438 kWh/year/100W-light was applied. This was found by assuming each light was on for an average of 12 hours per day over the 365 days in the year.

**Table 5** Energy Consumption and GHG Emissions for Village Streetlights

Streetlight Group Name	Total Use (kWh)	# of Streetlights	Total Emissions (t of CO <sub>2</sub> e)
100 W/HPS Light only	6,343	5	1.78
400 W/MH Floodlight only	6,153	2	1.72
100 W/LED Light only	59,130	135	16.56
100 W/LED Light with wood pole	3,504	8	0.98
200 W/LED Light only	876	1	0.25
100 W/HPS Light only	438	1	0.12
<b>Total</b>	<b>76,444</b>	<b>152</b>	<b>21.41</b>

In total, the GHG emissions associated with operating the Village's streetlights were 22 tonnes of CO<sub>2</sub>e. This represents 5% of all corporate sector emissions.

#### 4.4 Water and Wastewater Systems

The emissions associated with water and wastewater management systems can be highly variable in local government operations inventories. A number of factors influence this variability, including any sanitary sewer and potable water treatment plants in the system, and the local topography which affects the pumping and movement of water. Water and wastewater system real consumption data sets were retrieved from monthly NB Power bills provided by the Village.

**Table 6** Energy Consumption and Emissions for Operation of Village's Water and Wastewater Systems in 2015

Facility	Electricity (kWh)	Total Emissions (t of CO <sub>2</sub> e)
Waste Treatment Plant	312,960	87.63
Sewage Lagoon	247,610	69.33
Lift Station (546 Main St)	55,310	15.49
Lift Station (635 Wellington Rd)	19	0.01
Lift Station (435 Wellington Rd)	10,600	2.97
Pump (38 Wallace Cove Rd)	3,210	0.9
Sewer (342 Bayside View Rd)	3,465	0.97
Filtration (58 Farm Rd)	5,006	1.40
Water Control (66 French Village Rd)	5,262	1.47
<b>Total</b>	<b>643,442</b>	<b>180.17</b>

In total, the GHG emissions associated with operating the Village's Water and Waste Water Systems were 180 tonnes of CO<sub>2</sub>e. This represents 41.5% of all corporate sector emissions.

#### 4.5 Corporate Solid Waste

Emissions from solid waste, mostly in the form of methane, enter the air directly as waste decomposes. The corporate solid waste sector is often a small portion (> 3%) of total corporate sector emissions. Nonetheless, cost-savings and emission reduction opportunities are present within this sector. The data for this sector was deemed inconclusive, or not statistically significant. The overall admissions for this section are ad minimus.

#### **4.6 Business-As-Usual (BAU) Forecast**

The PCP Program requires municipalities to develop a simple forecast reflecting a business-as-usual scenario 10 years into the future. Generally, forecasts for municipal operations for most sectors will mirror the population projections for a community. For the Village of Blacks Harbour, this is challenging, as the permanent resident population has been in decline over recent years as it is a small, rural community. The population of Blacks Harbour was 982 in 2011 and dropped to 894 in 2016. An annual population decline of 1.8% (Statistics Canada, 2017) which would indicate a potential for limited or no increase in emissions over the next 10 years.

#### **4.7 Reduction Target – Milestone 2**

As of 2016, the PCP program commits members to adopt a corporate GHG reduction target of 30 per cent below 2005 levels by 2030, in line with the Government of Canada's target. In the past, the PCP program committed members to adopt a corporate GHG reduction target of 20 per cent below 2000 levels within 10 years of joining the PCP program.

With recent population decline, an increase in federal and provincial funding for GHG emission reduction projects (see Section 6.0 for further details), and the fact GHG emissions associated with electricity generation in New Brunswick is likely to decrease in the upcoming years, it is recommended that the Village of Blacks Harbour set a reduction target of 30% below 2015 levels by 2030. This is a reduction of 130 tonnes of CO<sub>2</sub>e.



## 5.0 Community Greenhouse Gas Emissions Inventory – Milestone 1

The Community GHG emission inventory includes energy consumption and contributions from the:

- Residential Sector;
- Commercial and Institutional Sector;
- Industrial Sector;
- Transportation; and
- Solid Waste.

Overall, the community of Blacks Harbour consumed 134,946 GJ of energy and produced 9,906 tonnes of CO<sub>2</sub>e in 2015 (**Table 7**). Approximately 38% of the emissions were produced by electricity consumption, 23.3 % by gasoline consumption, 12.8% by fuel oil consumption. A more detailed look into emissions can be found in the following sections.

**Table 7** Community Greenhouse Gas Emissions Summary for 2015

<b>GHG Emissions (Tonnes of CO<sub>2</sub>e)</b>	<b>2015</b>
Residential	2,118
Commercial	2,536
Industrial	1,570
Transportation	3,314
Solid Waste	368
<b>TOTAL GHG</b>	<b>9,906</b>

### 5.1 Residential Sector

Similar to the building sector in the municipal inventory, the residential sector is a large producer of GHG emissions. Real consumption data for the residential sector in the form of total electricity consumption was acquired from NB Power. Under NB Power, residential includes domestic use, use in churches and farms. In 2015, NB Power had a total of 470 residential contracts. The majority, 463, were rural; 3 seasonal; and 4 urban, which resulted in a total of 6,077,317 kWh.

Based on the Natural Resources Canada's (NRCAN) Comprehensive Energy Use Database data for New Brunswick, the 6,077,317 kWh used by the residential sector in the Village of Blacks Harbour is assumed to account for 61.7 % of the energy consumed in 2015. However, natural gas, accounting for 1.8% of the energy consumed, is not available for the residential sector in Blacks Harbour. Therefore, we assume that the electricity used by the residential sector accounted for 63.5% of the energy consumed in 2015. The remaining energy consumption data was estimated using the consumption breakdown given in the database.

**Table 8** New Brunswick Residential Sector Energy Use by Energy Source and Estimated Consumption in the Village of Blacks Harbour

Energy Source	Consumption Breakdown (%)	Energy Consumed (GJ)
Electricity	63.5	21,878.34
Heating Oil	16.9	5,822.73
Other (Propane)	0.2	68.91
Wood	19.4 (N/A)	6,684.09 (N/A)
<b>Total</b>	<b>100</b>	<b>34,454.08</b>

**Table 9** Residential Sector Energy Consumption Estimates and GHG Emissions for Village of Blacks Harbour

Fuel Type	Units	Total Use	Total CO <sub>2</sub> e
Electricity	kWh	6,077,317	1823.2
Heating Oil	L	150,535.93	411.72
Propane	L	2,722.64	4.2
<b>Total</b>	-	-	<b>2117.57</b>

The total value of all CO<sub>2</sub>e produced by the residential sector in Blacks Harbour is estimated to be approximately 2,118 tonnes. The average Blacks Harbour household produced 5.43 tonnes of greenhouse gas emissions. This represents 22.7% of all community sector emissions.

## 5.2 Commercial and Institutional Sector

Real consumption data for the commercial sector in the form of total electricity consumption was acquired from NB Power. Under NB Power, the commercial and institutional sector fall under “General Service” which are customers who use electricity for all purposes other than those specifically covered under the residential, industrial, street lighting or unmetered service categories. In 2015, NB Power had a total of 72 commercial contracts. The majority, 66, were “General Service 1” and the remaining 6 were “General Service 2” which resulted in a total of 5,126,452 kWh.

Based on the Natural Resources Canada’s (NRCAN) Comprehensive Energy Use Database data on commercial energy use for Atlantic Provinces, the 5,126,452 kWh used by the commercial sector in the Village of Blacks Harbour is assumed to account for 54.3% of the energy consumed in 2015. The remaining energy consumption data was estimated using the consumption breakdown given in the database.

**Table 10** Atlantic Province's Commercial Sector Energy Use by Energy Source and Estimated Consumption in the Village of Blacks Harbour

Energy Source	Consumption Breakdown (%)	Energy Consumed (GJ)
Electricity	54.3	18,455.23
Natural Gas	12.5	4,248.44
Light Fuel Oil	26.3	8,938.72
Heavy Fuel Oil	2.6	883.68
Other (Propane)	4.3	1,461.46
<b>Total</b>	<b>100</b>	<b>32,208.08</b>

**Table 11** Commercial Energy Consumption Estimates and GHG Emissions for Village of Blacks Harbour

Fuel Type	Units	Total Use	Total CO <sub>2</sub> e
Electricity	kWh	5,126,452	1537.94
Natural Gas	M <sup>3</sup>	110,550	211.37
Fuel Oil	L	231,094	632.04
Heavy Fuel Oil	L	20,792	65.39
Propane	L	57,742	89.15
<b>Total</b>	-	-	<b>2535.89</b>

The total value of all CO<sub>2</sub>e produced by the commercial sector in Blacks Harbour is estimated to be approximately 2,536 tonnes. This represents 25.2% of all community sector emissions.

### 5.3 Industrial Sector

Similar to the commercial and institutional sector, industrial sector energy consumption and GHG emissions can vary across municipalities based on the level of industry present within the municipality. Real consumption data for the residential sector in the form of total electricity consumption was acquired from NB Power. Under NB Power, industrial includes customers who use electricity chiefly for manufacturing, assembly or processing of goods, or the extraction of raw materials. In 2015, NB Power had a total of 6 small industrial contracts (up to 750 kilowatts) which resulted in a total of 2,059,130 kWh.

Based on the Natural Resources Canada's (NRCAN) Comprehensive Energy Use Database data on industrial energy use for Atlantic Provinces, the 2,059,130 kWh used by small industry in the Village of Blacks Harbour is assumed to account for 24.4% of the energy consumed in 2015. The remaining energy consumption data was estimated using the consumption breakdown given in the database. For Atlantic Provinces, a % was not available for natural gas, so the 34.5% was based on the assumption that the remainder of energy use is natural gas.

**Table 12** Atlantic Provinces Industrial Sector Energy Use by Energy Source and Estimated Consumption in the Village of Blacks Harbour

Energy Source	Consumption Breakdown (%)	Energy Consumed (GJ)
Electricity	24.4	7,412.87
Natural Gas	34.5	10,481.31
Fuel Oil	9.4	2,855.78
Heavy Fuel Oil	10.4	3098.83
Wood Waste and Pulping Liquor	21.3 (N/A)	6,471.07
<b>Total</b>	-	<b>30,380.61</b>

**Table 13** Industrial Energy Consumption Estimates and GHG Emissions for Village of Blacks Harbour

Fuel Type	Units	Total Use	Total CO <sub>2</sub> e
Electricity	kWh	2,059,130	617.74
Natural Gas	M3	272,737	521.46
Fuel Oil	L	73,831	201.93
Heavy Fuel Oil	L	72,913	229.31
<b>Total</b>	-		<b>1570.44</b>

The total value of all CO<sub>2</sub>e produced by the commercial sector in Blacks Harbour is estimated to be approximately 1,570 tonnes. This represents 15.6% of all community sector emissions.

## **5.4 Transportation**

The Vehicle Kilometers Travelled (VKT) method in the PCP Milestone Tool was used to determine community transportation emissions. This method takes into consideration the number of households in the community, the average number of vehicles per household in New Brunswick, and the average annual distance traveled by vehicles in New Brunswick. Based on the 2011 census, the Blacks Harbour had a total of 390 households. As provided in the PCP Milestone Tool, the average number of vehicles per household was 1.60, and the average annual distance travelled by vehicles in was 15,864.

The total value of all CO<sub>2</sub>e produced by the transportation sector in Blacks Harbour is estimated to be approximately 3,314 tonnes. This represents 32.9% of all community sector emissions.

## **5.5 Solid Waste**

Solid waste production information for the residential sector was available directly from the Southwest Solid Waste Commission. The waste category includes emissions produced from waste generated from the residential sector only. Industrial waste, construction waste and demolition waste, including concrete, wood, tires and contaminated soil, are not included in the community emissions inventory. Recyclables have also been excluded from the total, as they are not landfilled.

The 'methane commitment' approach available in the PCP Milestone Tool was used to determine emissions from the decomposition of waste. The Southwest Solid Waste Commission facility does have containment cells 1-7 equipped with wells that allow for landfill gas (LFG) collection. Over the last two years, the facility has not been flaring methane regularly to convert into CO<sub>2</sub> because of an insufficient volume of gas. In 2015, the facility flared for 28 days. However, an accurate estimate of the landfill gas collected by the system is unavailable at this time (Dan Harrington, Regional Service Commission, Personal Communication, January 31 2017).

The total mass of waste sent to landfill from the Village of Blacks Harbour was 278.4 tonnes. The decomposition of this waste is estimated to release 368 tonnes of CO<sub>2</sub>e. This value represents 3.8% of all community sector emissions.

## **5.6 Business-As-Usual (BAU) Forecast**

The PCP Program requires municipalities to develop a simple forecast reflecting a business-as-usual scenario 10 years into the future. Generally, forecasts for municipal operations for most sectors will mirror the population projections for a community. For the Village of Blacks Harbour, this is challenging, as the permanent resident population has been in decline over recent years as it is a small, rural community. The population of Blacks Harbour was 982 in 2011 and dropped to 894 in 2016. An annual population decline of 1.8% (Statistics Canada, 2017) which would indicate a potential for limited or no increase in emissions over the next 10 years.

## **5.7 Reduction Target - Milestone 2**

As of 2016, the PCP program commits members to adopt a community GHG reduction target of 30 per cent below 2005 levels by 2030, in line with the Government of Canada's target. In the past, the PCP program committed members to adopt a community GHG reduction target of 6 per cent below 2000 levels within 10 years of joining the PCP program.

With recent population decline, an increase in federal and provincial funding for GHG emission reduction projects (see Section 6.0 for further details), and the fact GHG emissions associated

with electricity generation in New Brunswick is likely to decrease in the upcoming years, it is recommended that the Village of Blacks Harbour set a community reduction target of 30% below 2015 levels by 2030. This is a reduction of 2,972 tonnes of CO<sub>2</sub>e.

## 6.0 Discussion

This report completes Milestone #1 of the PCP program with the development of the corporate GHG emissions inventory and estimates for the community sectors. These may now be reported to the FCM and the Village's PCP status updated on the FCM website. Milestone #2 requires the setting of firm corporate and community GHG emissions reduction targets by the Village which needs to be adopted by council. It is recommended that council adopts the target of 30% below 2015 levels by 2030 as recommended by the PCP program, and set in this report.

In total, the GHG emission's associated with the Village of Black Harbour's operation in 2015 were 434 tonnes of CO<sub>2</sub>e, and community emissions were 9,906 tonnes of CO<sub>2</sub>e. GHG emissions vary for each municipality and energy needs and sources used are also different by community (**Table 14**).

**Table 14** Comparison of GHG Emissions Between New Brunswick Municipalities

Municipality	Population	Corporate Emissions (t CO <sub>2</sub> e)	Community Emissions (t CO <sub>2</sub> e)	Per Capita Emissions
Blacks Harbour	894	434	9,906	11.1
Dorchester	954	185	6,402	6.7
Clair	857	664	14,166	16.5
Point Verte	967	298	16,076	16.6
Saint-Louis-de-Kent	930	452	16,076	17.2

Milestone #3 requires the development of a Local Action Plan (LAP) designed to meet the Corporate and Community emissions targets set in Milestone #2. Achievement of the corporate target will require close attention to each future decision that impacts the Village's energy consumption. As participants in the PCP program, the Village of Blacks Harbour is eligible for financial assistance from the FCM Green Municipal Fund and Municipalities for Climate Innovation Program. The Village is also eligible to participate in other funding programs including the NB Power Commercial Buildings Retrofit Program and Locally Owned Renewable Energy Small Scale (LORESS) Program, and the New Brunswick Environmental Trust Fund (ETF).

These funding programs can be used reduce energy consumption of municipal operations. For example, the Water and Wastewater System Sector accounts for 41% of the Village's emissions, generating 180 tonnes of CO<sub>2</sub>e. In 2012, the Village of Blacks Harbour commissioned an energy audit on the wastewater treatment plant and lift stations. If all of the recommendations were applied, the Village could see a reduction of approximately 194,600 kWh/ year which would result in a decrease of 58.38 tonnes of CO<sub>2</sub>e per year.

Additional resources will be required to engage the community and develop that portion of the Local Action Plan in a manner whereby the community takes ownership and identifies champions and initiatives that are most appropriate for it.

The setting of a community emission reduction target and the achievement of emission reductions may be much more of a challenge than meeting the corporate target, given the lack of data regarding the growth plans of the institutional, commercial, and small industrial sector. However, there are opportunities to improve the accuracy of the emissions inventory through participation of the community as part of a LAP. Given that most of the community GHG emissions are outside the direct control of the Village, the development of the LAP may best include considerable and effective involvement and interaction with the community, including the residents, businesses, industry and the operators of institutional facilities. The Village and the community may also wish to include their energy suppliers in their consultations.

While 44 other New Brunswick communities have joined the PCP program, Blacks Harbour has the opportunity to showcase leadership among its peers across the Province. This report provides an opportunity for the Village to complete Milestones #1 and #2 and, with some additional consultation with the corporate staff and community, to complete Milestone #3 in the future.

## **7.0 References**

Natural Resources Canada. 2014. Comprehensive Energy Use Database. Government of Canada. Retrieved from:

[http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive\\_tables/list.cfm](http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm).

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<http://www.blacksharbour.ca/history.html>.



## Appendix A – Emission and Conversion Factors

**Table 15** PCP Tool Emission Factors (Tonnes of CO<sub>2</sub>e/Unit)

<b>Energy Source</b>	<b>Emission Factor (Tonnes of CO<sub>2</sub>e/Unit)</b>
Electricity	0.000280
Natural Gas	0.001912
Fuel Oil	0.002735
Heavy Fuel Oil	0.003145
Kerosene	0.002544
Propane	0.001544
Diesel Stationary	0.002790

**Table 16** PCP Tool Conversion Factors (GJ/Unit)

<b>Energy Source</b>	<b>Conversion Factor (GJ/Unit)</b>
Electricity	0.003600
Natural Gas	0.038430
Fuel Oil	0.038680
Heavy Fuel Oil	0.042500
Propane	0.025310
Gasoline	0.035000
Kerosene	0.037680
Diesel Stationary	0.038300
Ethanol Blend	0.033860
Biodiesel (B5)	0.038170
Biodiesel (B10)	0.038040
Biodiesel (B20)	0.038780