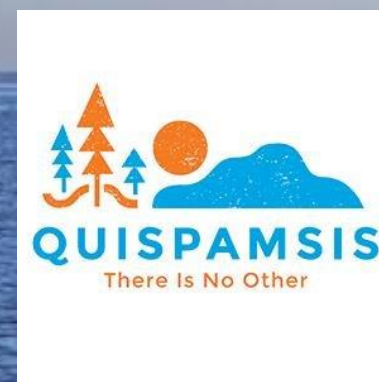


# Quispamsis's Corporate GHG Inventory & Action Plan



Realised with the



## Climate Change and Energy Initiative

June 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 Quispamsis'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.

**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 Quispamsis 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 Quispamsis has agreed to participate in CCEI.**

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

## 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.



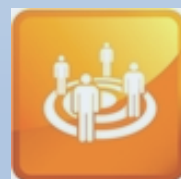
#### **MILESTONE 1 CREATING A GREENHOUSE GAS EMISSIONS INVENTORY AND FORECAST**

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 Quispamsis is located in the Kennebecasis Valley in southwestern New Brunswick, 22 km north of the City of Saint John. Quispamsis is located on the banks of the Kennebecasis and Hammond rivers and has a lake, Ritchie Lake, in the city center. The Town of Sussex is 45 minutes away and Moncton and Fredericton are 1 hour 30 minutes from Quispamsis.

### Municipal composition

- 1 mayor and 7 general councillors
- 87 full time employees and seasonal staff

### Municipal infrastructures

- 61 buildings, lighting, water and sewage
- 81 vehicles and motorized equipment

### Profile of the community

The population of Quispamsis in 2016 was 18,245 inhabitants spread over an area of 57.21 km<sup>2</sup>, a density of 318.9 hab./km<sup>2</sup>. It grew by 1.7% from 2011 to 2016. The Municipality had 6,596 private dwellings in 2016, of which 6,455 were occupied by full time residents. 57% of dwellings were built before 1991.

The official language spoken by the population of Quispamsis is English at 95%, French at 4% and both official languages at 1%.

### In Quispamsis :

- Elementary School
- Middle School
- High School
- Ambulance
- Public Transit
- Public Safety
- Arena
- Sports Fields
- Fire Department
- Public Parks

## 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 Quispamsis 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 Quispamsis has two public electric charging stations\* on its territory.

\*Listed by PlugShare (June 2018)

- Climate Change and Energy Initiative (CCEI) of the Union of Municipalities of New Brunswick, 2017
- Member – Partners for Climate Protection program, FCM since 1994
- Partners for Climate Protection, Milestone 1, Corporate and Community Greenhouse Gas Inventory, 2013
- Quispamsis, Municipal Plan, Draft By-law 054, 2017

IV. INVENTORY

**CORPORATE GHG INVENTORY**

## IV. INVENTORY

The Town of Quispamsis 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.

Quispamsis 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 Quispamsis. The relevant additional elements are detailed in the appendices.

## IV. INVENTORY

### A. Summary

The corporate component consists of five emission sectors which, in Quispamsis's case, are responsible for approximately 2 631 tons of CO<sub>2</sub> equivalent. The two largest corporate GHG emission sectors are buildings and vehicle fleet. The former produce 46.2% of corporate GHGs, the latter generate 27.7%. Water and sewage is responsible for 16.1% of the Municipality's emissions, waste 5.4% and finally 4.6% of emissions are attributed to municipal streetlights.

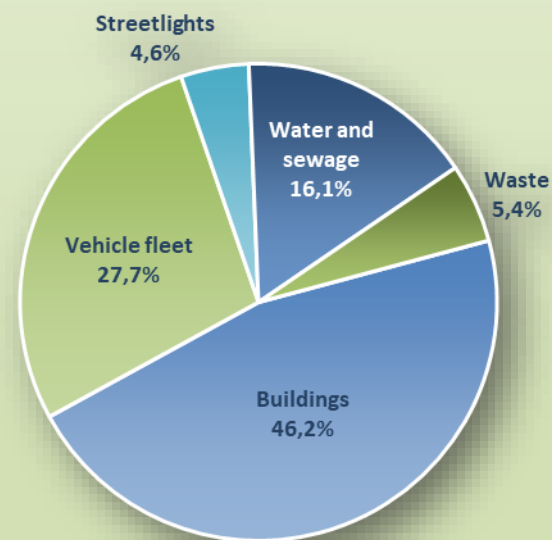
TABLE 1 :

CORPORATE GHG EMISSIONS FOR THE BASE YEAR

GHG (tons eCO <sub>2</sub> )	2015
Buildings	1 216
Vehicle fleet	729
Streetlights	121
Water and sewage	424
Waste	141
<b>Total</b>	<b>2 631</b>
Population	18 245
GHG per capita (teCO <sub>2</sub> )	0,1

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 2 489.9 tons of emissions (CO<sub>2</sub> equivalent). For its energy needs, Quispamsis 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. Diesel and gasoline 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		2015		2015	
	Volume	Units	(teCO <sub>2</sub> )	%	(Gj)	%
Electricity	6 146 434	kWh	1 721,0	69,1%	22 127,2	66,6%
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	150 014	Liters	402,6	16,2%	5 745,5	17,3%
Gasoline	133 789	Liters	326,4	13,1%	4 682,6	14,1%
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	25 873	Liters	39,9	1,6%	654,8	2,0%
Waste	-	-	-	-	-	-
<b>Total</b>			<b>2 489,9</b>		<b>2 923,2</b>	

## IV. INVENTORY

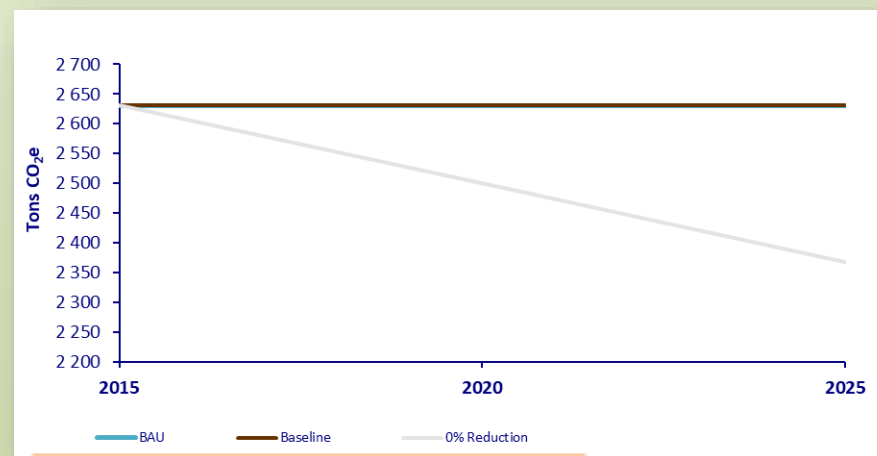
### B. Corporate Emissions Forecast

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, ie 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.

**TABLE 3 :**  
**CORPORATE INFORMATION**

<b>Base Year</b>	<b>2015</b>
<b>Forecast Year*</b>	<b>2025</b>
<b>Reduction Target by Forecast Year* (%)</b>	<b>12,0%</b>

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



**GHG ACTION PLAN**



## V. 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 12% reductions in GHG emissions for 2025 according to the reference year 2015.

TABLE 5 :  
OBJECTIVES AND YEAR

#### Objectives and year set by Quispamsis:

##### Corporate Action plan :

- Reduction Target : 12%
- 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 Quispamsis'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.

## V. ACTION PLAN

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

#### Global approach

#### «GOOD PRACTICE» PROJECTS

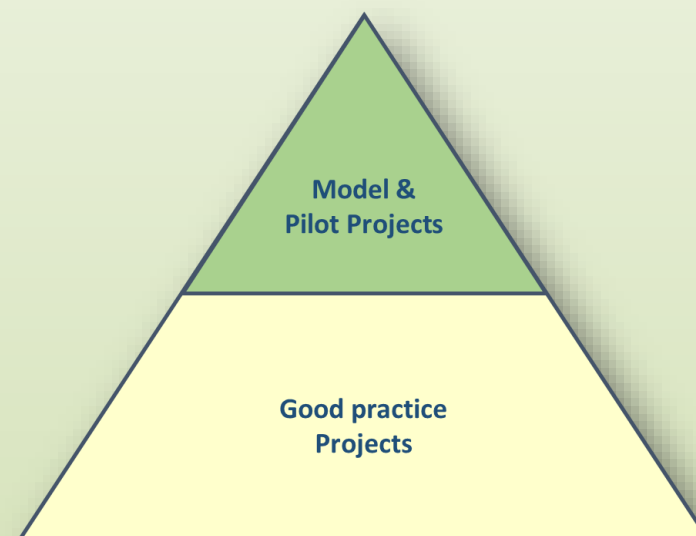
The action plan prioritises projects considered as "good practices". These projects correspond to the application of, for example, measures and technologies supported by the programs of New Brunswick Power, the Government of New Brunswick or Canada.

✓ 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>é</sup>R (Group Project)



## V. ACTION PLAN

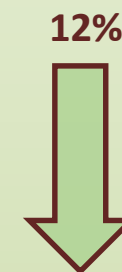
### B. REFERENCE LEVEL AND TARGET

The goal of the Town of Quispamsis’s Corporate Action Plan is to reduce greenhouse gas emissions by 12% by 2025 from their 2015 baseline.

For Quispamsis, 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 315.7 tons or 12%.

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

Tons of CO <sub>2</sub> equivalent	Year	
	Base 2015	forecast 2025
1 Current Emissions	2 631,2	
2 Reduction Target		12,0%
3 Forecast emissions (target) (line 1- line 4)		2 315,4
4 Total reductions to be achieved (line 1- line 3)		315,7



## V. ACTION PLAN

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

Achieving the objective of Quispamsis’s Action Plan would mean that the level of corporate GHG emissions for the year 2025 be at 2 311.5 tons of eq. CO<sub>2</sub>. This is a decrease of 319.6 tons from the 2015 emissions level of 2 631.2 tons of eq. CO<sub>2</sub>. This represents a potential reduction of 12.1%, which is 0.1 percentage points above the target of 12% and 3.9 tons more than the targeted reduction of 315.7 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)	2 631,2	100,0%
2 Early action results	91,0	3,5%
3 Expected reductions in the Action Plan	229,4	8,7%
4 Total Reductions (line 2 + line 3)	320,3	12,2%
5 Level of anticipated emissions (forecast year) (line 1 - line 4)	2 310,8	87,8%
6 Gap with the target	4,6	0,2%

## V. ACTION PLAN

### D. PROJECT PORTFOLIO – EARLY ACTIONS

Some projects have been completed or initiated by the Town of Quispamsis 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 four (4) projects whose estimated reductions were estimated at 91.0 tons of CO<sub>2</sub> equivalent.

TABLE 8 :

PROJECTS COMPLETED PRIOR TO THE ADOPTION OF THE ACTION PLAN (EARLY ACTIONS)

Projects (MAT)			Total GHG reductions (tons)
Buildings			-
Vehicle Fleet			27,5
1	EA	Fleet Renewal (Early Action)      Number of vehicles : 4	1,1
2	EA	Fleet Management (Early Action)      Number of vehicles : 3	25,7
3	EA	Hybrid Vehicle (Early Action)      Number of vehicles : 1	0,7
Streetlights			63,5
4	EA	Streetlight replacement	63,5
Water and Sewage			-
TOTAL			91,0

V. ACTION PLAN

D. PROJECT PORTFOLIO – EARLY ACTIONS

1. Transportation – Fleet Renewal (Early Action)

Between 2015 and 2018 four trucks are replaced. The new vehicles are added in 2017 and their fuel consumption is partial and undervalue their actual consumption. Savings have been estimated.

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

Fleet Renewal (Early Action)	Base year : 2015	
	Gasoline	Diesel
1 Number de vehicles replaced	3	1
2 Fuel consumption	6 417 liters	2 661 liters
3 Fuel cost	6 442 \$	2 867 \$
4 GHG emissions	15,65 eCO <sub>2</sub> (t)	7,14 eCO <sub>2</sub> (t)
5 Average efficiency gains due to renewal of fleet	5,0%	5,0%
6 Reduction of GHG emissions after conversion	0,78 eCO <sub>2</sub> (t)	0,36 eCO <sub>2</sub> (t)
7 Total Reductions in GHG Emissions	1,14 eCO <sub>2</sub> (t)	

V. ACTION PLAN

D. PROJECT PORTFOLIO – EARLY ACTIONS

2. Transportation – Fleet Management (Early Action)

Between 2015 and 2017 three vehicles are sold. No new vehicles have been added to the fleet in their replacement.

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



Fleet Management (Early Action)	Base year : 2015	
	Gasoline	Diesel
1 Number de vehicles replaced	0	3
2 Fuel consumption	0 liters	9 563 liters
3 Fuel cost	0 \$	10 303 \$
4 GHG emissions	0,00 eCO <sub>2</sub> (t)	25,66 eCO <sub>2</sub> (t)
5 Total Reductions in GHG Emissions	25,66 eCO <sub>2</sub> (t)	



## V. ACTION PLAN

### D. PROJECT PORTFOLIO – EARLY ACTIONS

#### 3. Transportation – Hybrid Vehicle (Early Action)

In 2017, Quispamsis has added a Chevrolet Volt to its fleet. 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.

There are two kinds of electric car:

- Fully Electric Cars are powered 100% by electricity and have zero tailpipe emissions. Fully electric cars can travel 200-400 km on a single charge.
- Plug-in Hybrid Electric Cars have small battery packs for short all-electric driving distances (20-80 km) before a gasoline engine or generator turns on for longer trips.

If a similar conventional vehicle was preferred, the same usage would cause more GHG emissions.

Chevrolet Cruze versus Chevrolet Volt (2017)			Base year : 2015	
1 Total kilometers travelled	8 000 km			
2 Number of targeted units	1			
3 Energy saved per year (Gj and \$)	10,59	314 \$		
4 GHG emissions reduction (tons and %)	0,71	51,7%		
5 Economy (cost) of MAT implementation	n/d			
6 Lifetime	10 years			
7 Project's lifespan benefit	3 140 \$			
8 Savings (\$ / ton GHG)	444 / t eCO2			

V. ACTION PLAN

D. PROJECT PORTFOLIO – EARLY ACTIONS

4. Streetlights – Streetlight replacement (Early Action)

NB Power and the Town of Quispamsis are undertaking the conversion of legacy street lighting to energy efficient, environmentally preferable, lower maintenance LED (light emitting diode) street lights. 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.

Streetlights		Base year : 2015
1	Total lighting consumption	412 132 kWh
2	Cost of electricity for lighting	126 112 \$
3	GHG emissions from lighting electric consumption	115,40 eCO <sub>2</sub> (t)
4	Efficiency gains after conversion	55%
5	Annual consumption after conversion	185 460 kWh
6	Annual energy savings due to conversion	226 673 kWh
7	Annual savings due to conversion	n/a \$
8	Reduction of GHG emissions after conversion	63,47 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 Quispamsis, the development of the Project Portfolio was completed.

The action plan contains nine (9) projects whose potential reductions are estimated at 229.4 tons of CO<sub>2</sub> equivalent (see Table 9).



V. ACTION PLAN

D. PROJECT PORTFOLIO

Project Portfolio Summary

TABLE 9 : CORPORATE PROJECT PORTFOLIO

Projects (MAT)			Total GHG reductions (tons)
<b>Buildings</b>			69,8
1	B1 Buildings (arenas, fire stations, recreational, ...)	Energy Efficiency (Electricity)	69,8
<b>Vehicle Fleet</b>			95,9
2	VF1 Gradual Fleet Renewal Policy	Number of vehicles : 41	16,3
3	VF2 Clean Vehicle Purchase Policy	Number of vehicles : 10	20,5
4	VF3 Idle-free Policy	Number of vehicles : 67	30,9
5	VF4 Telemetry & Idle-free Policy	Number of vehicles : 36	22,7
6	VF5 Electric Vehicle Car Sharing System	Number of vehicles : 2	2,5
7	VF6 Electric Vehicle	Number of vehicles : 1	3,1
<b>Streetlights</b>			-
8	SL1 Streetlight management		n/a
<b>Water and Sewage</b>			63,7
9	WS1 Water & Sewage	Energy Efficiency (Electricity)	63,7
<b>Corporate Waste</b>			-
<b>TOTAL</b>			229,4

## V. ACTION PLAN

### D. PROJECT PORTFOLIO

#### 1. Buildings (arenas, fire stations, recreational, ...) - Energy Efficiency (Electricity)

Town of Quispamsis plans to implement several energy conservation measures on its buildings and facilities (arenas and recreational facilities ; storages ; garages and fire stations)

- Upgrade the lighting System to LED
- Upgrade the Energy Management Control System (ECMS)
- Energy Optimization
- Install variable-frequency drive (VFD) where applicable
- Install High Efficiency Motors & Pumps where applicable
- Install Energy Meters
- Install VFD for the condenser Fans (Arenas)
- Install High Efficiency Motors for the Compressors (Arenas)
- Replace Chiller (Arenas)
- Replace Compressors (Arenas)
- Replace exiting boilers
- Upgrade the Heating System where applicable
- Increase the building envelop performance



Buildings (arenas, fire stations, recreational, ...)		Base year : 2015
1	Electricity used per year	1 662 031 kWh
2	Cost of electricity per year	188 016 \$
3	GHG emissions from electric consumption	465,37 eCO <sub>2</sub> (t)
4	Electricity saving (estimated)	15 %
5	Electricity reduction per year (kWh)	249 305 kWh
6	GHG emissions reduction (tons)	69,81 eCO <sub>2</sub> (t)
7	Annual savings	28 202 \$
8	Program length (action plan deadline : 2025)	8 Years
9	Project's lifespan benefit	225 619 \$
10	Annual savings (\$ / ton GHG)	404 \$ / eCO <sub>2</sub> (t)

V. ACTION PLAN

D. PROJECT PORTFOLIO

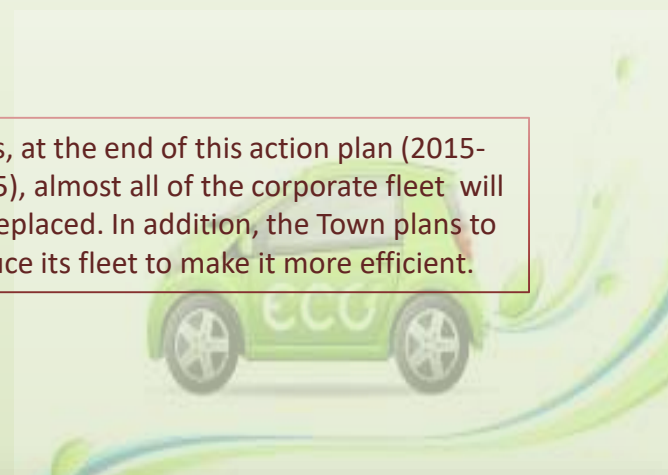
2. Transportation - Gradual Fleet Renewal Policy

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

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

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.



Gradual Fleet Renewal Policy	Base year : 2015	
	Gasoline	Diesel
1 Number de vehicles	37	30
2 Fuel consumption	77 139 liters	138 746 liters
3 Fuel cost	77 448 \$	149 485 \$
4 GHG emissions	188,18 eCO <sub>2</sub> (t)	372,32 eCO <sub>2</sub> (t)
5 Number of vehicles to be replaced	29	12
6 Average efficiency gains due to renewal of fleet	5,0%	5,0%
7 Reduction of GHG emissions after conversion	7,91 eCO <sub>2</sub> (t)	8,41 eCO <sub>2</sub> (t)
8 Total Reductions in GHG Emissions	16,32 eCO <sub>2</sub> (t)	

V. ACTION PLAN

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	10
2	Fuel type	Gasoline
3	Fuel consumption	21 368 liters
4	Fuel savings per year (liters)	3 459 liters
5	Fuel savings per year (\$)	3 473 \$
6	GHG emissions reduction (tons)	20,48 eCO <sub>2</sub> (t)
7	GHG emissions reduction (%)	31,92 %
8	Lifetime	10 years
9	Project's lifespan benefit	34 729 liters
10	Savings (\$ / ton GHG)	170 / 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-litre 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	37	30
2 Fuel consumption	133 789 liters	150 014 liters
3 Fuel cost	134 324 \$	161 625 \$
4 GHG emissions	326,38 eCO <sub>2</sub> (t)	402,55 eCO <sub>2</sub> (t)
5 Average fuel wasted idling	5 387 liters	6 614 liters
6 Average fuel economy	4,0%	4,4%
7 GHG emissions reduction	13,14 eCO <sub>2</sub> (t)	17,75 eCO <sub>2</sub> (t)
8 Fuel savings (\$)	5 409 \$	6 508 \$
9 Total GHG Emissions reduction	30,89 eCO <sub>2</sub> (t)	
10 Total fuel savings (\$)	11 917 \$	
11 Saving per ton of GHG reduced	386 / t eCO <sub>2</sub>	

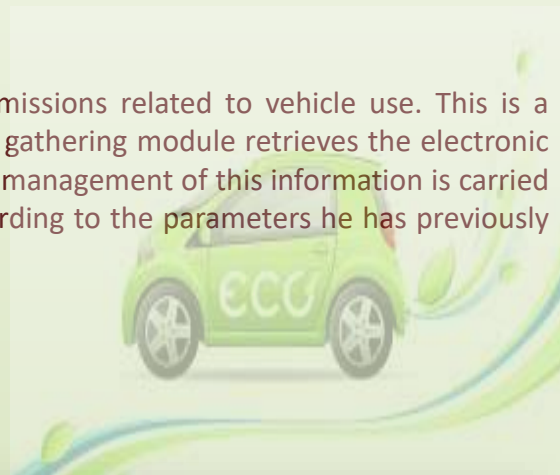


V. ACTION PLAN

D. PROJECT PORTFOLIO

5. Transportation - Telemetry & Idle-free Policy

Telemetry is a particularly effective measure to improve energy efficiency and the GHG emissions related to vehicle use. This is a management measure that makes it possible to optimize the use of vehicles. An information gathering module retrieves the electronic data from the vehicle in order to optimize the efficiency of its use by changes in behavior. The management of this information is carried out by means of computer software and enables the vehicle manager to obtain reports according to the parameters he has previously established. **Telemetry combined with idle-free policy allows fuel savings exceeding 10%.**



- 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

Telemetry & Idle-free Policy	Base year : 2015	
	Gasoline	Diesel
1 Number of units	28	8
2 Fuel consumption	64 822 liters	25 657 liters
3 Fuel cost	65 081 \$	27 643 \$
4 GHG emissions	158 eCO <sub>2</sub> (t)	69 eCO <sub>2</sub> (t)
5 Average fuel economy	<b>10,0%</b>	
6 GHG emissions reduction	15,81 eCO <sub>2</sub> (t)	6,88 eCO <sub>2</sub> (t)
7 Fuel savings (\$)	6 508 \$	2 764 \$
8 Total GHG Emissions reduction	<b>22,70 eCO<sub>2</sub> (t)</b>	
9 Total fuel savings (\$)	<b>9 272 \$</b>	
10 Saving per ton of GHG reduced	<b>409 / t eCO<sub>2</sub></b>	

V. ACTION PLAN

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6. 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.

Nissan Leaf (2018) versus Prius and Civic Hybrid		Base year : 2015	
1	Total kilometers travelled	34 402 km	
2	Internal users	km	
3	External users	km	
4	Number of targeted units	2	
5	Energy saved per year (Gj and \$)*	37,89	784 \$
6	GHG emissions reduction (tons and %)	2,46	58,1%
7	Economy (cost) of MAT implementation	n/d	
8	Lifetime	10 years	
9	Project's lifespan benefit	7 840	\$
10	Savings (\$ / ton GHG)	319	/t eCO2

V. ACTION PLAN

D. PROJECT PORTFOLIO

7. Transportation - Electric Vehicle

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.

There are two kinds of electric car:

**Fully Electric Cars** are powered 100% by electricity and have zero tailpipe emissions. Fully electric cars can travel 200-400 km on a single charge.

**Plug-in Hybrid Electric Cars** have small battery packs for short all-electric driving distances (20-80 km) before a gasoline engine or generator turns on for longer trips.

Nissan Leaf (2018) versus Toyota - Tundra (2010 )		
Base year : 2015		
1 Total kilometers travelled	9 386 km	
2 Number of targeted units	1	
3 Energy saved per year (Gj and \$)*	44,50	1 189 \$
4 GHG emissions reduction (tons and %)	3,05	86,2%
5 Economy (cost) of MAT implementation	n/d	
6 Lifetime	10 years	
7 Project's lifespan benefit	11 891	\$
8 Savings (\$ / ton GHG)	390	/ t eCO2

## V. ACTION PLAN

### D. PROJECT PORTFOLIO

#### 8. Water & Sewage - Energy Efficiency (Electricity)

Town of Quispamsis plans to implement a number of energy conservation measures on its Water and sewage facilities :

- Upgrade the lighting System to LED
- Upgrade the Energy Management Control System (ECMS)
- Energy Optimization
- Install Air to Air Heat Pump System in some areas within the Main garage
- Install Air to Air Heat Pump System to the entire building (Operation Complex)
- Air Gaping for the West Garage

Water & Sewage		Base year : 2015	
1	Electricity used per year	1 515 761	kWh
2	Cost of electricity per year	172 020	\$
3	GHG emissions from electric consumption	424,41	eCO <sub>2</sub> (t)
4	Electricity saving (estimated)	15	%
5	Electricity reduction per year (kWh)	227 364	kWh
6	GHG emissions reduction (tons)	63,66	eCO <sub>2</sub> (t)
7	Annual savings	25 803	\$
8	Program length (action plan deadline : 2025)	8	Years
9	Project's lifespan benefit	206 424	\$
10	Annual savings (\$ / ton GHG)	405	\$ / eCO <sub>2</sub> (t)

VI. APPENDICE

The methodology and references are available on request.

