

Grand Bay-Westfield's Community GHG & Energy Action Plan



Realised with the



Climate Change and Energy Initiative

June 2018

Consulting team



Financed by



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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 Grand Bay-Westfield** 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.

Grand Bay-Westfield 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**
- ✓ **Assessment and Test Application of the Community Vulnerability Assessment Tool (CVAT) in Grand Bay-Westfield, NB**



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.**



II. THE PLAN'S STRATEGY

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.



II. THE PLAN'S STRATEGY

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 includes 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 Grand Bay-Westfield is located in King's County, southern New Brunswick on the right (west) bank of the Saint John River, directly north of the City of Saint John. Grand Bay-Westfield borders Saint John to the south, Musquash Parish to the southwest, and Westfield Parish to the west and north.

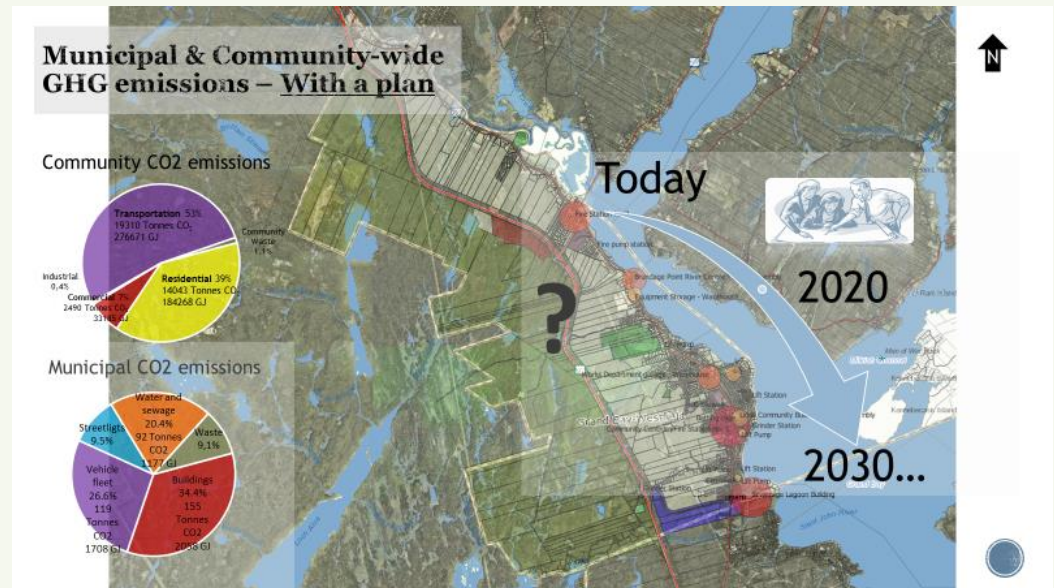
The population of Grand Bay-Westfield in 2016 was 4,964 inhabitants spread over an area of 59.78 km², a density of 83 inhabitants / km². The Municipality had 2 029 private dwellings in 2016, of which 1 933 were occupied by full time residents. 77% of dwellings were built before 1991.

The official languages spoken by the population of Grand Bay-Westfield are English at 96% and French at 4%.

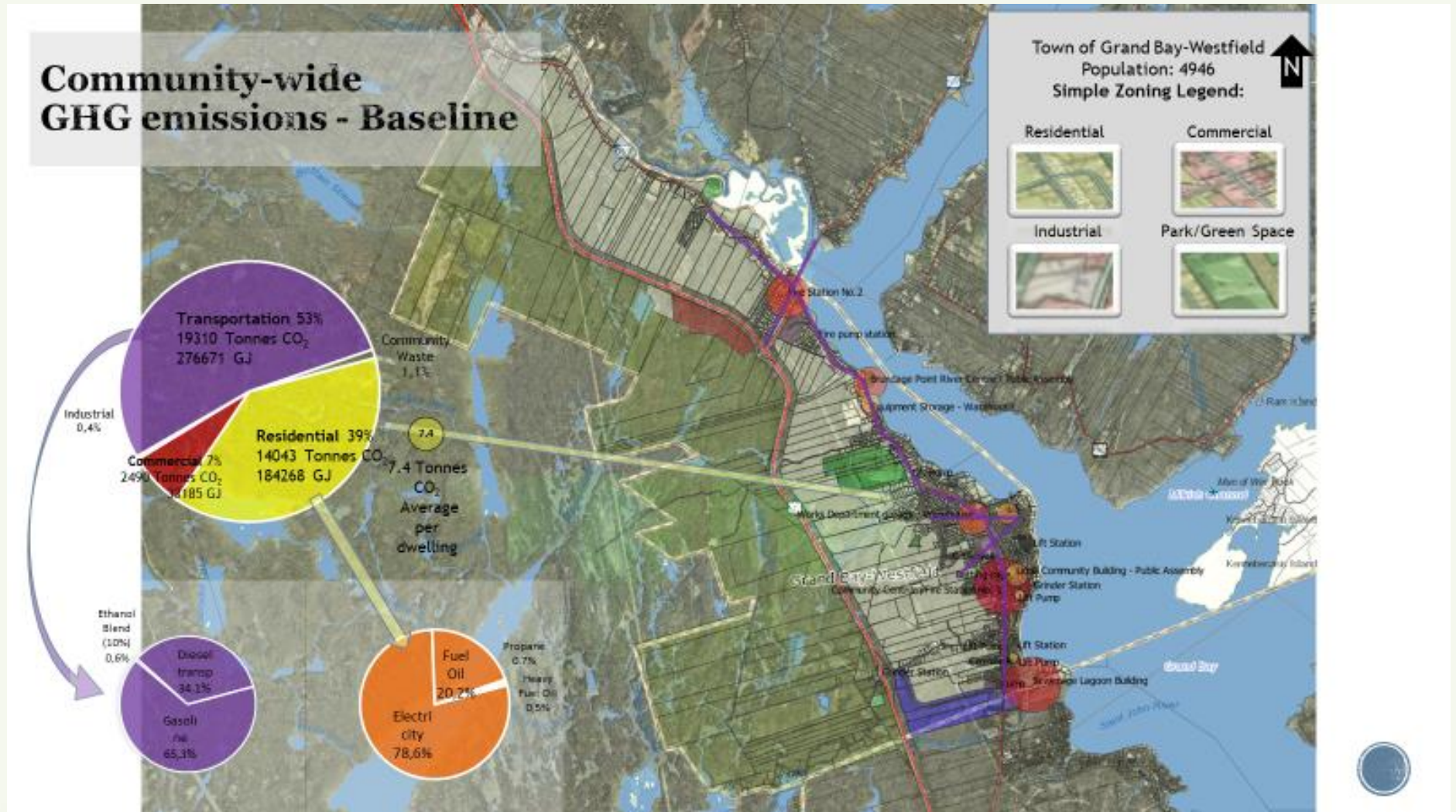
The Town's growth strategy for sustainable development strengthens the commercial core by providing zoning controls that foster a higher density and variety of housing mix. These controls encourage denser housing and commercial investment, while also reducing pressures to develop in un-serviced areas. The development strategy places a high priority on the master planning of vacant land around Colonel Nase Boulevard.

Many residents of Grand Bay-Westfield find employment in Saint John; many are tradespeople who work at the Point Lepreau Nuclear Generating Station, or the Coleson Cove Generating Station, as well as various J.D. Irving Limited pulp and paper factories and the Moosehead brewery - all located on the west side of the city.

PICTURE 1: GRAND BAY-WESTFIELD'S MAP



PICTURE 2: GRAND BAY-WESTFIELD'S GHG EMISSIONS MAP



Community GHG & Energy Action Plan

III. THE COMMUNITY'S PROFILE

Challenges

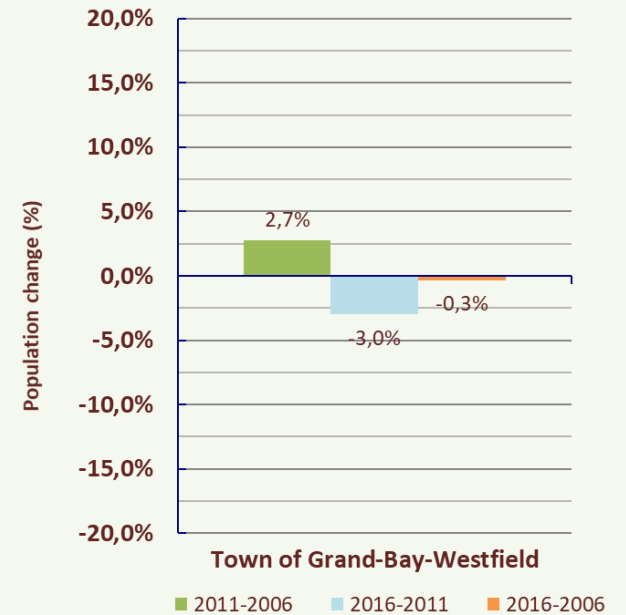
- ✓ The Town is facing an interesting challenge while its population remains stable with a slight population decrease (-0,3%) between 2006 and 2016.
- ✓ Responsibilities and demand for municipal services should remain stable in short term.

Opportunities

- ✓ Grand Bay-Westfield 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.

Grand Bay-Westfield Plans to be a leader for sustainable development in New Brunswick.

DEMOGRAPHIC EVOLUTION



A. THE PLAN

The Plan aims to help Grand Bay-Westfield and its Community to face main challenges.

- **Reduce dependency on fossil energies:**
 - Reduce by at least 25% 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 by at least 25% clothes 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
 - 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 or decrease**
- **Expand 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 | Reaching PCP Milestone 4 |
| 3 | Annual or biennial inventory update (Community & Corporate) | Reaching 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 |
| 2 | Monitoring activities | GHG & GJ reduction evaluation |



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 Fuel-efficient driving		
1	Annual activity review report	Status, project implementation development
T3 Electric Vehicle Community Program		
1	Annual activity review report	Status, project implementation development
2	Monitoring activities	EV purchase information
T4 Compact vehicles		
1	Annual activity review report	Status, project implementation development
T5 Community Van		
1	Annual activity review report	Status, project implementation development
2	Monitoring activities	GHG & GJ reduction evaluation



COMMUNITY GHG INVENTORY



V. THE INVENTORY

The Town of Grand Bay-Westfield has joined the Climate Change and Energy Initiatives Program by commissioning UMN 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.

Grand Bay-Westfield'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 Grand Bay-Westfield. The relevant additional elements are detailed in the appendices.



Community GHG & Energy Action Plan

V. THE INVENTORY

A. SUMMARY

The community component consists of five emission sectors. For Grand Bay-Westfield, the total emissions of the community is approximately 36 429 tons of CO₂ equivalent. Most of these came from transportation that is 51.7%. Residential sector generated 38.5% of emissions, commercial sector 6.8%, community waste 2.5% and finally 0.4% of emissions are attributed to the industries.

The Community, with its 4 964 inhabitants has a per capita emission rate of 7.3 tons of CO₂ equivalent.

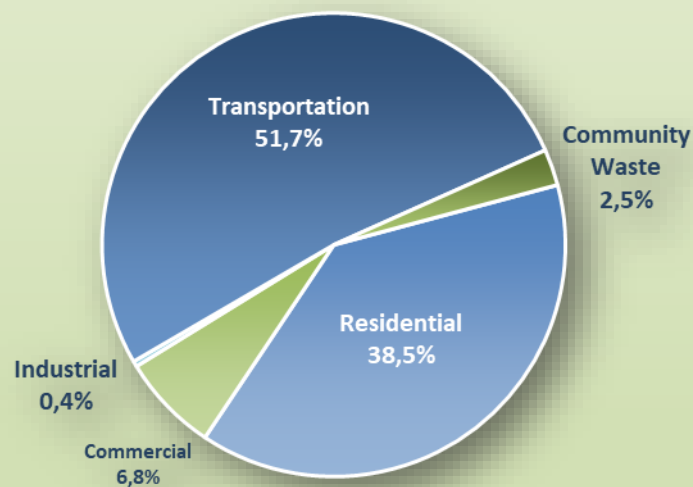
TABLE 1 :

COMMUNITY GHG EMISSIONS FOR THE BASE YEAR

GHG (tons eCO ₂)	2015
Residential	14 043
Commercial	2 490
Industrial	141
Transportation	18 834
Community Waste	921
Total	36 429
Population	4 964
GHG per capita (teCO ₂)	7,3

GRAPH 1 :

COMMUNITY GHG EMISSIONS BREAKDOWN BY SECTOR (teCO₂)



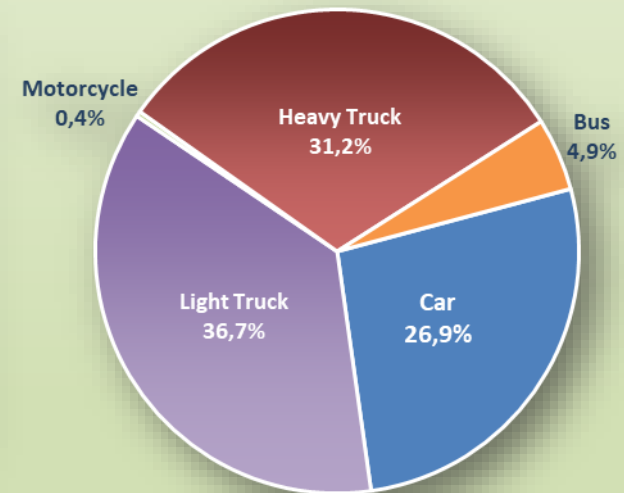
B. TRANSPORTATION

For the year 2015, the Grand Bay-Westfield community had 4 172 vehicles numbered on its territory. With 18 834 tons of eq. CO₂, the transportation sector is responsible for a large part (51.7%) 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	2 011	48,2%	5 069,8	26,9%
Light Truck	1 762	42,2%	6 913,1	36,7%
Motocycle	140	3,4%	66,6	0,4%
Heavy Truck	243	5,8%	5 870,4	31,2%
Bus	16	0,4%	914,5	4,9%
Total	4 172		18 834	

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



C. Industrial, Commercial and Institutional Buildings (ICI)

In 2015, an estimated 16 673.7 tons of eq. CO₂, greenhouse gas emissions come from Grand Bay-Westfield's residential, and industrial, commercial and institutional (ICI) sectors. Electricity gets noticed as first source of GHG emissions with 13 105.3 tons of eq. CO₂. Fuel oil and propane - building assume 3 364.5 and 115.6 tons and finally heavy fuel oil use emits 88.3 tons eq. CO₂.

TABLE 3 :

COMMUNITY GHG EMISSIONS AND ENERGY CONSUMPTION BY TYPE

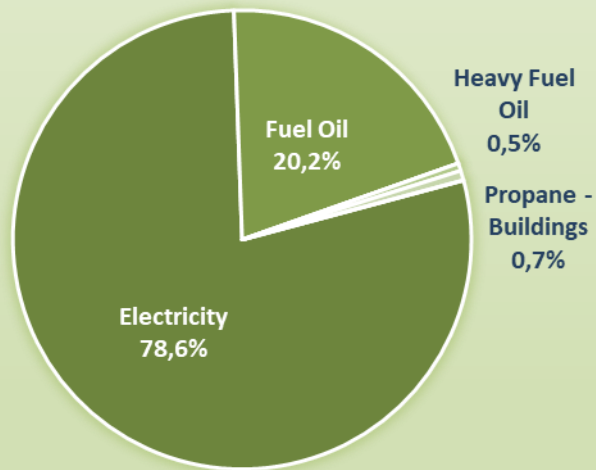
Energy	Volume	Unit	2015			
			(teCO ₂)	%	(Gj)	%
Electricity	46 804 642	kWh	13 105,3	78,6%	168 497	76,8%
Fuel Oil	1 230 088	Liters	3 364,5	20,2%	47 727	21,8%
Natural Gas	0	m ³	0,0	0,0%	0	0,0%
Diesel - Buildings	0	Liters	0,0	0,0%	0	0,0%
Heavy Fuel Oil	28 085	Liters	88,3	0,5%	1 194	0,5%
Propane - Buildings	74 892	Liters	115,6	0,7%	1 896	0,9%
District Energy	0		0,0	0,0%	0	0,0%
Total			16 673,7		219 313	



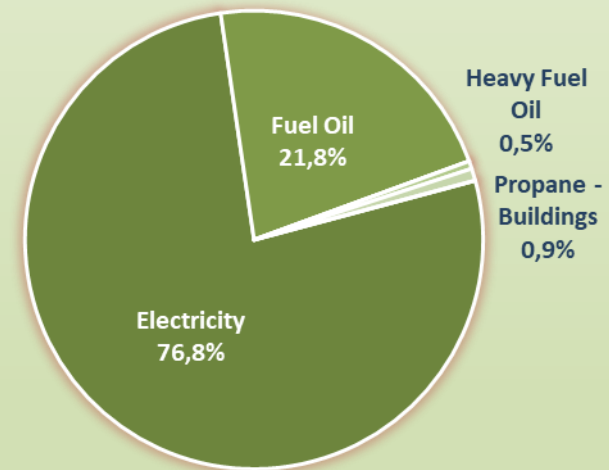
C. Industrial, Commercial and Institutional Buildings (ICI) (continued)

Electricity produces 78.6% of the sector's emissions and meets 76.8% of the Grand Bay-Westfield Territory's energy needs for the residential sector and ICI. Fuel oil, propane - buildings and heavy fuel oil accounted for 20.2%, 0.7% and 0.5% respectively, and together they contributed 21.8%, 0.9% and 0.5% of their energy demand in their sectors for the Grand Bay-Westfield 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

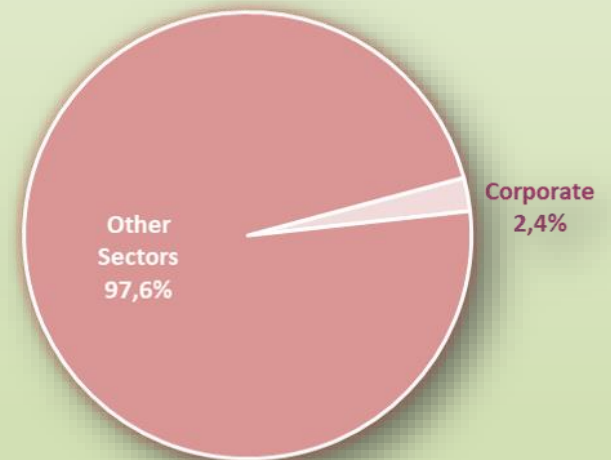
In 2015, the 2 648 tons of Grand Bay-Westfield’s solid waste produced 920.7 tons of eq. CO₂ greenhouse gas. They are responsible for 2.5% of the total emissions of the Community (see Graph 1).

The estimated share of corporate emissions is 9.1 tons of eq. CO₂ (1.0% of the total) which would correspond to nearly 54 tons of waste.

TABLE 4 :
COMMUNITY LANDFILL WASTE BY CATEGORY

Waste Category	2015			
	Tons	%	(teq. CO ₂)	%
Corporate	54	2,1%	9,1	1,0%
Other Sectors	2 594	97,9%	911,7	99,0%
Total	2 648		920,7	

GRAPH 5 :
COMMUNITY LANDFILL WASTE GHG EMISSIONS BY CATEGORY (teCO₂)



E. Community Emissions Forecast

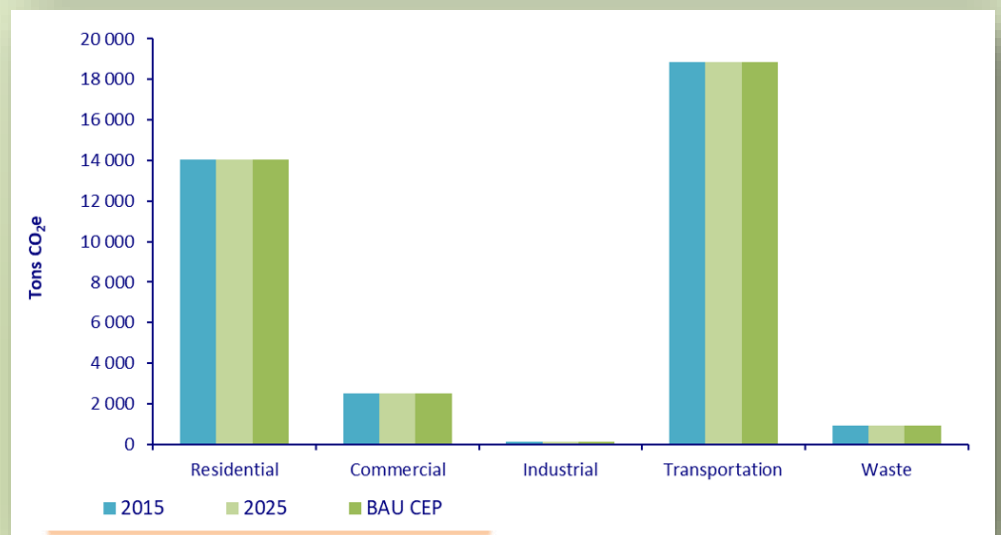
Community emissions forecast present how the inventory emissions may evolve at the end of the action plan (2025), based on a business as usual scenario (BAU), i.e. without any direct intervention of the decision-makers. Factors such as demographic change or economic conditions are taken into account in determining future levels of current emissions.

For Grand Bay-Westfield, the business as usual scenario anticipates that, apart from the present action plan reduction, the level of the community GHG emissions will remain stable.

TABLE 6 :

COMMUNITY EMISSIONS FORECAST BY SECTOR

	Current emissions	% Change Expected**	Emissions in Forecast year	Emissions in CEP Forecast year
Residential	14 043,1	0,0%	14 043,1	14 043,1
Commercial	2 490,1	0,0%	2 490,1	2 490,1
Industrial	140,6	0,0%	140,6	140,6
Transportation	18 834,4	0,0%	18 834,4	18 834,4
Waste	920,7	0,0%	920,7	920,7
Total Emissions (t CO₂e)	36 428,9		36 428,9	36 428,9



E. Community Emissions Forecast (continued)

The projected emissions, seek to present how inventory emissions will evolve at the end of the action plan, 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.

For Grand Bay-Westfield, the business as usual scenario anticipates that, apart from the present action plan reduction, the level of the community GHG emissions will remain stable. This action plan is expected to bring them down by 7% in 2025 and by 14% in 2035.

**TABLE 5 :
COMMUNITY INFORMATION**

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

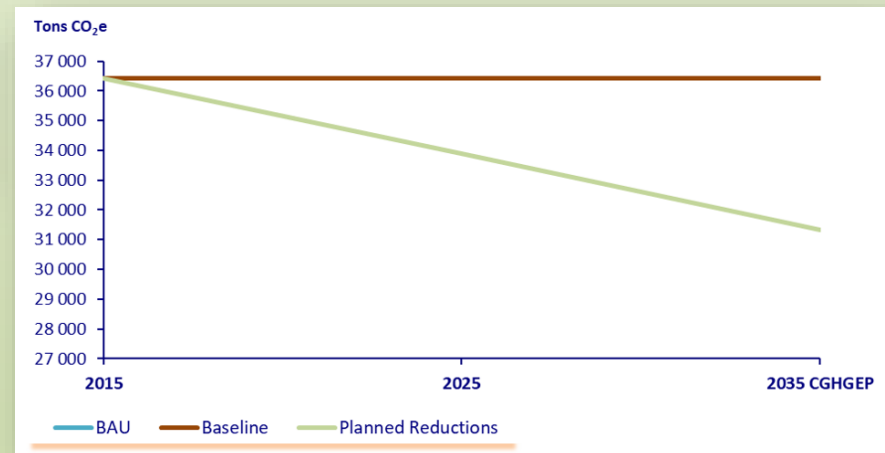
Baseline: 2015 (Base year)

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

2025: Action Plan deadline

CGHGEP or CEP: Community Greenhouse Gases Energy Planning. Long term projects requiring a longer horizon than the current action plan.

**GRAPH 6 :
COMMUNITY EMISSIONS FORECAST**



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 Grand Bay- Westfield:

Community Action plan :

- Reduction Target : 7% and 14%
- Base year : 2015
- Forecast year : 2025 and 2035



A. STRATEGY FOR GHG REDUCTION AND PROJECT SELECTION

Guiding Principles

The approach behind the development of the Town of Grand Bay-Westfield'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.

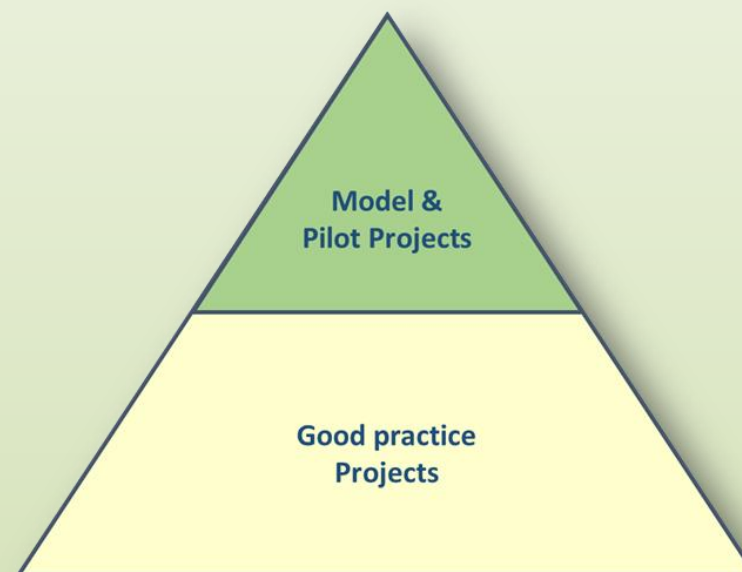
✓ These "Good Practice" projects form the basis of the Action Plan.

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)**

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



Community GHG & Energy Action Plan

VI. THE PLAN

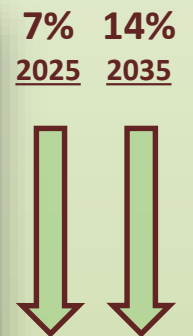
B. REFERENCE LEVEL AND TARGET

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

For Grand Bay-Westfield, 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 2 550 tons or 7% by 2025 and 5 100 tons or 14% by 2035.

TABLE 8 :
BASELINE AND TARGET

Tons of CO2 equivalent	Year		
	Base 2015	Forecast 2025	Forecast EGHGEP 2035
1 Current Emissions	36 429		
2 Community Emissions Forecast (BAU Scenario)		36 429	36 429
3 Reduction Target		7,0%	14,0%
4 Forecast emissions (target) (line 1 - line 5)		33 879	31 329
5 Total reductions to be achieved (line 1 - line 4)		2 550,0	5 100,0
6 Total reductions to be achieved (Including BAU Scenario)		2 550,0	5 100,0



C. ANALYSIS OF THE PROJECTED RESULTS OF THE ACTION PLAN

Achieving the objective of Grand Bay-Westfield’s Action Plan would mean that the level of community GHG emissions for the year 2025 be at 33 780 tons of eq. CO₂. This is a decrease of 2 649 tons from the 2015 emissions level of 36 429 tons of eq. CO₂. This represents a potential reduction of 7.3%, which is 0.3 percentage point above the target of 7,0% and 99.3 tons more than the targeted reduction of 2 550.0 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)	36 429	100,0%	
2 Early action results	0	0,0%	
3 Expected reductions in the Action Plan	2 649	7,3%	
4 Total Reductions (line 2 + line 3)	2 649	7,3%	
5 Level of anticipated emissions (forecast year) (line 1 - line 4)	33 780	92,7%	
6 Gap with the target (Action Plan 2025)	99,3	0,3%	
7 Considering BAU Scenario (2025)	99,3	0,0%	7,3%



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 Community of Grand Bay-Westfield, the development of the Project Portfolio was completed.

The action plan contains twelve (12) projects whose potential reductions are estimated at 2 649.3 tons of CO₂ equivalent (see Table 10).



D. PROJECT PORTFOLIO

Project Portfolio Summary

TABLE 10 : COMMUNITY PROJECT PORTFOLIO

Projects (Measures, Actions, Technologies)	Total GHG reductions (tons)
Residential	753,6
1 R1 LED lighting	48,5
2 R2 Clean Energy Conversion (Oil to Electricity) Conversion rate : 25%	155,2
3 R3 Energy efficiency (Residential buildings)	475,8
4 R4 Energy efficiency - Residential - Clothes Line Program	74,1
ICI	162,1
5 ICI1 LED lighting See Action R 1	85,2
6 ICI2 Energy efficiency (commercial buildings)	76,8
Transportation	1 733,6
7 T1 Idle-free Policy	1 176,8
8 T2 Fuel-efficient driving	355,6
9 T3 Electric Vehicle Community Program EV Units 23	72,0
10 T4 Compact vehicles Units 189	120,0
11 T5 Community Van Units 1	9,3
Community Waste	-
12 W1 Domestic composting	-
TOTAL	2 649,3



D. PROJECT PORTFOLIO

1. Infrastructure (lighting) - LED lighting

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	51 894	14 414 950	
2 Estimated residential lighting power consumption	1 889	524 704	3,64%
3 Total CI sector energy consumption	30 107	8 362 973	
4 Estimated commercial lighting power consumption	3 227	896 511	10,72%
5 Total industrial energy consumption	2 566	712 693	
6 Estimated industrial lighting power consumption	93	25 942	3,64%
Efficiency gains due to conversion			
7 Efficiency gains due to conversion		55%	
8 Conversion rate for 2025		60%	
9 Annual energy conversion reduction (residential)		173 152	kWh
10 Annual Energy Conversion Reduction (Commercial and Institutional)		295 849	kWh
11 Annual Energy Reduction in Conversion (Industrial)		8 561	kWh
12 Reduction of GHG emissions from conversion (residential)		48	t eCO ₂
13 Conversion GHG emission reduction (Commercial and Institutional)		83	t eCO ₂
14 Reduction in Conversion GHG Emissions (Industrial)		2	t eCO ₂
15 Reduction of GHG emissions from conversion (all sectors)		134	t eCO₂

Note:

Line 12- Table 10, Project 1 R 1

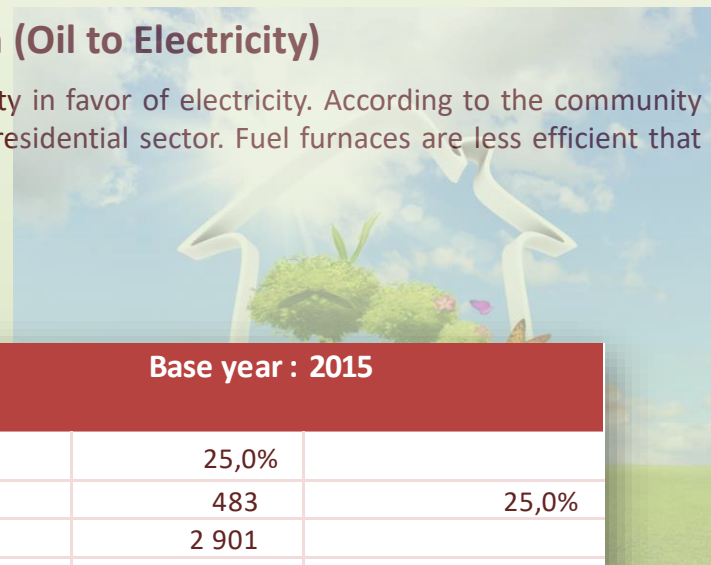
Lines 13 & 14- Table 10, Project 5 ICI 1



D. PROJECT PORTFOLIO

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

Grand Bay-Westfield wishes to reduce heating oil consumption in the community in favor of electricity. According to the community inventory, more than 38.5% of the community's GHG emissions come from the residential sector. Fuel furnaces are less efficient than electric heaters.



Clean Energy Conversion (Oil to Electricity)			Base year : 2015	
1	Energy conversion		25,0%	
2	Participating households (number and %) *		483	25,0%
3	Energy saved per (Gj)		2 901	
4	Reduction of GHG emissions (tons and %)		155,2	5,7%
	* Rough estimation			
Estimation details				
5	Heating oil consumption	38 682	Gj	
6	Heating oil GHG emissions	2 727	eCO ₂ (t)	
7	Projects' rate of implementation	25%	Target to set	
8	Number of Dwellings in the community	1 930		
9	Participating households	483		Rough estimation
10	Electricity needs (result of conversion)	6 769	Gj	
11	Electricity GHG Emissions (result of conversion)	526	eCO ₂ (t)	
12	Residual Heating Oil consumption	29 011	Gj	
13	Residual Heating GHG Emissions	2 045	eCO ₂ (t)	
14	GHG reduction	155,2	eCO ₂ (t)	



D. PROJECT PORTFOLIO

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

According to the community inventory, more than 38.5% 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 %) *		965	50,0%
3	Energy saved per year (Gj)		6 258	
4	Reduction of GHG emissions (tons and %)		475,8	5,0%
	* Rough estimation			
Estimation details				
5	Total electricity Consumption	145 162	Gj	
6	Energy use for heating purposes	65,94%		
7	Electric Consumption - heating	95 720	Gj	
8	Fuel consumption - heating	29 011	Gj	see below
9	Propane consumption - heating	425	Gj	
10	Electricity consumption GHG emissions	7 445	eCO ₂ (t)	
11	Fuel consumption GHG emissions	2 045	eCO₂ (t)	
12	Propane GHG emissions	26	eCO ₂ (t)	
13	GHG emissions targeted	9 516	26,1%	
14	Projects' rate of implementation	50%	To set	
15	Total community emissions	36 429	eCO ₂ (t)	
16	Average energy efficiency gain	10,0%	To set	
17	Number of Dwellings in the community	1 930		
18	Participating households	965	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 & envelope) - Energy efficiency - Residential - Clothes Line Program

Grand Bay-Westfield 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 38.5 % 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 %)	441	22,9%
3	Energy saved per year (kWh)	264 739	
4	Reduction of GHG emissions (tons and %)	74,1	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	1 930	
8	Ratio of households with an electric clothes dryer	91,4%	
9	Annual estimated power used by laundry dryers	2 117 916	kWh / year
10	Total estimated GHG emissions of laundry drying	593	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	441	
15	Energy reduction	264 739	kWh
16	GHG reduction	74	
17	Energy savings	28 036	\$
18	Total community emissions	36 429	eCO ₂ (t)



D. PROJECT PORTFOLIO

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

According to the community inventory, more than 6.8 % 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)		1 044	
3	Reduction of GHG emissions (tons and %)		76,85	5,0%
Estimation details				
4	Total electricity Consumption	22 168	Gj	
5	Energy use for heating purposes	48,35%		
6	Electric Consumption - heating	10 718	Gj	
7	Fuel consumption - heating	8 732	Gj	
8	Propane consumption - heating	1 439	Gj	
9	Electricity consumption GHG emissions	834	eCO ₂ (t)	
10	Fuel consumption GHG emissions	616	eCO ₂ (t)	
11	Propane GHG emissions	88	eCO ₂ (t)	
12	GHG emissions targeted	1 537	4,2%	
13	Projects' rate of implementation	50%	To Set	
14	Total community emissions	36 429	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	3 863	272
2 Fuel consumption	5 040 264 liters	2 394 737 liters
3 GHG emissions	12 296 eCO ₂ (t)	6 426 eCO ₂ (t)
4 Average fuel wasted idling	415 350 liters	60 928 liters
5 Average fuel economy	8,2%	2,5%
6 GHG emissions reduction	1013,3 eCO ₂ (t)	163,5 eCO ₂ (t)
7 Total GHG Emissions reduction	1176,75 eCO₂ (t)	

D. PROJECT PORTFOLIO

7. Transport - 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

		Base year : 2015	
Fuel-efficient driving			
1	Community transportation emissions	18 834	eCO ₂ (t)
2	Total community emissions	36 429	eCO ₂ (t)
3	Number of targeted units	401	
4	Reduction of GHG emissions (tons and %)	356	0,98%



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.

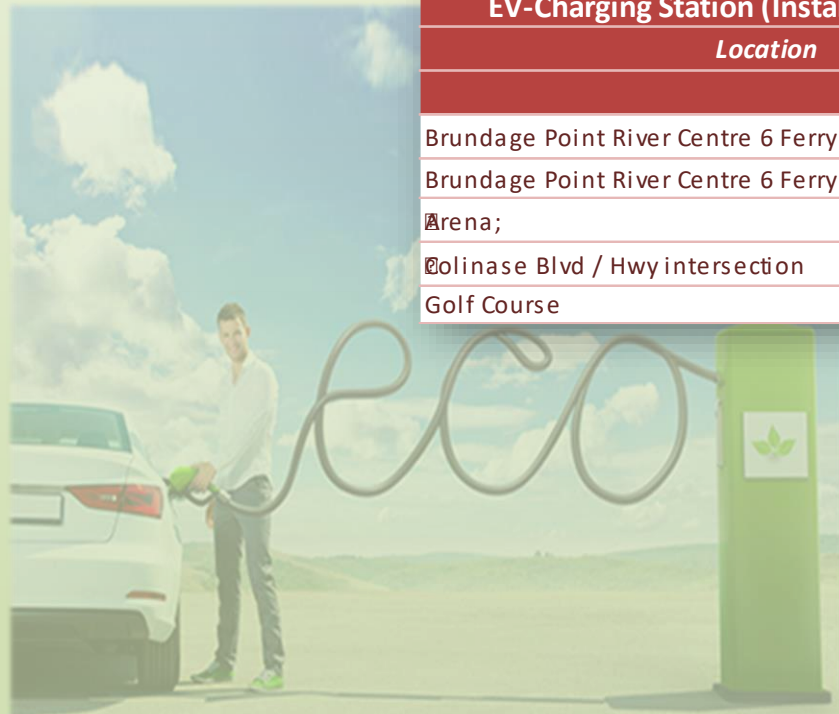
		Base year :	2015
		Target year :	2025
1	GHG Offset Target - eCO ₂ (t)		72
2	Target number of EV units for 2025	Minimum & maximum	23
3	NB CCAP Target for EV units for 2025 (estimated)	Total & annually	65
4	GHG emissions reduction (tons and %)	Minimum	72
5		Maximum	200
6	Transport GHG emissions reduction (%)	Minimum & Maximum	0,4%
7	Savings per year (Minimum & maximum)	Minimum & Maximum	8 638 \$
8	Number of car & light Truck		72 931 \$
9		Minimum & maximum	3 773
			0,6%
			1,7%



D. PROJECT PORTFOLIO

8. Transportation - Electric Vehicle Community Program (continued)

Charging Station : In 2018, Grand Bay Westfield counts 1 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	5
Brundage Point River Centre 6 Ferry Rd, - N2 NBPower Flo		1
Brundage Point River Centre 6 Ferry Rd	<i>Additional CS proposed</i>	1
Arena;	<i>Proposed W1</i>	1
Colinase Blvd / Hwy intersection	<i>Proposed W1</i>	1
Golf Course	<i>Proposed W1</i>	1

D. PROJECT PORTFOLIO

9. 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	18 834	eCO ₂	(t)
2	Total community emissions	36 429	eCO ₂	(t)
3	Number of targeted units	189		
4	Reduction of GHG emissions (tons and %)	120	0,33%	

D. PROJECT PORTFOLIO

10. 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.

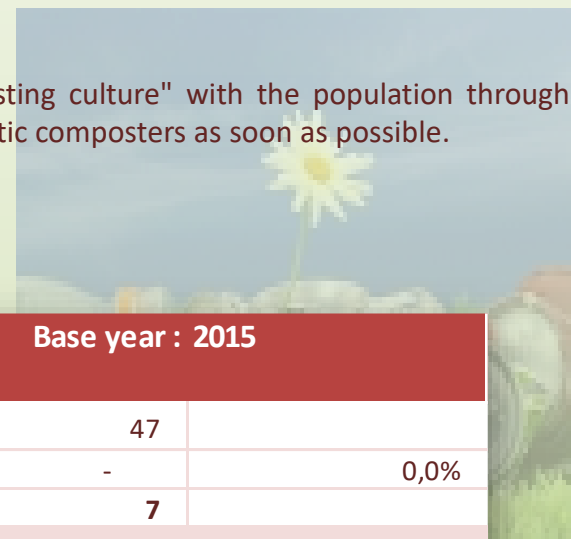
Community Van		Base year : 2015	
1	One-passenger cars removed from the roads	6	Units
2	km travelled	15 000	
3	Reduction of GHG emissions (tons and %)	9,29	60,5%
4	Passenger Van	1	Units
5	passenger capacity	12	seats
6	Fuel efficiency (L/100 KM)	17	L/100 km
7	km travelled	15 000	km
8	Fuel consumption	2 490	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

11. Solid Waste - Domestic composting

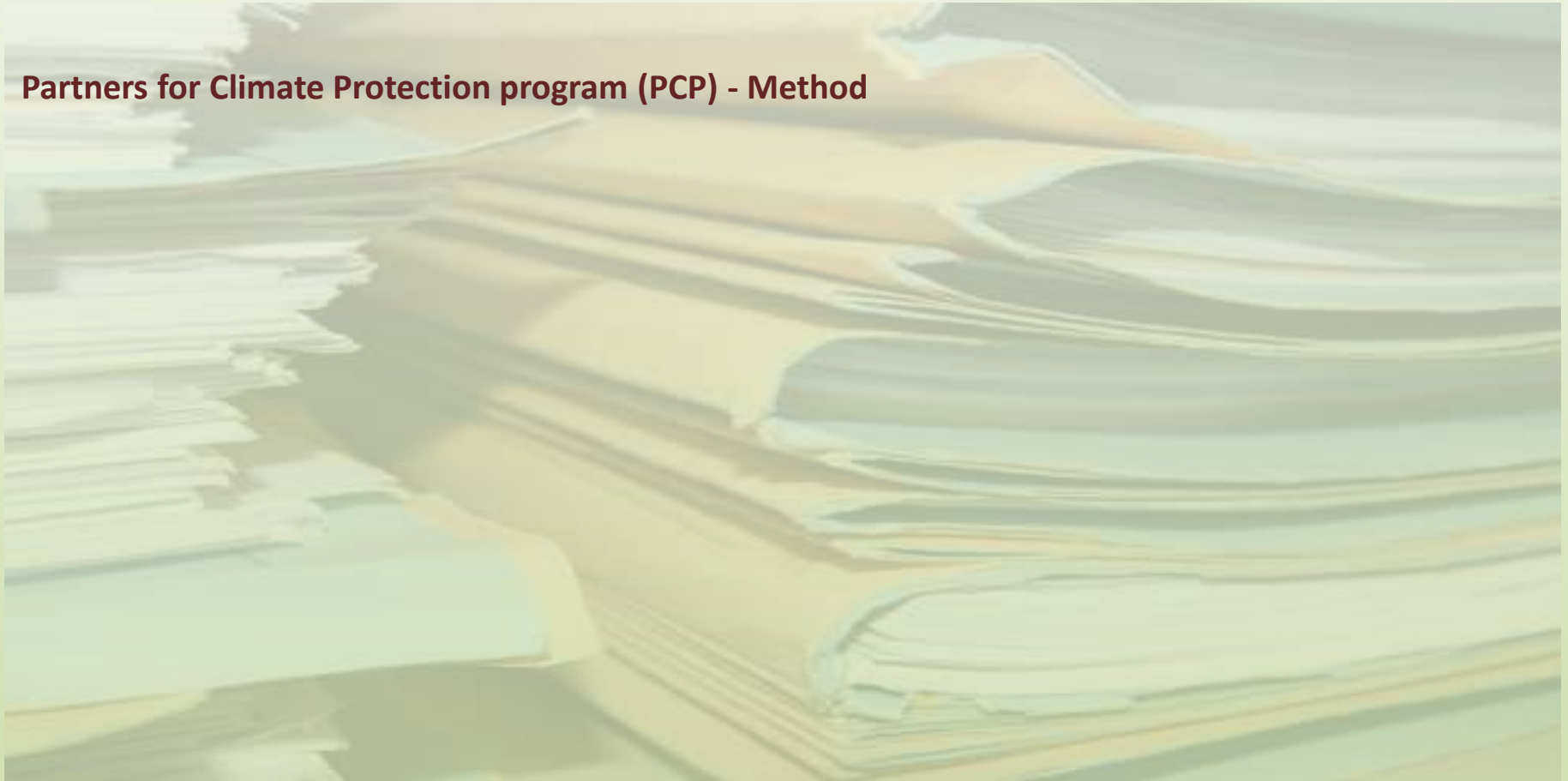
The Town of Grand Bay-Westfield intends to promote and establish a "domestic composting culture" with the population through actions such as training, composting, etc. This project involves the distribution of 190 domestic composters as soon as possible.



Solid Waste			Base year : 2015
1	Compostable materials diverted from landfill	47	
2	GHG emissions reduction (tons & %)	-	0,0%
3	Duration of the project	7	
Estimation details			
4	Community Waste sector emissions	921	eCO ₂ (t)
5	Total community emissions	36 429	eCO ₂ (t)
6	Residential solid waste	1 297	Tons
7	Number of Dwellings in the community	1 930	
8	Number of composters to be distributed	190	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	46,99	Tons
13	Avoided Emissions	17	eCO ₂ (t)
14	Emissions from composting	19	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.

