



ROTHESAY



RESOLUTION OF ROTHESAY COUNCIL

9 October 2018

Climate Change and Energy Initiative

MOVED by Counc. Mackay French and seconded by Counc. Wells:

WHEREAS Rothesay participated in the Climate Change & Energy Initiative (CCEI) of the Union of Municipalities of New Brunswick (UMNB),

AND WHEREAS Rothesay participated in the Partners for Climate Protection Program (PCP) of the Federation of Canadian Municipalities (FCM);

AND WHEREAS Rothesay has conducted a Corporate GHG Inventory & Action Plan and Community GHG & Energy Action Plan;

NOW THEREFORE BE IT RESOLVED Rothesay sets the target of reducing corporate GHG emissions by 15% by 2025, compared to their 2015 reference level;

AND Rothesay resolves to set the target of reducing community GHG emissions by 7% by 2025 and 14% by 2035 from their 2015 baseline.

Rothesay's Community GHG & Energy Action Plan



Realised with the



Climate Change and Energy Initiative

June 2018

Consulting team



Financed by



© 2018, Union of Municipalities of New Brunswick. All Rights Reserved.

The preparation of this plan was carried out with assistance from the Green Municipal Fund, a Fund financed by the Government of Canada and administered by the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Acknowledgements

We would like to express our deepest appreciation to all those who provided support to our team to complete reports, annexes and all tools developed in this UMNB initiative.

- A special gratitude to UMNB general managers, Mrs. Margot Cragg and Mr. Raymond Murphy (deceased).
- We want to thank Eddie Oldfield - Spatial QUEST for its technical contribution with the mapping, the workshops organisation and all the work provided.
- We also want to present special thanks to all stakeholders and municipal employees who have contributed to achieve the UMNB CCEI.



I.	Introduction	
II.	The Plan’s Strategy	
III.	The Community’s profile	
IV.	The Plan’s Summary	
V.	The Inventory	
VI.	The Plan	
VII.	Appendice	



Community GHG & Energy Action Plan

I. INTRODUCTION

Communities across Canada are facing the effects of climate change. Some have to deal with greater droughts, others with more violent storms.

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.

The 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 Rothesay** 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 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.

Rothesay is engaged:

- ✓ **Climate Change and Energy Initiative (CCEI) of the Union of Municipalities of New Brunswick, 2017**
- ✓ **Member – Partners for Climate Protection program, FCM, 2016**



In addition to the Corporate GHG Action Plan, the Community GHG & Energy Plan is the UMNBC CCEI second foundation stone. The Plan brings a powerful and dynamic tool to help communities for smart and sustainable development allowing to reduce their carbon footprint.

What is a Community GHG & Energy Plan? *The Plan is a long-term plan that identifies ways to reduce GHG emissions and to support the Municipality's local economy by increasing its competitiveness, helping to create local or regional jobs in the energy sector, improving energy efficiency, and improving energy security.*

In 2018, planning and coordinating energy use and GHG emission reduction at the community level remains innovative especially for smaller size communities outside metropolitan areas. However, in cities or communities where it has been done, it has resulted in some of the most efficient, and from an energy standpoint, most cost-competitive cities in the world, with resulting reductions in associated environmental impacts.

*The communities that are leaders have taken an integrated energy systems approach looking at the potential for innovation in how energy is sourced, generated, consumed, re-captured, conserved, stored, and delivered. **The UMNBC CCEI's Community GHG & Energy Plan** will be a "living document", in that the actions taken by the Municipality and community stakeholders are expected to grow and change over time.*

Why a Community & GHG Energy Action Plan *The Plan is great tool to face community transformation challenges encountered in New Brunswick: Climate change impacts, population growth or decline, development growth and economic transformation.*

Those challenges push municipalities and communities to examine ways to reduce its cost of services while continuing to maintain and enhance the quality of life. And how energy is used, and the cost of that energy to residents as well as to the municipality, is an important factor. Smart solutions also reduce environmental impacts associated with the consumption of energy. A good strategy and planning can enhance prosperity by making the municipality more economically competitive.

Enhancing access to energy efficiency, conservation and demand-management opportunities can also have a positive effect on the local retail and service industry. Businesses that increase the energy efficiency of their facilities and operations can improve their competitiveness in the marketplace.



Vision

The vision of the Plan is to achieve a low carbon and smart energy community in an economically viable way:

Reducing its carbon footprint by increasing energy conservation, using energy efficiently through new development and retrofits, transportation planning, producing renewable or clean energy, helping to improve local energy security.

Goals

The vision is supported by a series of goals that bring focus to mitigating climate change, improving energy performance within the community and creating economic advantage:

- 1. Foster a shift towards low carbon technologies.**
- 2. Increase energy efficiency for new and existing buildings.**
- 3. Foster a shift towards low carbon transportation that integrates EV infrastructure, promotes alternative fuel vehicles, low carbon fuel options, as well as public transit and active transportation as mechanisms to reduce the number of vehicles on the road.**
- 4. Create or help adaptive, sustainable, affordable, and reliable local renewable and clean energy supply.**
- 5. Design, build, and revitalize neighbourhoods as complete communities that offer multi-modal transportation options.**
- 6. Create new market opportunities for innovative energy solutions that are attractive for local and new businesses, and through high quality, affordable, clean energy services foster retention and growth of existing businesses and industries.**
- 7. Build awareness about energy investment and create a culture of energy conservation amongst residents, business, institutions, and industries.**
- 8. Build knowledge, skills, and technical capacity through partnerships that deliver innovative energy solutions at the local scale.**



The principles provide direction for the development of the projects and initiatives presented in the Plan. To build and implement an action plan and portfolio of environmentally and economically successful projects all proposed solutions, projects, or initiatives should consider these principles:

1. Advocate for urgent action to address climate change
2. Set achievable reduction targets
3. Maximize benefits for the municipality and the community
4. Ensure and enhance a sustainable energy system
5. Maximize efficient use of energy
6. Design model and innovative projects
7. Build on existing programs and funds: for example, FCM and GMF programs, Environmental Trust Fund, NB Power programs, etc.
8. Create a competitive and economic advantage for the Community
9. Demonstrate global leadership

GHG Emission Reduction Target

7% for 2025 and 14% for 2035

For the Community Plan, GHG emission reduction target is 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 is -6% over the base year, within 10 years.
- ✓ The objectives of the Government of New Brunswick.*
- ✓ The GHG reduction potential of the municipality and its community.

*** 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.



Timeline For efficiency, the choice of a pertinent timeline is essential. Because the scope of the Community Plan is important and imply major technological and behavioral changes, we recommend a 20 years timeline. However, for reviewing and monitoring process the Community Plan propose a 10 year step in 2025 concordance with the **Corporate GHG Action Plan**.

Approach and developing the Plan

Background data was collected via energy distributors in New Brunswick and from various other provincial and federal sources. Electricity data was provided by NB Power, Saint John Energy and Perth Andover Electric and Light Commission.

For all participant, a workshop was held to do a mapping exercise through a community GHG & energy planning process. The workshop allowed the team, the municipality and its stakeholders to identify areas or sectors where GHG reduction projects, conservation and efficiency measures could be focused, to assess the potential for local generation, particularly renewable energy, and look at the energy implications of future growth and prosperity. Webinars were held with each participants to finalize the Corporate GHG & Energy Action Plan as well as to prepare the final workshop to complete the Community GHG & Energy Action Plan. Each municipality CCEI manager invited to workshops and webinars, stakeholders they considered important to assist, councillors and municipal employees.

Each Community Plan include a presentation document and more importantly is also build with a series of tool joined in annexes:

- Annexe A: Project's description with implementation procedures
- Annexe B: Excel Projects Sheets with GHG and energy data calculation
- Annexe C: Mapping document for Workshop (Spatial Quest)

As final step, the Community and the Corporate plan are submitted to the Participant Municipality to be adopted by resolution.

YHC Environnement, an energy planning and environment consultant, was retained by UMNb to provide services to produce inventories, action plans and the various tool needed. Spatial Quest was hired to do the GHG and energy mapping related to workshop's organisation and as liaison agent with the concerned stakeholders in New Brunswick.



Community GHG & Energy Action Plan

III. THE COMMUNITY'S PROFILE

The Town of Rothesay is located in Kings County, New Brunswick, in the Kennebecasis River Valley. Rothesay is located northeast of the City of Saint John and southwest of the Town of Quispamsis. It is a suburb of the City of Saint John.

The population of Rothesay in 2016 was 11,659 inhabitants spread over an area of 34.72 km², a density of 335.8 hab./km². It decreased by 2% from 2011 to 2016. The Municipality had 4,816 private dwellings in 2016, of which 4,636 were occupied by full time residents. 72% of dwellings were built before 1991.

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

PICTURE 1: ROTHESAY'S MAP



III. THE COMMUNITY'S PROFILE

Challenges

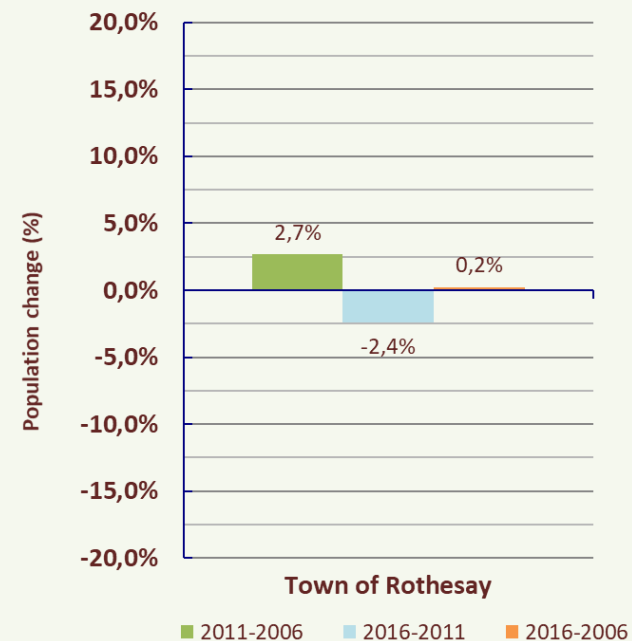
- ✓ The Town's population is stable: 0,2% increase between 2006 and 2016 but a decrease between 2016-2011.
- ✓ Responsibilities and demand for municipal services may increase in short and medium term.

Opportunities

- ✓ The community growth of population must be considered an opportunity.
- ✓ Rothesay is aiming to promote energy efficiency and clean energy projects and programs in the Community for example by:
 - Promoting electric and clean equipment to remove residential oil furnace;
 - Promoting EV acquisition and use;
 - Negotiating deal with clean tech industries and businesses to develop green and clean projects on its territory;
 - Etc.

Rothesay's Plan to stay a leader for sustainable development in New Brunswick.

DEMOGRAPHIC EVOLUTION



The Plan

The Plan aims to help Rothesay and its Community to face main challenges.

- **Reduce dependency on fossil energies:**
 - Reduce at least by half residential heating oil use
- **Curb down energy use, expenses and reduce GHG emissions**
 - Promote individual and collective energy efficient habits:
 - a. Implement an ongoing anti-idling campaign & fuel efficient driving all across the community
 - b. Increase at least by 25% clothe line usage
 - Promote energy efficient technologies:
 - a. LED lighting to replace 60% all lights in the community
 - b. At least half of residential and commercial to improve their energy efficiency for an average of 10%
 - Promote energy wise decision-making : smaller vehicles are in average 20% more fuel efficient
- **Foster a shift towards low carbon transportation solutions integrating EV infrastructure, promotes alternative fuel vehicles**
 - Use existing programs and incentives to increase the number of Electric and Hybrid Cars and to install more Charging Stations
- **Implement low capital project & strategy to generate good return on investment overcome tax income stagnation**
- **Diversify transportation alternatives by setting up a community van service**



B. THE STRATEGY

Strategy's Summary

Implementation and monitoring Procedures

General Procedures

- | | | |
|---|---|--------------------------|
| 1 | Annual sectorial review meeting | |
| 2 | Annual Community GHG & Energy Action Plan Update | Reachnig PCP Milestone 4 |
| 3 | Annual or biennial inventory update (Community & Corporate) | Reachnig PCP Milestone 5 |
| 4 | Project Portfolio Revision: New & Retrieved Project | |

Project Portfolio Procedures

Residential

R 1 LED lighting

- | | | |
|---|-------------------------------|--|
| 1 | Annual activity review report | Status, project implementation development |
|---|-------------------------------|--|

R 2 Clean Energy Conversion (Oil to Electricity)

- | | | |
|---|-------------------------------|--|
| 1 | Annual activity review report | Status, project implementation development |
| 2 | Monitoring activities | GHG & GJ reduction evaluation |

R 3 Energy efficiency (Residential buildings)

- | | | |
|---|-------------------------------|--|
| 1 | Annual activity review report | Status, project implementation development |
| 2 | Monitoring activities | GHG & GJ reduction evaluation |

R 4 Energy efficiency - Residential - Clothes Line Program

- | | | |
|---|-------------------------------|--|
| 1 | Annual activity review report | Status, project implementation development |
|---|-------------------------------|--|



B. THE STRATEGY

Project Portfolio Procedures		
ICI		
ICI 1 LED lighting		
1	Annual activity review report: Status, project implementation development	
ICI 2 Energy efficiency (commercial buildings)		
1	Annual activity review report	Status, project implementation development
2	Monitoring activities	GHG & GJ reduction evaluation
Transportation		
T1 Idle-free Policy		
1	Annual activity review report	Status, project implementation development
T2 Electric Vehicle Community Program		
1	Annual activity review report	Status, project implementation development
2	Monitoring activities	EV purchase information
T3 Fuel-efficient driving		
1	Annual activity review report	Status, project implementation development
T4 Compact vehicles		
1	Annual activity review report	Status, project implementation development
T5 Community Van		
	Annual activity review report	Status, project implementation development



COMMUNITY GHG INVENTORY



V. THE INVENTORY

The Town of Rothesay 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.

Rothesay's 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 Community Component of the Town of Rothesay. The relevant additional elements are detailed in the appendices.



A. Summary

The community component consists of five emission sectors. For Rothesay, the total emissions of the community is approximately 96 645 tons of CO₂ equivalent. Most of these came from transportation that is 45.8%. Residential sector generated 38.6% of emissions, businesses 12.8%, industries 0.6% and finally 2.24% of emissions are attributed to the community waste.

The Community, with its 11 659 inhabitants has a per capita emission rate of 8.3 tons of CO₂ equivalent

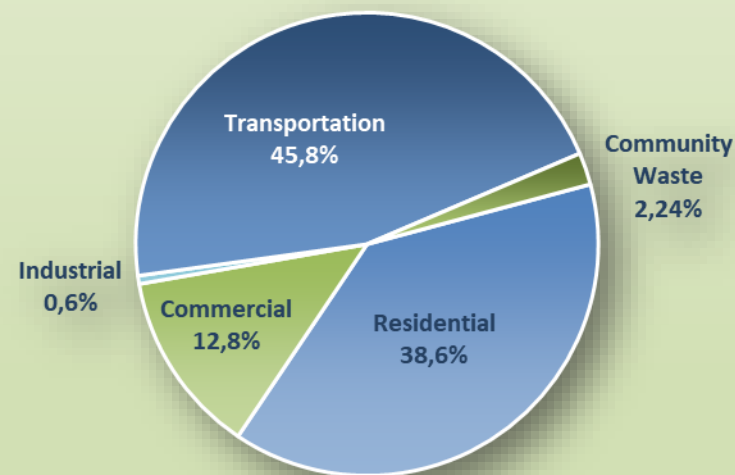
TABLE 1 :

COMMUNITY GHG EMISSIONS FOR THE BASE YEAR

GHG (tons eCO ₂)	2015
Residential	37 291
Commercial	12 399
Industrial	556
Transportation	44 237
Community Waste	2 163
Total	96 645
Population	11 659
GHG per capita (teCO ₂)	8,3

GRAPH 1 :

COMMUNITY GHG EMISSIONS BREAKDOWN BY SECTOR (teCO₂)



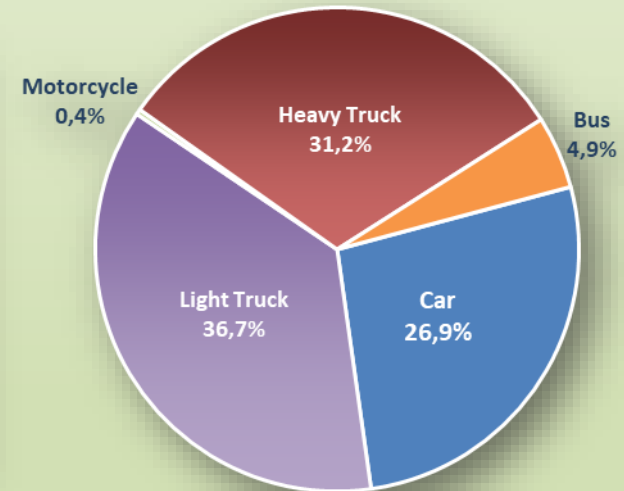
B. Transportation

For the year 2015, the Rothesay community had 9 799 vehicles numbered on its territory. With 16 236.8 tons of eq. CO₂, the transportation sector is responsible for a large part (45.8%) of greenhouse gas emissions of the community (see Graph 1). Emissions from the sector come from five (5) subclasses; light trucks, because of their large number, form the category that generates the most GHG emissions, with 36.7% of the sector's total. Heavy Trucks are in second place with 31.2%, follow cars (26.9%), buses (4.9%), and finally motorcycles with 0.4%.

TABLE 2 :
TRANSPORTATION GHG EMISSIONS BREAKDOWN
BY VEHICLE TYPE (teCO₂)

Vehicle Type	2015			
	Number	%	(teCO ₂)	%
Car	4 724	48,2%	11 907,5	26,9%
Light Truck	4 138	42,2%	16 236,8	36,7%
Motorcycle	330	3,4%	156,5	0,4%
Heavy Truck	570	5,8%	13 787,8	31,2%
Bus	38	0,4%	2 147,9	4,9%
Total	9 799		44 237	

GRAPH 2 :
TRANSPORTATION GHG EMISSIONS BREAKDOWN
BY VEHICLE TYPE (teCO₂)



C. Residential & Industrial, Commercial, Institutional (ICI)

In 2015, an estimated 50 246.1 tons of eq. CO₂, greenhouse gas emissions come from Rothesay's residential and industrial, commercial and institutional (ICI) sectors. Electricity gets noticed as first source of GHG emissions with 38 925.4 tons of eq. CO₂. Fuel oil and propane assume 10 393.5 and 513.6 tons and finally, heavy fuel oil use emits 413.6 tons eq. CO₂.

TABLE 3 :

COMMUNITY GHG EMISSIONS AND ENERGY CONSUMPTION BY TYPE

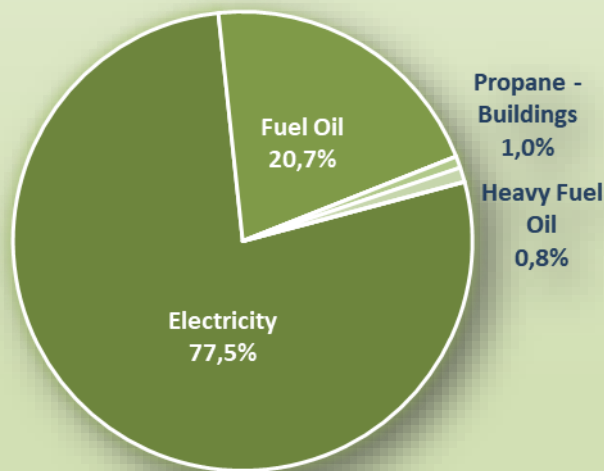
Energy			2015			
	Volume	Unit	(teCO ₂)	%	(Gj)	%
Electricity	139 019 403	kWh	38 925,4	77,5%	500 470	75,6%
Fuel Oil	3 799 962	Liters	10 393,5	20,7%	147 439	22,3%
Natural Gas	0	m3	0,0	0,0%	0	0,0%
Diesel - Buildings	0	Liters	0,0	0,0%	0	0,0%
Heavy Fuel Oil	131 493	Liters	413,6	0,8%	5 588	0,8%
Propane - Buildings	332 638	Liters	513,6	1,0%	8 419	1,3%
District Energy	0		0,0	0,0%	0	0,0%
Total			50 246,1		661 916	



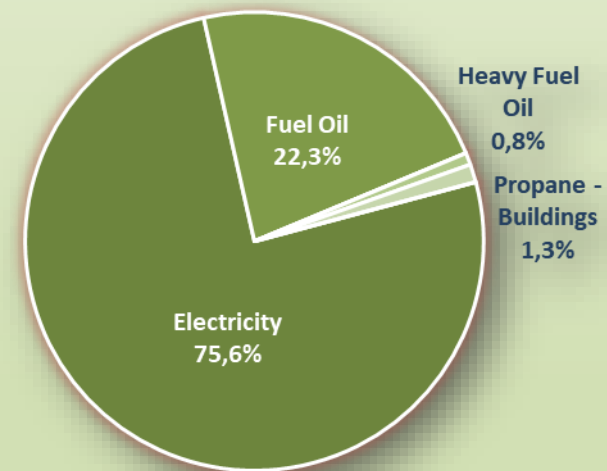
C. Residential & Industrial, Commercial, Institutional (ICI) (continued)

Electricity produces 77.5% of the sector's emissions and meets 75.6% of the Rothesay Territory's energy needs for the residential sector and ICI. Fuel oil, propane and heavy fuel oil accounted for 22.7%, 1.0% and 0.8% of greenhouse gases, respectively, and together they contributed to the satisfaction of 22.3%, 1.3% and 0.8% of their energy demand in their sectors for the Rothesay community.

GRAPH 3 :
RESIDENTIAL AND ICI GHG EMISSIONS BREAKDOWN
BY ENERGY TYPE (tCO₂)



GRAPH 4 :
RESIDENTIAL AND ICI ENERGY CONSUMPTION BREAKDOWN
BY ENERGY TYPE (GJ)



D. Community Waste

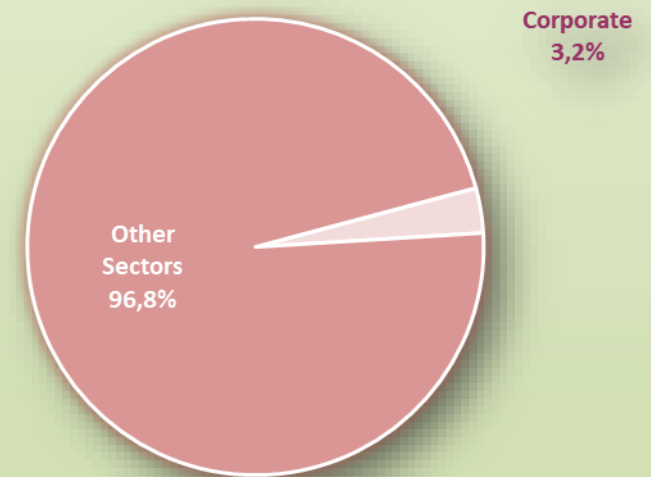
In 2015, the 6 220 tons of Rothesay's solid waste produced 2 162.6 tons of eq. CO₂ greenhouse gas. They are responsible for 2.2% of the total emissions of the Community (see Graph 1).

The estimated share of corporate emissions is 69.0 tons of eq. CO₂ (3.2% of the total) which would correspond to nearly 168 tons of waste.

TABLE 4 :
COMMUNITY LANDFILL WASTE BY CATEGORY

Waste Category	2015			
	Tons	%	(teq. CO ₂)	%
Corporate	168	2,7%	69,0	3,2%
Other Sectors	6 052	97,3%	2 093,6	96,8%
Total	6 220		2 162,6	

GRAPH 5 :
COMMUNITY LANDFILL WASTE GHG EMISSIONS BY CATEGORY (TECO₂)



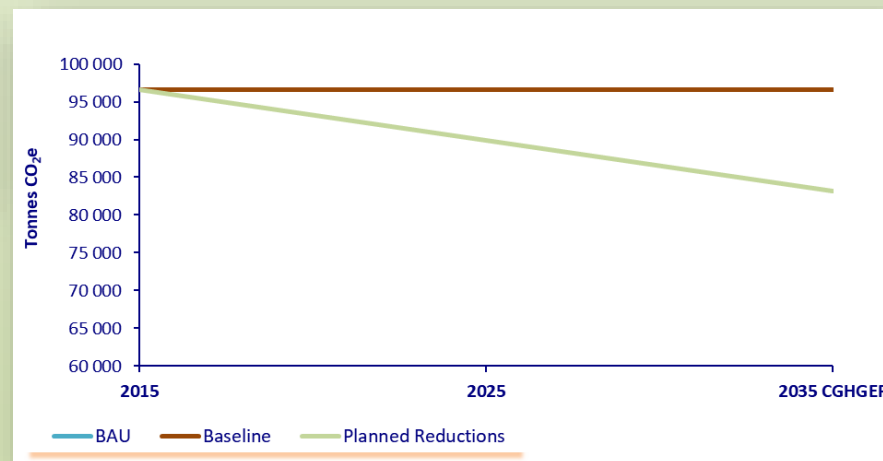
D. Community Emissions Forecast

Community emissions forecast present how the inventory emissions may 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.

**TABLE 5 :
COMMUNITY INFORMATION**

Base Year	2015	
Forecast Year*	2025	2035 CGHGEP
Reduction Target by Forecast Year* (%)	7,0%	14,0%

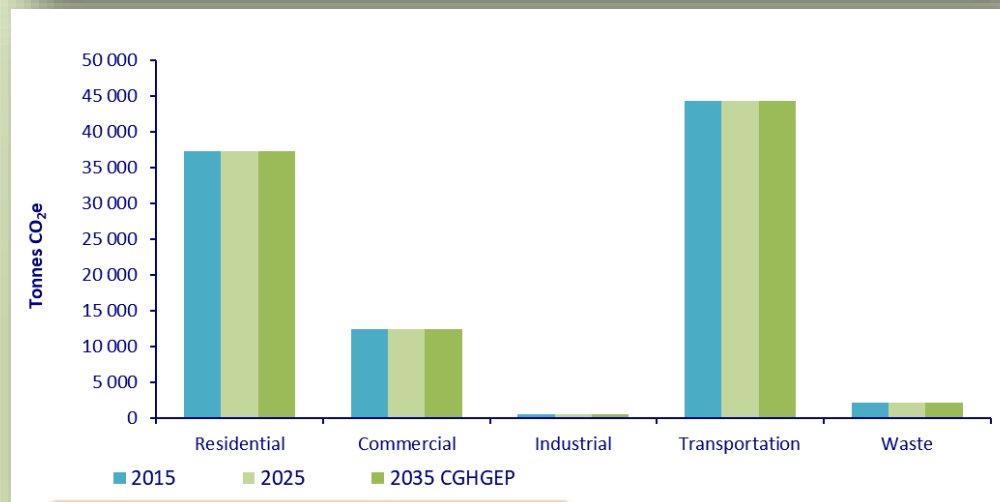
**GRAPH 6 :
COMMUNITY EMISSIONS FORECAST**



D. Community emissions forecast (continued)

TABLE 6 :
COMMUNITY EMISSIONS FORECAST BY SECTOR

	Current emissions	% Change Expected**	Emissions in Forecast year	Emissions in CEP Forecast year
Residential	37 290,8	0,0%	37 290,8	37 290,8
Commercial	12 399,1	0,0%	12 399,1	12 399,1
Industrial	556,2	0,0%	556,2	556,2
Transportation	44 236,5	0,0%	44 236,5	44 236,5
Waste	2 162,6	0,0%	2 162,6	2 162,6
Total Emissions (t CO₂e)	96 645,2		96 645,2	96 645,2



COMMUNITY PLAN



Community GHG & Energy Action Plan

VI. THE PLAN

A. STRATEGY FOR GHG REDUCTION AND PROJECT SELECTION

Community 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 community plan proposes the achievement of a target of 7% reductions in GHG emissions for 2025 and 14% reductions in GHG emissions for 2035 according to the reference year 2015.

TABLE 7 :
COMMUNITY INFORMATION

Objectives and year set by Rothesay:

Community Action plan :

- | | |
|--|---|
| | <ul style="list-style-type: none">• Reduction Target : 7% and 14% |
| | <ul style="list-style-type: none">• Base year : 2015 |
| | <ul style="list-style-type: none">• Forecast year : 2025 and 2035 |



A. STRATEGY FOR GHG REDUCTION AND PROJECT SELECTION

Guiding principles

The approach behind the development of the Town of Rothesay'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

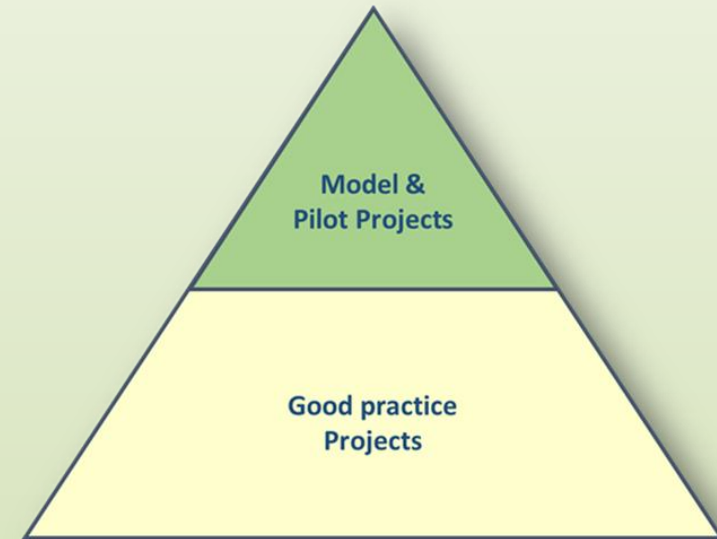
The action plan prioritises projects considered as "good practices". These projects correspond to the application of, for example, measures and technologies supported by the programs of New Brunswick Power, the Government of New Brunswick or Canada.

✓ 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 – SAUVÉR (Group Project)




B. REFERENCE LEVEL AND TARGET


The goal of the Town of Rothesay’s Community Action Plan is to reduce greenhouse gas emissions by 7% by 2025 and 14% by 2035 from their 2015 baseline.

For Rothesay, the emissions calculated for the year 2015 allow us to estimate the reductions required to reach the target set by the Community's action plan to approximately 6 765.2 tons or 7% by 2025 and 13 530.3 tons or 14% by 2035.

TABLE 8 :
BASELINE AND TARGET

tons of CO2 equivalent		Base	Year		7%	14%
		2015	Forecast 2025	Forecast EGHGEP 2035	<u>2025</u>	<u>2035</u>
1	Current Emissions	96 645				
2	Community Emissions Forecast (BAU Scenario)		96 645	96 645		
3	Reduction Target		7,0%	14,0%		
4	Forecast emissions (target) (line 1 - line 5)		89 880	83 115		
5	Total reductions to be achieved (line 1 - line 4)		6 765,2	13 530,3		
6	Total reductions to be achieved (Including BAU Scenario)		6 765,2	13 530,3		







C. ANALYSIS OF THE PROJECTED RESULTS OF THE ACTION PLAN

Achieving the objective of Rothesay's Action Plan would mean that the level of community GHG emissions for the year 2025 be at 89 107 tons of eq. CO₂. This is a decrease of 7 539 tons from the 2015 emissions level of 96 645 tons of eq. CO₂. This represents a potential reduction of 7.8%, which is 0.8 percentage point above the target of 7% and 773.4 tons more than the targeted reduction of 6 765.2 tons (see Table 8).

TABLE 9 :
ANALYSIS OF THE OUTCOME OF THE ACTION PLAN

		Total reductions		Forecast EGHGEP 2025
		eCO ₂ (t)	%	
1	Current Emissions (Base year)	96 645	100,0%	
2	Early action results	0,0	0,0%	
3	Expected reductions in the Action Plan	7 539	7,8%	
4	total Reductions (line 2 + line 3)	7 539	7,8%	
5	Level of anticipated emissions (forecast year) (line 1 - line 4)	89 107	92,2%	
6	Gap with the target	773,4	0,8%	
7	Considering BAU Scenario (2025)	773,4	0,0%	7,8%



C. 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 Community of Rothesay, the development of the Project Portfolio was completed.

The action plan contains twelve (12) projects whose potential reductions are estimated at 7 538.6 tons of CO₂ equivalent (see Table 10).



D. PROJECT PORTFOLIO

Project Portfolio Summary

TABLE 10 : COMMUNITY PROJECT PORTFOLIO

Projects (MAT)		Total GHG reductions (tons)
Residential		2 632,4
1	R1 LED lighting	457,2
2	R2 Clean Energy Conversion (Oil to Electricity) Conversion rate : 50%	824,3
3	R3 Energy efficiency (Residential buildings)	1 172,9
4	R4 Energy efficiency - Residential - Clothes Line Program	178,0
ICI		844,2
5	ICI1 LED lighting See also R 1	461,5
6	ICI2 Energy efficiency (commercial buildings)	382,6
Transportation		4 062,0
7	T1 Idle-free Policy	2 763,6
8	T2 Electric Vehicle Community Program Nb EV Unit 55	169,1
9	T3 Fuel-efficient driving	838,6
10	T4 Compact vehicles	281,4
11	T5 Community Van	9,3
Community Waste		-
12	W1 Domestic composting	-
TOTAL		7 538,6



D. PROJECT PORTFOLIO

1. Infrastructure (lighting) - LED lighting

LED technology is more reliable with a much longer life span compared to incandescent or fluorescent bulbs. LED technology is more reliable with a much longer life span compared to other types of lighting. According to Hydro-Quebec : "Most LED bulbs last about 25,000 hours, while incandescent lightbulbs last only 1,000." So if they're on 8 hours a day, 365 days a year, LED bulbs could last more than 8 years". In the community, voluntary conversions and those made through information, awareness and incentive campaigns reduce electricity consumption. It is assumed that 60% of the incandescent bulbs will be replaced by LED bulbs at the end of this action plan.

LED lighting	Base year : 2015		
	GJ	kWh	Ratio
1 Total residential energy consumption	489 316	135 921 016	
2 Estimated residential lighting power consumption	17 811	4 947 525	3,64%
3 Total CI sector energy consumption	165 238	45 899 483	
4 Estimated commercial lighting power consumption	17 714	4 920 425	10,72%
5 Total industrial energy consumption	7 362	2 045 022	
6 Estimated industrial lighting power consumption	268	74 439	3,64%
7 Efficiency gains due to conversion		55%	
8 Conversion rate for 2025		60%	
9 Annual energy conversion reduction (residential)		1 632 683	kWh
10 Annual Energy Conversion Reduction (CI)		1 623 740	kWh
11 Annual Energy Reduction in Conversion (Industries)		24 565	kWh
12 Reduction of GHG emissions from conversion (residential)		457	t. eq. CO ₂
13 Conversion GHG emission reduction (CI)		455	t. eq. CO ₂
14 Reduction in Conversion GHG Emissions (Industries)		7	t. eq. CO ₂
15 Reduction of GHG emissions from conversion (all sectors)		919	t. eq. CO₂



D. PROJECT PORTFOLIO

2. Infrastructure (heating, cooling) - Clean Energy Conversion (Oil to Electricity)

Rothesay wishes to reduce heating oil consumption in the community in favor of electricity.

The municipality plans to run a survey on heating oil users for a better understanding of their number, needs and demands. The survey will allow to adjust the project's target and timeline.

According to the community inventory, more than 38,6% of the community's GHG emissions come from the residential sector. Fuel furnaces are less efficient than electric heater.

Clean Energy Conversion (Oil to Electricity)			Base year : 2015	
1	Energy conversion		50,0%	
2	Participating households (number and %) *		2 318	50,0%
3	Energy saved per (Gj)		15 408	
4	Reduction of GHG emissions (tons and %)		824,3	11,4%
	* Rough estimation			
Estimation details				
5	Heating oil consumption	102 717	Gj	
6	Heating oil GHG emissions	7 241	eCO ₂ (t)	
7	Projects' rate of implementation	To Set	50%	Target
8	Number of Dwellings in the community	4 635		
9	Participating households	2 318		Rough estimation
10	Electricity needs (result of conversion)	35 951	Gj	
11	Electricity GHG Emissions (result of conversion)	2 796	eCO ₂ (t)	
12	Residual Heating Oil consumption	51 359	Gj	
13	Residual Heating GHG Emissions	3 620	eCO ₂ (t)	
14	GHG reduction	824,3	eCO ₂ (t)	



D. PROJECT PORTFOLIO

3. Infrastructure (heating, cooling & envelope) - Energy efficiency (Residential buildings)

According to the community inventory, more than 38,6% of the community's GHG emissions come from the residential sector. Improving energy efficiency is therefore a key means of reducing overall community emissions. NB Power has developed a series of financial incentive programs such as waterproofing, insulation or replacement of home heating systems. The average implementation rate of these measures is set at 50%. The average efficiency of all these measures is set at 10%.

Energy efficiency (Residential buildings)			Base year : 2015
1	Energy saving (estimated)		10,0%
2	Participating households (number and %) *		2 318 50,0%
3	Energy saved per year (Gj)		15 333
4	Reduction of GHG emissions (tons and %)		1 172,9 5,0%
	* Rough estimation		
Estimation details			
5	Total electricity Consumption	385 471	Gj
6	Energy use for heating purposes	65,94%	
7	Electric Consumption - heating	254 180	Gj
8	Fuel consumption - heating	51 359	Gj see below
9	Propane consumption - heating	1 127	Gj
10	Electricity consumption GHG emissions	19 770	eCO ₂ (t)
11	Fuel consumption GHG emissions	3 620	eCO₂ (t)
12	Propane GHG emissions	69	eCO ₂ (t)
13	GHG emissions targeted	23 459	24,3%
14	Projects' rate of implementation	50%	To Set
15	Total community emissions	96 645	eCO ₂ (t)
16	Average energy efficiency gain	10,0%	To Set
17	Number of Dwellings in the community	4 635	
18	Participating households	2 318	Rough estimation
See Oil removal project : Community aims to reduce heating oil use at the end of the current Action Plan			



D. PROJECT PORTFOLIO

4. Infrastructure (heating, cooling) - Energy efficiency - Residential - Clothes Line Program

Rothsay wishes to promote simple yet efficient measures that will reduce energy costs and carbon footprint of its citizens. According to the community inventory, more than 38.6% of the community's GHG emissions come from the residential sector. Clothes lines have multiple advantages : Low installation/repair cost, saves money, zero GHG emission, etc. The average implementation rate of these measures is set at 25%.

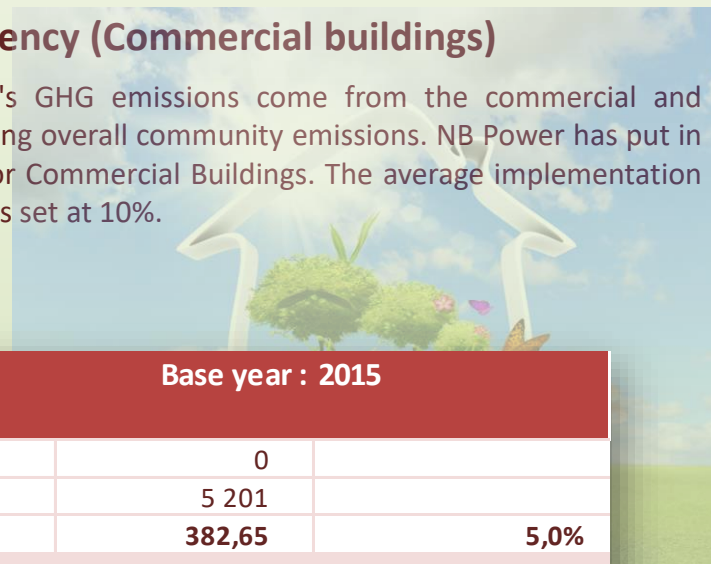
Infrastructure (heating, cooling & envelope)		Base year : 2015	
1	Energy saving (estimated)	12,5%	
2	Participating households (number and %)	1 060	22,9%
3	Energy saved per year (kWh)	635 786	
4	Reduction of GHG emissions (tons and %)	178,0	0,2%
Estimation details			
5	Average electric clothes Dryer consumption per household	100	kWh / month
6	Total power use for clothes drying	1 200	kWh / year
7	Number of Dwellings in the community	4 635	
8	Ratio of households with an electric clothes dryer	91,4%	
9	Annual estimated power used by laundry dryers	5 086 289	kWh / year
10	Total estimated GHG emissions of laundry drying	1 424	eCO ₂ (t)
11	Clothes lines efficiency	100%	
12	Clothes lines use rate	50%	6 months / year
13	Projects' rate of penetration	25%	To set
14	Participating households	1 060	
15	Energy reduction	635 786	kWh
16	GHG reduction	178	
17	Energy savings	67 330	\$
18	Total community emissions	96 645	eCO ₂ (t)



D. PROJECT PORTFOLIO

5. Infrastructure (heating, cooling & envelope) - Energy efficiency (Commercial buildings)

According to the community inventory, more than 12.8% of the community's GHG emissions come from the commercial and institutional sector. Improving energy efficiency is therefore a key means of reducing overall community emissions. NB Power has put in place a program called "Energy Smart Commercial Buildings Retrofit Program" for Commercial Buildings. The average implementation rate of these measures is set at 50%. The average efficiency of all these measures is set at 10%.



Energy efficiency (commercial buildings)			Base year : 2015	
1	Energy saving (estimated)		0	
2	Energy saved per year (Gj)		5 201	
3	Reduction of GHG emissions (tons and %)		382,65	5,0%
Estimation details				
4	Total electricity Consumption	110 380	Gj	
5	Energy use for heating purposes	48,35%		
6	Electric Consumption - heating	53 369	Gj	
7	Fuel consumption - heating	43 478	Gj	
8	Propane consumption - heating	7 165	Gj	
9	Electricity consumption GHG emissions	4 151	eCO ₂ (t)	
10	Fuel consumption GHG emissions	3 065	eCO ₂ (t)	
11	Propane GHG emissions	437	eCO ₂ (t)	
12	GHG emissions targeted	7 653	7,9%	
13	Projects' rate of implementation	50%	To set	
14	Total community emissions	96 645	eCO ₂ (t)	
15	Average energy efficiency gain	10,0%	To set	



D. PROJECT PORTFOLIO

6. 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	9 074	638
2 Fuel consumption	11 838 122 liters	5 624 544 liters
4 GHG emissions	28 879 eCO ₂ (t)	15 093 eCO ₂ (t)
5 Average fuel wasted idling	975 636 liters	142 912 liters
6 Average fuel economy	8,2%	2,5%
7 GHG emissions reduction	2380,1 eCO ₂ (t)	383,5 eCO ₂ (t)
9 Total GHG Emissions reduction	2763,59 eCO₂ (t)	



D. PROJECT PORTFOLIO

7. Transportation - Fuel-efficient driving

Driving can significantly influence fuel consumption. We assume in this project that community drivers, through incentives, promotional campaigns and economic reasons, will gradually integrate these principles of effective behaviour.

According to Natural resources Canada, Adopting these five fuel-efficient driving techniques can reduce fuel consumption and carbon dioxide emissions by as much as 20 percent (20%):

1. Accelerate gently
2. Maintain a steady speed
3. Anticipate traffic
4. Avoid high speeds
5. Coast to decelerate

Fuel-efficient driving		Base year : 2015	
1	Community transportation emissions	44 237	eCO ₂ (t)
2	Total community emissions	96 645	eCO ₂ (t)
3	Number of targeted units	943	
4	Reduction of GHG emissions (tons and %)	839	0,87%



D. PROJECT PORTFOLIO

8. Transportation - Electric Vehicle Community Program

The EV Community Program is proposed for the Community GHG and Energy Planning timeline. The program is related to the NB Climate Action Plan and will help the community to integrate EV and gradually replace conventional vehicle use.

Information : EV 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.

		Base year :	2015
		Target year :	2025
1	GHG Offset Target - eCO ₂ (t)		169
2	Target number of EV units for 2025	Minimum & maximum	55 153
3	<i>NB CCAP Target for EV units for 2025 (estimated)</i>	<i>Total & annually</i>	<i>153 19</i>
4	GHG emissions reduction (tons and %)	Minimum	169 0,2%
5		Maximum	469 0,5%
6	Transport GHG emissions reduction (%)	Minimum & maximum	0,4% 1,1%
7	Savings per year (Minimum & maximum)		20 289 \$ 171 295 \$
8	Number of car & light Truck		8 861
9		Minimum & maximum	0,6% 1,7%



D. PROJECT PORTFOLIO

9. Transportation - Electric Vehicle Community Program (continued)

Charging Station : In 2018, Rothesay counts 6 public N2 charging stations (CS) on its territory. Number of public charging stations should be increased locally and regionally. We estimates that EV owners should have private level 2 charging station (500 to 800\$).

EV-Charging Station (Installed & planned)		
Location	Comment	Number
	Total	6
No CS in Rothesay in 2018		0
Provincial schools, Rothesay High, Rothesay Elementary	Proposed W1	1
Marr Road. Clark Road, Development Complex	Proposed W1	1
Riverside Golf Course	Proposed W1	1
Town parking lot @ Rothesay arena	Proposed W1	1
Grocery Stores, Sobeys, Superstore	Proposed W1	1
K Park, Rothesay Park, East riverside park	Proposed W1	1



D. PROJECT PORTFOLIO

10. Transportation - Compact vehicles

The community vehicle fleet is becoming more fuel-efficient and fuel-efficient, consuming about 20% less fuel. Change is achieved through targeted incentives, public awareness, a gradual change in transportation patterns, or the availability of more attractive business models.



Compact vehicles			Base year : 2015
1	Community transportation emissions	44 237	eCO ₂ (t)
2	Total community emissions	96 645	eCO ₂ (t)
3	Number of targeted units	443	
4	Reduction of GHG emissions (tons and %)	281	0,29%



D. PROJECT PORTFOLIO

11. Transportation - Community Van

Community Van is a service offered by the municipality which provides the community and its members a shared means of transportation for short or long distance travels. Because the community van is a form of public transportation service, it helps reducing the number of commuting cars.

Community Van		Base year : 2015	
1	One-passenger cars removed from the roads	6	Units
2	km travelled	15 000	
3	Reduction of GHG emissions (tons and %)	9,29	60,5%
4	Passenger Van	1	Units
5	passenger capacity	12	seats
6	Fuel efficiency (L/100 KM)	17	L/100 km
7	km travelled	15 000	km
8	Fuel consumption	2 490	Liters
9	GHG emissions (tons)	6,1	eCO ₂ (t)
10	Occupied seats in average	50%	To Set
11	One-passenger cars removed from the roads	6	Units
12	Average Fuel consumption rating of removed cars	7	L/100 km
13	Avoided fuel consumption	6 300	Liters
14	Avoided GHG emissions	15,4	eCO ₂ (t)
15	GHG reductions	9,3	eCO₂ (t)



D. PROJECT PORTFOLIO

12. Solid Waste - Domestic composting

The Town intends to promote and establish a "domestic composting culture" with the population through actions such as training, composting, etc. This project involves the distribution of 460 domestic composters as soon as possible.

Solid Waste		Base year : 2015	
1	Compostable materials diverted from landfill	114	
2	GHG emissions reduction (tons & %)	-	0,0%
3	Duration of the project	7	
Estimation details			
4	Community Waste sector emissions	2 163	eCO ₂ (t)
5	Total community emissions	96 645	eCO ₂ (t)
6	Residential solid waste	3 035	Tons
7	Number of Dwellings in the community	4 635	
8	Number of composters to be distributed	460	Units
9	Number of users per composter	2,24	
10	Average organic material per person / year	0,184	Tons
11	Proportion of organic matter actually composted	60%	
12	Compostable materials diverted from landfill	113,76	Tons
13	Avoided Emissions	40	eCO ₂ (t)
14	Emissions from composting	45	eCO ₂ (t)
15	Net Short-term Reductions	0	eCO ₂ (t)



Partners for Climate Protection program (PCP) - Method



Community GHG & Energy Action Plan

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.



Rothesay's Corporate GHG Inventory & Action Plan



Realised with the



Climate Change and Energy Initiative

June 2018

Consulting team



Financed by



© 2018, Union of Municipalities of New Brunswick. All Rights Reserved.

The preparation of this plan was carried out with assistance from the Green Municipal Fund, a Fund financed by the Government of Canada and administered by the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.



Corporate GHG Inventory & Action Plan

I. Introduction

II. Strategy

III. Town profile

IV. Inventory

V. Action Plan

VI. Appendice



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 Rothesay'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 Rothesay 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 Rothesay has agreed to participate in CCEI.

[Link to: ACTION-GHG Rothesay](#)



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.



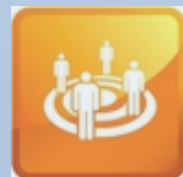
MILESTONE 1 CREATING A GREENHOUSE GAS EMISSIONS INVENTORY AND FORECAST

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 Rothesay is located in Kings County, New Brunswick, in the Kennebecasis River Valley. Rothesay is located northeast of the City of Saint John and southwest of the Town of Quispamsis. It is a suburb of the City of Saint John.

Municipal composition

- 1 mayor and 7 general councillors
- 45 Full Time employees and seasonal staff

Municipal infrastructures

- 65 buildings, lighting, water and sewage
- 36 vehicles and motorized equipment

Profile of the community

The population of Rothesay in 2016 was 11,659 inhabitants spread over an area of 34.72 km², a density of 335.8 hab./km². It decreased by 2% from 2011 to 2016. The Municipality had 4,816 private dwellings in 2016, of which 4,636 were occupied by full time residents. 72% of dwellings were built before 1991.

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

In Rothesay:

- Regional library
- Many churches
- Elementary School
- Middle School
- High School
- Post Office
- Arenas
- Fire Station
- Yacht Club
- Boating clubs and a rowing club
- Train Station



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 Rothesay 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 Rothesay has no 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



IV. INVENTORY

CORPORATE GHG INVENTORY



IV. INVENTORY

The Town of Rothesay 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.

Rothesay's 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 Rothesay. The relevant additional elements are detailed in the appendices.



IV. INVENTORY

A. Summary

The corporate component consists of five emission sectors which, in Rothesay's case, are responsible for approximately 1 614 tons of CO₂ equivalent. The two largest corporate GHG emission sectors are buildings and vehicle fleet. The former produce 31.4% of corporate GHGs, the latter generate 28.7%. Water and sewage is responsible for 23.51% of the Municipality's emissions, streetlights 12.1% and finally 4.3% of emissions are attributed to municipal waste.

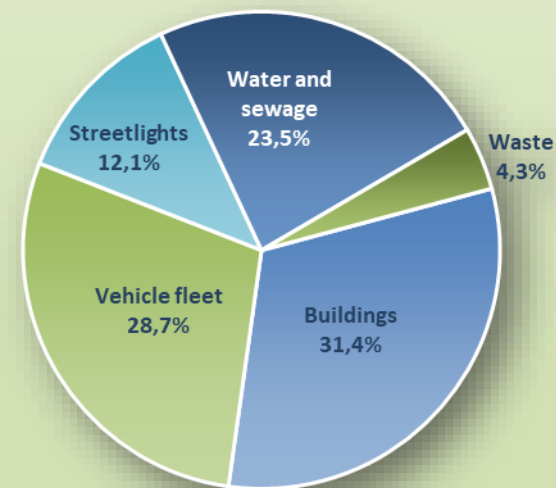
TABLE 1 :

CORPORATE GHG EMISSIONS FOR THE BASE YEAR

GHG (tons eCO ₂)	2015
Buildings	507
Vehicle fleet	464
Streetlights	196
Water and sewage	380
Waste	69
Total	1 614
Population	11 659
GHG per capita (teCO ₂)	0,1

GRAPH 1 :

CORPORATE GHG EMISSIONS BREAKDOWN BY SECTOR (teCO₂)



IV. INVENTORY

A. Summary (continued)

In 2015, the energy consumption of the various corporate activities of the Municipality was the source of 1 545.5 tons of emissions (CO₂ equivalent). For its energy needs, Rothesay uses electricity, propane and fuel oil for heating and two types of fuels for vehicles. Electricity, propane and fuel oil are devoted to the energy demand of buildings and other infrastructure. Gasoline, diesel and propane 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		(tCO ₂)	%	(Gj)	%
	Volume	Units				
Electricity	3 746 038	kWh	1 048,9	67,9%	13 485,7	65,3%
Natural Gas	0	m ³	0,0	0,0%	0,0	0,0%
CNG	0	Liters	0,0	0,0%	0,0	0,0%
Diesel	116 941	Liters	313,8	20,3%	4 478,9	21,7%
Gasoline	61 371	Liters	149,7	9,7%	2 148,0	10,4%
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	2 349	Liters	6,4	0,4%	91,1	0,4%
Propane	17 249	Liters	26,6	1,7%	436,6	2,1%
Waste	-	-	-	-	-	-
Total			1 545,5		20 640,3	



IV. INVENTORY

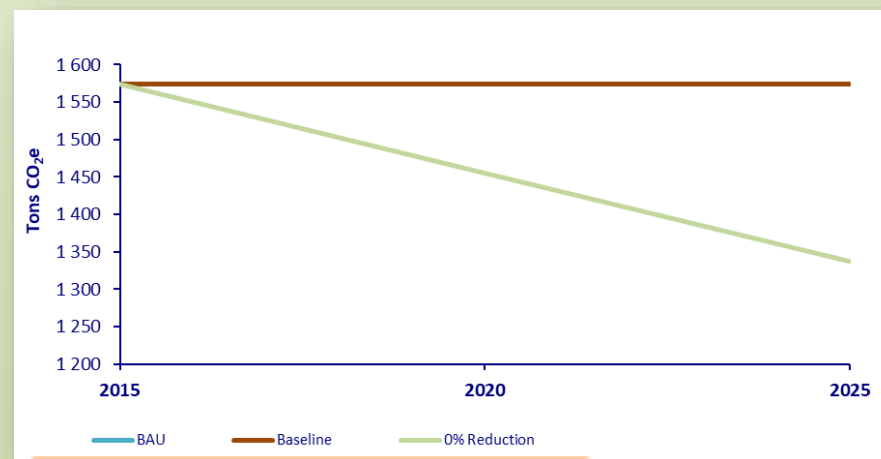
B. Corporate Emissions Forecast

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

Base Year	2015
Forecast Year*	2025
Reduction Target by Forecast Year* (%)	15,0%

GRAPH 2 :
FORECAST OF CORPORATE GHG EMISSIONS UNTIL 2025



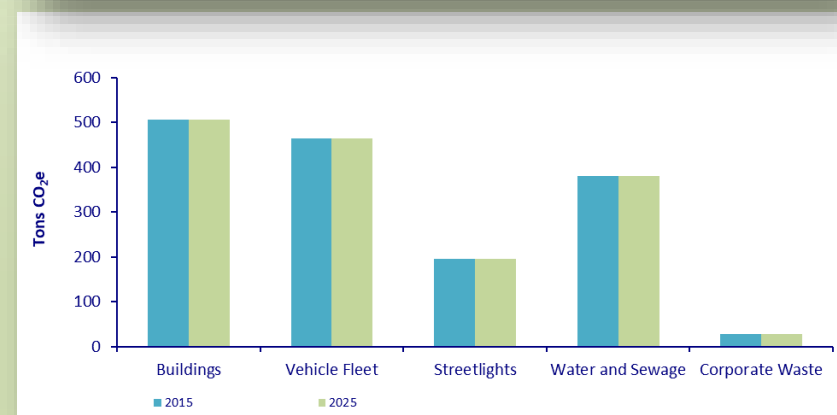
IV. INVENTORY

B. Corporate Emissions Forecast (continued)

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, 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.

TABLE 4 :
CORPORATE EMISSIONS FORECAST BY SECTOR

	Current emissions	% Change Expected**	Emissions in Forecast year
Buildings	506,7	0,0%	506,7
Vehicle Fleet	463,5	0,0%	463,5
Streetlights	195,7	0,0%	195,7
Water and Sewage	379,6	0,0%	379,6
Corporate Waste	68,7	0,0%	68,7
Émissions total (t CO₂e)	1 614,2		1 614,2



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 15% reductions in GHG emissions for 2025 according to the reference year 2015.

TABLE 5 :
OBJECTIVES AND YEAR

Objectives and year set by Rothesay:		
Corporate Action plan:		
		• Reduction Target : 15%
		• 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 Rothesay'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

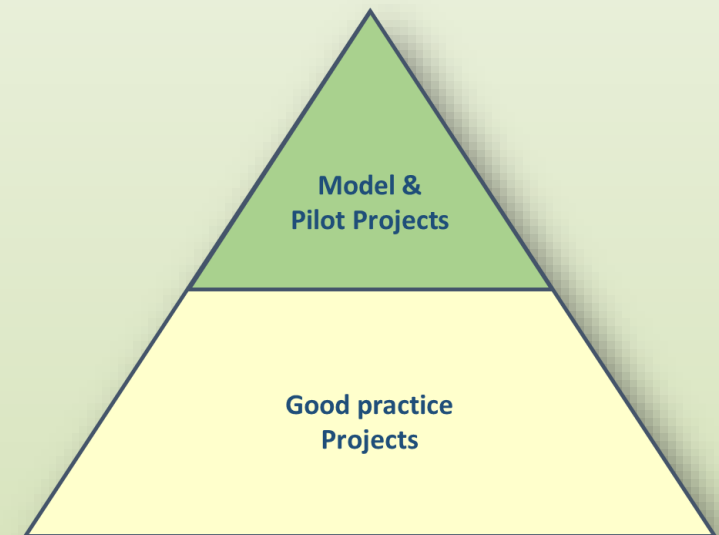
The action plan prioritises projects considered as "good practices". These projects correspond to the application of, for example, measures and technologies supported by the programs of New Brunswick Power, the Government of New Brunswick or Canada.

✓ 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^éR (Group Project)



V. ACTION PLAN

B. REFERENCE LEVEL AND TARGET

The goal of the Town of Rothesay’s Corporate Action Plan is to reduce greenhouse gas emissions by 15% by 2025 from their 2015 baseline.

For Rothesay, 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 242.1 tons or 15%.

TABLE 6 :
BASELINE AND TARGET

	Year	
	Base 2015	forecast 2025
Tons of CO₂ equivalent		
1 Current Emissions	1 614,2	
2 Reduction Target		15,0%
3 Forecast emissions (target) (line 1- line 4)		1 372,1
4 Total reductions to be achieved (line 1- line 3)		242,1

15%



V. ACTION PLAN

C. ANALYSIS OF THE PROJECTED RESULTS OF THE ACTION PLAN

Achieving the objective of Rothesay's Action Plan would mean that the level of corporate GHG emissions for the year 2025 be at 1 365.5 tons of eq. CO₂. This is a decrease of 248.7 tons from the 2015 emissions level of 1 614.2 tons of eq. CO₂. This represents a potential reduction of 15.4%, which is 0.4 percentage points above the target of 15% and 6.6 tons more than the targeted reduction of 242.1 tons (see Table 6).

TABLE 7 :
ANALYSIS OF THE OUTCOME OF THE ACTION PLAN

		Total reductions	
		eCO ₂ (t)	%
1	Current Emissions (Base year)	1 614,2	100,0%
2	Early action results	80,3	5,0%
3	Expected reductions in the Action Plan	168,4	10,4%
4	Total Reductions (line 2 + line 3)	248,7	15,4%
5	Level of anticipated emissions (forecast year) (line 1 - line 4)	1 365,5	84,6%
6	Gap with the target	6,6	0,4%



V. ACTION PLAN

D. PROJECT PORTFOLIO – EARLY ACTION

Some projects have been completed or initiated by the Town of Rothesay 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 one (1) project whose estimated reductions were estimated at 80.3 tons of CO₂ equivalent.

TABLE 8 :

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

Projects (MAT)	Total GHG reductions (tons)
Buildings	-
Vehicle Fleet	-
Streetlights	80,3
EA Streetlight replacement	80,3
Water and Sewage	-
TOTAL	80,3

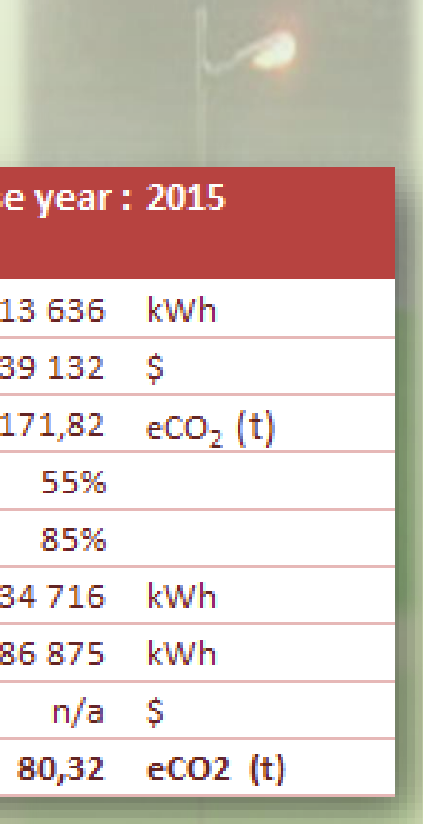


V. ACTION PLAN

D. PROJECT PORTFOLIO – EARLY ACTION

Streetlights - Streetlight replacement (Early Action)

Energy NB and Rothesay 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		613 636 kWh
2 Cost of electricity for lighting		139 132 \$
3 GHG emissions from lighting electric consumption		171,82 eCO ₂ (t)
4 Efficiency gains after conversion		55%
5 Conversion Ratio		85%
6 Annual consumption after conversion		234 716 kWh
7 Annual energy savings due to conversion		286 875 kWh
8 Annual savings due to conversion		n/a \$
9 Reduction of GHG emissions after conversion		80,32 eCO ₂ (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 Rothesay, the development of the Project Portfolio was completed.

The action plan contains eight (8) projects whose potential reductions are estimated at 168.4 tons of CO₂ equivalent (see Table 9).



V. ACTION PLAN

D. PROJECT PORTFOLIO

Project Portfolio Summary

TABLE 9 : CORPORATE PROJECT PORTFOLIO

Projects (MAT)				Total GHG reductions (tons)
Buildings				104,8
1	B1	Buildings (Bill McGuire Memorial Centre)	Clean Energy Conversion (Oil to Electricity)	1,5
2	B2	Buildings (Bill McGuire Memorial Centre)	Energy Efficiency (after conversion to electricity)	1,1
3	B3	Buildings (Town Hall, ...)	Energy Efficiency (Electricity)	13,0
4	B4	Buildings (Rothesay Arena)	Energy Efficiency (Eco Chill)	89,2
Vehicle Fleet				21,1
5	VF1	Gradual Fleet Renewal Policy	Number of vehicles : 19	3,7
6	VF2	Clean Vehicle Purchase Policy (gasoline)	Number of vehicles : 5	5,1
7	VF3	Idle-free Policy	Number of vehicles : 25	12,3
Streetlights				-
Water and Sewage				42,5
8	WS1	Water and Sewage	Energy Efficiency (Electricity)	42,5
Corporate Waste				-
TOTAL				168,4



V. ACTION PLAN

D. PROJECT PORTFOLIO

1. Buildings (Bill McGuire Memorial Centre) - Clean Energy Conversion (Oil to Electricity)

The building uses both heating oil and electricity. The building is equipped with heat pumps and in 2015, windows have been changed with more performant models. The project consists of dropping heating oil usage for a clean source of energy such as electricity.



Buildings (Bill McGuire Memorial Centre)		Base year : 2015
1 Annual heating oil Consumption	91	Gj
2 Annual heating oil Cost	1 784	\$
3 Annual GHG Emissions	6,42	eCO ₂ (t)
4 Total Reductions in GHG Emissions	1,46	eCO ₂ (t)
5 Energy savings	27	Gj



V. ACTION PLAN

D. PROJECT PORTFOLIO

2. Buildings (Bill McGuire Memorial Centre) - Energy Efficiency (after conversion to electricity)

Once the conversion to electricity is completed, Rothesay plans to implement a number of energy conservation measures on these two buildings : Upgrade the lighting System to LED.

Minimum target for overall energy savings: 5.4%

Buildings (Bill McGuire Memorial Centre)		Base year : 2015
1	Electricity used per year	76 360 kWh
2	Cost of electricity per year	11 293 \$
3	GHG emissions from electric consumption	21,38 eCO ₂ (t)
4	Electricity saving (estimated)	5,4 %
5	Electricity reduction per year (kWh)	4 093 kWh
6	GHG emissions reduction (tons)	1,15 eCO ₂ (t)
7	Annual savings	605 \$
8	Program length (action plan deadline : 2025)	n/a Years
9	Project's lifespan benefit	n/a \$
10	Annual savings (\$ / ton GHG)	528 \$ / eCO ₂ (t)



V. ACTION PLAN

D. PROJECT PORTFOLIO

3. Buildings (Town Hall, ...) - Energy Efficiency (Electricity)

Town of Rothesay plans to implement a number of energy conservation measures on three of its 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

Minimum target for overall energy savings: 15%.

Buildings (Town Hall, ...)		Base year : 2015
1	Electricity used per year	309 994 kWh
2	Cost of electricity per year	43 188 \$
3	GHG emissions from electric consumption	86,80 eCO ₂ (t)
4	Electricity saving (estimated)	15 %
5	Electricity reduction per year (kWh)	46 499 kWh
6	GHG emissions reduction (tons)	13,02 eCO ₂ (t)
7	Annual savings	6 478 \$
8	Program length (action plan deadline : 2025)	8 Years
9	Project's lifespan benefit	51 826 \$
10	Annual savings (\$ / ton GHG)	498 \$ / eCO ₂ (t)



V. ACTION PLAN

D. PROJECT PORTFOLIO

4. Buildings (Rothesay Arena) - Energy Efficiency (Eco Chill)

Rothesay plans a major renovation on the arena. The extend of the changes is yet to be determined. The chosen technology is Eco Chill is adaptable to users' needs and to the particularities of the existing structure.

Minimum target for overall energy savings: 40%.

Buildings (Rothesay Arena)		Base year : 2015
1	Electricity used per year	796 320 kWh
2	Cost of electricity per year	102 795 \$
3	GHG emissions from electric consumption	222,97 eCO ₂ (t)
4	Electricity saving (estimated)	40 %
5	Electricity reduction per year (kWh)	318 528 kWh
6	GHG emissions reduction (tons)	89,19 eCO ₂ (t)
7	Annual savings	41 118 \$
8	Program length (action plan deadline : 2025)	8 Years
9	Project's lifespan benefit	328 944 \$
10	Annual savings (\$ / ton GHG)	461 \$ / eCO ₂ (t)



V. ACTION PLAN

D. PROJECT PORTFOLIO

5. 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 de vehicles	18	28
2 Fuel consumption	23 605 liters	109 430 liters
3 Fuel cost	24 785 \$	120 373 \$
4 GHG emissions	57,58 eCO ₂ (t)	293,65 eCO ₂ (t)
5 Number of vehicles to be replaced	13	6
6 Average efficiency gains due to renewal of fleet	5,0%	5,0%
7 Reduction of GHG emissions after conversion	2,6 eCO ₂ (t)	1,1 eCO ₂ (t)
8 Total Reductions in GHG Emissions	3,70 eCO₂ (t)	



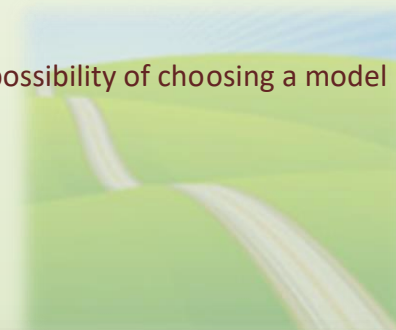
V. ACTION PLAN

D. PROJECT PORTFOLIO

6. Transportation - Clean Vehicle Purchase Policy (gasoline)

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).



Base year : 2015	
More compact cars	
1 Number of targeted units	5
2 Fuel type	Gasoline
3 Fuel consumption	10308 liters
4 Fuel savings per year (liters)	2 089 liters
5 Fuel savings per year (\$)	2 194 \$
6 GHG emissions reduction (tons)	5,10 eCO ₂ (t)
7 GHG emissions reduction (%)	20,27 %
8 Lifetime	10 years
9 Project's lifespan benefit	21 939 liters
10 Savings (\$ / ton GHG)	430 / t eCO ₂



V. ACTION PLAN

D. PROJECT PORTFOLIO

7. 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	18	7
2 Fuel consumption	23 605 liters	8 198 liters
3 Fuel cost	24 785 \$	9 018 \$
4 GHG emissions	57,58 eCO ₂ (t)	22,00 eCO ₂ (t)
5 Average fuel wasted idling	3 519 liters	1 369 liters
6 Average fuel economy	14,9%	16,7%
7 GHG emissions reduction	8,59 eCO ₂ (t)	3,67 eCO ₂ (t)
8 Fuel savings (\$)	3 695 \$	1 345 \$
9 Total GHG Emissions reduction	12,26 eCO₂ (t)	
10 Total fuel savings (\$)	5 040 \$	
11 Saving per tonne of GHG reduced	411 / t eCO ₂	



V. ACTION PLAN

D. PROJECT PORTFOLIO

8. Water and Sewage - Energy Efficiency (Electricity)

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

In 2018, pumps of the water planet (28 Dolan Road) will be upgraded.

Other improvement will also be considered :

- 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

Water and Sewage		Base year : 2015
1	Electricity used per year	1 012 396 kWh
2	Cost of electricity per year	105 246 \$
3	GHG emissions from electric consumption	283,47 eCO ₂ (t)
4	Electricity saving (estimated)	15 %
5	Electricity reduction per year (kWh)	151 859 kWh
6	GHG emissions reduction (tons)	42,52 eCO ₂ (t)
7	Annual savings	15 787 \$
8	Program length (action plan deadline : 2025)	8 Years
9	Project's lifespan benefit	126 296 \$
10	Annual savings (\$ / ton GHG)	371 \$ / eCO ₂ (t)



VI. APPENDICE

The methodology and references are available on request.

