

# Sussex's Corporate GHG Inventory & Action Plan



Realised with the



## Climate Change and Energy Initiative

July 2018

Consulting team



Financed by



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**Corporative GHG Inventory & Action Plan**

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## I. INTRODUCTION

### A. CONTEXT

*The simple fact of having asked for a greenhouse gas inventory and an action plan to reduce it already demonstrates the willingness of Sussex's elected officials and municipal leaders to do their part in the protection of air quality and the environment !*

Communities across Canada are facing the effects of climate change. Some have to deal with greater droughts, others with more violent storms. For example, shorter and warmer winters accentuate coastal erosion and damage to infrastructure, which is less well protected due to loss of coastal ice. Such repercussions will cost municipalities and their communities millions of dollars and the implementation of adaptation and mitigation measures in and for communities seems inevitable today. Municipal governments have a leading role to play in climate protection. They have direct or indirect control over nearly half of Canada's greenhouse gas (GHG) emissions (350 million tons).

**Canada's goal is to reduce its GHG emissions by 30% below 2005 levels under the Paris Agreement.**



## I. INTRODUCTION

### B. UMNb CCEI & PPC

**CLIMATE CHANGE AND ENERGY INITIATIVE (CCEI)** - Municipalities in New Brunswick are increasingly aware of environmental challenges they face, and are particularly concerned with actual and future impacts of climate change. The Town of Sussex joined the Climate Change and Energy Initiative of the Union of Municipalities of New Brunswick, to reinforce its efforts to advance in the Partners for Climate Protection program (PCP). The UMNb initiative fits perfectly in the global and national context of addressing climate change, following the Paris Agreement (COP 21).

The UMNb CCEI aims to offer support to members to realize their corporate and community GHG inventories and Local Action Plan, as well as integrate the QUEST Community Energy Planning approach.

**THE PARTNERS FOR CLIMATE PROTECTION (PCP) PROGRAM** is a network of Canadian municipal governments that have committed to reducing greenhouse gases (GHG) and to acting on climate change. Since the program's inception in 1994, over 300 municipalities have joined PCP, making a public commitment to reduce emissions. PCP membership covers all provinces and territories and accounts for more than 65 per cent of the Canadian population. PCP is the Canadian component of ICLEI's Cities for Climate Protection (CCP) network, which involves more than 1,100 communities worldwide. PCP is a partnership between the **Federation of Canadian Municipalities (FCM) and ICLEI** — Local Governments for Sustainability.

As a member of UMNb, the Town of Sussex has agreed to participate in CCEI.

*Link to: [ACTION-GHG Sussex](#)*



## I. INTRODUCTION

### C. PARTNERS FOR CLIMATE PROTECTION PROGRAM (PCP) - METHOD

**UMNB CCEI** allows participating municipalities to complete the first 3 steps of the Partners for Climate Protection (PCP) program. Steps 4 and 5 consist of the implementation of action plans and the monitoring and reporting of results.



#### **MILESTONE 1 CREATING A GREENHOUSE GAS EMISSIONS INVENTORY AND FORECAST**

A greenhouse gas inventory brings together data on community and municipal energy use and solid waste generation in order to estimate greenhouse gas (GHG) emissions in a given year. The forecast projects future emissions based on assumptions about population, economic growth and fuel mix.



#### **MILESTONE 2 SETTING AN EMISSIONS REDUCTIONS TARGET**

An emissions reduction target can be established at any time. The target is normally set, however, following the development of an emissions inventory and forecast or after the quantification of existing emissions reduction measures.



#### **MILESTONE 3 DEVELOPING A LOCAL ACTION PLAN**

A Local Action Plan (LAP) is a strategic document that outlines how your municipality will achieve its greenhouse gas (GHG) emissions reduction target. The LAP covers municipal operations and the community.

## II. STRATEGY

### A. UMNb - CCEI OBJECTIVE AND STRATEGY

#### UMNB CCEI aims to design and implement projects:

- ✓ Which will be examples and role models for New Brunswick and other communities in Canada;
- ✓ Which will improve the quality of life of communities and can guarantee a better environment and economic benefits (energy savings, income, job creation);
- ✓ Which will develop expertise for UMNb members and for New Brunswick.

#### The strategy is based on the following principles:

1. Build an action plan and portfolio of environmentally and economically successful projects;
2. Design model and innovative projects;
3. Set ambitious and achievable reduction targets;
4. Build on existing programs and funds: for example, FCM and GMF programs, Environmental Trust Fund, NB Power programs, etc. ;
5. Maximize benefits for participating municipalities, their region.

## II. STRATEGY

### B. GHG EMISSION REDUCTION TARGET

For PCP and GMF, the GHG emission reduction targets of participating municipalities are set on a voluntary and non-binding basis. It is important that the targets are ambitious while being realistic both in their importance (projected reductions) and in their duration (year of maturity).

**Before setting the reduction targets and the action plan timeline, we took into account:**

- PCP and GMF recommendations.
- The objectives of the Government of New Brunswick.
- The GHG reduction potential of the municipality and its community.

**The PCP and GMF make the following recommendations:**

- For **the Corporate component**, that is, the municipality itself, the recommended target is -20% over the reference year, within 10 years. Thus, if the reference year is 2015, the year of maturity will be 2025.
- For the **Community component**, that is to say citizens, businesses, etc., the recommended target is -6% over the base year, within 10 years.

**\* The New Brunswick's Climate Change Action Plan "Transitioning to a Low-Carbon Economy" (2017) - The provincial government will:** 31 - Establish specific GHG emission targets for 2020, 2030 and 2050 that reflect a total output of:  
a - 14.8 Mt by 2020;  
b - 10.7 Mt by 2030; and  
c - 5 Mt by 2050.



## III. TOWN PROFILE

### Profile of the municipality and its geographical context

The Town of Sussex is located in the Kennebecasis River Valley in Kings County, southern New Brunswick. The Town is 81 km southwest of Moncton and 75 km northwest of St. John. The town has a complex territory, bordering the parish of Sussex to the north, Sussex Corner to the east, the parish of Sussex in the south and Studholm in the west.

### Municipal composition

- 1 mayor and 7 general councillors
- 30 full time employees

### Municipal infrastructures

- 26 buildings, lighting, water and sewage
- 30 vehicles and motorized equipment

### Profile of the community

The population of Sussex in 2016 was 4,282 inhabitants spread over an area of 8.95 km<sup>2</sup>, a density of 478.3 hab./km<sup>2</sup>. It experienced a 0.7% population decrease from 2011 to 2016. The Municipality had 2,147 private dwellings in 2016, of which 1,988 were occupied by full time residents. 78% of the dwellings were built before 1991.

The official languages spoken by the population of Sussex are English at 98%, French at 1.5% and both official languages at 0.5%.

### In Sussex :

- Public Library
- Elementary School
- Middle School
- Regional High School
- Health Center
- Ambulance
- Fire Department
- Sport Centre
- Golf
- Curling Club
- Amphitheatre

## III. TOWN PROFILE

### CLIMATE CHANGE AND ENERGY INITIATIVE (CCEI)

Municipalities in New Brunswick are increasingly aware of environmental challenges they face, and are particularly concerned with actual and future impacts of climate change. The Town of Sussex joined the Climate Change and Energy Initiative of the Union of Municipalities of New Brunswick, to reinforce its efforts to advance in the Partners for Climate Protection Program (PCP).

The UMNb initiative fits perfectly in the global and national context of addressing climate change, following the Paris Agreement (COP 21).

The UMNb CCEI aims to offer support to members to realize their corporate and community GHG inventories and Local Action Plan, as well as integrate the QUEST Community Energy Planning approach.

The Town of Sussex has one public electric charging station\* on its territory.

\*Listed by PlugShare (May 2018)

- Climate Change and Energy Initiative (CCEI) of the Union of Municipalities of New Brunswick, 2017
- Member – Partners for Climate Protection program, FCM, 2016
- The Greater Sussex –Hampton Region Economic Development Strategy, 2017

**CORPORATE GHG INVENTORY**

## IV. INVENTORY

The Town of Sussex has joined the Climate Change and Energy Initiatives Program by commissioning UMNb and YHC Environnement to develop an inventory of its GHG emissions that will be used to develop an action plan that includes a suite of measures to control and reduce GHG emissions from their sources.

Sussex emissions inventory consists of two separate components. The first is emissions from the activities of the municipal administration (the Corporate) and the second covers the entire territory of the Municipality (the Community).

This document covers the Greenhouse Gas Emission Inventory for the 2015 reference year of the Corporate Component of the Town of Sussex. The relevant additional elements are detailed in the appendices.

## IV. INVENTORY

### A. SUMMARY

The corporate component consists of five emission sectors which, in Sussex's case, are responsible for approximately 1 052 tons of CO<sub>2</sub> equivalent. The two largest corporate GHG emission sectors are buildings and water and sewage. The former produce 35.0% of corporate GHGs, the latter generate 34.5%. Vehicle fleet is responsible for 15.4% of the Municipality's emissions, streetlights 12.8% and finally 2.3% of emissions are attributed to municipal waste.

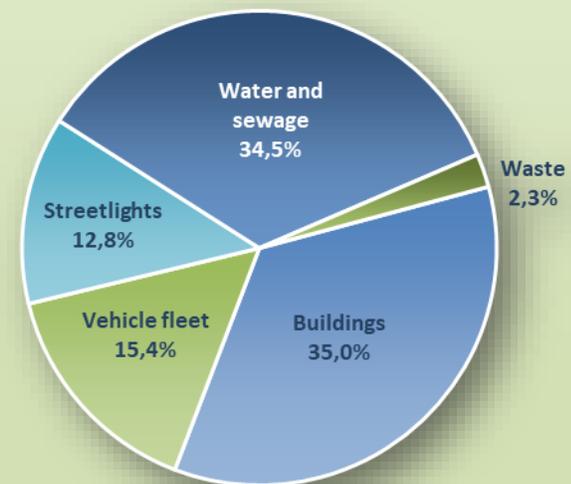
TABLE 1 :

CORPORATE GHG EMISSIONS FOR THE BASE YEAR

GHG (tons eCO <sub>2</sub> )	2015
Buildings	368
Vehicle fleet	162
Streetlights	135
Water and sewage	363
Waste	24
<b>Total</b>	<b>1 052</b>
Population	4 282
GHG per capita (teCO <sub>2</sub> )	0,2

GRAPH 1 :

CORPORATE GHG EMISSIONS BREAKDOWN BY SECTOR (teCO<sub>2</sub>)



## IV. INVENTORY

### A. SUMMARY (continued)

In 2015, the energy consumption of the various corporate activities of the Municipality was the source of 1 028.4 tons of emissions (CO<sub>2</sub> equivalent). For its energy needs, Sussex uses electricity and propane for heating and two types of fuels for vehicles. Electricity and propane are devoted to the energy demand of buildings and other infrastructure. Gasoline and diesel are used by the fleet of vehicles and various equipment and tools of the municipal administration.

**TABLE 2 : CORPORATE GHG EMISSIONS AND ENERGY CONSUMPTION BY TYPE**

Energy	2015		(teCO <sub>2</sub> )	%	(Gj)	%
	Volume	Units				
Electricity	3 075 664	kWh	861,2	83,7%	11 072,4	82,1%
Natural Gas	0	m <sup>3</sup>	0,0	0,0%	0,0	0,0%
CNG	0	Liters	0,0	0,0%	0,0	0,0%
Diesel	43 375	Liters	116,4	11,3%	1 661,3	12,3%
Gasoline	17 122	Liters	41,8	4,1%	599,3	4,4%
District Energy	0	Gj	0,0	0,0%	0,0	0,0%
Ethanol Blend (10%)	0	Liters	0,0	0,0%	0,0	0,0%
Biodiesel	0	Liters	0,0	0,0%	0,0	0,0%
Fuel Oil	0	Liters	0,0	0,0%	0,0	0,0%
Propane	5 837	Liters	9,0	0,9%	147,7	1,1%
Waste	-	-	-	-	-	-
<b>Total</b>			<b>1 028,4</b>		<b>13 480,7</b>	

## IV. INVENTORY

### B. CORPORATE EMISSIONS FORECAST

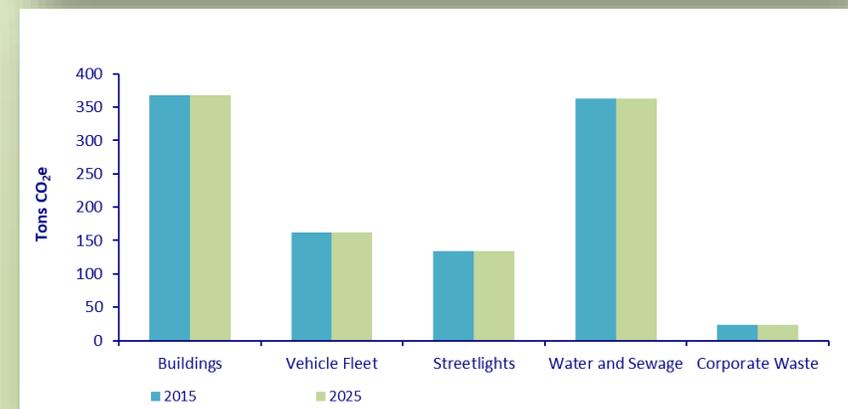
The corporate inventory of GHG emissions is only valid for the reference year. The forecast emissions seek to show how inventory emissions will evolve at the end of the action plan (2025), based on a business as usual scenario (BAU), i.e. without any direct intervention from the decision makers. Factors such as demographic change or economic conditions are taken into account in determining future levels of current emissions.

For Sussex the business as usual scenario anticipates that, apart from the present action plan reduction, the level of the corporate GHG emissions will remain stable.

**TABLE 3 :**

**CORPORATE EMISSIONS FORECAST BY SECTOR**

	Current emissions	% Change Expected**	Emissions in Forecast year
Buildings	367,9	0,0%	367,9
Vehicle Fleet	162,5	0,0%	162,5
Streetlights	134,6	0,0%	134,6
Water and Sewage	363,3	0,0%	363,3
Corporate Waste	24,1	0,0%	24,1
<b>Émissions total (t CO<sub>2</sub>e)</b>	<b>1052,4</b>		<b>1052,4</b>



## IV. INVENTORY

### B. CORPORATE EMISSIONS FORECAST (continued)

The portrait of the corporate inventory of GHG emissions is only valid for the reference year. The projected emissions, seek to present how inventory emissions will evolve at the end of the action plan (2025), based on a business as usual scenario, i.e. without any direct intervention of the decision-makers. Factors such as demographic change or economic conditions are taken into account in determining future levels of current emissions.

For Sussex, the business as usual scenario anticipates that, apart from the present action plan reduction, the level of the corporate GHG emissions will remain stable. This action plan, at its end, is expected to bring them down by 33% (Graph 2).

**TABLE 4 :**  
**CORPORATE INFORMATION**

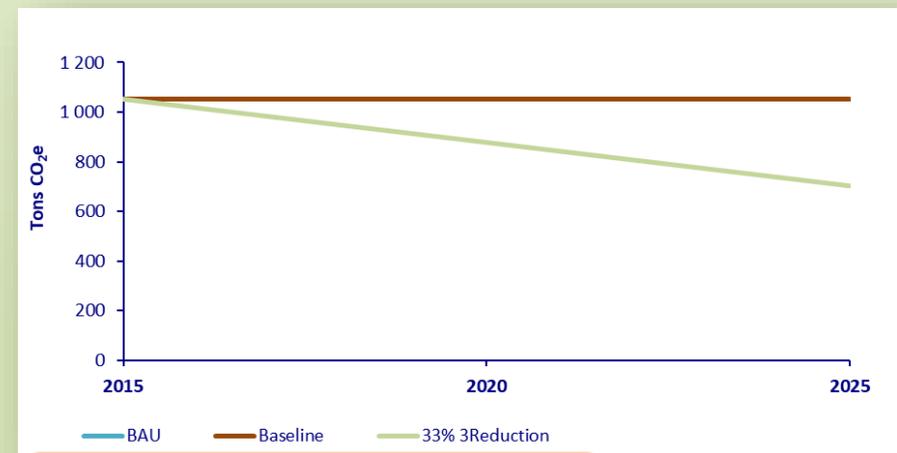
<b>Base Year</b>	<b>2015</b>
<b>Forecast Year*</b>	<b>2025</b>
<b>Reduction Target by Forecast Year* (%)</b>	<b>33,0%</b>

Baseline: 2015 (Base year)

BAU: Business as usual scenario forecast (when BAU scenario predicts no change in GHG emissions, it equals to Baseline)

2025: Action Plan deadline

**GRAPH 2 :**  
**FORECAST OF CORPORATE GHG EMISSIONS UNTIL 2025**



**GHG ACTION PLAN**

#### A. STRATEGY FOR GHG REDUCTION AND PROJECT SELECTION

##### Corporate Action Plan

As noted in Section II - Strategy, for PCP and GMF, the GHG emission reduction targets of participating municipalities are set on a voluntary and non-binding basis.

Taking into account the context of the Municipality, the corporate plan proposes the achievement of a target of 33% reductions in GHG emissions for 2025 according to the reference year 2015.

TABLE 5 :  
OBJECTIVES AND YEAR

##### Objectives and year set by Sussex:

##### Corporate Action plan :

- Reduction Target: 33%
- Base year : 2015
- Forecast year : 2025

## V. ACTION PLAN

### A. STRATEGY FOR GHG REDUCTION AND PROJECT SELECTION

#### Guiding Principles

The approach behind the development of the Town of Sussex's Action Plan as part of UMNb's CCEI is to develop an action plan that includes projects which :

**1) Improve the quality of life of communities (better environment and savings)**

- ✓ Improve the quality of life of communities (better environment and savings) ;
- ✓ Generate GHG emission reductions that meet the goals and needs of the community ;
- ✓ Allow as much as possible to generate energy savings that guarantee the sustainability of the actions of the Municipality and its community.

**2) Use community resources to develop the expertise of UMNb and New Brunswick members**

- ✓ Optimize the use of community resources and know-how to maximize socio-economic benefits;
- ✓ Help develop local and regional expertise to increase the knowledge of communities and New Brunswick..

**3) Will become examples and models for New Brunswick and other communities in Canada**

- ✓ The projects must enable UMNb member municipalities to stand out/take leadership, to respond to challenges of climate change for New Brunswick communities, to protect the environment, improve the quality of life, and become role models for action and resilience.



### A. STRATEGY FOR GHG REDUCTION AND PROJECT SELECTION

#### Global Approach

##### «GOOD PRACTICE» PROJECTS

The action plan prioritises projects considered as "good practices". These projects correspond to the application of, for example, measures and technologies supported by the programs of New Brunswick Power, the Government of New Brunswick or Canada.

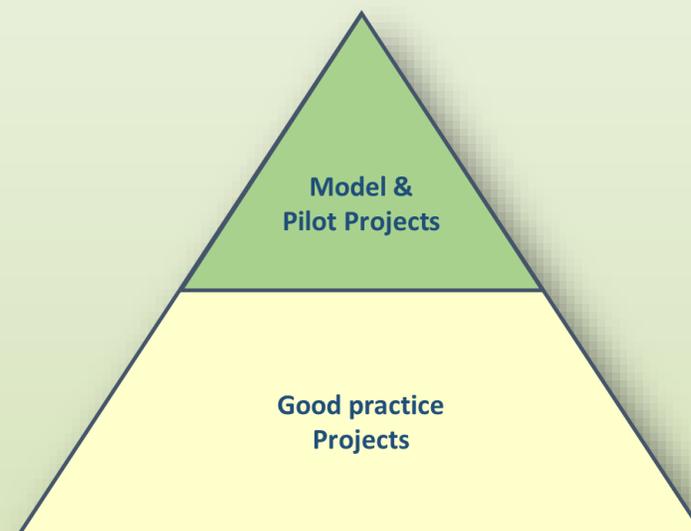
✓ These "Good Practice" projects form the basis of the Action Plan.

##### MODEL PROJECTS & UMNb PILOT PROJECTS

As part of UMNb's CCEI, the action plan also proposes to municipalities two types of model projects & pilot projects :

1. **Transport electrification & EV integration in the community**
2. **EV & Carsharing – SAUV<sup>ÉR</sup>\* (Group Project)**

\* SAUV<sup>ÉR</sup> concept is a fleet management and carsharing system for municipalities, organizations and companies. Its objectives are both to protect the environment and to create a synergy using regional municipalities to develop innovative technologies and services to create and support local expertise and services and enhance regional development.



### B. REFERENCE LEVEL AND TARGET

The goal of the Town of Sussex’s Corporate Action Plan is to reduce greenhouse gas emissions by 33% by 2025 from their 2015 baseline. For Sussex, the emissions calculated for the year 2015 allow us to estimate the reductions required to reach the target set by the Municipality's action plan to approximately 347 tons or 33%.

**TABLE 6 :**  
**BASELINE AND TARGET**

	Year	
	Base	forecast
Tons of CO <sub>2</sub> equivalent	2015	2025
1 Current Emissions	1 052	
2 Reduction Target		33%
3 Forecast emissions (target) (line 1- line 4)		705
4 Total reductions to be achieved (line 1- line 3)		347

33%



### C. ANALYSIS OF THE PROJECTED RESULTS OF THE ACTION PLAN

Achieving of the objective of Sussex’s Action Plan would mean that the level of corporate GHG emissions for the year 2025 be at 702.1 tons of eq. CO<sub>2</sub>. This is a decrease of 350.3 tons from the 2015 emissions level of 1 052.4 tons of eq. CO<sub>2</sub>. This represents a potential reduction of 33.3%, which is 0.3 percentage points above the target of 33% and 3.0 tons more than the targeted reduction of 347 tons (see Table 6).

**TABLE 7 :**  
**ANALYSIS OF THE OUTCOME OF THE ACTION PLAN**

	Total reductions	
	eCO <sub>2</sub> (t)	%
1 Current Emissions (Base year)	1 052,4	100,0%
2 Early action results	298,4	28,3%
3 Expected reductions in the Action Plan	51,9	4,9%
4 Total Reductions (line 2 + line 3)	350,3	33,3%
5 Level of anticipated emissions (forecast year) (line 1 - line 4)	702,1	66,7%
6 Gap with the target	3,0	0,3%

## V. ACTION PLAN

### D. PROJECT PORTFOLIO – EARLY ACTIONS

Some projects have been completed or initiated by the Town of Sussex between the reference year of the inventory (2015) and the year of adoption of the action plan presented (2018). These early actions have contributed to the municipality's effort to reduce corporate GHG emissions.

The action plan identified the completion of six (6) projects whose estimated reductions were estimated at 298.4 tons of CO<sub>2</sub> equivalent.

**TABLE 8 : PROJECT PROJECTS COMPLETED PRIOR TO THE ADOPTION OF THE ACTION PLAN (EARLY ACTIONS)**

Projects (Measures, Actions, Technologies)		Total GHG reductions (tons)
<b>Buildings</b>		<b>40,9</b>
1	EA1 Buildings (2 buildings) Energy Efficiency (Electricity)	0,8
2	EA2 Buildings (Fire Station) Energy Efficiency (Electricity)	40,2
<b>Vehicle Fleet</b>		<b>5,0</b>
3	EA3 Clean Vehicle (Hybrid Vehicle) Number of vehicles : 1	0,6
4	EA4 Vehicle removal Number of vehicles : 1	4,4
<b>Streetlights</b>		<b>70,7</b>
5	EA5 Streetlight replacement Number of bulbs : 819	70,7
<b>Water and Sewage</b>		<b>181,7</b>
6	EA6 Water and Sewage Aeration Upgrade	181,7
<b>TOTAL</b>		<b>298,4</b>



### D. PROJECT PORTFOLIO – EARLY ACTIONS

#### 1. Buildings (2 buildings) - Energy Efficiency (Electricity) (Early Action)

In 2016 & 2017, Train Station and Art & Culture Centre are equipped with cooling/heating capable mini-splits. Because they do not produce heat but only moving it, mini-splits are more efficient than other conventional home heating technologies. The same reason explains why their performance varies according to the temperature.

Minimum target for overall energy savings: 2.1%



Buildings (2 buildings)		Base year : 2015
1	Electricity used per year	131 045 kWh
2	Cost of electricity per year	14 725 \$
3	GHG emissions from electric consumption	37 eCO <sub>2</sub> (t)
4	Electricity saving (estimated)	2,11 %
5	Electricity reduction per year (kWh)	2 763 kWh
6	GHG emissions reduction (tons)	0,77 eCO <sub>2</sub> (t)
7	Annual savings	311 \$
8	Program length (action plan deadline : 2025)	8 Years
9	Project's lifespan benefit	2 484 \$
10	Annual savings (\$ / ton GHG)	401 \$ / eCO <sub>2</sub> (t)

### D. PROJECT PORTFOLIO – EARLY ACTIONS

#### 2. Buildings (Fire Station) - Energy Efficiency (Electricity) (Early Action)

The Heating System of the Fire Station is retrofitted. A heat pump is installed in 2017. Because they do not produce heat but only moving it, mini-splits are more efficient than other conventional home heating technologies.

Minimum target for overall energy savings: 72%

Buildings (Fire Station)		Base year : 2015	
1	Electricity used (base year)	199 110	kWh
2	Cost of electricity (base year)	22 117	\$
3	GHG emissions from electric consumption (Base Year)	56	eCO <sub>2</sub> (t)
4	Electricity consumption (After retrofit)	55 652	kWh
5	Electricity saving (estimated)	72,0	%
6	GHG emissions reduction (tons)	40,17	eCO <sub>2</sub> (t)
7	Annual savings	15 935	\$
8	Program length (action plan deadline : 2025)	8	Years

## V. ACTION PLAN

### D. PROJECT PORTFOLIO – EARLY ACTIONS

#### 3. Transportation - Clean Vehicle (Hybrid Vehicle) (Early Action)

Clean vehicle purchase policy is that when the vehicles are to be replaced, the municipality evaluates the possibility of choosing a model smaller than the vehicle currently used.

Note : Cumulative effects of other projects are not considered (ex. Vehicle replacement policy).



More compact cars		Base year : 2015
1	Number of targeted units	1
2	Fuel type	Gasoline
3	Fuel consumption	940 liters
4	Fuel savings per year (liters)	240 liters
5	Fuel savings per year (\$)	129 \$
6	GHG emissions reduction (tons)	0,58 eCO <sub>2</sub> (t)
7	GHG emissions reduction (%)	25,5 %
8	Lifetime	10 years
9	Project's lifespan benefit	1 289 liters
10	Savings (\$ / ton GHG)	220 / t eCO <sub>2</sub>

D. PROJECT PORTFOLIO – EARLY ACTIONS

4. Transportation - Vehicle removal (Early Action)

The Town of Sussex has removed an unnecessary vehicle from its fleet.

Note : Cumulative effects of other projects are not considered (ex. Vehicle replacement policy).



More compact cars		Base year : 2015
1 Number of targeted units		1
2 Fuel type		Diesel
3 Fuel consumption		1 654 liters
4 Fuel savings per year (liters)		1 654 liters
5 Fuel savings per year (\$)		947 \$
6 GHG emissions reduction (tons)		4,44 eCO <sub>2</sub> (t)
7 GHG emissions reduction (%)		100,0 %

### D. PROJECT PORTFOLIO – EARLY ACTIONS

#### 5. Streetlights - Streetlight Replacement (Early Action)

"Early actions" are those initiated or carried out between the base year of the inventory (2015) and the year of adoption of the action plan (2017). The Town of Sussex has carried out a number of early measures, actions and realizations. The action plan we are currently working on cannot integrate them all because their positive impact is already pointed out in the 2015 inventory.

NB Power's LED streetlight replacement project is designed to save money and reduce the utility's carbon footprint. LED uses approximately 50-60% less energy compared to HPS street lights. LED technology is more reliable with a much longer life span compared to the current HPS bulbs (20 year design life vs. 6 years for HPS bulbs), so they require less maintenance, making them more economical to operate.

The LED lights NB Power is using are International Dark Sky compliant, which reduce light pollution into the homes of New Brunswickers. These LEDs produce a whiter light, resulting in better colour rendition and consistent light across the roadway. In 2016, the LED replacement has been extended to all the remaining streetlights and decorative lighting to LEDs.

Streetlight replacement		Base year : 2015
1	Electricity consumption of non-LED lightings	459 164 kWh
2	Electricity Cost (non-LED lighting)	158 972 \$
3	GHG emissions (non-LED lighting)	128,60 eCO <sub>2</sub> (t)
4	Efficiency gains after conversion	55 %
5	Consumption after conversion	206 624 kWh
6	Energy savings due to conversion	252 540 kWh
7	Savings due to conversion	n/a \$
8	Reduction of GHG emissions after conversion	70,7 eCO <sub>2</sub> (t)

### D. PROJECT PORTFOLIO – EARLY ACTIONS

#### 6. Water and Sewage - Aeration Upgrade (Early Action)

The Wastewater Lagoon Aeration System Upgrade project is completed in 2017.

Financed by Infrastructure of Canada, this \$ 2,2 M project has improved energy efficiency of the facility by 50%.

Water and Sewage		Base year : 2015	
1	Electricity used per year	592 320	kWh
2	Cost of electricity per year	149 222	\$
3	GHG emissions from electric consumption	363,3	eCO <sub>2</sub> (t)
4	Electricity saving (estimated)	50	%
5	Electricity reduction per year (kWh)	296 160	kWh
6	GHG emissions reduction (tons)	181,66	eCO <sub>2</sub> (t)
7	Annual savings	74 611	\$
8	Program length (action plan deadline : 2025)	8	Years
9	Project's lifespan benefit	596 887	\$
10	Annual savings (\$ / ton GHG)	411	\$ / eCO <sub>2</sub> (t)

## V. ACTION PLAN

### D. PROJECT PORTFOLIO

The most recent measures, technologies and programs have been analyzed and evaluated. They form the basis of the action plans produced by YHC Environnement. Then, based on the 2015 inventory data, as well as the characteristics and needs of the Town of Sussex, the development of the Project Portfolio was completed.

The action plan contains five (5) projects whose potential reductions are estimated at 51.9 tons of CO<sub>2</sub> equivalent (see Table 9).



### D. PROJECT PORTFOLIO

TABLE 9 : CORPORATE PROJECT PORTFOLIO

Projects (Measures, Actions, Technologies)	Total GHG reductions (tons)
<b>Buildings</b>	27,0
1 B1 Buildings (5 buildings) Energy Efficiency (Electricity)	27,0
<b>Vehicle Fleet</b>	24,9
2 VF1 Gradual Fleet Renewal Policy Number of vehicles : 15	3,3
3 VF2 Clean Vehicle Purchase Policy Number of vehicles : 2	1,7
4 VF3 Idle-free Policy Number of vehicles : 29	15,5
5 VF4 Electric Vehicle Car Sharing System Number of vehicles : 1	4,4
<b>Streetlights</b>	0,0
<b>Water and Sewage</b>	0,0
<b>Corporate Waste</b>	0,0
<b>TOTAL</b>	51,9

### D. PROJECT PORTFOLIO

#### 1. Buildings (5 buildings) - Energy Efficiency (Electricity)

The Town of Sussex plans to implement a number of energy conservation measures at five buildings:

- Upgrade the lighting System to LED
- Upgrade the Energy Management Control System (ECMS)
- Energy Optimization
- Install Heat Pump System
- Replace existing boilers with high efficiency heating system
- Increase the building envelop performance
- Replace old thermostats with programmable thermostats

Minimum target for overall energy savings : 10%.



Buildings (5 buildings)		Base year : 2015
1	Electricity used per year	964 920 kWh
2	Cost of electricity per year	132 069 \$
3	GHG emissions from electric consumption	270,18 eCO <sub>2</sub> (t)
4	Electricity saving (estimated)	10 %
5	Electricity reduction per year (kWh)	96 492 kWh
6	GHG emissions reduction (tons)	27,02 eCO <sub>2</sub> (t)
7	Annual savings	13 207 \$
8	Program length (action plan deadline : 2025)	8 Years
9	Project's lifespan benefit	105 655 \$
10	Annual savings (\$ / ton GHG)	489 \$ / eCO <sub>2</sub> (t)

### D. PROJECT PORTFOLIO

#### 2. Transportation - Gradual Fleet Renewal Policy

The vehicle replacement policy of the municipality is as follows:

- Fire trucks: after 25 years
- Heavy machinery: after 12 to 15 years
- Heavy trucks: after 8 to 10 years
- Trucks and light vehicles: after 10 years

Thus, at the end of this action plan (2015-2025), almost all of the corporate fleet will be replaced. In addition, the Town plans to reduce its fleet to make it more efficient.

Note : Cumulative effects of other projects are not considered (ex. Idle free policy).

Gradual Fleet Renewal Policy	Base year : 2015	
	Gasoline	Diesel
1 Number of vehicles	7	20
2 Fuel consumption	13 317 liters	43 375 liters
3 Fuel cost	7 160 \$	24 842 \$
4 GHG emissions	32,49 eCO <sub>2</sub> (t)	87,30 eCO <sub>2</sub> (t)
5 Number of vehicles to be replaced	3	12
6 Average efficiency gains due to renewal of fleet	5%	5%
7 Reduction of GHG emissions after conversion	0,70 eCO <sub>2</sub> (t)	2,62 eCO <sub>2</sub> (t)
<b>8 Total Reductions in GHG Emissions</b>	<b>3,32 eCO<sub>2</sub> (t)</b>	

D. PROJECT PORTFOLIO

3. Transportation - Clean Vehicle Purchase Policy

Clean vehicle purchase policy is that when the vehicles are to be replaced, the municipality evaluates the possibility of choosing a model smaller than the vehicle currently used.

Note : Cumulative effects of other projects are not considered (ex. Vehicle replacement policy).

More compact cars		Base year : 2015
1	Number of targeted units	2
2	Fuel type	Gasoline
3	Fuel consumption	3 728 liters
4	Fuel savings per year (liters)	678 liters
5	Fuel savings per year (\$)	364 \$
6	GHG emissions reduction (tons)	1,65 eCO <sub>2</sub> (t)
7	GHG emissions reduction (%)	18,2 %
8	Lifetime	10 years
9	Project's lifespan benefit	3 643 liters
10	Savings (\$ / ton GHG)	220 / t eCO <sub>2</sub>



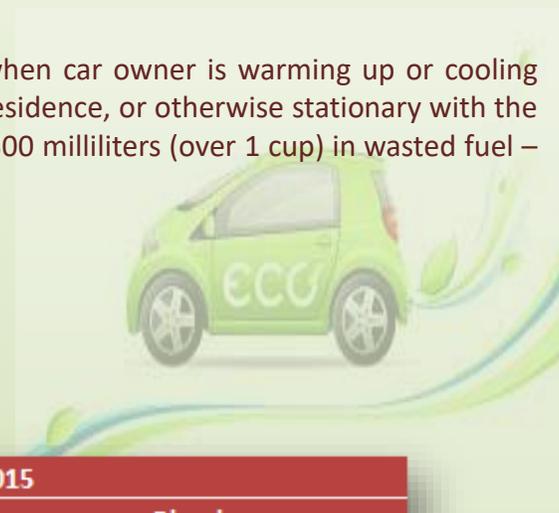
## V. ACTION PLAN

### D. PROJECT PORTFOLIO

#### 4. Transportation - Idle-free Policy

Idling refers to running a vehicle's engine when the vehicle is not in motion. Idling occurs when car owner is warming up or cooling down a vehicle, drivers are stopped at a red light, waiting while parked outside a business or residence, or otherwise stationary with the engine running. For the average vehicle with a 3-litre engine, every 10 minutes of idling costs 300 milliliters (over 1 cup) in wasted fuel – and one half of a liter (over 2 cups) if your vehicle has a 5-liters engine.

- For a successful anti-idling campaign includes
- the adoption of a speed reduction regulation
  - carrying out an awareness-raising campaign
  - the acquisition and installation of permanent signs



Idle-free Policy	Base year : 2015	
	Gasoline	Diesel
1 Number of units	9	20
2 Fuel consumption	17 122 liters	43 375 liters
3 Fuel cost	9 206 \$	24 842 \$
4 GHG emissions	41,77 eCO <sub>2</sub> (t)	116,39 eCO <sub>2</sub> (t)
5 Average fuel wasted idling	1 223 liters	4 659 liters
6 Average fuel economy	7%	11%
7 GHG emissions reduction	2,98 eCO <sub>2</sub> (t)	12,50 eCO <sub>2</sub> (t)
8 Fuel savings (\$)	658 \$	1 774 \$
<b>9 Total GHG Emissions reduction</b>	<b>15,49 eCO<sub>2</sub> (t)</b>	
10 Total fuel savings (\$)	2 432 \$	
11 Saving per ton of GHG reduced	157 / t eCO <sub>2</sub>	

D. PROJECT PORTFOLIO

5. Transportation - Electric Vehicle Car Sharing System

**Electric cars** use electrical energy to power an electric motor, they also reduce society's dependence on environmentally damaging fossil fuels while lowering greenhouse gas emissions and air pollution. Electric cars are cost effective, good for the environment and deliver great performance.

**Car-sharing :**  
Optimizes vehicle usage and improves fleet administration. Depending on the situation, the best fit vehicle for the task is used regardless of the department the vehicle is assigned to. Sharing EV among all corporate departments increases the use of this car which has zero GHG emissions and less operational and energy costs.

Chevrolet Spark (2015) versus Chevrolet Silverado (2011)		Base year : 2015	
1	Total kilometers travelled	15 244	km
2	Internal users		km
3	External users		km
4	Number of targeted units	1,0	
5	Energy saved per year (Gj and \$)*	64,9	1855,2
6	GHG emissions reduction (tons and %)	4,4	0,9
7	Economy (cost) of MAT implementation	n/d	
8	Lifetime	10	years
9	Project's lifespan benefit	18 552	\$
10	Savings (\$ / ton GHG)	417,2	/ t eCO2



VI. APPENDIX

The methodology and references are available on request.

